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An Analysis of Revenue Diversification Across Select Indian States

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AN ANALYSIS OF REVENUE DIVERSIFICATION ACROSS SELECT INDIAN STATES

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Abstract

The revenue structure is a composition of various taxes and non-taxes. States' respective revenue structures with a relatively limited resource base exert pressure on their fiscal health. The processes of fiscal decentralisation have come to force the states to improve their own-source revenue mobilisation through diversifying their revenue structure and introducing fiscal reforms over time. As this empirical study aims at examining the trends as well as determinants of revenue diversification, this paper proceeds in two steps -First it provides a detailed analysis on the trends in revenue diversification across 14 major Indian states over the period 1980-81to 2014-15. Second, it explores the factors that determine the level of revenue diversification. The major findings point to a gradual decrease in the levels of revenue diversification in recent decades. In the process of revenue diversification, economic and institutional factors seem to be contributing more positively as compared to the political factors.

Keywords: revenue structure, non-tax revenue, revenue diversification, CS-ARDL Approach.

Introduction

Sound fiscal management has been a major issue of concern for sub-national governments, mainly in a federal system like India. On account of poor fiscal management and enhanced expenditure responsibilities, sub-national governments end up with a huge resource gap, which necessitates fiscal and policy interventions by higher level of government as a measure of bridging such a resource gap. Balanced revenue generation along with fiscal adjustment helps to reduce such gaps. As observed by Gary C. Cornia and Ray D. Nelson, two main factors i.e, the uniqueness of each state's economy and a state's choice of taxes, tax base, and tax rates, alter the growth and volatility (variability) of the revenue of each state.

Revenue structure is a composition of various taxes and non-taxes. States' respective revenue structures with a relatively limited resource base exert pressure on their fiscal health. Own revenue effort is one of the indicators of the quality of fiscal adjustment. Mobilization of more and more revenue through internal sources provides more autonomy, flexibility and accountability in revenue management. The relative share of alternative revenue sources reflects the state of fiscal health. Greater reliance on own revenue sources reflects fiscal robustness. The processes of fiscal decentralization have come to force the states to improve their own- source revenue mobilisation through diversifying their revenue structure and introducing fiscal reforms over the time.

Based on Second generation fiscal federalism theories, thrust to state level fiscal reforms was made by the Eleventh Finance Commission. MTFRF is used to incentivise states to undertake some fiscal and institutional reforms at the sub-national level (MTFP, 2005 and various issues).Aided by this, states

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have undertaken several fiscal adjustments cum reform measures to improve their fiscal position during the last two decades. In view of these revenue and expenditure led fiscal correction measures undertaken at the states' level, it is necessary to examine how the states' reliance on different sources of revenue has changed over time. Variations in the composition of revenue coupled with increased expenditure demands led to a substantial budget deficit. In more recent years, the issue of diversification of the revenue structure has been used as an important method in analysing the variations in the changing revenue trends in state finances.

Diversification is a process of changing the level of diversity of revenue mobilisation as a part of mitigating the risk associated with reliance on a single or a few revenue sources. Diversification of revenue helps to expand the tax base, which allows for the expansion of total revenue as a whole. Increased reliance on alternative taxes instead of higher level of dependency on any one single tax ensures an adequate level of revenue to finance public services.

As observed in existing literature, balanced revenue generation helps reduce fiscal stress (Shamsub and Akoto,2004), lessens the reliance on higher levels of government, reduces the extent of variability associated with revenue mobilisation, improves fiscal stability (Oates,1985) and also improves fiscal performance. Taking the above factors into consideration, the key objective of this paper is to explore the trends in revenue diversification and subsequently focus on the determinants of such diversification.

The structure of the paper is as follows**:** Section I reviews the existing literature on state finance and revenue diversification along with providing a theoretical background on revenue diversification. Section II critically assesses the changing trends in state finances and Section III discusses the trends in revenue diversification occurring in 14 major states between 1980and 2014 before finally examining the factors that determine the levels of revenue diversification and summarising the findings in Section IV.

Theoretical Underpinnings

In the public finance and public choice literature, there are two distinct views with respect to the effect of revenue diversification (tax structure) on the size of government (expenditure and revenue): One is fiscal illusion (revenue complexity) and the other is the fiscal stress hypothesis. The fiscal illusion hypothesis propagates that it is a systematic misperception of the cost of government on the part of tax payers and this illusion induces an underestimation of the tax prices of public expenditure. Scholars such as Buchanan (1967) Wagner (1976) and Baker (1983) argue that diversifying revenue streams often leads to a "fiscal illusion due to the increased complexity of the tax structure and it leads to bigger government by increasing public expenditure or the tax burden".

On the other hand, the fiscal stress (mismatch between government revenue and cost) hypothesis propagates that revenue diversification ensures continuity of public service by reducing the cost associated with revenue variability, while instability in revenue has an adverse impact on the size of government (Misiolek and Harold, 1988);(White,1983). So, both approaches use revenue diversification as an indicator of estimating the extent of fiscal illusion and also as a protective instrument in terms of bearing the cost of revenue volatility (variability) as per White's argument (1983). Both find a direct

relationship between tax diversification and the size of government. This dichotomy creates some problems in interpreting the revenue diversification used in measuring tax complexity as well as revenue stability (Misiolek and Harold, 1988). In 1991, Oates also views that revenue complexity and revenue diversification are the two competing hypotheses. Based on these views, Carroll(2005) observes that revenue complexity does not directly lead to revenue diversification, but revenue diversification results in revenue complexity. When revenue diversification is considered from the point of revenue variability or volatility, a diversified revenue structure is used as a protective mechanism to control variability in the generation of revenue.

Review of Empirical Studies

Until the 1980s, relatively less attention was given by economists to the role of revenue diversification in state and local revenue structures. Later, with the initial work Suyderhoud (1994), a diversification index was widely employed in revenue structure analysis. The empirical studies discussed below focused on the different aspects of revenue diversification. Assessing the relationship between tax collection and the growth rate, Dye and McGuire (1997) conclude that revenue diversification can have an adverse impact on the tax growth rate. Using the state government data (US states), the study concludes that tax variability and growth rate are negatively related. It means that when a government excludes volatile revenue sources from its tax base, it suffers a decline in the tax growth rate. The trade-off between variability of taxes and growth rate makes it harder for governments to diversify their tax structures, particularly in times of boom. Whereas, in 2004, Shamsub and Akoto investigated how state and local governments' fiscal structures improve or deteriorate the fiscal performance. Using a pooled panel approach to the 49 US state-local data for the period 1982 to 1997, the study reveals that local revenue diversification lowers fiscal stress and recommends the adoption of revenue diversification strategies for the states and local governments as part of enhancing their fiscal performance. Another empirical analysis by Maleckaite (2012) which examines the relationship between revenue diversification and debt per capita using the data of US municipal governments from 2000-2009concludes that in recent years, both the national and sub-national governments have come to rely more on multiple revenue sources rather than depending on any single source of revenue. As per the study, diversification helps in debt sustainability. The larger the stability in revenue structure, the lesser will be the dependency on obligatory sources.

A review of the existing literature on revenue diversification means reliance of states on multiple sources of revenue significantly reduces the fiscal stress faced by states mainly due to an imbalanced use of any single source of revenue at the expense of other revenue sources. At the same time, there is a view that a diversified revenue structure does not necessarily help achieve tax policy goals like efficiency, equity and adequacy (Ladd and Weist,1987) and also that it may lead to expenditure inefficiency on the part of the state government and a higher tax burden (Wagner,1976). Hence, it is essential to empirically assess the extent of revenue diversification, its determinants and also the benefits which Indian states get from diversifying their own revenue.

Overview of Total Revenue Sources

The total available revenue sources of sub-national governments can be classified into independent and dependent revenue sources. States' own revenue sources are broadly classified into tax and non-tax revenue. Tax revenue sources can be further classified into direct and indirect taxes. The revenue categories used in this analysis include taxes on income; taxes on property and capital transactions; taxes on commodities and services and states' own non-tax revenue. Taxes on income comprised agricultural income tax and taxes on professions, trades, callings and employment; taxes on property and capital transactions comprise land revenue, stamps and registration fees and urban immovable property tax; taxes on commodities and services comprise sales tax, state excise, taxes on vehicles, taxes on goods and passengers, taxes and duties on electricity, entertainment tax, other taxes and duties.

Before analysing the structure of revenue diversification, it is necessary to examine the structure of own-source revenue to understand the changing trends in the revenue diversification of the select 14 states. The existing research on state finances reveals two main factors. One is a long run decline in states' own-source revenue and the other is a growing dependence of states on the central government to finance their growing expenditure (RBI annual reports). It is evident from the existing literature that states were having a narrow tax base due to the predominance of taxes on commodities and services, with three major taxes i.e, sales tax, excise and taxes on transport (taxes on vehicles, taxes on goods and passengers) together contributing nearly 78% of the overall own-tax revenue of the states.[1]

On the other hand, the minimal use of agricultural taxation (tax on agriculture is levied by only six out of 14 major states) and land revenue, with its contribution, amounted to just 1% of the total tax revenue in respect of most of the states, with the notable exception of West Bengal which contributes nearly 8.62% of its total tax revenue[2]. On the non-tax revenue side, the existing literature which concentrates mainly on the contribution of non-tax sources to the total revenue receipts of the states observes the insignificant role of non-tax sources. It is evident from the empirical outcome that the recovery rate to the corresponding expenditure on some of the major (six services-education, health, major and minor irrigation, roads and water supply & sanitation) services was minimal, but as compared to other services, education and water supply & sanitation performed well[3]. Studies also noticed the practice of soft budget constraints by the state governments due to higher dependency on the central government transfers and bailout practices had further enhanced the fiscal stress on states.

Table 1: States' Own Tax and non-tax revenue shares

Revenue Components-14 states	(as of Total own-source of Revenue)						
Sub-Periods	**1980-85**	**1985-90**	**1990-95**	**1995-00**	**2000-05**	**2005-10**	**2010-14**
Agricultural Income Tax	0.24	0.18	0.13	0.10	0.01	0.01	0.01
Taxes on Professions, Trades, Callings and Employment	0.64	0.80	0.90	1.01	1.28	0.86	0.61
Land Revenue	1.61	1.78	1.31	1.09	1.08	1.13	1.12
stamps and registration fees	4.47	4.94	5.96	6.95	7.92	9.95	9.91
Urban Immovable Property Tax	0.05	0.05	0.06	0.07	0.04	0.55	1.20
Sales Tax	39.34	43.40	44.25	45.93	48.87	48.84	52.33
State Excise	12.58	11.11	11.40	10.51	10.24	9098	10.30
Taxes on Vehicles	4.77	4.39	4.08	4.60	4.87	4.27	4.39
Taxes on Goods and Passengers	2.93	2.64	2.27	1.74	2.06	2.08	1.97
Taxes and Duties on Electricity	2.40	3.31	3.15	3.18	3.16	2.68	2.85
Entertainment Tax	2.79	1.51	0.83	0.63	0.49	0.27	0.26
Other Taxes and Duties	0.67	0.80	0.66	1.51	0.71	0.53	0.52
State's Own non-tax revenue	27.50	25.10	24.99	22.69	19.25	18.86	14.53

Source: RBI (2004, 2010, 2016)

Following the existing literature, the present study tries to assess the proportion of each category of revenue as a percentage of total own-source revenue among 14 major states as a whole. It is evident from table1 that in the changing revenue structure, the contribution of sales tax accounts for more than half of the own-source revenue. Though the sales tax predominates in the period of analysis as a whole, from the first half of nineties, stamp duty and registration fee, urban immovable property tax and taxes on vehicles increased their relative share over a period over the period under their respective categories.

The real estate boom, growing urbanisation and increase in the number of registered motor vehicles contributed towards revenue collection. The revenue from four major state taxes such as stamps and registration fees (direct tax) sales tax, excise duty and motor vehicles tax comprising taxes on vehicles and taxes on goods and passengers (indirect taxes) accounts for more than 70 percent of the aggregate own-source revenue of states. Receipts from the interests, dividends and profits from state PSUs and income from royalty constitute for relatively larger share in non-tax revenue. The above table indicates that if the states try to mobilise additional resources, more and more reliance on non-sales taxes and non-tax revenue is inevitable.

Method of Measuring Revenue Diversification- Using HH Index

In the public finance literature, revenue diversification is measured by Hirschman-Herfindahl Index (HHI). In 1983, Shannon and Cline measured revenue diversification in respect of three tax sources namely property, income and sales taxes. Similarly, Suyderhoud in 1994 measured the extent of revenue source of diversity using the Hirschman-Herfindahl Index (HHI). Hirschman-Herfindahl Index (HHI) is the most widely used method to measure revenue diversification. Theoretically, the revenue diversification index (RDI) value ranges from 0 to 1, where 0 means no diversification, while 1 means

the maximum possible diversification. If the revenue structure is well diversified with an RDI value closer to 1, it is an indication of reliance on more number of revenue categories, whereas, the value of RDI being closer to 0 is an indication of dependency on one or a few sources of revenue (Suyderhoud, 1994; Hendrik, 2002; Carroll, 2010; Wenli, 2008). To assess the extent of dependency on different sources of revenue, this study employs the revenue diversification index (RDI) score, which is based on the Herfindahl-Hirschman index of concentration. The formulation of HHI is found slightly changed in the recent studies. The derivation of HHI follows:

$$HHI = \frac{(1 - \sum_{i=1}^{N} \boldsymbol{p_i^2}}{1 - \frac{\mathbf{1}}{\boldsymbol{N}}}$$

HHI is computed first by taking the sum of squares of the proportion of each category of revenue to the total revenue sources in percentage terms. Since HHI is an index of concentration, by subtracting summed percentages of revenue from one (1-HHI) = $\mathbf{(1-\sum_{i=1}^{N} p_i^2)}$ value near to one is interpreted as a move towards increased diversification. Here, N represents the total number of revenue categories and p_i is the proportion of ith revenue to the total categories of revenue. In the second stage, the value derived in the first stage is scaled by the number of revenue categories with 0 as the lower limit of concentration. The major limitation of the HHI Index is that it is difficult to know the contribution of specific tax/revenue in the process of revenue diversification. So, to overcome that drawback, the above analysis of analysing the structure of own-source revenue helps to understand the changing trends in the revenue diversification of the select 14 states.

Revenue Diversification Trends in the States

In the absence of studies that deal with the trends in revenue diversification in the Indian context, this is an attempt to look into the revenue diversification structure and the extent of diversification with specific reference to 14 major states for the period 1980 to 2014. The total own-source revenue (18 taxes) is broadly classified into four categories, i.e., as taxes on income; taxes on property and capital transactions; taxes on commodities and services; and states' own non-tax revenue in order to develop HHI Index. One of the prominent fiscal trends in state finance is the gradual decrease in the level of revenue diversification, more so in the recent decades as compared to the 1980s. In the 1980s, the level of diversification was relatively more noticeable across several states, but over time, with a fall in the share of non-tax revenue and direct taxes, along with increased dependence on sales tax (mainly by BIMARU and middle income states), the level of diversification has further decreased. The possible reason could be the reform measures undertaken after 2000 with the enactment of FRBM-Fiscal Responsibility and Budget Management Act, as one of the institutional reforms initiated by state governments as a major policy change.

In the 1980s, more fiscally stressed states like Odisha, Rajasthan, Bihar, Uttar Pradesh and Madhya Pradesh displayed a more diversified revenue structure. The changing pattern of diversification, over time, suggests that high and some middle income states like Punjab, Haryana, Maharashtra and West Bengal showed a relatively progressive trend till the end of the third sub-period. However, in recent years, a fall in the level of diversification has been much more visible than ever before except in

Odisha and Uttar Pradesh. The entire period of analysis has been sub-divided into four sub-periods for a decade-wise analysis. A comparison of the average level of diversification with respect to the four sub-periods (1980-81 to 1990-91(Period I); 1991-92 to 2000-01(Period II); 2001-02 to 2010-11(Period III); and 2011-2014(Period IV), shows that during the first period (1980-81 to 1990-91), the average level of revenue diversification was 0.67% before decreasing to 0.65% and further to 0.61% during the second and third periods. During the fourth sub-period (2010-11 to 2014-15), the average level of diversification has further decreased to 0.55%. For the entire period of analysis, the average level of revenue diversification amounts to 0.63% with a median of 0.65 and a standard deviation of 0.08 in respect to all the states (14 major states).

For each of the 14 major states of India, the last four columns of tables 2 &3 and charts 1 &2 show the change in the level of diversification within and across states over different sub-periods. From among the 14 states, Haryana comes under the highly diversified category across all the three sub-periods, while as a contrast, Tamil Nadu, Kerala and Karnataka are the less diversified states with a higher reliance on sales tax (above75-80%) and continuous fall in non-tax revenue. For the remaining states, variations in the HHI index value can be noticed with a remarkable improvement in respect to Punjab, a positive trend in respect to Maharashtra, Gujarat and West Bengal. However, for Odisha and Rajasthan, it is a significant decline with lower RDI values. In the same way Bihar, Madhya Pradesh, Uttar Pradesh and Andhra Pradesh also show a slowdown in their RDI rankings with lower values. Surprisingly, Odisha and Uttar Pradesh seem to be relatively more diversified and excepting these two states, as compared to the remaining states, the process of diversification has slowed down in recent years as compared to the previous decades.

Table 2: RDI Values of the States

States	1981-2014	1981-1990	1991-2000	2001-2010	2011-2014
Andhra Pradesh (AP)	0.61 ↓	0.62	0.61	0.60	0.56
Bihar (BHI)	0.66 ↓	0.73	0.68	0.61	0.56
Gujarat (GUJ)	0.60 ↓	0.60	0.62	0.61	0.51
Haryana (HAR)	0.72 ↓	0.77	0.75	0.71	0.65
Karnataka (KAR)	**0 55 ↓**	**0 61**	**0 56**	**0 53**	**0 41**
Kerala (KER)	0.49 ↓	0.57	0.46	0.43	0.49
Madhya Pradesh (MP)	0.68 ↓	0.71	0.69	0.66	0.66
Maharashtra (MHR)	0.65 ↓	0.64	0.67	0.66	0.58
Odisha (ODS)	0.72 ↓	0.80	0.74	0.64	0.66
Punjab (PUJ)	0.71 ↑	0.63	0.75	0.83	0.53
Rajasthan (RAJ)	0.71 ↓	0.78	0.74	0.62	0.67
Tamil Nadu (TN)	0.46 ↓	0.47	0.45	0.45	0.44
Uttar Pradesh (UP)	0.67 ↓	0.72	0.66	0.64	0.63
West Bengal (WB)	0.60 ↑	0.63	0.60	0.63	0.51

Source: Authors' compilation based on the various documents of RBI state finances.

Chart 1: RDI Values of the States

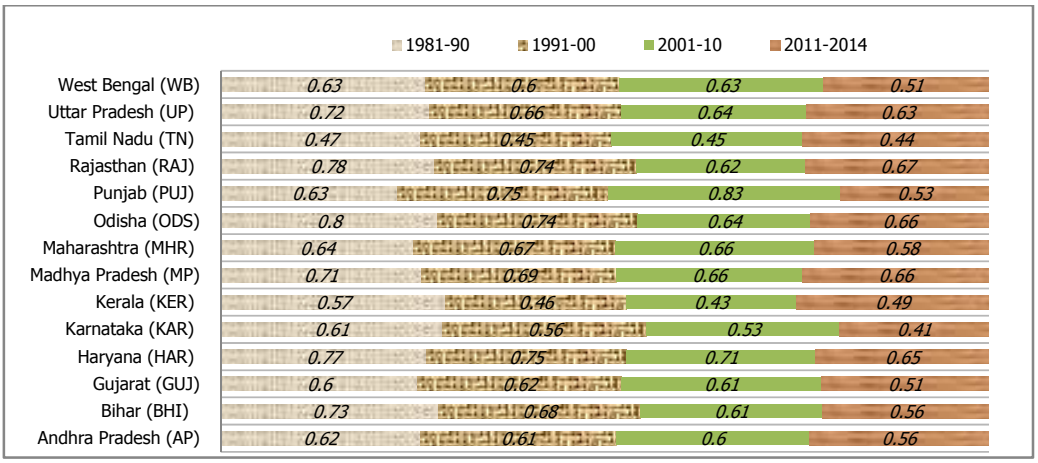
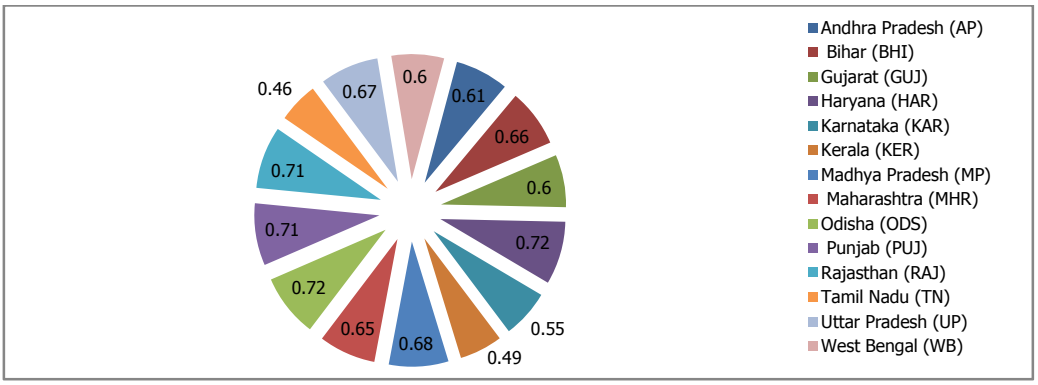


Chart 2: RDI Values of the States (1981- 2014 in average)



Source: Authors' compilation based on the various documents of RBI state finances.

Table 3: Bifurcation of States Based on Change in the Level of RD Across Different Sub-Periods

Sub-Periods	RD	RD	RD
RDI Index values	States with RD Above 65 per cent	States with RD In between 55-65 per cent	States with RD below 55 per cent
PERIOD-I, 1981-1990 (average)	ORS, RAJ, HAR, BHI, MP, UP	AP, KAR, KER, MAH, PUJ, WB, GUJ	TN
PERIOD-II, 1991-2000 (average)	BHI, HAR, MP, MAH, ORS, PUJ, RAJ, UP	WB, KAR, KER, GUJ, AP	TN
PERIOD-III, 2001-2010 (average)	HAR, MP, MAH, ORS, PUJ	AP, BHI, GUJ, RAJ, UP, WB	TN, KER, KAR
PERIOD-IV, 2011-2014 (average)	HAR, MP, RAJ, ORS	MAH, AP, BHI, UP	WB, TN, KAR, KER, PUJ, GUJ
Entire Period 1981-2014 (average)	HAR, PUJ, BHI, MP, ORS, WB, RAJ, UP, MAH	AP, GUJ, KER, KAR	TN
Comparing across the sub-periods	States with an increase in the value of RD	States with a decrease in the value of RD	States with stagnant in the value of RD
B\W PERIOD-I & PERIOD-II	GUJ, MAH, PUJ	AP, BHI, HAR, KAR, KER, MP, ORS, RAJ, TN, UP, WB	Nil
B\W PERIOD-II & PERIOD-III	PUJ, WB	AP, BHI, GUJ, HAR, KAR, KER, MP, ORS, RAJ, TN, UP	MAH, TN
B\W PERIOD-III & PERIOD-IV	ORS, UP	AP, BHI, GUJ, HAR, KAR, KER, MP, TN, MAH, PUJ, WB	RAJ

Source: Authors' compilation based on the various documents of RBI state finances.

As for the state-wise rankings, Haryana has registered a significant improvement in the HHI value with an increase in the share of non-tax revenue (25 to 42%), stamps and registration fees, taxes on goods and passengers, state excise, along with a fall in sales tax (66 to 52%). As a result, the state seems more diversified in terms of its revenue structure. In contrast, states such as Tamil Nadu, Kerala, and Karnataka have remained less diversified across all the four sub-periods with increased reliance on sales tax (75-80%), followed by a steady fall in non-tax revenue (9 to 14%) and a slight rise in some indirect non-sales and direct tax rates and hence, these states continue to remain at the same level.

Out of three states, in respect to **Karnataka,** a rise in excise, vehicles and taxes on goods and passengers contributed positively during the initial years of FRBM. In addition, the share witnessed a substantial fall in non-tax revenue comprising receipts from its interest and social and economic services. The lower tax revenue collection was also due to decreased revenue collection from taxes and duties on electricity and entertainment tax. Sales tax remained the larger source of revenue. Thus the RDI has declined considerably. In respect of Kerala, a continuous rise in sales tax and an improvement in stamps and registration fees, but a fall in taxes on vehicles and excise make it less diversified. On the other side, Tamil Nadu remains the least diversified as compared to all other states with a stagnant share of sales tax in the total revenue with a slight improvement in stamps and registration fees, taxes on goods and passengers (fall in non-tax revenue> rise in non-sales taxes other than non-tax revenue).

On the other hand, states such as Punjab, Maharashtra and West Bengal show a significant improvement in their RDI rankings due to progress made in non-tax revenue (Punjab, West Bengal), stamps and registration fees (Maharashtra) vehicles, electricity, other taxes with a fall in excise and sales tax (Punjab, Maharashtra, West Bengal). Among the three states, Maharashtra shows a significant improvement in stamps and registration fees and a slight rise in land, electricity and profession tax along with a fall in excise, while Punjab, with a significant progress in non-tax revenue (20 to 35%) along with a fall in sales and excise (10%) taxes and West Bengal with a rise in non-tax revenue, stamps and registration fees, vehicles, electricity along with a fall in sales and excise taxes display improved rankings for the recent decades (2000s). On the other side, a drastic fall in the rankings of Rajasthan, Odisha, Andhra Pradesh and Bihar due to continuous fall in non-tax revenue along with a rise in sales and excise is noticeable. Individually, in the case of Rajasthan, a simultaneous rise and fall in sales tax (10%) and non-tax revenue (10%), a slight rise in stamps and registration fees and in Odisha and Andhra Pradesh, a fall in non-tax revenue (5%) and some improvements in taxes on goods and passengers (Orissa-7%) along with a rise in sales, excise tax (AP) have made these states account for lower HHI values for the successive sub-periods. Finally, the remaining states such as UP, MP and Gujarat have witnessed a successive fall in non-tax revenue (MP - 9%) along with a rise in sales (10,8%-UP,MP) and excise. The exception to this is some progress made in stamps and registration fees and vehicle tax collection and thus, it remains in the same category barring a slight improvement in respect of MP and Gujarat rankings and a fall in UP ranking. An overall analysis reveals that some states have significantly improved their rankings while some other states have experienced a drastic fall in their rankings and also a few states have witnessed slight variations in their rankings. However, a few states have remained more or less in the same position with less diversification.

This attempt to examine the trends as well as the structure of revenue diversification with respect to14 major states throws up mixed results. An in-depth state-wise analysis shows that states with a progressive improvement in non-tax revenue along with a continuous fall in sales tax remain highly diversified, while states witnessing a continuous rise in sales and excise taxes along with a drastic fall in non-tax revenue display lower RDI ranking. However, this doesn't mean that there is no improvement observed in respect to taxes other than sales and non-tax revenue. A fair progress in the taxes such as stamps and registration fees, vehicles tax, taxes on goods and passengers, electricity, land with a stagnant state of sales tax from the mid 1990s is evident from the existence of diversification in the state revenue structures. As this empirical analysis aims at examining the trends as well as the determinants of revenue diversification, the relative effect of various determining factors is examined in the following section.

Regarding the choice of variables which are used as determinants of the level of revenue diversification, this paper broadly follows the papers, well documented and commented upon (Mahesh and Vishnu Kanth Purohit, 2009; ChaudhuriandDasgupta, 2006; Khemani, 2004; Sridharan, 2004). Since tax and non-tax revenue sources accounted for the estimation of revenue diversification index, sub-categories of GSDP such as share of service, construction and real estate, mining GSDP to total GSDP and area under food grains in total cropped area (contribution of agriculture) are used as base for tax revenue. In order to account for the contribution of non-tax revenue, the present paper considers the sources of six services such as education, health, road, water supply and sanitation and major and minor irrigation which are the major contributors of non-tax revenue. Following the existing literature, urbanisation, schools, teachers (education), irrigated area, number of vehicles (road) urban density (water supply and sanitation) and agriculture GSDP (major and minor irrigation) are used as proxies of the above five services except health due to data constraints. Along with the above variables which represent economic factors, the study further employs step and pulse dummies which represent non-economical factors (political and structural dummies) for the analysis.

The expected signs of the independent variables are briefly mentioned below. For sub-categories of GSDP such as primary, mining, food cropped area, construction and real estate, urban density and transport (vehicles) excluding service, positive sign is expected as the larger reliance on non-service sector indicates more diversification. A negative sign is expected for VAT (dominant tax), economic slowdown (adverse impact on economic activities) and election dummies even though there are chances to go for more revenue collection during the period of post-election. States' steps towards revenue-led fiscal correction measures' (FRL) positive sign is expected with dependent variable. Indicators of non-tax revenue such as irrigation, schools, and teachers will have a positive sign if their contribution is significant in revenue mobilisation. Among some other political variables such as incumbency, regional parties, coalition government, expected sign can be positive or negative. In the case of incumbency dummy, there are chances for the incumbent government to concentrate on more revenue collection through diversifying revenue sources. For regional parties and coalition government dummies, if the expected sign is negative, the reason may be the emergence of alliance or political affiliation between the central and state governments with their focus being more on getting a lion's share in the financial assistance from the centre. Sub-national governments may be less enthusiastic in

tax collection compared to spending. The variables and their data sources considered in the model are presented as follows:

Table 4: Variable Specifications and Data Sources

Dependent and Independent Variables	Definition and data source
RDI -Revenue Diversification	Annual state HHI of revenue diversification.
Share of Service GSDP\Total GSDP	National Accounts Statistics, CSO, New Delhi
Share of Transport GSDP\Total GSDP	National Accounts Statistics, CSO, New Delhi
Share of Mining GSDP\Total GSDP	National Accounts Statistics, CSO, New Delhi
Share of Construction and Real estate GSDP in the total gross state domestic product and urban density	National Accounts Statistics, CSO, New Delhi, Census of India
Share of area under food grains in gross cropped area (%)	Directorate of Economics and Statistics, Ministry of Agriculture
Number of schools, Teachers (general education)	Selected Educational Statistics
Irrigation- measured as a percentage of gross cropped area irrigated	Directorate of Economics and Statistics, Ministry of Agriculture.
VAT (Value added tax)-One of the institutional reforms introduced by state governments in 2005.It is used as a dummy variable to capture its impact on revenue diversification, as it is a major policy change.	State finance documents
FRBM (FRL)-Fiscal Responsibility and Budget Management Act, One of the institutional reforms initiated by state governments enacted in-between 2003 to 2010.	State finance documents
Form of government-coalition or single party is in power at the state level (takes value 1 if the coalition government is in power, 0 otherwise).	http://eci.gov.in of Election Commission of India.
Political incumbency- takes value 1 if there is change in the ruling party in the next state legislative assembly, 0 otherwise.	http://eci.gov.in of Election Commission of India.
Regional party-takes value 1 if the regional party is in power,0 otherwise.	http://eci.gov.in of Election Commission of India.
Electoral cycle dummies-(ELA- election year of state legislative assembly, BELA-one year prior to election and AELA- one year post election.	http://eci.gov.in of Election Commission of India.
Log of Per capita GSDP	CSO, New Delhi
Urban Density	Census of India

Determining Factors of Revenue Diversification

Data and Empirical Methodology

The methodology used in the analysis of factors which determine the levels of revenue diversification with respect to the 14 states is the time-series cross-section (TSCS) model. The standard time series methods are used to model the dynamics of time-series cross-section (TSCS) data, since T is larger enough and T>N. Static Panel data (TSCS) models control unobserved differences among individuals which may bias the estimates linked with independent variables. Fixed Effect (FE) model takes into account the unobserved common factors that vary across units (controls unit level heterogeneity), but they are unable to control within unit heterogeneity and cannot identify the effects of independent variables that don't vary within groups- Gormley and Matsa, 2012). FE controls common unobserved factors which capture time-constant individual heterogeneity across units, and are often related to the covariates. If they are correlated with independent variables, it will have an adverse impact on the consistency of estimates. Whereas, Random Effect model is estimated under the assumption that

unobserved factors are uncorrelated with independent variables. The major drawback is that fixed effect omits all the time-invariant variables and it may lead to omitted variable bias with the exclusion of some important time-invariant variables and FE is even not good for variables which are sluggish in nature, unobserved invariant within unit and level of variance lesser among dependent variables compared to independent variables. Slowly moving variables may have the high standard error due to correlation with fixed effects (little impact over time but large cross-sectional impact or large inter and not intra unit-Eg. institutional variables with unit-specific reaction-Wilson and Butler, 2007). In order to account for the sluggish variables and time invariant variables with unit specific nature, it is important to test the extent and nature of cross-sectional dependence of residuals as well as the individual macroeconomic variables which are considered in the analysis of large TSCS models. So, it is essential to test for unit-wise heteroskedasticity which occurs due to some differences between states, autocorrelation in the error term due to variable dependency on their lagged values (time constant or time-varying variables and true state dependence-Andreß, Golsch, and Schmidt,2013) and error terms are contemporaneously correlated due to some economic shocks. So, in order to overcome these methodological limitations, dynamic models are preferable. A dynamic model includes dynamics in the estimated part, not in the error part of the model, which invalidates static Fixed and Random estimates. Since several policy factors and sluggish variables result in a common latent factors and cross section dependency, the following empirical model is used: $Y_{it} = \alpha_i + \lambda_t + \beta_1 X_{1it} + u_{it}$.

The error term decomposed as $u_{it} = \alpha_i + \lambda_t + \varepsilon_{it}$. Y_{it} -continuous dependent variable, $\beta_1 X_{1it}$ -vector of all explanatory variables or covariates, α_i-individual heterogeneity, which is often unobservable, varies across individuals, but it remains fixed across time. α_{i-} represents state-specific factors being major sources of cross-sectional correlation.λ_t -Time or year dummy controls time-specific fixed effects (economic shocks) which are not captured by the included explanatory variables. It captures the influence of aggregate trends. When the time dummies are used as a proxy for unobserved common shocks, they consider or assume that the impact of those common factors is the same across units (factor loadings are homogeneous).

Since T is larger enough,cross-sectional dependence is tested using the test methods developed by Pesaran (2004-test for cross sectional independence) and Pesaran (2015-test for weak cross sectional dependence). The CD-test is used to test CSD between the residuals and separately for each variable between units in a panel. This test is robust to non-stationarity, parameter heterogeneity and structural breaks. Based on the post-estimation diagnostics, it is evident that static models are not efficient due to the presence of serially correlated, CSD and non-stationary residuals (test results are incorporated in this paper).

$$CSD_{Pesaran} = \frac{\sqrt{2T}}{N(N-1)} \left(\sum_{i=1}^{N-1} \quad \sum_{j=i+1}^{N} \widehat{\rho ij} \right) N(0, 1).$$

While working on the large panel, following the results of cross-sectional dependence, testing the unit root is common to finding the existence of a spurious correlation and to detect the order of integration of each variable. The unit root test helps select the appropriate method to estimate the coefficients. In the existing literature, several unit root tests assume cross-sectional independence of errors. Second generational unit root tests assume the existence of cross-sectional dependence of

errors. Since CSD exist (see table A1 in Appendix), second generational unit root tests are employed in the present analysis.

The CADF is described as in the equation below:

$\Delta y_{i,t} = \alpha_i + \beta_i y_{i,t-1} + \gamma_i \bar{y}_{t-1} + \delta_i \Delta\bar{y}_t + \varphi\Delta\bar{y}_{t-1} + u_{i,t}$, $u_{it} = \lambda_i f_t + \varepsilon_{i,t}$.

Where $\bar{y} = N^{-1}\sum_{j=1}^{N} y_{jt}$, $\Delta\bar{y}_t = N^{-1}\sum_{j=1}^{N}\Delta y_{jt}$.

The above equation is augmented with CSA of the lagged levels and the first differences of the variable. $\bar{y}_{t-1}$ is the mean of lagged levels, $\Delta\bar{y}_t$ is the mean of the first differences and $\Delta\bar{y}_{t-1}$ is used to remove time series dependence with larger T. They are used as proxy for unobserved single common factors f_t.

Tables B1 and B2 (in Appendix) report the results of Breitung (for T>N) and Hadri and Pesaran CADF panel unit root test. Cross-sectional augmented panel unit root test (CADF) allows testing dependency caused by a single (unobserved) common factor. Focusing on the test results of unit root, it can be concluded that the results are mixed in the case of few variables at level. For instance, as per CADF panel unit root test, except revenue diversification, all other variables are non-stationary at level. But as per Hadri & Berting test statistics, all the variables are non-stationary at level. In the case of first difference, it is confirmed that all the variables are stationary and no variable is integrated of order two, I (2).

The Pedroni and Westerlund co-integration methods are employed when all the variables follow the same order of integration. Since several qualitative variables- time dummies which represent the policy as well as non-economic factors in influencing the level of revenue diversification and some of the economic variables are stationary at level, Auto Regressive Distributed Lag (ARDL) approach proposed by Pesaran, Shin and Smith (1995, 1999) seems to be a more appropriate model. ARDL is more preferable, when the variables are integrated with mixed order I(1) & I(0) and no variable is integrated of order two, I(2). The major advantage of ARDL model is the consideration of both the short and long run relationship between the dependent and independent variables. It assumes heterogeneous slopes in the short run. It helps in analysing the contemporaneous impacts and speed of adjustment to equilibrium and long-run coefficients (slops) are homogeneous, which is more preferable for moderate T compared to dynamic fixed effect and mean group model.

Before entering into ARDL model, to check whether the non-stationary I(1) economic variables are cointegrated, Pedroni panel cointegration test is applied to test the null hypothesis of no cointegration. Pedroni's (1995, 1999, 2004) residual based test statistics are based on the assumption that all the variables are integrated at I(1) and assumes both intercept and slope heterogeneity. Out of seven statistics, four are based on pooling data in within-dimension (panel co-integration) and the remaining three are averaging values for each unit for between-dimensions (group mean co-integration). Residuals extracted from the level and differenced regression are used in auto regression form to estimate the variance, long-run covariance and to use those to estimate each test statistic (Pedroni, 1999, 2004; Barbieri, 2009).

The test results presented in **table C1** reject the null hypothesis of no co-integration and prove the cointegration between the variables. Model 1 includes mining, Model 2 includes primary

sector, whereas Model 3 includes schools. Excluding these three variables, construction and real estate, service, transport, urban density and foodgrains have been retained in all the three models.Following the Pedroni test results, in order to consider the influence of time-specific dummy variables, auto regressive distributed lag model is employed to estimate the factors that determine the levels of revenue diversification.

Model Specification

Since N is small, this analysis employs PMG as well as the PMG-adjusted for cross section dependence (PMG is quite robust to outliers and choice of lag orders- Pesaran et al., 1995). The CS-ARDL and CS-DL estimators are augmented with the lagged cross-section mean of the variable and its lags. ARDL methodology assumes that errors are independently distributed across t and i. If the unobserved common factor in the error term is correlated with the repressors and the failure to account for dependency, it results in inappropriate standard errors and bias the coefficients (Peasran, 2006).

Estimation methods-The ARDL model is written as

$$Y_{i,t} = \delta \sum_{k=1}^{p} \varphi_{i,k} y_{i,t-k} + \sum_{l=0}^{q} \beta'_{i,l} x_{i,t-l} + u_{i,t}$$

its cointegration form would be

$$Y_{i,t} = \theta_i x_{i,t} \quad \alpha'_I(L)\Delta x_{it} + \tilde{u}_{i,t.}, \tilde{u}_{i,t.} = \gamma'_i F_t + \varepsilon_{i,t}$$

Where φi = -(1-ρ_{il}) is the speed of adjustment parameter and it must be non-zero, expected to be negative and significant. It represents bringing back the variable to a long-run equilibrium. The short-run coefficients, the speed of adjustment to long-run from short-run deviation and error variances differ across units,whereas, in the long-run, coefficients are assumed to be homogeneous across units. $\theta_i = \theta_I$, i=1,2…..,N. θ_i is estimated to find out whether the variables are exogenous or endogenous and are I(0) or I(1) in nature(Pesaran et al.,1999).

$$\frac{\theta_i = \sum_{l=0}^{q} \beta_{i,l}}{1 - \sum_{l=1}^{p} \varphi_{i,l}}$$

'p' is the lags of dependent variable and 'q'is the lags of independent variable.

To overcome the problem of unobserved common factors, following the seminal work of Chudik, Mohaddes, Pesaran and Raissi (2013, 2015), CS-ARDL approach is employed, following CCE methodology of Pesaran(2006). When the feedback effects from the lagged values of the dependent variable to the independent variables exist,$\tilde{u}_{it}$ is correlated with $x_{it,}$ then the Distributed Lag model would be inconsistent.

The CS- ARDL model is

$$Y_{i,t} = \sum_{k=1}^{p} \varphi_{i,k} y_{i,t-k} + \sum_{l=0}^{q} \beta'_{i,l} x_{i,t-l} + \sum_{l=0}^{\bar{z}} \psi'_{il} \bar{Z}_{t-l} + u_{i,t}$$

Where $\bar{z}_t = (\bar{y}_t, \bar{x}'_t)'$ & $\bar{z} = [T_{\frac{1}{3}}]$ cross section averages of current and lags of dependent and independent variables.

The test results of the above models are reported in the tables D1, D2 & D3. Each table contains different models with different sets of control variables. Major observations from the three tables are as follows:

- When the dummy variables which represent the institutional reforms and lags of independent variables are not included in the model, sign of some of the variables changed in the long-run.
- When most of the sources of non-tax revenue are included in the model, the speed of adjustment (ECT) is slower compared to the model which includes most of the tax revenue sources.
- Most of the variables including contemporaneous variables and also variables with one year lag of first differenced variables including the lag of dependent variable are insignificant in the short run.
- Most of all the variables are significant with expected sign in the long-run.
- Cross-section averages of dependent & independent variables are not included in the table-D3, it is simple ARDL model with dummy variables in the short run. Whereas, remaining models run by including cross-section averages to control CSD of error term. All the models are free from serial correlation and CSD.

The empirical analyses with the inclusion of cross-section averages successfully account for the presence of common factors across units. According to the estimated models, in all the models, error correction term is negative and significant in respect of all the three cases. Table D1 reports the estimation results of CS-ARDL specification. To take care of the potential endogeneity of elections, CS-ARDL models are employed. In the estimated models, the ECT helps to differentiate the influence of independent variables on the dependent variable. Focusing on the long-term coefficients, most of the variables are found statistically significant and the EC [yt-1] refers to the Error-Correction term (speed of adjustment parameter) which is statistically significant at 1% level in the model 1 in table 9.The estimated coefficient of the error correction implies convergence towards the long-run equilibrium at 70 per cent (in CS-ARDL model in column 2 of table D1) adjustment per year. This confirms the co-integrating relationship between the variables in the long-run. In all the models, co-integrating relationship is more significant in long-run than in the short-run.

In CS-ARDL model column 2 of table D1 indicates that most of the economic variables are significant. Sectoral shares of GSDP are the core independent variables used in this model. Among the long-run coefficients the share of construction and real estate GSDP & urban density (4.37) and transport (1.66) are significant and positively associated with revenue diversification, whereas mining (0.56) is negatively correlated with dependent variable but service (0.08) seems to be insignificant. As per the outcome, both construction and transport are contributing positively, whereas mining is not contributing to the process of revenue diversification. In the short-run, none of the variables seems to be significant.

Following the findings of table-D1, in table-D2 inclusion of further independent variables which represent the contribution of non- tax revenue such as schools and gross-irrigated area are also significant and positively contributed in the process of revenue diversification. For instance, Schools (2.96) which is used as a source of revenue from education service contribute significantly to the process of diversification of revenue. And also the contribution of gross irrigated area (6.23) is positive

and significantly primary sector (0.44) contributes in the process of diversification. The details of results presented in the column 2 of table D2 suggest that most of the variables (economic and political in nature) are significant and are in expected sign in the long-run. When merely the share of construction and real estate GSDP is consider in the analysis, its sign in negative, whereas density the share of construction and real estate GSDP combined with urban density is positive and significantly correlated. It might be because of consideration of both real estate and urban density together represents real estate activities and reforms in it meanly in the urban area responsible behind such outcome. The estimated coefficient of the error correction implies convergence towards the long-run equilibrium at 29 per cent (in CS-ARDL model in column 2 of table D2), and 30 per cent (in CS-ARDL model in column 3 of table D2) adjustment per year.

In CS-ARDL model (column 2 of table D2), except service, other sources such as transport, school, transport and primary are positive and significantly contribute towards revenue diversification. Whereas in the column 3 of model 2 from table D2, association of food crops (0.30), replacing primary GSDP has been estimated which also yields positive associated with the dependent variable. Positive impact of construction and real estate GSDP & urban density, transport, gross irrigated area, primary sector, schools, food crops is indicative of the fact that larger the share and tax and non-tax base contribute towards more revenue diversification. On the other hand service with its larger share in total GSDP is negatively associated with the process of revenue diversification. As per the above outcomes, stamps and registration fees, taxes on vehicles, real estate boom, agricultural taxation, reforms in motor vehicle taxes and social and economic services from non-tax revenue have positively contributed towards mobilisation of revenue from non-sales taxes. Hence the present analyses find the evidence in favour of revenue diversification.

Finally, in the last two models without the inclusion of cross sectional averages of dependent and independent variables analysed only with ARDL (column 2 & 3 of table D3). In both the models from table D3, most of the variables in the long-run and some of the variables in the short-run are significant and are with expected sign. In both the models the share of construction and real estate GSDP, urban density, mining, food crops, vehicle and schools are positive and positively associated whereas, service (-0.61, -0.70) is negative and significantly associated with the dependent variable. In the short run also service is negatively significant along with some political variables.

On the other hand, apart from economic variables, several political variables are negative and significantly related to the dependent variable in all the models. The revenue collection from different sources of own revenue during election years as well as non-election years (state legislative assembly) is not progressively associated to the revenue collection. But, as per model D3, governments seem to be more enthusiastic about raising more revenue from different sources during the year before election. The emergence of coalition politics at the sub-national level has a significant association with revenue generation. Even during the period of Coalition governments at the sub-national level, political parties (ruling parties) less enthusiastic to widen the own revenue base and raise less own-non-tax revenues due to frequent unstable governments as compared to a single party rule (this variable is negative and insignificant and it has not been considered in all the models, but retained in the second model- column 2 of table D2). Regional parties another important variable also seems to be more reluctant to raise

revenue from different sources at the sub-national level. The reason may be the emergence of alliance or political affiliation between central and state governments and their more focus towards getting a lion's share of financial assistance from the centre rather than focusing more on own revenue collection. This variable is negative and statistically significant in CS-ARDL models. Another political variable, incumbency dummy (0.09, 0.02) is positive and significantly associated with dependent variable. In the case of incumbency, the incumbent state government seems to be concentrating more on revenue generation from different sources to continue with the existing level of government spending. During the successive governments, parties may focus more on revenue generation from different sources, which have been contributing more to revenue diversification. Consideration of variables related to institutional policies of the state governments, implementation of VAT has an adverse impact on the process of revenue diversification in most of the models. The reason might be the more emphasis on service sector revenue generation with the implementation of VAT. Whereas with the implementation of FRBM policy, in the post- FRBM period, the overall level of diversification has improved, even though it varies across the states. In the implementation of policy reform measures, revenue-led adjustment policies with own- revenue generation in some states along with expenditure-led adjustment measures undertaken at the sub-national level may also be the reason behind this positive influence on the process of diversification. And finally, economic slowdown (-0.02) also has a negative and significant association with the dependent variable (column 3 of table D3, ARDL model). The reason might be difficulties even in the revenue from regular major sources such as stamps and registration and commercial taxes (sales tax). The major sources of revenue are commercial, stamps and registration, motor vehicle taxes, motor vehicle and excise duties across all the states which are under the consideration. Significant decline in the major taxes and less emphasis on non-tax revenue because of non revision of user charges, non-recovery of user charges and even no regular monitoring of collection of user charges adverse impact on the process of revenue diversification. For instance, among major taxes stamps & registration and commercial taxes (sales tax) are relatively more elastic compared to motor vehicle and excise duties. Revenues from sales, which are the major source of revenue and stamps & registration, remained relatively (reduction in stamps & registration duty) elastic show consistent fall during the period of economic slowdown. And even revenue from motor vehicle and excise duties decrease with economic slowdown lack of demand led growth and several stimulus measures undertaken by the respective governments both at the state and central level to stimulate demand both at the internal and external economy may also contribute to the negative association with dependent variable (MTFP, various issues and refer part-1which explains the factors behind variations in the level of revenue diversification).

Conclusions and Policy Suggestions

The key objective of this paper is to explore the extent and changing trends in the revenue diversification and to subsequently focus on the determinants of such diversification. The present analysis brings to light some interesting findings while examining the trends and factors influencing such diversification. In the process of fiscal adjustment, states need to focus on multiple revenue sources to improve their own revenue collection in order to continue with the existing level of spending.

If states diversify their revenue by relying more of non-sales taxes as well as non-tax revenue there is an indication of higher level of diversification. Such form of diversification will be higher than the reliance on either diversifying their revenue structure only through non-sales taxes, ignoring mobilisation of revenue through non-tax sources or diversifying their revenue structure only through non-tax sources ignoring mobilisation of revenue through non-sales tax sources. Considering the above factors, the present paper has made an attempt to understand the relative share of different sources of revenue in the process of revenue diversification among the 14 states which are under consideration.For instance, among the 14 states, Haryana remained more diversified with an enhanced share of non-tax revenue and non-sales taxes such as stamps and registration fees, taxes on goods and passengers andstate excise along with a fall in sales tax. In the same way, Maharashtra shows improvement in stamps and registration fees, land, electricity and profession tax with progress in non-tax revenue. West Bengal with improved mobilisation of revenue through non-tax revenue, stamps and registration fees, vehicles and electricity has improved RDI rankings in the recent decades, while Punjab shows a significant progress in non-tax revenue. More improvement in RDI rankings can be noticed due to progressive movement towards non-tax revenue among the above four states. On the other hand, some states like UP(progress in excise, stamps and registration fees and vehicle tax collection), MP (progress in excise, stamps and registration fees and vehicle tax collection), Gujarat (progress in excise, stamps and registration fees and vehicle tax collection),Rajasthan(progress in stamps and registration fees), Odisha (progress in stamps and registration fees, taxes on goods and passengers), Andhra Pradesh(progress in stamps and registration fees, taxes on goods and passengers, excise) and Bihar(progress in excise) occupy the middle rankings due to continuous fall in non-tax revenue and a rise in sales and excise duty. Finally, the remaining states such as Tamil Nadu (progress in stamps and registration fees, taxes on goods and passengers), Kerala (progress in stamps and registration fees), and Karnataka, (progress in excise, vehicle) with increased reliance on sales tax, followed by a steady fall in non-tax revenue and slight progress in non-sales tax collection have remained less diversified.

The principal findings from the econometrics analysis employed in assessing the determinants revealed that economic variables contribute significantly to revenue diversification as compared to political variables. It is evident from the preliminary analysis that the progressive nature of non-sales taxes such as stamps and registration fees and taxes on vehicles helped to diversify their revenue portfolio even though they vary across the states. It seems to be easier to rely more on non-sales taxes compared to non-tax sources in the mobilisation of additional revenue.

Apart from tax sources, non-tax sources continue to remain fiscally insignificant sources of revenue. Several states are still reluctant to mobilise additional revenue from non-tax sources. Considering the economic ups and downs and also the limitation in tax collection, states need to rationalise the levy of user charges in the services which come under non-tax revenue category. This is a matter of concern and needs policy makers' attention. Since services come under economic and social services having socio-economic importance,there is a need to rationalise the existing user charges in a way that it will not affect the demand for public goods, mainly education and health. In the mean time, irrigation projects, water rate structure and related user charges need to be revised from time to time based on recommendations of committees related to such services. States need to be incentivised by

the institutions which allocate funds in way to improve their non-tax revenue sources. Mahesh & Vishnu Kanth Purohit (2009) who analyse the structure of non-tax sources through comparative analysis of the recovery rates of non-tax sources in two different time periods come to the same conclusion that the fiscal significance of non-tax sources is not given much importance in the process of revenue generation and some services have a major potential to generate more revenue. Apart from economic determinants, political unwillingness in respect of own-revenue generation is also evident from the results. Political willingness is inevitable for more revenue generation considering the volume of total expenditure which continues to grow and which is largely caused by an increase in both revenue as well as capital expenditure in the post-FRBM period. Since the 1990s, the structure of financing states' expenditure has undergone significant changes with states implementing new policy measures. A significant impact of policy factors seems to be increasingly influencing the process of revenue generation.

However, the present paper which tries to examine the process of diversification across the states is not free from limitations due to the nature of data analysis employed in this study. Since this study considers 14 major states in the analysis, it is difficult to go in-depth to draw policy measures for each state taking all the factors into consideration. Despite all these limitations, it is hoped that the above results and suggestions are useful to policy makers in taking measures to diversify their revenue portfolio, improving through non-tax and non-sales revenue in their revenue receipts.

End Notes

[1] Swathi Raju

[2] Nirvikar Singh(2006)

[3] Mahesh & Vishnu Kanth Purohit (2009)

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Appendix

Table A1: Pesaran CD-test

Variables	CD	P value
log Per capita GSDP	52.5	0.000***
revenue diversification	14.51	0.000***
SSTGSDP-Share of service GSDP\total GSDP	44.76	0.000***
STT GSDP-Share of transport GSDP\total GSDP	51.68	0.000***
SMTGSDP-Share of mining GSDP\total GSDP	0.007	0.995
SCTGSDP &UD-Share of construction and real estate GSDP in the total gross state domestic product and urban density	39.18	0.000***
Irrigation-percentage of gross cropped area irrigated	30.72	0.000***
Foodgrains-Share of area under foodgrains in the gross cropped area	24.98	0.000***
Number of schools	33.71	0.000***
log of urban density	3.905	0.000***
Construction and real estate GSDP	15.54	0.000***

Note: *** denotes significant at 1% level.

Table B1: Pesaran CADF and Hadri Panel Unit Root Test Statistics

	Pesaran CADF				Hadri	
Variables	**Deterministics**	**Level form**		**Lag**	**Level form**	
		t-bar	**t-bar P-value**		**Statistic**	**P-value**
log Per capita GSDP	Constant + trend	-2.098	1.028 (0.848)	1	41.1356	0.00
revenue diversification	Constant + trend	-2.95	-2.592 (0.005)	1	9.7877	0.00
SSTGSDP-Service	Constant + trend	-2.095	1.041 (0.851)	1	21.6693	0.00
STT GSDP- Transport	Constant + trend	-2.482	-0.606 (0.272)	1	42.5438	0.00
SMTGSDP- Mining	Constant + trend	-1.856	1.347 (0.911)	1	21.6225	0.00
SCTGSDP &UD- Construction and real estate & urban density	Constant + trend	-2.116	0.953 (0.830)	1	40.2022	0.00
Irrigation	Constant + trend	-1.687	2.776 (0.997)	1	19.703	0.00
Foodgrains	Constant + trend	-2.532	-0.818 (0.207)	1	6.0669	0.00
Schools	Constant + trend	-1.899	1.877 (0.970)	1	23.7668	0.00
Urban density	Constant + trend	-1.874	1.982 (0.976)	1	23.1671	0.00
SCTGSDP -Construction and real estate GSDP	Constant + trend	-1.912	1.8206 (0.966)	1	35.6565	0.00
SPSGSDP-Primary	Constant + trend	-2.731	-1.664 (0.048)	1	18.8195	0.00
log of STT GSDP- Transport	Constant + trend	-2.222	0.5 (0.692)	1	34.2801	0.00
log of SCTGSDP &UD- Construction and real estate & urban density	Constant + trend	-2.318	0.092 (0.537)	1	28.2732	0.00

Note: The Pesaran CADF test of H_0 of non-stationary and Hadri Unit Root test of Ho of Stationarity. The optimum number of augmenting lag is selected based on Schwarz Criterion and Pesaran *et al* (2013) set lag order, ρ = $[4(\frac{T}{100})^{\frac{1}{4}}]$

Table B2: Pesaran CADF and Hadri Panel Unit Root Test Statistics

	Pesaran CADF				Hadri	
Variables	**Deterministics**	**First-difference**		**Lag**	**First-difference**	
		t-bar	**t-bar P-value**		**Statistic**	**P-value**
log P K GSDP	Constant + trend	-4.717	-10.105 (0.00)	1	0.2159	0.4145
revenue diversification	Constant + trend	-4.993	-11.279 (0.00)	1	-2.9313	0.9983
SSTGSDP-Service	Constant + trend	-4.304	-8.353 (0.00)	1	-2.0317	0.9789
STT GSDP- Transport	Constant + trend	-4.067	-7.342 (0.00)	1	1.8685	0.0308
SMTGSDP- Mining	Constant + trend	-4.028	-7.178 (0.00)	1	0.3598	0.3595
SCTGSDP &UD- Construction and Real estate & urban density	Constant + trend	-4.026	-7.169 (0.00)	1	3.3591	0.0004
Gross irrigated area	Constant + trend	-4.125	-7.588 (0.00)	1	-2.2441	0.9876
Foodgrains	Constant + trend	-4.568	-9.475 29 (0.00)	1	-3.9119	1.000
Schools	Constant + trend	-4.231	-8.042(0.00)	1	-1.095	0.8632
Urban density	Constant + trend	-4.230	-8.037 (0.00)	1	-0.7004	0.7581
SCTGSDP -Construction and real estate GSDP	Constant + trend	-4.348	-8.536 (0.00)	1	-0.4941	0.6894
SPSGSDP-Primary	Constant + trend	-4.208	-7.941 (0.00)	1	-1.4597	0.9278
log of STT GSDP- Transport	Constant + trend	-4.255	-8.143 (0.00)	1	-0.184	0.573
log of SCTGSDP &UD- Construction and real estate & urban density	Constant + trend	-3.863	-6.476 (0.00)	1	0.7993	0.2121

Note: The Pesaran CADF test of H_0 of non-stationary and Hadri Unit Root test of Ho of Stationarity.

Table C1: Pedroni Error-correction Based Panel Cointegration Tests

Pedroni Co-integration	Model 1	Model 2	Model 3
Panel v	-1.331	-1.242	-1.349
Panel rho	0.2085	0.2492	0.1648
Panel pp	-6.48*	-6.742*	-7.052*
Panel ADF(parametric)	-3.757*	-5.236*	-4.145*
Group rho	1.507	1.439	1.327
Group pp	-6.508*	-7.011*	-7.315*
Group ADF(parametric)	-4.176*	-5.874*	-3.806*

Note: * implies rejection of no co-integration at 1% level.

Table D1: Dependent Variable: Revenue Diversification Index (CS-ARDL model)

Explanatory Variables	CS-ARDL with Dummy variable in SR
	Model -1 (lag 1 both in SR & LR)
Dependent Variable	Δ Revenue Diversification
ECT	**-0 7048 (-4 40)**
	Long-Run
SSTGSDP-Service$_{(t-1)}$	0.0859 (1.32)
STT GSDP- Transport$_{(t-1)}$	1.6633 (4.23)***
SMTGSDP- Mining $_{(t-1)}$	-0.5674 (-3.20)***
SCTGSDP &UD- Construction and Real estate & urban density$_{(t-1)}$	4.370 (4.86)***
VAT	-0.1047 (-3.44)***
FRL	0.0963 (3.27)***
BLEY	-0.0029 (-1.82)**
LEY	-0.0040 (-2.58)***
ALEY	-0.0071 (-5.28)***
Regional parties	-0.0174 (-2.50)***
	Short Run
Δ SSTGSDP- Service	-0.1407 (-0.36)
Δ STT GSDP- Transport	0.6588 (0.48)
Δ SMTGSDP-Mining	-21.22 (-0.96)
Δ SCTGSDP &UD-Construction and Real estate & urban density	2.940 (0.94)
Δ Log of PKGSDP	-0.1875 (-1.33)
Δ FRL	-0.0360 (-1.37)
Δ VAT	0.0290 (1.03)
Δ Food Crops	-0.0199 (-0.66)
Δ RD (-1)	0.0019 (0.03)
Δ SSTGSDP-Service(-1)	0.2335 (0.82)
Δ STT GSDP- Transport(-1)	-0.1456 (-0.11)
Δ SMTGSDP- Mining(-1)	-25.73 (-1.01)
Δ SCTGSDP &UD- Construction & Real estate & urban density(-1)	-4.460 (-0.67)
Constant	0.609 (4.12)***
CD-test (p-value)	0.88 (0.38)
Corr	0.016

Note: ***p<0.01, **p<0.05, *p<0.1 levels of significance respectively. T-statistics are shown in the parentheses. Δ represents first difference. 14 major Indian states for the period 1980-2014 have been considered for the analysis. The 14 major states are considered for the analysis: Andhra Pradesh (AP); Bihar (BHI); Gujarat (GUJ); Haryana (HAR); Kerala (KER); Karnataka (KAR); Madhya Pradesh (MDP); Maharashtra (MHR); Odisha (ODS); Punjab (PUJ); Rajasthan (RAJ); Tamil Nadu (TN); Uttar Pradesh (UP);and West Bengal (WB).

Table D2: Dependent Variable: Revenue Diversification Index (2 CS-ARDL models)

Explanatory Variables	CS-ARDL with Dummy variable in SR	CS-ARDL with Dummy variable in SR
	Model -1 (lag 1 both in SR & LR)	Model -2 (lag 1 in LR)
Dependent Variable	Δ Revenue Diversification	Δ Revenue Diversification
ECT	-0.2908 (-3.07)***	-0.300 (-3.39)***
	Long Run	
SSTGSDP-Service $_{(t-1)}$	-0.603 (-5.19)***	-0.299 (-5.94)***
STT GSDP- Transport $_{(t-1)}$	2.696 (5.40)***	0.495 (1.93)*
Irrigation$_{(t-1)}$	6.233 (5.10)***	
Schools$_{(t-1)}$	2.966 (6.41)***	1.86 (19.57)***
PMGSDP- primary $_{(t-1)}$	0.438 (5.17)***	
Food Crops $_{(t-1)}$		0.306 (11.21)***
Log Urban Density $_{(t-1)}$	0.00222 (0.24)	0.0064 (1.05)
SCTGSDP-C & Real estate $_{(t-1)}$	-1.486 (-4.63)***	-1.21 (-14.04)***
SMTGSDP- Mining $_{(t-1)}$		-1.40 (-8.08)***
Gross irrigated area $_{(t-1)}$		-000022 (-12.58)***
VAT	-0.0600814 (-2.96)***	-1.20 (-2.67)***
FRL	0.0134 (0.67)	1.14 (2.55)***
BLEY	-0.0115 (-2.43)**	0.060 (1.89)*
LEY	-0.0699 (-6.64)***	-0.056 (-0.78)
ALEY		-0.058 (-1.07)
Regional parties	-0.0220 (-3.15)***	
Coalition governments	-0.0220 (-1.91)*	0.052 (1.54)
Incumbency	0.0940 (7.78)***	0.019 (9.70)***
	Short Run	
Δ PMGSDP- primary	0.580 (1.36)	
Δ SSTGSDP- Service	0.266 (0.65)	-0.280 (-0.75)
Δ STT GSDP- Transport	0.910 (1.13)	1.88 (1.29)
Δ SMTGSDP-Mining		2.86 (0.90)
Δ SCTGSDP- C & Real estate	-0.207 (-0.37)	-0.368 (-0.85)
Δ log of Urban Density	-0.0588 (-1.23)	0.066 (1.60)
Δ Gross irrigated area	5.144 (0.16)	7.144 (0.15)
Δ Schools	3.911 (0.03)	-2.288 (-0.89)
Δ Food Crops		-0.0245 (-0.24)
ΔLog Vehicles		-0.0052 (-0.03)
ΔVAT		0.071 (1.03)
Δ FRL	0.00806(0.38)	-0.107 (-1.81)*
ΔBLEY		-0.0114 (-1.66)*
ΔLEY		-0.010 (-1.21)
ΔALEY		0.0082 (1.33)
Δ RD(-1)	-0.0733 (-0.88)	
Δ STT GSDP- Transport(-1)	-2.625 (-3.00)***	
Δ PMGSDP- primary(-1)	-0.0979 (-0.45)	
constant	0.0535 (2.43)**	0.213 (3.54)***
N	460	460
CD-test(p-value), corr	-0.63 (0.527), -0.012	1.85 (0.064), 0.034

Note: ***p<0.01, ** p<0.05,*p<0.1 levels of significance respectively. T-statistics are shown in the parentheses. Δ represents first difference.

Table D3: Dependent Variable: Revenue diversification index (2 ARDL models)

Explanatory Variables	ARDL with Dummy variable in SR LR	ARDL with Dummy variable in SR LR
	Model- 1 (lag 1)	Model -2 (lag 1)
Dependent Variable	Δ Revenue Diversification	Δ Revenue Diversification
ECT	**-0 499 (-4 51)**	**-0 462 (-4 18)**
	Long Run	
SSTGSDP-Service$_{(t-1)}$	-0.304 (-3.91)***	-0.248 (-2.86)***
STT GSDP- Transport$_{(t-1)}$		
SMTGSDP- Mining $_{(t-1)}$	0.509 (1.11)	0.877 (1.59)
SCTGSDP &UD- Construction and Real estate & urban density$_{(t-1)}$	1.86 (3.90)***	2.066 (4.15)***
Schools$_{(t-1)}$	2.244 (2.95)***	
Teachers$_{(t-1)}$	-1.19 (-4.08)***	
Food Crops$_{(t-1)}$	0.209 (6.25)***	0.237 (7.25)***
Vehicles$_{(t-1)}$	1.860 (2.12)***	2.011 (2.04)*
VAT	-0.0673 (-4.82)***	-0.071 (-5.18)***
FRL	0.0494 (4.07)***	0.049 (4.14)***
BLEY	0.292(4.01)***	0.311 (4.07)***
LEY	-0.369 (-2.34)***	-0.352 (-2.24)**
ALEY	0.0868 (0.66)	0.049 (0.39)
Regional parties	0.0244 (2.31)***	0.0266 (2.51)**
Incumbency		
Economic slowdown	0.00732 (1.57)	-0.017 (-1.79)*
Coalition governments		
	Short Run	
Δ SSTGSDP- Service	-0.618 (-1.80)*	-0.708 (-2.40)**
Δ STT GSDP- Transport	2.282 (1.65)*	2.340 (1.60)
Δ SMTGSDP-Mining	3.892 (1.58)	1.715 (0.45)
ΔSCTGSDP &UD-Construction and Real estate & urban density	5.92 (1.03)	5.200 (0.89)
ΔSchools	-6.877 (-0.84)	-1.144 (-1.16)
ΔVAT	0.0248 (2.53)***	0.0232 (2.71)***
Δ Food Crops	0.0723 (1.73)*	0.081 (1.56)
ΔLog Vehicles	-5.300 (-0.07)	
Δ Teachers	7.877 (0.88)	6.388 (0.81)
Δ Economic Slowdown		0.0093 (1.57)
Δ Vehicles		-5.600 (-0.84)
ΔBLEY	-0.131 (-4.04)***	-0.129 (-3.69)***
ΔLEY	0.0452 (3.87)***	0.0212 (2.60)***
ΔALEY	0.000984 (0.19)	0.0012 (0.25)
ΔRegional parties	0.00536 (0.26)	0.0154 (0.82)
Constant	0.291 (4.32)***	0.249 (4.06)***
N	460	
CD-test(p-value)	1.91 (0.056)	1.90 (0.058)
Corr	0.035	0.035

Note: ***p<0.01, ** p<0.05,*p<0.1 levels of significance respectively. T-statistics are shown in the parentheses. Δ represents first difference.

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