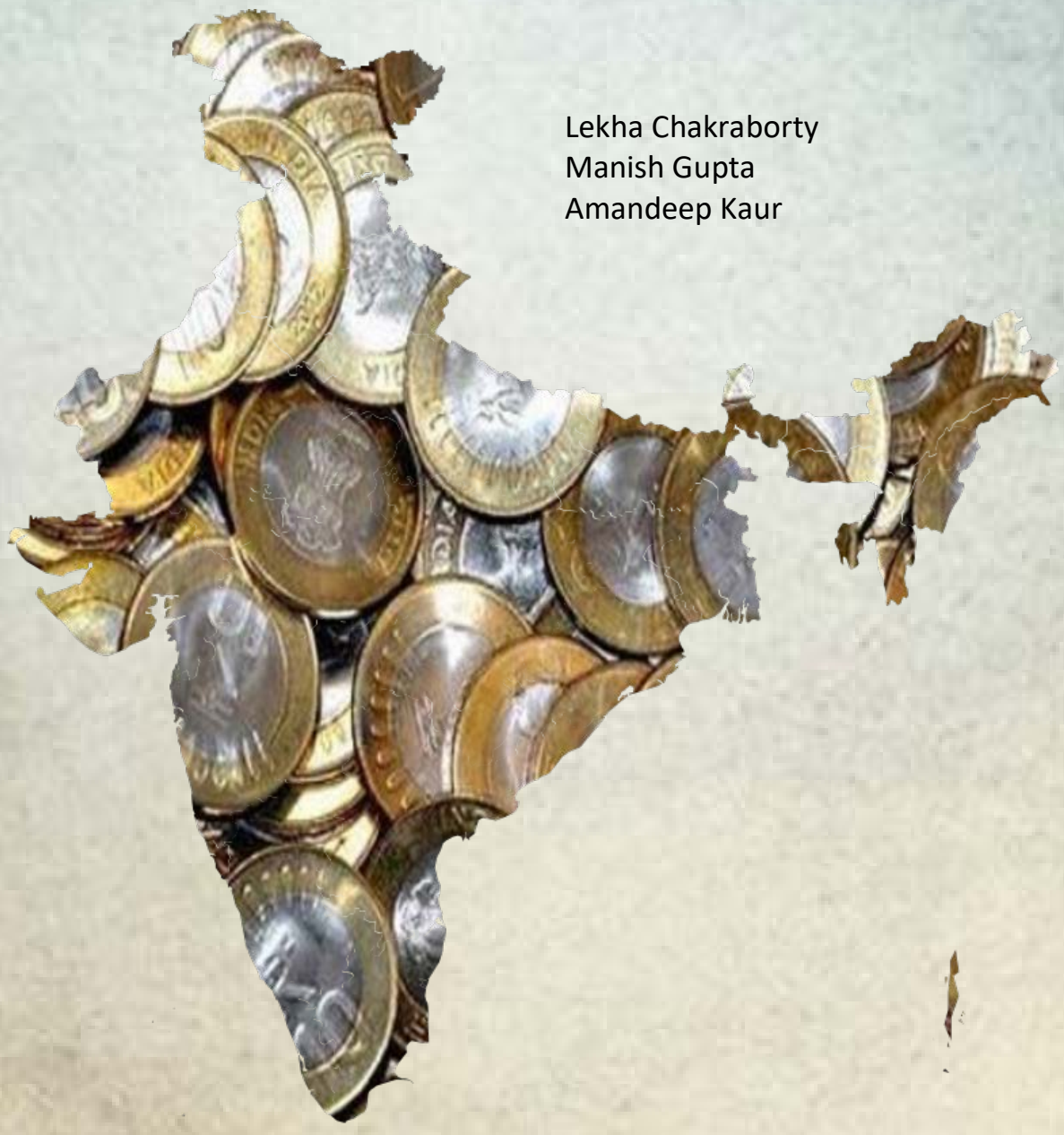
ANALYSIS OF STATE BUDGETS 2018-19

KEY ISSUES AND CHALLENGES

BUDGET CREDIBILITY AND FISCAL FORECASTING ERRORS



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NATIONAL INSTITUTE OF PUBLIC FINANCE AND POLICY

Analysis of State Budget 2018-19: Key Issues and Challenges

Special Theme: Budget Credibility and Fiscal Forecasting Errors

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PREFACE

This study is an outcome of the research project, “Innovations in Public Finance", supported by a grant from the Gates Foundation.

The central theme of this report is the “Budget Credibility and Fiscal Forecasting Errors of 28 States in India” led by Prof. Pinaki Chakraborty. The findings of this study was presented by Prof. Pinaki Chakraborty in the NIPFP Annual State Finances meetings in India International Centre, August 10th 2018. The other members of the team are Prof. Lekha Chakraborty, Dr. Manish Gupta and Ms Amandeep Kaur. The theme paper was presented in the 75th Meetings of International Institute of Public Finance in Glasgow, Scotland, August 21-23, 2019.

The members of the Governing Body of the National Institute of Public Finance and Policy are in no way responsible for the opinions expressed in these reports. The authors alone are responsible for the views expressed here.

Rathin Roy
Director,
NIPFP

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This study is an outcome of the research project, “Innovations in Public Finance", supported by a grant from the Gates Foundation. This project was led by Professor Pinaki Chakraborty.

The members of the team are Professor Lekha Chakraborty, Dr Manish Gupta and Ms Amandeep Kaur. The central theme of this report is the “Budget Credibility and Fiscal Forecasting Errors of 28 States in India”. The theme paper was presented by Professor Lekha Chakraborty in the 75th Meetings of International Institute of Public Finance in Glasgow, Scotland, August 21-23, 2019. This paper has also been published as a working paper from the Levy Economics Institute of Bard College, New York.

The main findings of the study were presented by Professor Pinaki Chakraborty in a seminar on "Issues in State Finance - Analysis of State Budget 2018-19”, organized by the National Institute of Public Finance and Policy on 10 August 2018 at India International Centre, New Delhi. The seminar was attended by the Expenditure Secretary, Government of India; Additional Chief Secretary(s), Finance Secretary(s), Resident Commissioner(s) of a number of States, Senior Officers from the Ministry of Finance Government of India and Department of Finance of many States, NITI Aayog, IMF as well as academicians and members of civil society organization. The authors gratefully acknowledge their comments and suggestions.

We are grateful to Shri A N Jha, Expenditure Secretary, Government of India for his participation and comments on the presentation.

We are grateful to the Reserve Bank of India for supporting this initiative of NIPFP through active participation. The team from the Reserve Bank of India led by Dr. Rajiv Ranjan, Adviser, Fiscal Analysis Division of the Department of Economic and Policy Research, and Dr Sangita Mishra, Director, Fiscal Affairs Division, RBI presented their findings on State Finances in the seminar. We are grateful to RBI team for their participation.

Special thanks are due to Shri A P Srivastava, Additional Chief Secretary (Finance), Government of Madhya Pradesh and Shri Samir Kumar Sinha, Principal Secretary (Finance), Government of Assam for their detailed comments and suggestions.

Special thanks are due to Mr Piyush Gandhi and Mr Ruzel Shrestha for their analytical support for preparing the tax buoyancy and budget credibility modules. The tax buoyancy analysis of chapter 3 is selectively included in the paper invited for presentation in the 76th Meetings of International Institute of Public Finance on “Public Finance, Natural Resources and Climate Change” in Reykjavik, Iceland, August 19-21, 2020. This paper is also published as NIPFP Working Paper in July 2020.

We are thankful to Mr Md. Azharuddin Khan for compiling the data on State Finances for the study and data analysis. We thank Dr. H.K. Amarnath (In-charge NIPFP Data Bank) and his team for their support. We also acknowledge Mr Roby Thomas for his technical assistance; Ms Usha Mathur and Ms Kavita Issar for secretarial assistance; and Ms. Amita Manhas from NIPFP publications division for her formatting.

The authors are solely responsible for any errors or omissions.

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Chapter 1: Introduction

While there is lot of focus on the budget of the union government, not much importance is given to the budgets of the state governments. State governments are an important constituent of the Indian federal system. Their share in the combined total and revenue expenditures of the union and states in the fiscal year 2015-16 was 60.46 percent and 60.65 percent respectively. It is important to examine the fiscal position of state governments It is in this context the present study examines the finances of all the 29 state governments in aggregate. This is done by examining the budgets documents of all the states for the fiscal year 2018-19.

The primary objective of the study is to understand emerging issues in state finances based on the 2018-19 State Budgets in a comparative perspective, analysing state-level fiscal policy stance and key sectoral spending. While the rollout of Goods and Services Tax (GST) on 1 July 2017 was historical, the benefits of this new tax would only start flowing in when the new tax system stabilizes. 2018-19 is the first year when state budgets start reporting GST revenues[1]. We find lot of variation in the reporting of GST data by the state governments in their budgets. While some states have reported GST compensation as grants others have included it as part of their own tax revenues. Also, there seems to be no clarity in the reporting of Integrated GST (IGST) revenues in the state budgets. Making sense of GST revenue data reported in state budgets is another focus of the study.

Any budget (union or states) has three sets of numbers, the budget estimates (or BE) for the current fiscal year (i.e. year t), revised estimates (or RE) of the previous year i.e., year (t-1) and actuals which is for the period (t-2). The credibility of the budget depends on the quality of these estimates. There can be issues arising if these estimates are inaccurate, which at times can have unintended/adverse macroeconomic consequences. In cases where the actual expenditure exceeds the budgeted, there would be an unanticipated need of financing the deficit. Conversely, if the actual expenditure is less than the budgeted, then there would be idle resources which could have otherwise been put to productive use in other sectors. Therefore, having accurate forecasts are quintessential for proper implementation of the budget. Accurate fiscal forecasts are also important from the point of view of fiscal management. Thus it is important that the estimates presented in the budget are credible and accurate. In this year's issue of state finances we focus on *Budget credibility and forecast errors in the state budgets*. It is the main theme of this year's report on state finances[2].

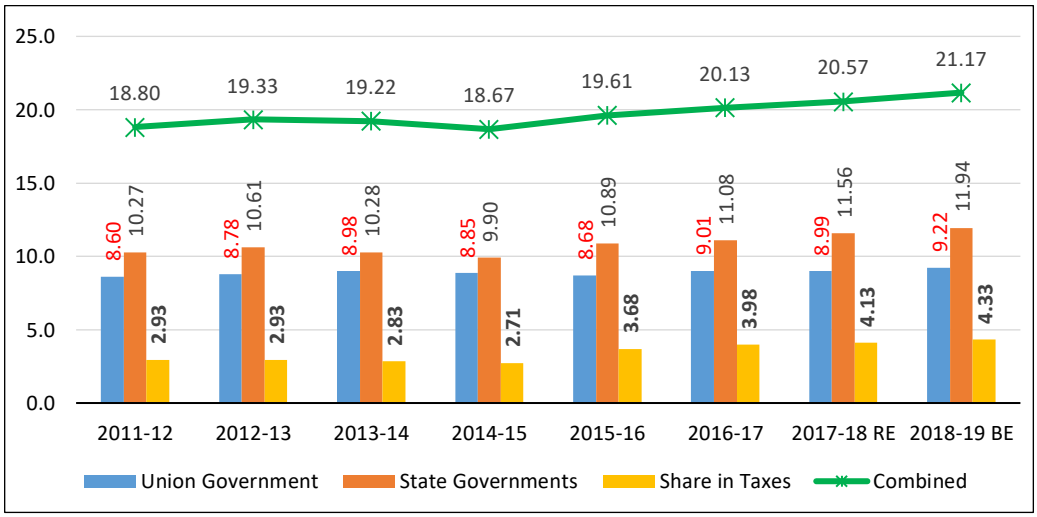
[1] GST was rolled out in July while the state budgets for 2017-18 were presented during February and March 2017. Hence, GST revenues were not reported in 2017-18 budgets.

[2] The analysis in this chapter was presented by Pinaki Chakraborty in a seminar on "Issues in State Finance - Analysis of State Budget 2018-19", organized by the National Institute of Public Finance and Policy on 10 August 2018 at India International Centre, New Delhi.

1.1 Overall Finances of the Union and State Governments

The combined revenue receipts of the Union and states as percentage of GDP declined from 19.33 to 18.67 percent between 2012-13 and 2014-15. The combined revenues increased to 19.61 percent of GDP in 2015-16 largely due to the increase in devolution recommended by the Fourteenth Finance Commission (fig 1) which (as percent of GDP) increased from 2.71 percent in 2014-15, the terminal year of the Thirteenth Finance Commission to 3.68 percent in 2015-16, the first year of the award of the Fourteenth Finance Commission[3]. The combined revenues are budgeted to be around 21.17 percent in 2018-9BE. Between 2015-16 and 2018-19BE, while the revenue receipts aggregate across all states as percent of GDP is projected to increase from 10.89 percent to 11.94 percent, an increase of more that 1 percent of GDP, the revenues of the Union government is projected to increase by only 0.54 percent of GDP.

Figure 1: Revenue Receipts (% of GDP): Union, States and Combined



Source: Indian Public Finance Statistics and Budget Documents of 29 States

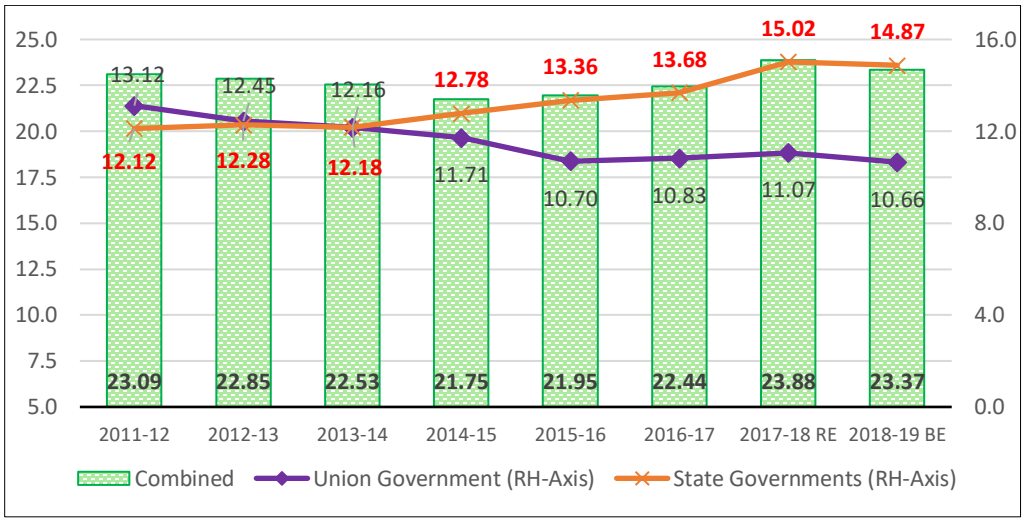
Examination of the revenue expenditure of the Union and state governments reveal that state governments in aggregate spend more than the union government. In 2017-18RE, revenue expenditure aggregated across all states as percent of GDP at 15.02 percent was around 36 percent higher than that of the union government (fig 2).

Comparative picture of the finances of the Union and State Governments for the period 2011-12 to 2018-19BE is presented in table 1. From the examination of key fiscal indicators, it is evident that between

[3] The Fourteenth Finance Commission recommended a devolution of 42 percent of the divisible pool of taxes, an increase of 10 percent from 32 percent that was recommended by the Thirteenth Finance.

2011-12 and 2018-19BE, there has been improvement in the finances of the Union Government with major fiscal parameters like revenue deficit, fiscal deficit, primary deficit and outstanding liabilities expressed as percentage of gross domestic product (GDP) showing a declining trend.

Figure 2: Revenue Expenditure (% of GDP): Union, States and Combined



Source: Indian Public Finance Statistics and Budget Documents of 29 States

The revenue deficit of the Union Government as percent of GDP declined from 4.51 percent in 2011-12 to 2.07 percent in 2016-17 and is budget to be around 2.22 percent in 2018-19BE (fig 3), while the fiscal deficit declined from 5.91 percent to 3.33 percent during the same period (fig 4). The primary deficit also showed considerable improvement declining from 2.78 percent in 2011-12 to 0.26 percent in 2017-18BE and outstanding liabilities as percentage of GDP declined by 3.9 percent from 51.71 percent in 2011-12 to 47.85 percent in 2017-18BE.

While the fiscal position of the Union government showed an improvement, the combined finances of the State governments deteriorated during this period as can be seen from 1. We find a deterioration of the fiscal position of States since 2013-14. Surpluses in the revenue account turned into deficit and we observe re-emergence of revenue deficit in 2013-14 (also see fig 3). The number of States having revenue deficit increased from 6 in 2011-12 to 11 in 2013-14 and further to 15 in the following year (table 2). In 2016-17, 10 states had deficit in their revenue account. Although the combined revenue account of all States show a surplus to the tune of 0.14 percent of Gross State Domestic Product (GSDP) in 2018-19BE, 7 States have budgeted for revenue deficit.

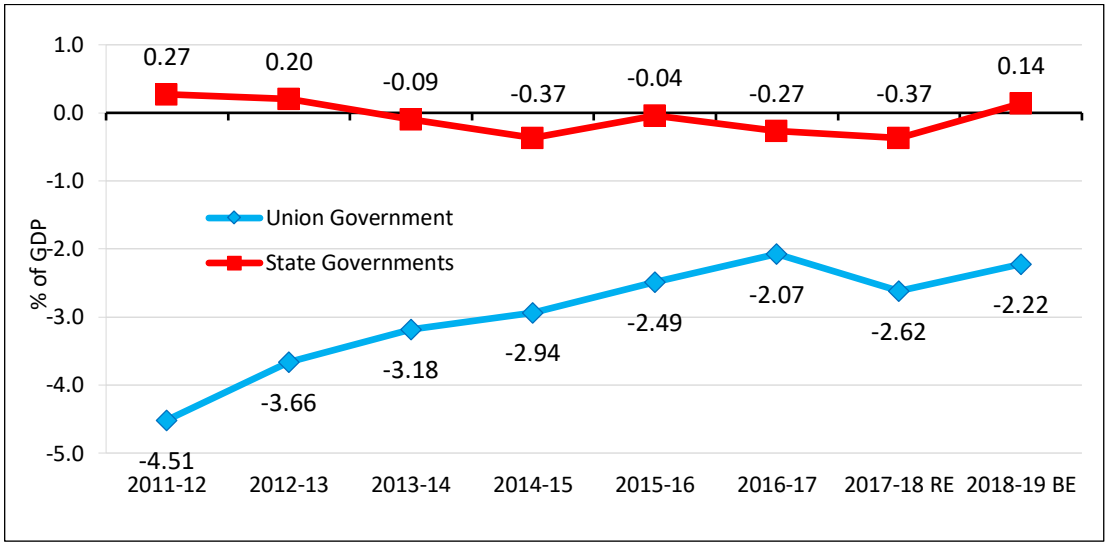
Table 1: Finances of the Union and States

(% of GDP)

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18 RE	2018-19 BE
Revenue Deficit								
Union Government	-4.51	-3.66	-3.18	-2.94	-2.49	-2.07	-2.62	-2.22
State Governments	0.27	0.20	-0.09	-0.37	-0.04	-0.27	-0.37	0.14
Fiscal Deficit								
Union Government	-5.91	-4.93	-4.48	-4.10	-3.87	-3.51	-3.55	-3.33
State Governments	-1.93	-1.97	-2.21	-2.63	-3.06	-3.50	-3.07	-2.62
Primary Deficit								
Union Government	-2.78	-1.78	-1.14	-0.87	-0.66	-0.36	-0.38	-0.26
State Governments	-0.36	-0.45	-0.70	-1.01	-1.51	-1.86	-1.32	-0.93
Outstanding Liabilities								
Union Government	51.71	50.99	50.47	50.16	50.14	48.75	49.15	47.85
State Governments	22.34	21.80	21.40	21.49	22.69	24.37	24.78	24.91

Note: 1) Surplus (+) / Deficit (-); 2) GDP is at current prices (2011-12 series); 3) Fiscal Deficit of States in 2015-16 and 2016-17 includes DISCOM debt taken over by the States under UDAY.
Source: 1) Union Government: Budget Documents (various years); 2) State Government: Finance Accounts (various years) and Budget Documents 2018-19; 3) Economic Survey 2017-18, Vol. 2.

Figure 3: Revenue Deficit (% of GDP)



Note: Surplus (+) / Deficit (-)
Source: Finance Accounts and Budget documents of 29 State Governments

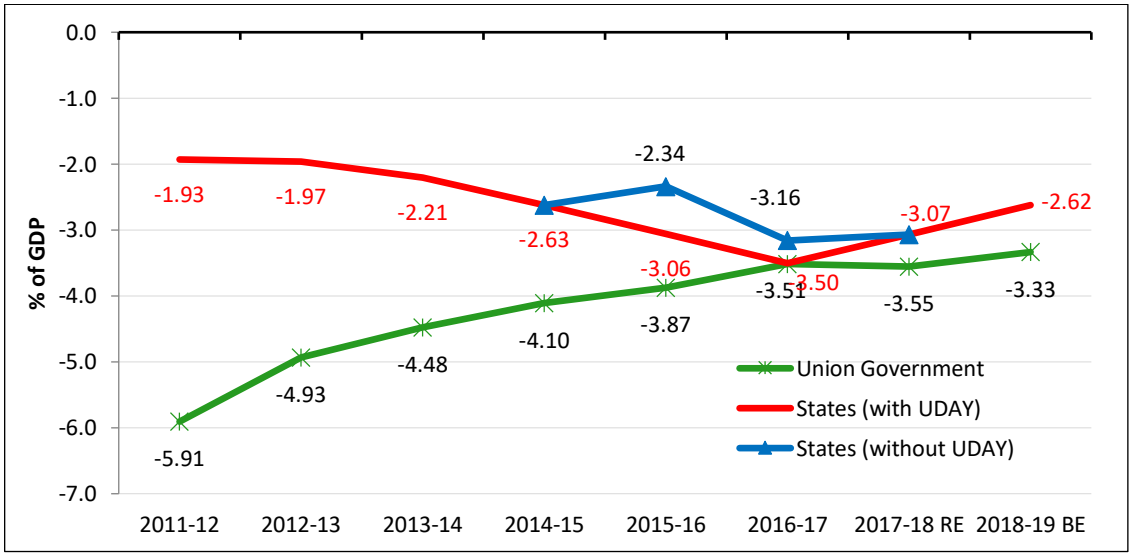
Fiscal deficit aggregated across States also deteriorated during this period. Fiscal deficit as percentage of GDP declined from 1.93 percent in 2011-12 to 3.50 percent in 2016-17 (table 1 and Fig 4). However, it is budgeted to improve to 3.07 percent in 2017-18RE and further to 2.62 percent in 2018-19BE. High fiscal deficit in 2015-16 and 2016-17 is on account of State governments taking over 75 percent of the DISCOM

debt under UDAY.[4] Excluding UDAY liabilities the FD-GDP ratio would be around 2.34 percent in 2015-16 and 3.16 percent in 2016-17. The FD-GDP ratio in 2015-16 exceeded the 3 percent FRBM ceiling of fiscal prudence for the first time since 2004-05. The number of states reporting FD-GSDP ratio greater than 3 percent increased from 9 in 2011-12 to 14 in 2016-17 (table 3). In 2018-19 14 states have budgeted a FD-GSDP ratio greater than 3 percent.

Table 2: States with Revenue Deficit

2013-14	2014-15	2015-16	2016-17	2017-18 RE	2018-19 BE
Chh, Goa, Har, HP, Ker, Mah, Miz, Pun Raj, TN, WB	AP, Ass, Chh, Har, HP, J&K, Jha, Ker, Mah, Miz, Pun, Raj, TN, Utt, WB	AP, Har, J&K, Ker, Mah, Pun, Raj, TN, Utt, WB	AP, Ass, Har, Ker, Mah, Pun, Raj, TN, Utt, WB	AP, Ass, Har, HP, Ker, Mah, Pun, Raj, TN, Tri, WB	Har, HP, Ker, Mah, Pun, Raj, TN
11 States	15 States	10 States	10 States	11 States	7 States

Figure 4: Fiscal Deficit (% of GDP)



Note: Surplus (+) / Deficit (-)
Source: Finance Accounts and Budget documents of 29 State Governments

[4] State joining UDAY were to take over 75 percent of DISCOM debt in a staggered manner - 50 percent in 2015-16 and 25 percent in 2016-17.

Table 3: States with Fiscal Deficit > 3 percent of GSDP

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18 RE	2018-19 BE
FD > 3%	9 states	8 states	7 states	16 states	13 states	14 states	20 states	14 states

Primary deficits of all states taken together also show a deterioration during this period declining from 0.36 percent of GDP in 2011-12 to 1.86 percent in 2016-17. In 2018-19BE, the all states' primary deficit is budgeted to improve to 0.93 percent of GDP (table 1). Outstanding liabilities aggregated across all states as percent of GDP declined from 22.34 percent in 2011-12 to 21.40 percent in 2013-14, thereafter it increased to 24.37 percent in 2016-17 and is budgeted to be around 24.91 percent in 2018-19BE. The increase in outstanding liabilities in 2016-17 and 2017-18 is taking over of DISCON debt by the state governments under UDAY. RBI's report on state finances attribute UDAY to result in an increase in outstanding liabilities as percentage of GDP by about 1.5 percent in 2016 over 2015 and by 0.7 percent in 2017 over 2016. The report further cautions about the increase in future liabilities of States if farm loan waivers become the norm.

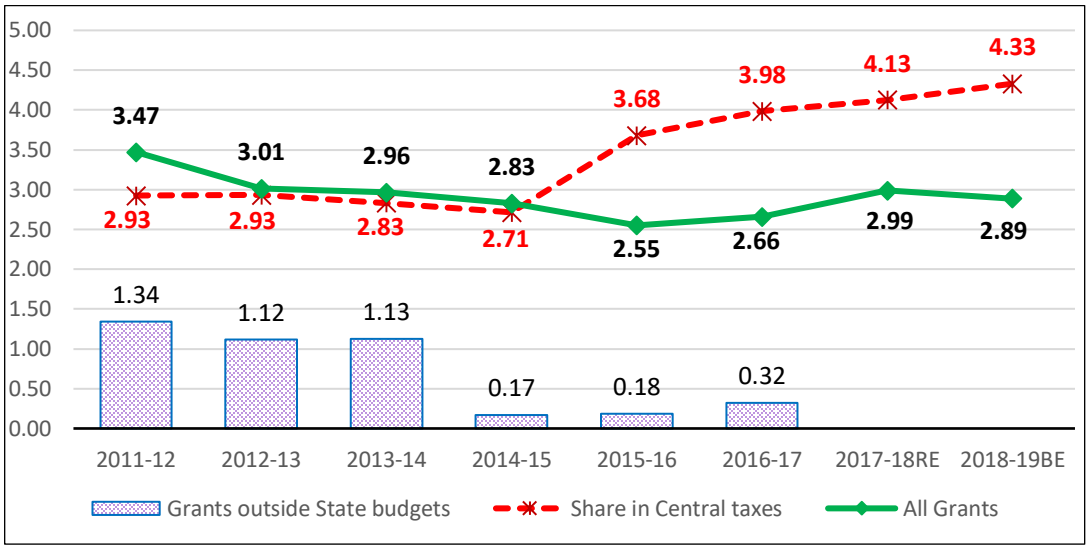
1.2 Trends in Central Transfers to States

Examination of the trends in transfers from the union government to states show that there has been an increase in tax devolution to states (as percent of GDP) in 2015-16, the initial year of the award of the Fourteenth Finance Commission vis-à-vis 2014-15, the terminal year of the award of the Thirteenth Finance Commission. Tax devolution as percent of GDP increased from 2.71 percent in 2014-15 to 3.68 percent in 2016-17, an increase of almost one percent of GDP. In 2016-17, devolution to states was 3.98 percent of GDP and is budgeted to increase to 4.33 percent in 2018-19BE (fig 5).

While devolution to states (as percent of GDP) have increased, central grants to states, including those going directly to implementing agencies in states, outside the state budgets as percentage of GDP have declined from 3.47 percent in 2011-12 to 2.83 percent in 2014-15 and further to 2.55 percent in 2015-16 as evident from fig 5. This is not surprising as central grants to states were restructured in 2015 to accommodate enhanced tax devolution recommended by the Fourteenth Finance Commission. Although central grants to states increased to 2.66 percent of GDP in 2016-17 and are budgeted to further increase to 2.89 percent[5] of GDP in 2018-19BE, as percentage of GDP they are lower compared to the level in 2011-12.

[5] GST compensation to states for 2017-18 and 2018-19 was booked as grants in 12 state budgets. Grants were adjusted by excluding GST compensation from grants for the years 2017-18 and 2018-19.

Figure 5: Central Transfers to States (as % of GDP)



Source: Finance Accounts and Budget Documents of 29 States

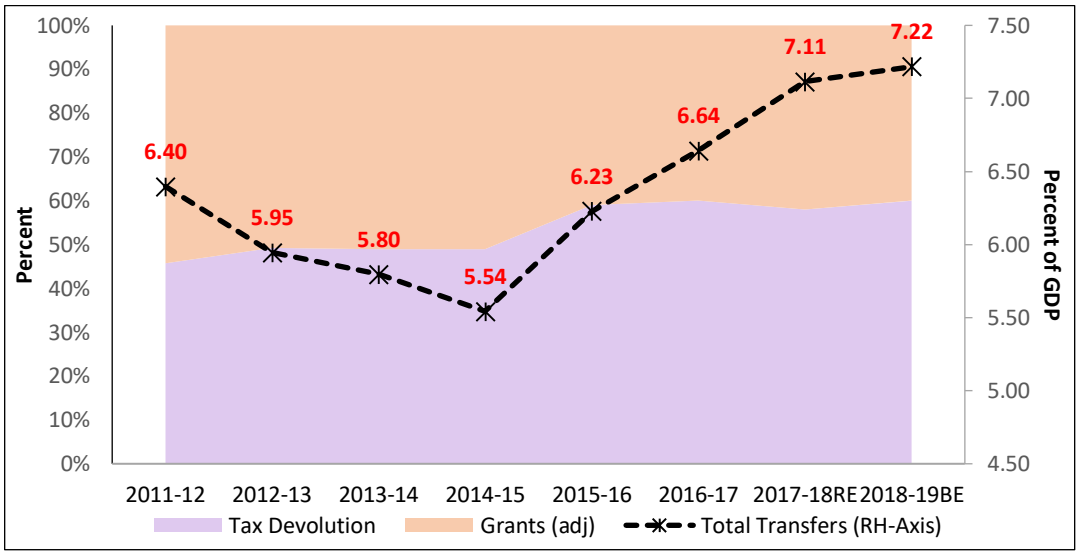
Examining total central transfers to states (tax devolution and grants-in-aid) as percentage of GDP between 2011-12 and 2018-19BE, we find central transfers have declined to 5.54 percent in 2014-15 from 6.40 percent in 2011-12 (fig 6). Post FFC award, i.e., from 2015-16 we see an increase in total transfers to states. Central transfers to states increased to 6.64 percent in 2016-17 and was budget to be around 7.22 percent in 2018-19BE. The increase in central transfers was largely due to the increase in tax devolution recommended by the Fourteenth Finance Commission. Not only has the total central transfers to States increased, its composition has also undergone a change. Untied and formula-based transfers (i.e., tax devolution) have become the dominant form of transfers accounting for about 60 percent of total central transfers to states in 2018-19BE.

Although central transfers to states as percentage of GDP have increased from 6.40 percent in 2011-12 to 7.22 percent in 2018-19BE, but when expressed as percentage of gross tax revenue (GTR) of the Union government, transfers to states have in fact declined. Central transfers as percentage of GTR of the union government fell from 62.8 percent in 2011-12 to 59.1 percent in 2016-17 and is budget to be around 59.5 percent in 2018-19BE as is evident from fig 7. This is primarily due to the increase in cess and surcharge levied by the Union government which are not shareable with the states. Cess and surcharge as percent of GTR increased from 9.43 percent in 2011-12 to 16.47 percent in 2015-16 and is budget to be around 14.29 percent in 2018-19BE. As a result of the increase in cess and surcharge the divisible pool[6] has shrunk thereby affecting the devolution to states. The Fourteenth Finance Commission had recommended 42 percent of the

[6] Divisible pool = Gross tax revenue – (Cess and surcharge + Cost of collection)

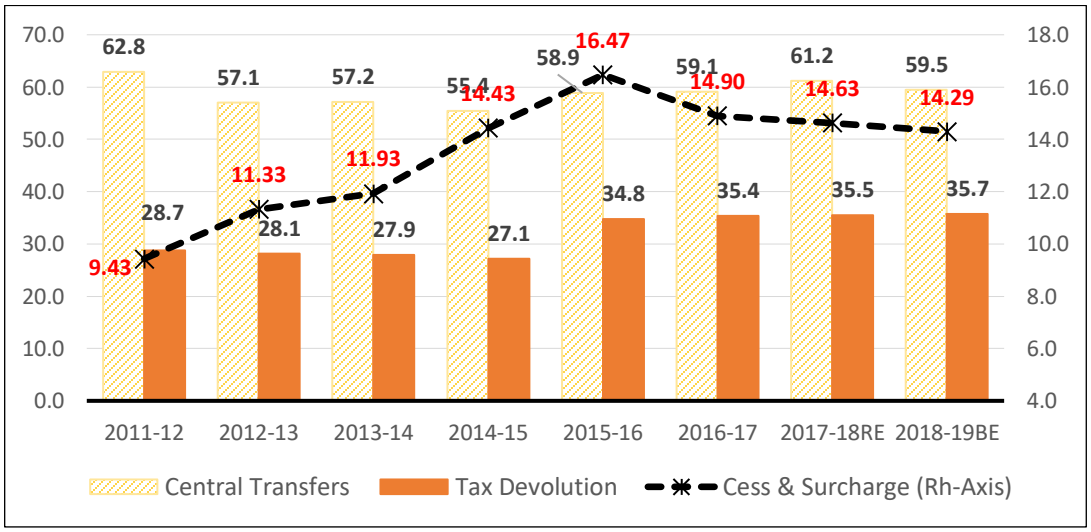
divisible pool of taxes to be devolved to the states during its award period, but when expressed as a percentage of GTR of the union, the devolution ranges between 34.8-35.7 percent during 2015-16 and 2018-19BE (fig 7), and the average devolution during this period is around 35.3 percent.[7] The effective increase in devolution (as percent of GTR) by the Fourteen Finance Commission was about 7.4 percent.

Figure 6: Trends in Aggregate Central Transfers



Source: Finance Accounts and Budget Documents of 29 States

Figure 7: Trends in Aggregate Central Transfers (as a % of GTR)



Source: Finance Accounts and Budget Documents of 29 States; Budget documents of Union Government.

[7] The average devolution during 2011-12 to 2014-15 (i.e, last four years of the Thirteenth Finance Commission award) was around 28 percent of GTR while the Thirteenth Finance Commission had recommended a devolution of 32 percent of the divisible pool.

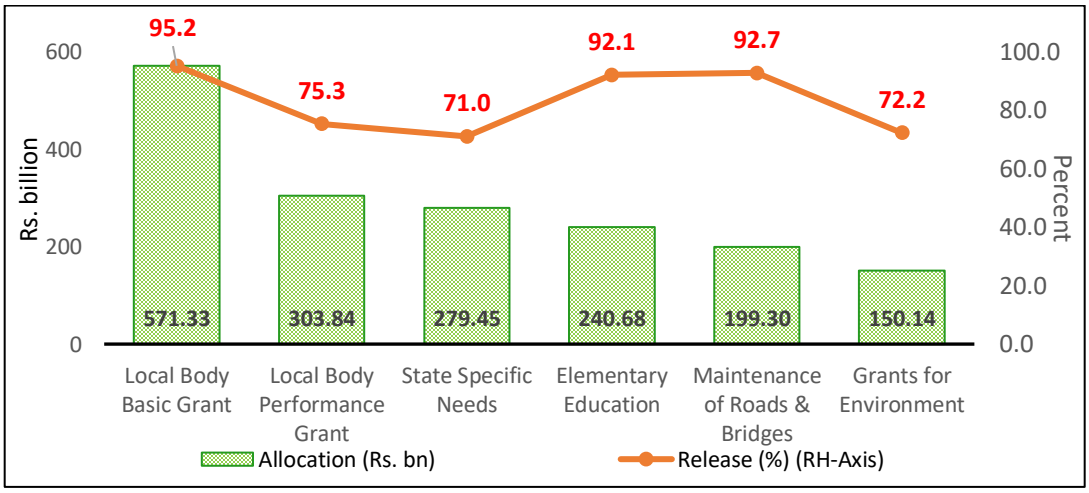
1.3 Trends in Finance Commission Grants

There has been a lot of discussion on conditional versus unconditional grants especially in light of the Terms of Reference issued to the Fifteenth Finance Commission by the government. We examine the allocation and releases of some of the grants recommended by the Thirteenth Finance Commission during its award period 2010-11 to 2014-15. We consider Local Body Grants (Basic grant and Performance grant separately), grants for State specific needs, grant for elementary education, grant of maintenance of roads and bridges, and environment grants.

For the local body basic grant which was an unconditional grant, the releases-allocation ratio was 95.2 percent, but for local body performance grants which required meeting a number of conditionalites, the releases-allocation ratio was 75.3 percent, much lower than the unconditional local body basic grant (fig 8). For state specific grants and environment grants, which were conditional in nature the releases-allocation ratio was relatively lower than the unconditional local body basic grants and ranged between 71-72 percent. However, in the case of elementary education grant and grants for maintenance of roads and bridged the releases-allocation ratio was around 92 percent.

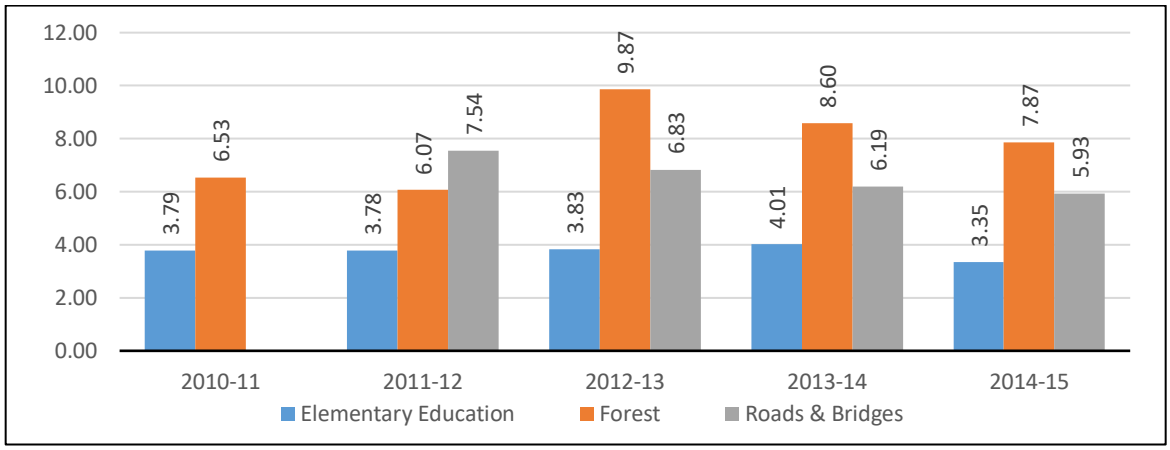
The share of grants recommended by the Finance Commissions in the total transfers recommended by them has been low. In the case of Thirteenth Finance Commission, the grants accounted for about 14.17 percent of the total transfers recommended by the Commission. The contribution of the (Thirteenth) Finance Commission grants to the sectoral expenditures of the states is also low as can be seen from fig 9. The share of grants for elementary education in total expenditure by the states towards elementary education ranges between 3-4 percent; in the case of forest, it varies between 6-10 percent and in case of roads and bridges its share is around 6-7.5 percent.

Figure 8: FC-XIII Grants: Allocation and Releases (% of Allocation)



Source: Report of the Thirteenth Finance Commission; Budget Documents of Union Government

Figure 9: FC-XIII Grants (as % of Sectoral Expenditure by States)



Source: Budget Documents of State Governments

Thus, we see that the role of Finance Commission grants – conditional or unconditional in influencing expenditures and thereby outcomes at the state level is limited. The conditional grants are more likely to remain unutilized as compared to unconditional grants as the states have to provide utilization certificates for every installment released fulfilling the conditionalities attached with the grants and states' capacity to meet these requirements are not uniform.

1.4 Financial Flows to States – Devolution, Grants, Debt and Access to Credit

We consider the per capita distribution/access/availability of resources across states in India over two periods of time and compare it with their per capita income to examine the relation between the two – is the distribution progressive or regressive (i.e., whether states with low per capita income have more access to the resources or vice-versa). We consider the following four sources (a) tax devolution as recommended by the Finance Commission; (b) central grants to states; (c) borrowings by state governments and (d) access to credit or allocation of credit. We compare the distribution of these resources in a recent period (i.e., 2015-16 and 2016-17) and compare it with that during 2008-09 and 2009-10.

a) Tax Devolution

The scatter plot of per capita devolution (measured in the vertical axis) and per capita GSDP (measured on the horizontal axis) show a negative relation for both the period under consideration. States with low per capita income get more devolution in per capita terms (fig 10a and 10b). Thus the devolution recommended by the Finance Commissions has been progressive, transferring more resources to relative poorer or low per capita income states.

Figure 10a: Per Capita Devolution (Rs.): Avg. of 2015-16 & 2016-17

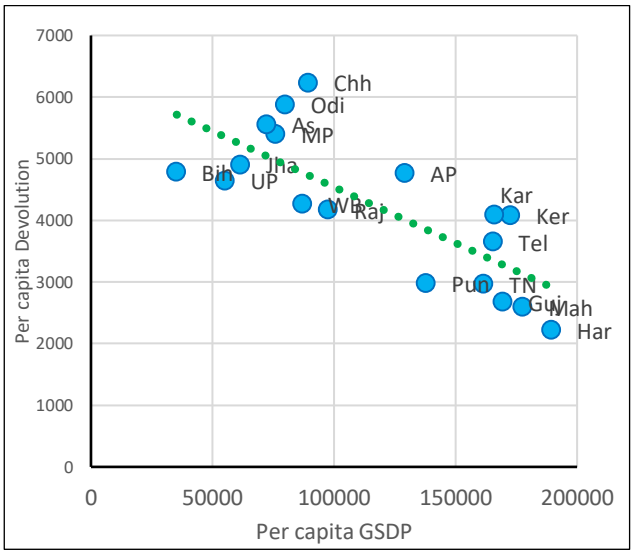
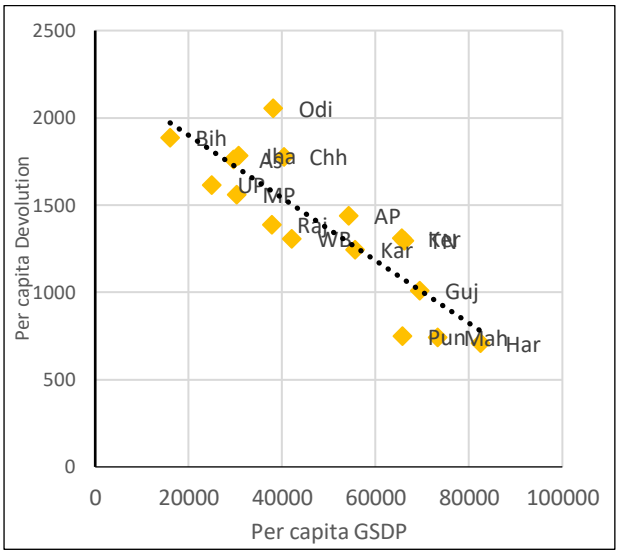


Figure 10b: Per Capita Devolution (Rs.): Avg. of 2008-09 & 2009-10



b) Grants:

As regards central grants to states is concerned we find no relation between per capita grants to states and their PCGSDP during 2015-16 and 2016-17 (Fig 11a). The linear fit seems to be flat. However, in 2008-09 and 2009-10 the relation was progressive with higher assistance going to relatively poorer states (fig 11b). The degree of progressivity of grants has declined in recent times. One of the reasons could be the restructuring of grants in 2015-16 by the Union Government wherein a large number of schemes meant for the backward and poorer regions of the country like Backward Regions Grants Fund were discontinued.

Figure 11a: Per Capita Grants (Rs.): Avg. of 2015-16 & 2016-17

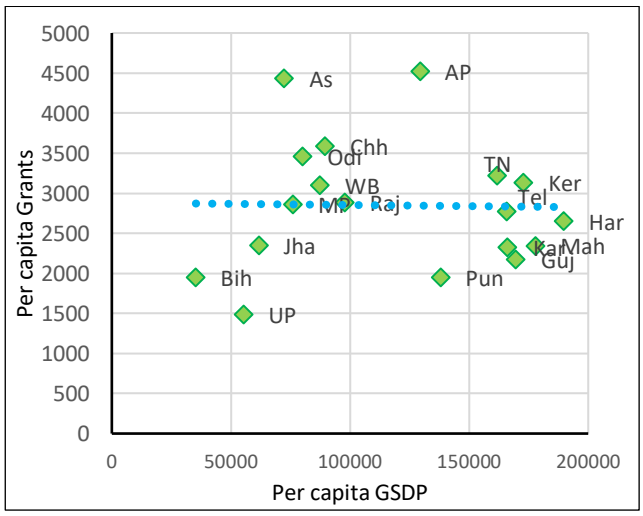
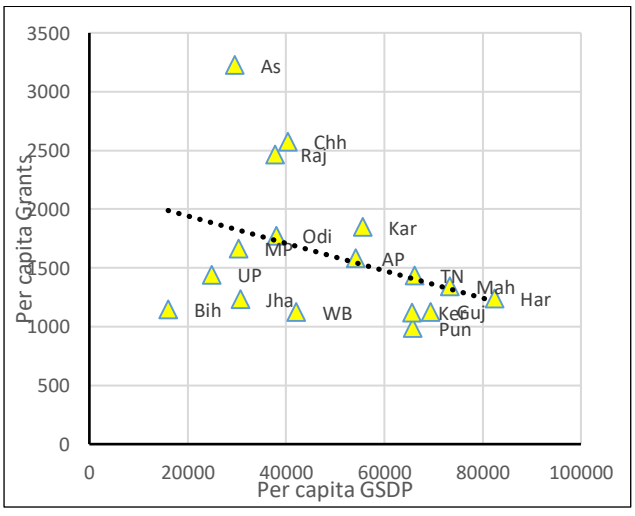


Figure 11b: Per Capita Grants (Rs.): Avg. of 2008-09 & 2009-10



c) Debt and Access to Credit:

Examining the relation between per capita debt and PCGSDP and per capita access to credit and PCGSDP we find it to be regressive as evident from the scatter plots in fig 12a and fig 12b. The slope of the fitted line is positive implying states with higher PCGSD have more the access to credit and their per capita borrowings is also higher. Higher borrowings by state governments imply higher spending towards capital expenditure implying better infrastructure – both physical and social infrastructure.

Figure 12a: Distribution of Per capita Debt (Rs.) - Average of 2015-16 and 2016-17

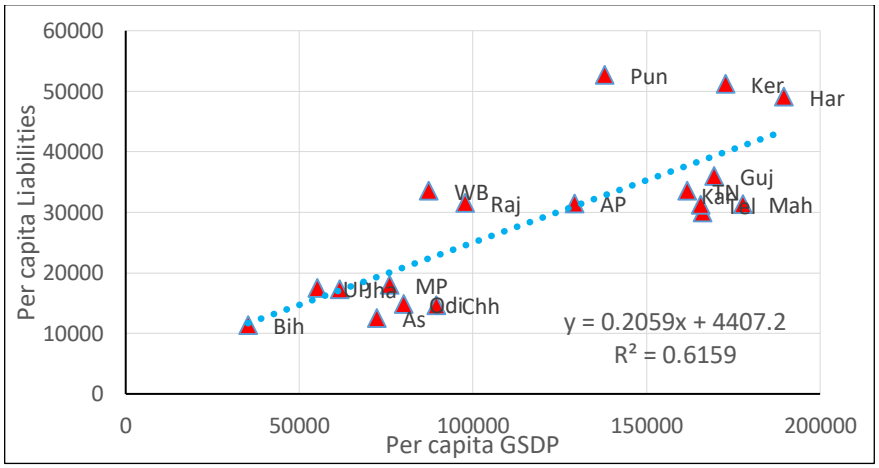
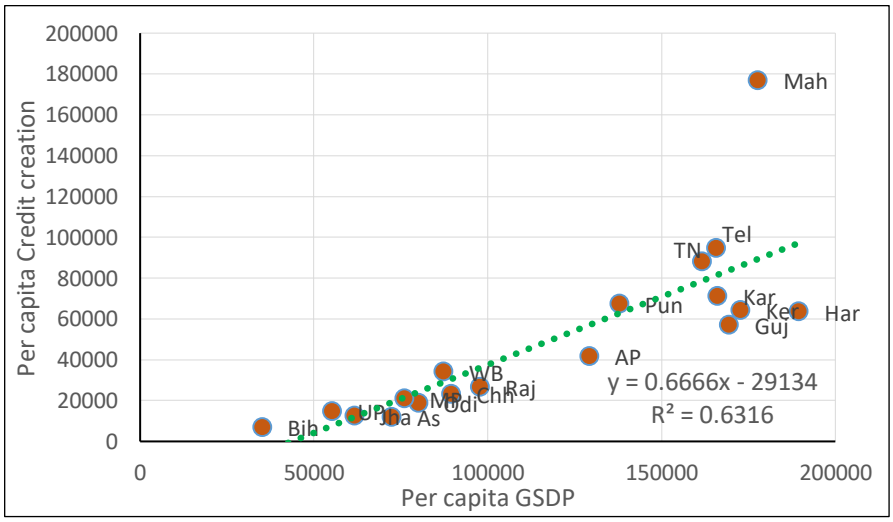


Figure 12b: Distribution of Per capita Allocation of Credit - Average of 2015-16 and 2016-17



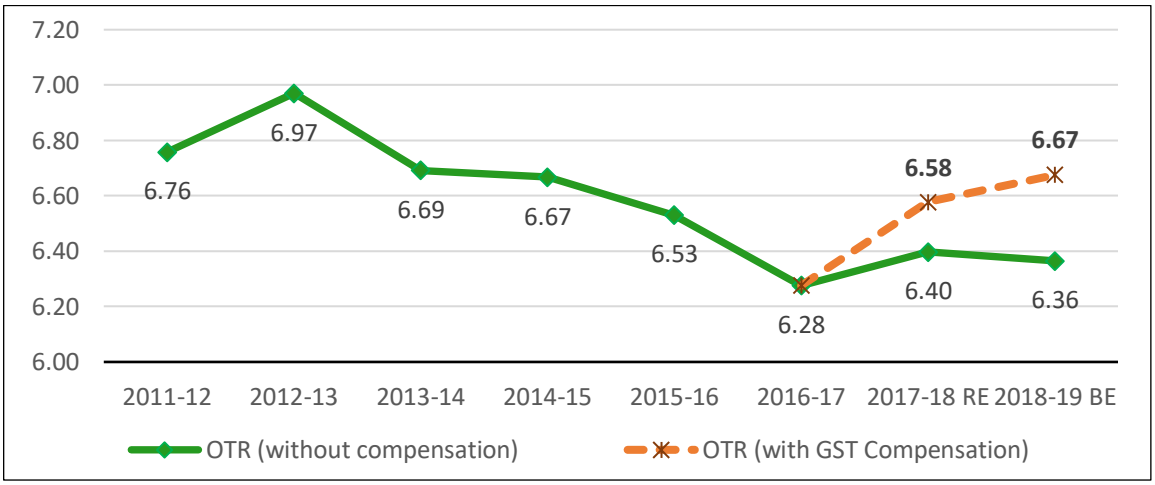
Thus, we see that while tax devolution is progressive, there seem to be no relation between per capita

GSDP and per capita grants. Although during the period 2008-10, central grants to states were progressive with more per capita flows to relatively poorer states, post 2015-16 we find no relation between per capita income of states and per capita grants. This might be an outcome of restructuring of grants that was carried out in 2015-16. As regards allocation to credit across states is concerned we find richer states have more allocation of credit in per capita terms as compared to the poorer states in the country. Even the per capita borrowings by high income states is more vis-à-vis the poorer states. Thus the flow/availability of resources/funds, with the exception of tax devolution is relatively higher in richer states as compared to the states with low per capita GSDP.

1.5 Own Tax Revenue of States

There has been a decline in own revenues aggregated across states as percentage of GSDP between 2011-12 and 2016-17 primarily due to the fall in own tax revenues. Own tax revenues aggregated across all states as percentage of GSDP declined from about 6.97 percent in 2012-13 to 6.28 percent in 2016-17 and was budgeted to be around 6.36 percent in 2018-19BE (fig 13). Including GST compensation the own tax revenues would be 6.58 percent in 2017-18RE and 6.67 percent in 2081-9BE.

Figure 13: Own Tax Revenue (% of GSDP)



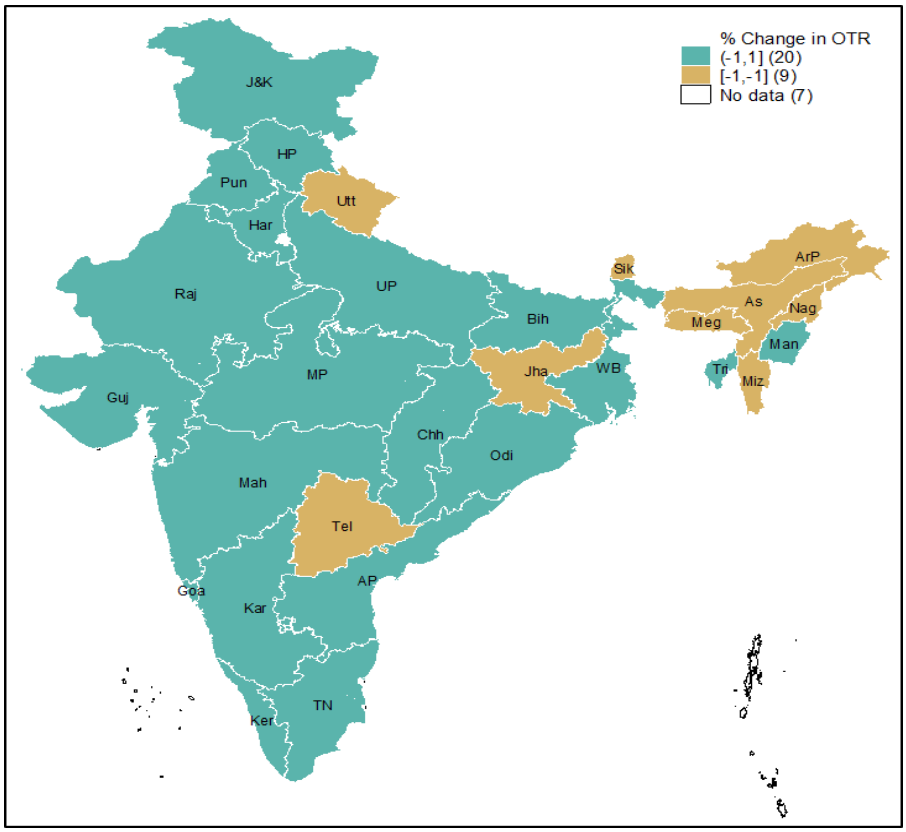
Source: Finance Accounts and Budget Documents of 29 State Governments

The decline in own tax revenues is due to the fall in revenues from (i) State Sales Tax/VAT which account for about 63 percent of total own tax revenues of states, (ii) Stamp & Registration fees (their share in tax revenues of states is 11 percent), and (iii) State Excise (their share in tax revenues is 12 percent). These three taxes together account for about 85 percent of states' own tax revenues. The own non-tax revenues of states on the other hand has largely remained stagnant during this period fluctuating between within a narrow

range of 1.17 to 1.25 percent of GSDP.

Between 2015-16 and 2016-17 we see that own-tax revenues as percentage of GSDP declined in 20 out of 29 states in the country. The states that have registered an increase in own tax revenues (as percent of GSDP) during this period are – Arunachal Pradesh, Assam, Jharkhand, Meghalaya, Mizoram, Nagaland, Sikkim, Telangana and Uttarakhand (fig 14).

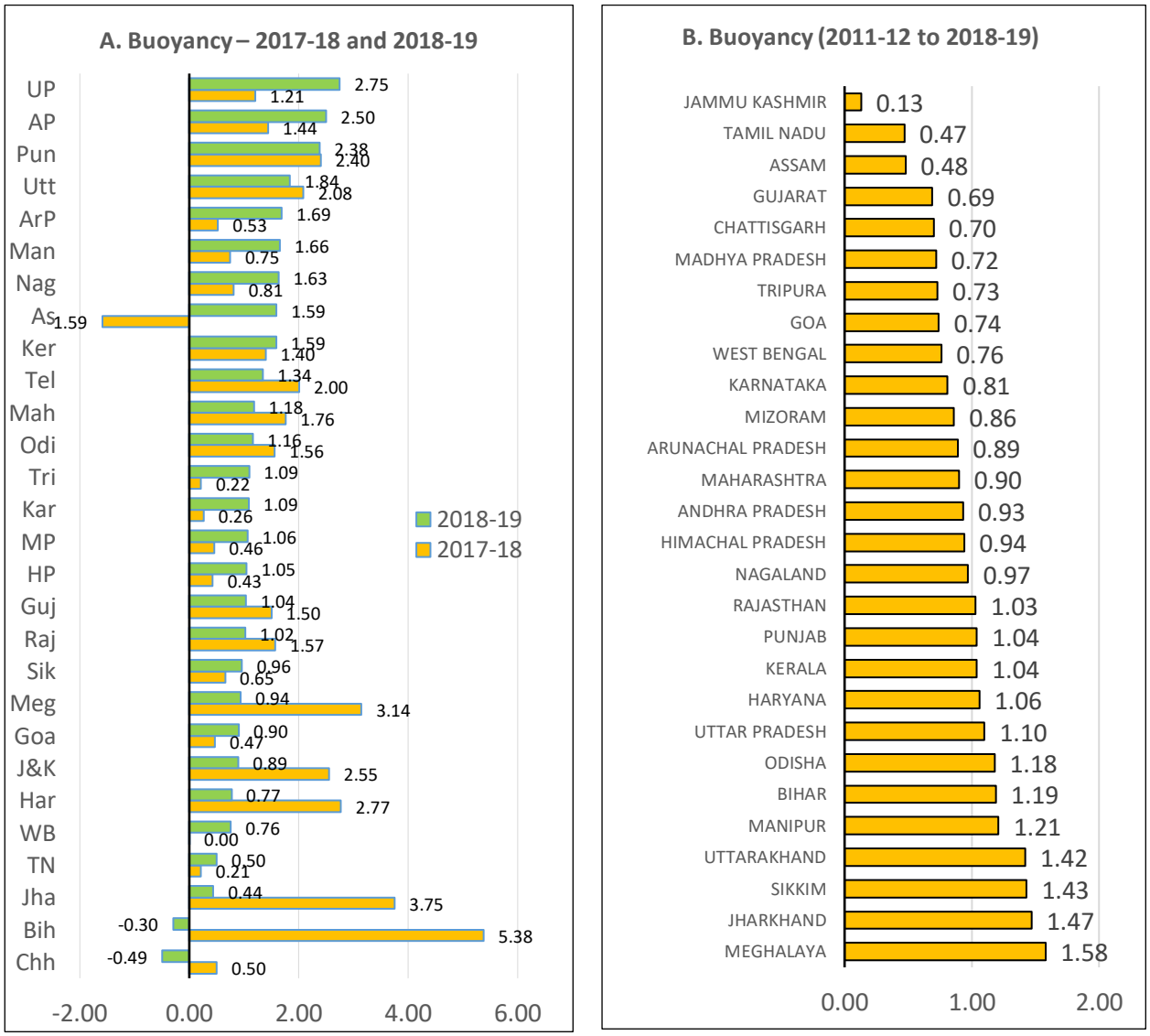
Figure 14: Change in the Own Tax Revenue between 2015-16 and 2016-17 (% of GSDP)



Source: Finance Accounts of 29 State Governments

The own tax buoyancy of states is presented in fig 15. The own tax buoyancy for 2017-18RE and 2018-19BE show a large number of state have budgeted high revenue buoyancies (panel A) with Assam (in 2017-18RE) and Bihar and Chhattisgarh (in 2018-19BE) budgeting for negative buoyancy. If we consider the buoyancies of own tax revenues of individual states during the period 2011-12 to 2018-19BE (panel B), we find only 12 states have own tax revenue buoyancies greater than 1 (and 7 states have buoyancies greater than 1.10) and the all-state own tax buoyancy is around 0.90.

Figure 15: Own Tax Buoyancy of States



Source: Finance Accounts and Budget documents of 29 State Governments

Goods and Services Tax (GST) was rolled out nationwide on 1 July 2017 and the 2018-19 is the first year when GST revenues are reported in the state budgets. Examination of state budgets reveal considerable variations in the reporting of GST data by state governments in their budgets especially reporting of Integrated Goods and Service Tax (IGST) and GST Compensation data as evident from tables 4 and 5. While some states have reported IGST data as own tax revenues, others have reported it as devolution and Tamil Nadu reports IGST both as tax revenues and as part of devolution (table 4).

Table 4: Making Sense of IGST Data – State Budgets *(Rs. lakhs)*

States	2017-18 RE			2018-19 BE		
	As OTR	As Devolution	Total IGST	As OTR	As Devolution	Total IGST
Andhra Pradesh	292731.00		292731.00	90405.00		90405.00
Arunachal Pradesh		108495.00	108495.00		45642.00	45642.00
Assam		225141.00	225141.00	581147.00	69531.00	650678.00
Bihar		657201.00	657201.00		202965.00	202965.00
Chhattisgarh	424092.00		424092.00	714431.20		714431.20
Goa		25703.00	25703.00		7938.00	7938.00
Gujarat		209706.00	209706.00		64764.00	64764.00
Haryana						
Himachal Pradesh		48483.00	48483.00		17018.31	17018.31
Jammu & Kashmir						
Jharkhand						
Karnataka		320474.00	320474.00		98973.00	98973.00
Kerala						
Madhya Pradesh		513249.00	513249.00		158508.00	158508.00
Maharashtra	888804.00		888804.00	1516276.00		1516276.00
Manipur			24301.01			29161.21
Meghalaya		43655.00	43655.00		26138.00	26138.00
Mizoram		31279.00	31279.00		18723.00	18723.00
Nagaland			33863.00			13062.00
Orissa		315647.00	315647.00		97482.00	97482.00
Punjab		107233.00	107233.00		33117.00	33117.00
Rajasthan		373649.02	373649.02		115395.02	115395.02
Sikkim		24955.00	24955.00		7707.00	7707.00
Tamil Nadu	741400.13	273556.00	1014956.13	1268310.16	84483.00	1352793.16
Telangana	165711.00		165711.00	51177.00		51177.00
Tripura		40000.00	40000.00		72000.00	72000.00
Uttar Pradesh					355831.00	355831.00
Uttarakhand		71534.00	71534.00		22092.00	22092.00
West Bengal		459200.00	459200.00		996600.00	996600.00

Source: 2018-19 Budget documents of states.

Similarly with regards to reporting of GST compensation, we find that many state governments are reporting it as grants-in-aid from central government while others have reported it as part of their own tax revenues as evident from table 5 (states highlighted in yellow in the table report GST compensation as part of their own tax revenues). Thus, there seems to be no clarity among states in terms of reporting these data.

As a result one is not sure whether the devolution, own tax revenue and grants numbers reported in state budgets are at all comparable.

Table 5: GST Compensation to States as report in State Budgets (Rs. lakhs)

States	2017-18 RE		2018-19 BE	
	Rs. Crore	% of GSDP	Rs. Crore	% of GSDP
Andhra Pradesh	1000.00	0.126	2000.00	0.230
Arunachal Pradesh				
Assam	1000.00	0.350	1000.00	0.311
Bihar	0.00	0.000	3698.00	0.717
Chhattisgarh				
Goa				
Gujarat	4984.29	0.378	10295.70	0.688
Haryana				
Himachal Pradesh				
Jammu & Kashmir	1616.13	1.147	3174.89	2.017
Jharkhand				
Karnataka	6130.00	0.483	10800.00	0.767
Kerala	0.00	0.000	0.00	0.000
Madhya Pradesh	2200.00	0.319	2600.00	0.315
Maharashtra				
Manipur				
Meghalaya				
Mizoram				
Nagaland				
Orissa	0.01	0.000	0.01	0.000
Punjab				
Rajasthan	3500.00	0.417	4500.00	0.479
Sikkim	0.00	0.000	110.58	0.478
Tamil Nadu	970.00	0.068	1698.28	0.085
Telangana	1200.00	0.160	1500.00	0.178
Tripura				
Uttar Pradesh	1955.00	0.142	5941.51	0.389
Uttarakhand				
West Bengal	4744.50	0.465	9876.00	0.942
All States	**29299.93**	**0.180**	**57194.97**	**0.310**

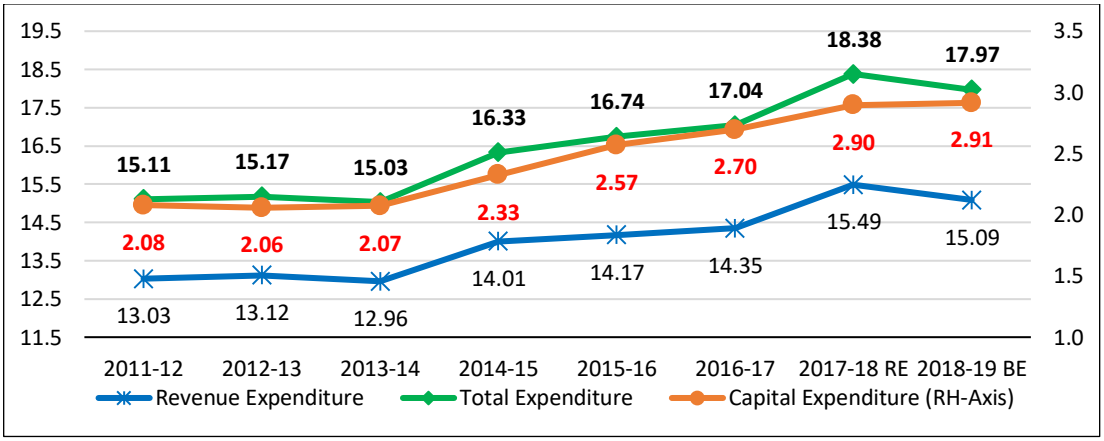
Note: Those highlighted in yellow report it as part of own tax revenues.
Source: 2018-19 Budget documents of states.

1.6 Expenditures of States

Analysis of trends in expenditure aggregated across all states reveal that total expenditure as percentage of GSDP show an increase from 16.33 percent in 2014-15 to 16.74 percent in 2015-16 and further to 17.04 percent in 2016-17 as evident from fig 16. Both revenue and capital expenditures contributed to the increase in total expenditures between 2014-15 and 2016-17. Capital expenditure increased from 2.33 percent in 2014-15 to 2.70 percent in 2016-17, while revenue expenditure rose from 14.01 percent to 14.35 percent during this period. The total expenditure is budgeted to increase to 17.97 percent in 2018-19BE.

Despite increase in capital expenditures (as percent of GSDP) aggregated across all states between 2014-15 and 2016-17, 12 states show a decline period, namely, Arunachal Pradesh, Gujarat, Manipur, Meghalaya, Mizoram, Nagaland, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttarakhand and West Bengal. The capital expenditure is budgeted to increase to 2.91 percent of GSDP in 2018-19BE. We find that between, 20115-16 and 2018-19BE, capital expenditure on general services (as percentage of GSDP) has largely remained unchanged. Therefore the increase in capital expenditure during this period is largely due to the increase in capital expenditure on social services (which increased from 0.54 percent of GSDP to .076 percent) and to some extent on the increase in expenditure on economic services (which increased from 1.88 percent of GSDP to 1.96 percent).

Figure 16: Trends in Expenditure (% of GSDP)



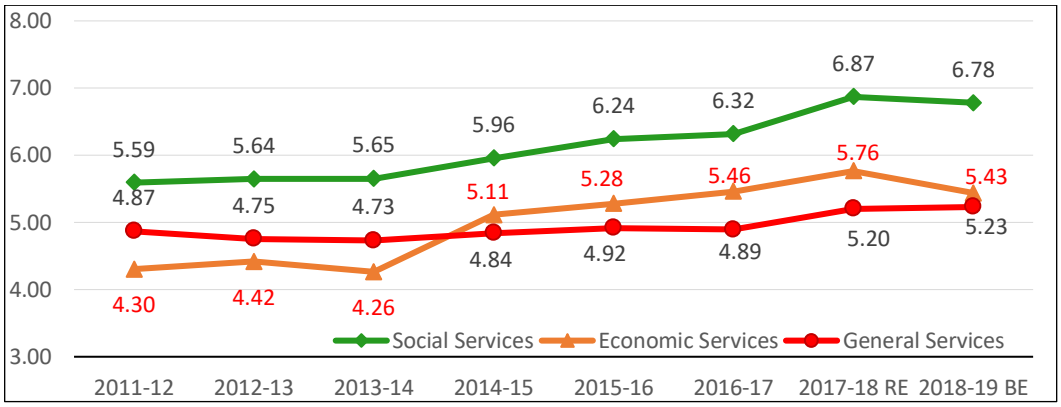
Source: Finance Accounts and Budget documents of 29 State Governments

Examination of services-wise expenditure (i.e., expenditure on general services, social services and economic services) as percentage of GSDP aggregated across states reveals that between 2014-15 and 2016-17, total expenditure on general services as percentage of GSDP have increase marginally from 4.84 percent to 4.89 percent. The increase in total expenditure is due to the increase in expenditure on social and economic services (fig 17). While expenditures on general services and social services is budgeted to increase to 5.23 percent and 6.78 percent in 2018-19BE, that on economic services has been budgeted to fall to 5.43 percent from 5.46 percent in 2016-17.

While expenditure on social services aggregated across all states as percent of all state GSDP show an increasing trend between 2014-15 and 2018-19BE, the sectors which contributed to this increase are urban development, water supply and sanitation, welfare of SCs, STs & backward classes, relief on account of natural calamities and housing. These together account for about 39 percent of the total expenditure on social services. Although expenditures on social services aggregated across states as percent of GSDP show an increase between 2014-15 and 2016-17, state-wise details show that in several states there was a decline in

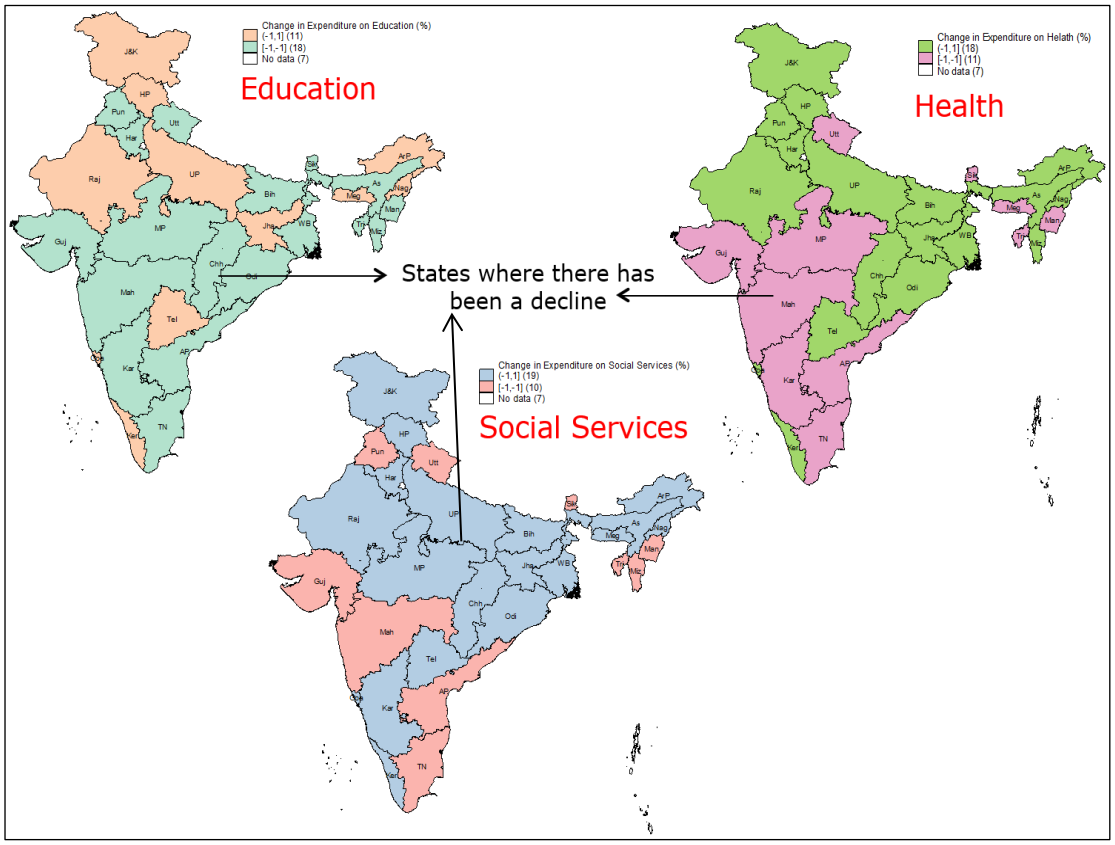
expenditures on social services, education and health as percent of GSDP as can be seen from fig 18.

Figure 17: Service-wise Expenditure (% of GSDP)



Source: Finance Accounts and Budget documents of 29 State Governments

Figure 18: Change in Expenditure on Social Services as % of GSDP between 2016-17 & 2014-15

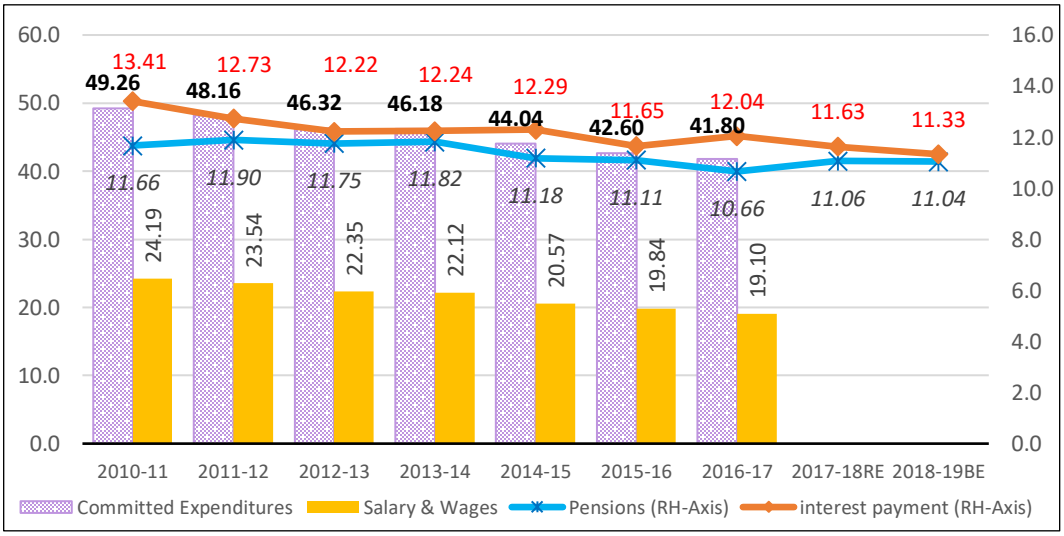


Source: Finance Accounts and Budget documents of 29 State Governments

Committed expenditure comprising interest payments, pension payments, and salaries and wages aggregated across all states as percentage of revenue expenditure has been declining from 49.26 percent in 2010-11 to 41.80 percent in 2016-17 (fig 20). The share of salaries and wages, which is the largest component of committed expenditures in the revenue expenditure fell from 24.2 percent in 2010-11 to 19.10 percent in

2016-16. The expenditure on salaries and wages is expected to increase in the coming years as the state governments start implementing the recommendations of the Seventh Central Pay Commission. The interest payments as percent of revenue expenditure had decline from 13.41 percent in 2010-11 to 12.04 percent in 2016-17 and is budgeted to further decline to 11.33 percent in 2018-19BE. While pension payments as percent of revenue expenditure have shown a declining trend between 2011-12 and 2016-17, it is budgeted to increase to 11.04 percent in 2018-19BE on account of implementation of Seventh Central Pay Commission award by the states.

Figure 19: Trends in Committed Expenditures (% of revenue expenditure)



Source: Finance Accounts and Budget documents of 29 State Governments

Examining the relationship between per capita GSDP (average of three years 2014-15, 2015-16 and 2016-17) and per capita expenditure (average of three years 2014-15, 2015-16 and 2016-17) on education, health,[8] social services and economic services for general category states we find that high per capita income states spend more in per capita terms on education, health, social and economic services and vice versa (see fig 20). Similar trend is observed for the north eastern and Himalayan (NE&H) states (fig 21).

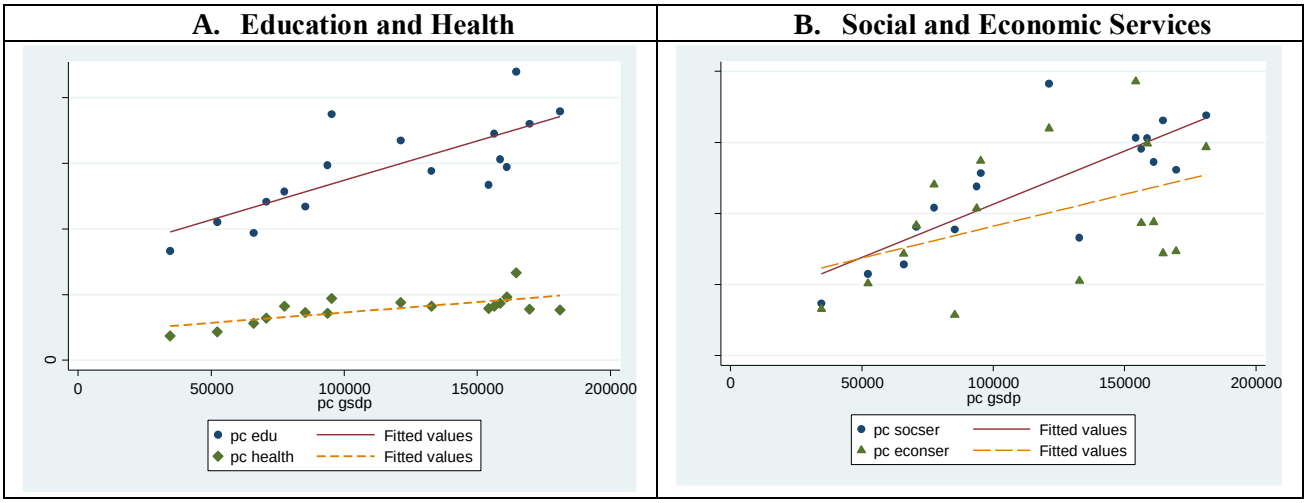
The crude correlation between PCGSDP and per capita expenditure on education; PCGSDP and per capita expenditure on health; PCGSDP and per capita expenditure on social services; and PCGDP and per capita expenditure on economic services for both general category states and north eastern and Himalayan states is positive (table 6).

[8] Expenditure on 'Education' pertains to total expenditure (i.e., revenue and capital expenditure) on 'Education, Sports, Arts and Culture, while expenditure on 'Health' comprises total expenditure on Medical and Public Health.

Table 6: Correlation between PCGSDP and Education, Health, Social and Economic Services

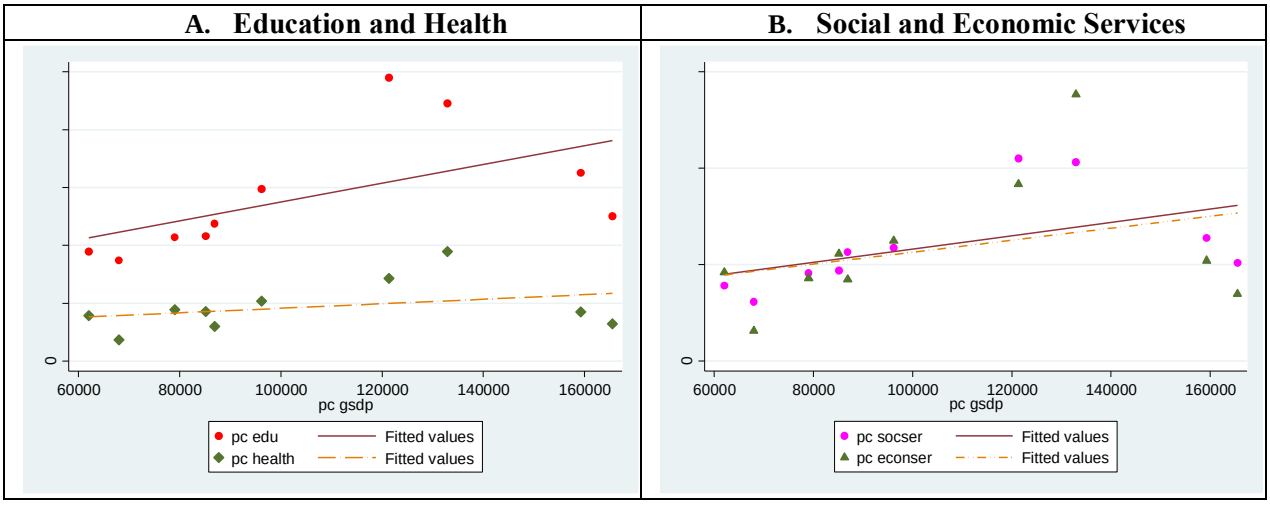
Correlation Coefficient between	General Category States	Special Category States
PCGSDP-Education	0.773	0.523
PCGSDP-Health	0.688	0.311
PCGSDP-Social services	0.810	0.487
PCGSDP-Economic services	0.449	0.327

Figure 20: Relation between PCGSDP & Per capita Expenditure on Social & Economic Services: General States



Note: Based on average of 3 years 2014-15, 2015-16 & 2016-17; Does not include Goa.

Figure 21: Relation between PCGSDP & Per capita Expenditure on Social & Economic Services: NE&H States



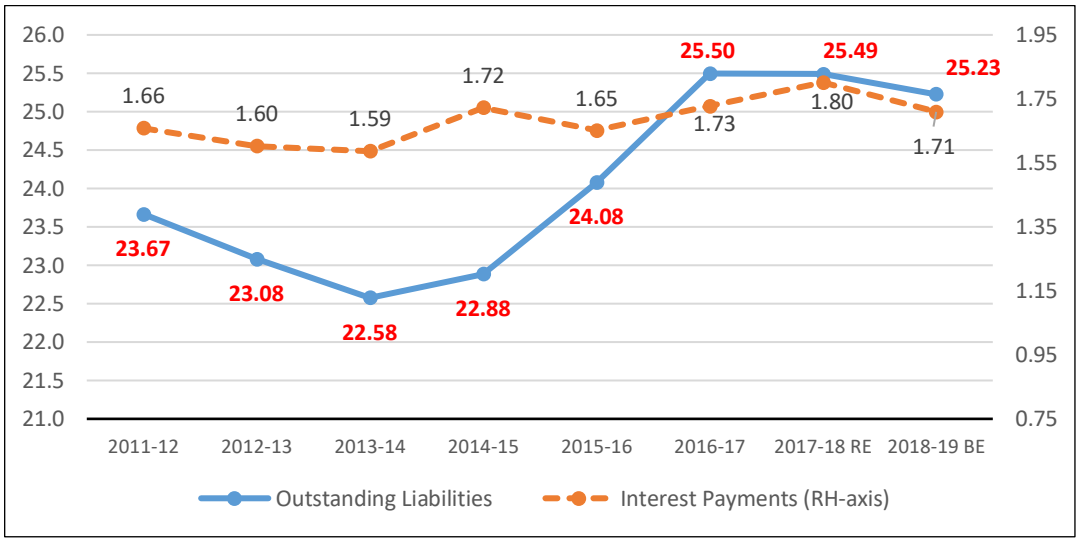
Note: Based on average of 3 years 2014-15, 2015-16 & 2016-17; Does not include Sikkim

1.7 Outstanding Liabilities

Outstanding liabilities aggregated across states as percentage of GSDP declined from 23.67 percent in 2011-12 to 22.58 percent in 2013-14. It increased to 24.08 percent in 2015-16 and further to 25.50 percent in 2016-17 (fig 22). In 2015-16, 16 states reported an increase in outstanding liabilities, and 22 states in 2016-17. The increase in outstanding liabilities 2015-16 and 2016-17 could be attributed to UDAY. Moreover, the new framework of borrowing recommended by the Fourteenth Finance Commission provided additional borrowing to fiscally prudent states.[9] This was implemented by the Union government from 2016-17, the second year of the award period of the Commission. Nine states were eligible for additional borrowings of 0.25 percent of GSDP and seven states for 0.50 percent of GSDP in 2016-17. This also contributed to increase in liabilities in outstanding liabilities in 2016-17. The outstanding liabilities aggregated across all states as percentage of GSDP is budgeted to marginally decline to 25.23 percent in 2018-19BE as evident from fig 22.

[9] For more details refer to Chakraborty et al. (2017).

Figure 22: Outstanding Liabilities and Interest Payments (% of GSDP)



Source: Finance Accounts and Budget documents of 29 State Governments

As a result on increase in outstanding liabilities due to UDAY and the new framework of borrowings by the Fourteenth Finance Commission, we see that the interest payments aggregated across all states as percent of GSDP which was around 1.65 percent in 2015-16 increased to 1.73 percent in 2016-17 and further to 1.80 percent in 2017-18RE (fig 22) . It is budgeted to decline to 1.71 percent in 2018-19BE.

1.8 Conclusions

Based on the analysis of State Budgets of 2018-19 we find that after an increase in fiscal imbalance in 2015-16, and 2016-17, states in aggregate show an improvement in FD-GSDP ratio in 2017-18RE and 2018-19BE. The increase in the FD-GSDP ratio in 2015-16 and 2016-17 is largely due to the taking over of 75 percent of DISCOM debt under UDAY in a staggered manner by state governments – 50 percent in 2015-16 and 25 percent in 2016-17. The outstanding liabilities aggregated across states also registered an increase in 2016-17 and 2017-18 on account of UDAY and the new framework of borrowings of the Fourteenth Finance Commission. The fiscal stance of the states in aggregate for 2018-19 is to bring back fiscal deficit below 3 percent of GSDP and generation of revenue surplus.

State have been complacent is raising resources from their own sources. The own tax revenues aggregated across all states as percentage of GSDP has been declining since 2012-13. A large number of states have shown a fall in their own tax revenues between 2014-15 and 2016-17. However, states have budgeted for a marginal improvement in 2017-18RE and 2018-19BE. As regards reporting and accounting of GST data in the state budgets is concerned especially those pertaining to IGST and GST compensation

there seems to be no uniformity or clarity in their reporting in the state budgets. The reporting and accounting of IGST and GST compensation data in state budgets needs to improve.

Total expenditures aggregates across states show an increasing trend. Both capital and revenue expenditure aggregated across states as percentage of GSDP have increased. We find that the increase in total expenditure is largely driven by the increase in expenditure on social services. The increase in social services expenditure is due to increase in expenditures in urban development, water supply and sanitation, welfare of SCs, STs and backward classes, relief on account of natural calamities and housing which account for about 39 percent of the expenditure on social services. Committed expenditures comprising salaries and wages, pension and interest payments as percent of revenue expenditure show a declining trend. However, this may increase as states start implementing the recommendations of the Seventh Central Pay Commission from 2017-18.

Chapter 2: Budget Credibility of Subnational Governments: Analyzing the Fiscal Forecasting Errors of 28 States in India

Budget credibility is integral to Public Financial Management (PFM). It is the ability of the governments to accurately forecast the macro-fiscal variables[10]. Fiscal marksmanship captures the extent of errors in the budgetary forecasting. The fiscal rules can determine fiscal marksmanship as effective fiscal consolidation procedure affects the fiscal behaviour of the states. Even logical and well-written fiscal rules require justification, given that constraining a government's ability to practice fiscal policy has obvious disadvantages as well (Auerbach, 2017). Against this backdrop, we analyse the errors in the budget forecasts in India at the State level for the period 2011-12 to 2015-16. The FRBM (Fiscal Responsibility and Budget Management) stipulated that States should maintain a fiscal deficit to GDP threshold ratio of 3 percent except for West Bengal, Kerala and Punjab (Fiscal Responsibility and Budget Management (FRBM) Committee Report, 2017). The FRBM compliance by the States has been rewarded by performance incentive grants by the central government. Therefore, two issues are relevant here to analyse, (i) the credibility of budget forecasts and (ii) if there are any changes in fiscal behaviour of the States ex-post fiscal rules.

Technically, the revenue and expenditure forecasts are initially made in the annual *Budget Speech* by the Finance Minister as "*Budget Estimates*", and these forecasts are revised after a year which are published as "*Revised Estimates*". The Finance Accounts of the States with a lag of one or two years provide the "*Actual*" figures for audited revenue and expenditure. There is a high likelihood for huge deviations between these three stages.

We examine these deviations in macro-fiscal variables for 28 States (except Telangana) in India by employing a technique which estimates the magnitude and the sources of forecast errors. The paper is organized in 5 sections. Section 1 explains what forecast error is and why studying the forecast error is important. Section 2 reviews the fiscal marksmanship analysis. Section 3 explains the data sources and measurement issues. Section 4 presents the magnitude of errors using simple statistical tools. Section 5 carries out the application of the Theil's U techniques for the evaluation of fiscal marksmanship and identify the systemic and random components of forecast errors for all States in India. Section 6 concludes and draws policy implications.

[10] This chapter was presented in the International Institute of Public Finance meetings on "Taxation and Mobility" in Glasgow in August 2019. This paper was also published as a Working Paper from the Levy Economics Institute of Bard College, New York, July 2020.

I What is forecast error and why analyzing forecast error is important?

Any budget has three sets of numbers, the budget estimates for the current year, the revised estimates of the ensuing year and the actuals. The credibility of the budget depends on the quality of the budgetary estimates.

There can be various issues arising if the government estimates are inaccurate, which at times can have unintended/adverse macroeconomic consequences. In cases where the actual expenditure exceeds the budgeted, there would be an unanticipated need of financing the deficit. Conversely, if the actual expenditure is less than the budgeted, then there would be idle resources which can otherwise be put to productive use. Therefore, having accurate forecasts are quintessential for proper implementation of the budget.

Accurate fiscal forecasts are also important for fiscal management. For instance if a country wants to reduce fiscal deficit, one needs to rely on the accuracy of the budgetary estimates of its revenues and expenditures. Generally, the budgetary estimates will consist of errors i.e. the forecasts would deviate from the actual values. However, not all errors can be treated similarly. Primarily one can distinguish between systematic errors and random errors. The systematic errors can be improved upon by incorporating additional relevant variables or even factoring in the variations in the different variables involved. On the other hand, random errors are the errors which cannot be improved upon by improving upon the forecasting methodologies/techniques and is because of unanticipated and exogenous shock which out of control of the forecaster. Therefore, credible budgetary forecasts would have a higher proportion of random errors compared to systematic error. It is only when the estimates are credible that one can maintain a desired level of fiscal deficit.

The Theil's Index is used in the literature assess the extent of errors. To know the composition of errors we break down the error into systematic error and random error. If the systematic component of error is high, one can improve the forecasting by improving the forecasting method. This can be done adding more variables into the forecasting model or also by incorporating the fluctuations in the variables in the model. In case the random error is high, one cannot improve the forecasting further and the model used to estimate the error is a good model (Theil, H 1958).

Effective fiscal consolidation at subnational government levels requires a high degree of accuracy in forecasting tax revenue and in estimating public expenditure. Fiscal Marksmanship is an exercise to examine the degree of correspondence between the actual and forecasted revenue and expenditure which will aid in

assessing the extent of errors and also the composition of errors. The fiscal marksmanship is significant because the revenue projections/forecasting determine the extent of borrowing requirements to finance the public expenditure. The public expenditure compression – the significant deviation between "what is budgeted" and "what is actually spent"- to meet the FRBM targets also have adverse macroeconomic consequences.

II A Review of Fiscal Marksmanship Analysis

The political economy of budget deficit and other macro-fiscal variables have started gaining attention since the nineties (Alesina, Alberto and Roberto Perotti, 1995; Blanchard Olivier, 1990). However, one of the earlier attempts on fiscal forecast errors was made by Allan (1965) in the case of Britain. According to Allan, the importance of fiscal marksmanship during that time was because that the margin for error was limited, given the tradeoff between inflation and full employment. In such a scenario, accurate predictions of budgetary estimates were important to meet the fiscal policy targets of having full employment without undesirably high inflation. Davis (1980), following up on Allan's study has taken a longer time series (from 1951 to 1978).

Auld (1970) has done a fiscal marksmanship exercise for Canada for the post war period (till 1968). Auld says that if the government is to finance its long range programmes, accurate predictions is important. Morrison (1986) has done a fiscal marksmanship exercise in the United States for the years 1950-1983. Cassidy, Glenn, Mark. S. Kamlet, and Daniel S. Nagin (1989) analysed the revenue forecast biases in the context of Europe. The expectations of macro-fiscal variables may be subject to error has been recognized as an important part of most explanations of the changes in the level of economic activity (Muth, 1961). Fiscal marksmanship is the accuracy of budgetary forecasting. Good fiscal marksmanship can be one important piece of available information the rational agents must consider in forming expectations. The significant variations between actual revenue and expenditure from the forecasted budgetary magnitudes could be an indicative of non-optimization or non-attainment of set objectives of fiscal policy. In this context, the role of budget estimates needs to be emphasized as *fiscal signals* (Davis 1980), where he noted that budget estimates have an important 'signal effect' on outside forecasters and analysts, with particular attention in recent years focused on the estimated borrowing requirement. If expectations are rational rather than adaptive, it is the estimate of taxes and public expenditure in any given budget - the ex-ante data, not the observed data that will be used by forward-looking private agents who base their decisions in whole or in part on fiscal variables (Morrison, 1986).

In the context of Eurozone, Stephan Andreas and Brück Tilman (2005) have estimated the political economy determinants of budget deficit forecast errors. Their findings show that political, electoral cycles and the institutional design of governments affects the quality of fiscal forecasts. Their findings against the backdrop of Stability and Growth Pact (SGP) suggest incentives for "unobservable fiscal effort" (Beetsma and Jensen 2004) of a malign nature, by eurozone governments (compared to other OECD governments) in reporting their budget deficits prior to elections. They explained the fiscal behaviour under three cycles- an electoral forecast cycle, partisan forecast cycle and an institutional cycle.[11] They applied panel econometric techniques to the analysis of forecast errors of both euro zone and non-euro zone OECD economies. Their findings suggest that the forecast errors are more with election cycles in euro zone countries.

Xisco Oliver[SEP]Joan Rosselló (2016) in the context of Stability and Growth Pact, have examined the relationship between fiscal rules and budgetary forecasts by analyzing the significance of political and institutional variables in Eurozone. Their findings showed that level of public sector debt is crucial in explaining budgetary forecast errors. The electoral coincidence, political orientation of ruling parties, tax autonomy and per capita revenue are the other significant determinants of forecast errors. This study took the literature forward to subnational tiers of government in 15 European countries, unlike the earlier studies in the context of Eurozone which have confined their analysis on a macroeconomic perspective at the national government levels. The Stability and Growth Path therefore creates incentives for creative budgetary deficit forecasts prior to election cycles (Strauch et al 2004).

Luisa Giuriato, Alessandra Cepparulo and Matteo Barberi (2016) analysed the quality of fiscal forecasts of 13 EU countries by using annual forecast vintages, 1999-2013 against the backdrop of Stability and Convergence Programme. They found that if fiscal rules counter the executive's monopoly of fiscal forecasting, strengthening the legislature's formal powers negatively influences the fiscal forecast accuracy. Pina Álvaro and Nuno Venes (2011) analysed the budget balance forecasts prepared by 15 European countries in their "Excessive Deficit Procedure (EDP)"reportings. They found that growth surprises, fiscal

[11] They emphasized that in an electoral forecast cycle, election date determines the nature of government spending and taxation plans, for instance, government may increase public expenditure and revise taxation plans prior to election date and manipulate the emerging budget deficit until after the elections. In a partisan forecast cycle, they have elaborated that a cyclical behaviour derives from different preferences of the political parties and their respective voters. The quality of budget deficit forecasts in such a cycle depends on the political orientation of a government, for instance, the left-wing (right-wing) governments pursue employment (price stability) at the expense of price stability (employment) which means that tax revenues are more (less) difficult to forecast. In an institutional forecast cycle, they elaborated that the institutions of governance create incentives for manipulating budget deficit forecasts, for instance, the deficit forecasts of a coalition or minority government and a single-party majority governments may not be the same. Artis, Michael J. and Massimilano Marcellino (2001) also analysed the forecast errors of OECD countries.

institutions, elections cycle, forms of fiscal governance and numerical expenditure rules (unlike deficit and debt rules) affect the forecast errors.

There have been a number of fiscal marksmanship exercises in the case of India (Bhattacharya, and Kumari 1988). In one of the earlier attempts at analyzing budgetary estimates in India (for 1956-64), Paul and Rangarajan (1974) has done an analysis of two components of the capital expenditure of the state and union budget, namely construction and industrial development (the analysis was limited to these two because of the scope of the subject matter they were dealing with). In this study, the analysis of forecasting errors were based largely on graphs plotting the actual expenditure and the budget estimates. In their analysis, it is stated that while in both the components the budget estimates of the center was more accurate compared to the state. This difference was attributed to the different in efficiency in the budgetary process.

Asher (1978) has performed a more comprehensive fiscal marksmanship exercise for India for the period 1967-68 to 1975-76 for both the revised and budget estimates. The study showed that during that period, both the revenues and expenditures were consistently underestimated. However, it was observed that the extent of error for the expenditure side was larger.

Chakrabarty and Varghese (1982) have used data from 1970-71 to 1979-80. One of the major findings of that study was that both revenues and expenditure are underestimated. Pattnaik (1990) has done a fiscal marksmanship exercise using the Theil's Index for the period 1951 to 1989. The study observes that the errors in the revised estimates are lower than the errors in the budget estimate (although there are large errors in both). It is stated that largely most of the errors in the estimates are systematic in nature for both the entire time period as well as sub time periods (the systematic errors were maximum for the period 1981 to 1989).

More recent studies on fiscal marksmanship in India have a different conclusion. A study done by K Nitin and Roy (2015) using data from 1990-91 to 2011-12 observes that the source of error in components such as tax revenue, non-tax revenue, interest payments, defense revenue expenditure, plan revenue expenditure and fiscal deficit were primarily due to random error (in the paper, if the proportion of the random error is more than any of the bias component or the error in variance). The rest of the components such as subsidy expenditure, non-plan revenue expenditure, capital expenditure and non-debt capital receipts had a higher systematic error (mean error and slope error). A very interesting point made in the paper is that while there is an attempt to have fiscal consolidation by controlling expenditure, the predictability of expenditure is quite low compared to revenue. In a similar study, Chakraborty and Sinha (2018) has done a fiscal marksmanship exercise for the period 1990-1991 to 2016-17 and have come up with a similar

conclusion.

A trend which is observed based on the empirical literature is that from 1951 to 1990, the systematic component of the error was higher, from 1990 to 2016-17, the random component is higher compared to the systematic component. It is worth noting that, that these studies are based on data of the union government. Shrestha and Chakraborty (2019) is the only study that has examined the fiscal marksmanship in the context of a State in India. Their study focused on Kerala, and identified forecast errors with respect to tax revenue projections.

In the recent empirical literature, the fiscal forecast errors are analysed against the backdrop of fiscal rules. The political economy of fiscal forecasts at the subnational level depend on the tax autonomy and the nature of the intergovernmental fiscal transfer mechanism. The tax autonomy is heterogeneous across States. The intergovernmental fiscal transfers may be progressive if the transfer is designed to offset the inter-state fiscal disabilities.

In India, the Finance Bill 2018 has incorporated a few clauses (clauses 207–10) to amend FRBM Act, 2003, with special reference to eliminate the reference to "revenue balance" and using fiscal deficit as an operational parameter (Chakraborty and Chakraborty, 2018). Against these policy changes, it is pertinent to analyse the impact of fiscal rules on fiscal marksmanship of macro-fiscal variables in India. Buiter and Patel (2011) have analysed the fiscal rules in India, however the effect of fiscal rules on fiscal marksmanship in the context of India has not been analysed. As mentioned above, Nitin and Roy (2014) have analysed the normative fiscal assessments of the Finance Commission (FC) of India, and realization of fiscal policy with regard to Central Finances over the period 1990–2012.

The recent empirical literature on fiscal marksmanship is highly confined to the forecast errors of national governments in India (Chakraborty and Sinha, 2018, Nitin and Roy, 2014). There have been virtually no effort in doing a fiscal marksmanship exercise at the state level. In this paper, we attempt to do a fiscal marksmanship exercise at the state level from the year 2010-11 to 2015-16; analyzing the magnitude of the errors of the states and subsequently examining the nature of the errors. This is done in two ways: a) Firstly to check whether the errors are overestimates or under-estimates and b) To check the extent of systematic and random components in these fiscal forecast errors.

III Data and Measurement Issues

The data is organized from Finance Accounts of various States and CSO. The forecast error is defined as deviation between what is predicted (as Budget Estimates or Revised Estimate) and what is Actual. The

summary statistics usually used to measure forecasting errors in the empirical literature are the following (González Cabanillas, Laura and Alessio Terzi, 2012).

III.1: The Mean Error

The mean error (ME) refers to the average difference between the forecast and the actual. The mean error has been calculated by taking the average of the difference between the Predicted values (of both BE and RE) and the actuals over the period 2011/12 to 2015/16. We have divided the mean error by the sum of actuals of the reference period for a meaningful inference from data. The Mean error is a crude measure of quality of forecast as positive and negative errors can offset each other, thereby not giving us the exact magnitude of error. However, The ME is a pointer to a possible bias in the forecast.

III.2: The Root Mean Square Error

The root mean squared error (RMSE) is a measure of the relative size of the forecast error. In this paper, to calculate the RMSE the mean squared error is taken over the reference period after which the square root of the MSE is calculated. While this will give us the magnitude of error, it will not give any information on the direction of the error, i.e. whether the error is positive or negative. We have taken the RMSE as a proportion of the sum of actuals of the reference period. It takes reflects the fact that large forecast errors are more significant than small differences.

III.3: Theil's Inequality Coefficients (U)

Theil's inequality coefficient (U) is used to analyze the measure of accuracy of the budget forecasts. Theils' inequality coefficient is based on the mean square prediction error. The forecast error of Theil (1958) is defined as:

$$\mathbf{U_1} = \frac{\sqrt{1/n\sum (P_t - A_t)^2}}{\sqrt{1/n\sum P_t^{\,2}} + \sqrt{1/n\sum A_t^{\,2}}} \qquad (1)$$

where

U_1 = inequality coefficient

P_t = Predicted value

A_t = Actual value

n = the number of years

This inequality coefficient ranges from zero to one. When $P_t = A_t$ for all observations (a perfect forecast), U_1 equals zero[12].

The mean square prediction error (U_1) has been decomposed in order to indicate systematic and random sources of error. The systematic component is further divided into the proportion of the total forecast error due to bias and the proportion of total forecast error attributable to unequal variation. The derivation of equation 4 is given in detail in Davis (1980).

$$\mathbf{1} = \frac{(\overline{P} - \overline{A})^2}{1/n\sum(P_t - A_t)^2} + \frac{(Sp - Sa)^2}{1/n\sum(P_t - A_t)^2} + \frac{2(1-r)\,Sp.Sa}{1/n\sum(P_t - A_t)^2} \qquad (2)$$

In equation (2), P and A are mean predicted and mean actual changes respectively; Sp and Sa are the standard deviations of predicted and actual values respectively; and r is the coefficient of correlation between predicted and actual values.

The first expression of RHS of equation (2) is the proportion of the total forecast error due to bias. It represents a measure of proportion of error due to over prediction or under prediction of the average value. The second expression of the RHS of equation (2) is the proportion of total forecast error attributable to unequal variation. In other words, it measures the proportion of error due to over prediction or under

[12] Theils' second equation for inequality coefficient, which uses a revised measure of forecast error. Theil's (1966 and 1971) revised measure of inequality is as follows.

$$\mathbf{U_2} = \frac{\sqrt{1/n\sum(P_t - A_t)^2}}{\sqrt{1/n\sum A_t^{\,2}}}$$

This measure has an advantage that denominator does not contain P and the inequality coefficient does not depend on the forecast. In perfect forecast, U_2 equals to zero. U_2 does not have an upper bound.

A more rigorous measure of Theil's inequality statistics is also used, by incorporating the lags in the actuals and the difference of predicted value from the lag of the actuals to capture the magnitude of error.

$$\mathbf{U_3} = \sqrt{\frac{1/n\sum[Pt - at]^2}{1/n\sum[Pt]^2 + 1/n\sum[at]^2}}$$

Where $a = A_t - A_{t-1}$

$P_t = P_t - A_{t-1}$

n= no: of years

prediction of the variance of the values. The third expression on the RHS of the equation (2) measures the proportion of forecasting error due to random variation.

The first two sources of error are systematic. Presumably they can be reduced by the improved forecasting techniques; while the random component is beyond the controller of the forecaster (Intriligator, 1978; Pindyck and Rubenfield, 1998; Theil, 1966).

IV: Magnitude of Forecasting Errors

Our analysis showed that in 28 States, the overestimation of revenue receipts amount to 1.18 percent of GSDP, with respect to the forecast deviation between Budget Estimates (BE) and Actuals. The same ratio however has slightly reduced to 1.03 percent for Revised Estimates (RE) and Actuals. The underestimation (negative deviations of BE and Actuals) of revenue however is negligible (Table 1).

The State's own tax revenue alone showed 0.40 percent overestimation as percent of GSDP for all States with regard to forecast errors between BE and Actuals. The errors reduced to 0.22 percent of GSDP for RE-Actuals. The State's own non-tax revenue was cumulatively overestimated to the range of 0.11 percent while the Central transfers was overestimated to the range of 0.14 percent of GSDP. It would be interesting to analyse the reasons of this forecast errors in central transfers to all states. The design of cess and surcharges is an additional dimension for the reduction in the divisible tax pool central transfers to the States. The cumulative forecast errors/deviation between BE and Actuals was relatively higher for grants than tax transfers to all States, at a range of 0.66 percent for BE-Actuals (Table 1).

The cumulative overestimation of revenue expenditure of all States over the period 2011-12 to 2015-16 was 1.05 percent of GSDP with respect to the forecast errors between BE and Actuals (Table 2) . Within the revenue expenditure, the overestimation of social services (0.53 % with respect to RE-Actuals) is the higher than economic services and general services. This is broadly giving an indication that against the backdrop of fiscal rules at subnational level, expenditure compression happens more with the social sector spending. The cumulative overestimation of general services is 0.34 percent for BE-Actuals and lesser at 0.17 percent for RE-Actuals.

Table 1: Deviation between BE/RE and Actuals in Revenue Receipts as Percent of GSDP, 2011-12 to 2015-16

	Revenue Receipts		States' Own Tax Revenue		State's Own Non Tax Revenue		Share in Central Taxes		Grants From Center	
	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals
Over-estimation as a % of All State GSDP	1.20%	1.05%	0.40%	0.22%	0.11%	0.08%	0.14%	0.12%	0.67%	0.66%
Under-estimation as a % of All State GSDP	0.00%	-0.08%	-0.04%	-0.07%	-0.04%	-0.03%	-0.02%	-0.02%	-0.02%	0.00%

Source: Finance Accounts of States and State Budget documents (various years)

Table 2: Deviation between BE/RE and Actuals in Revenue Expenditure: as % of GSDP, 2011/12-2015/16

	Revenue Expenditure(total)		Social Services		Economic Services		General Services	
	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals
Over-estimation as a % of All State GSDP	1.05%	1.29%	0.37%	0.53%	0.19%	0.39%	0.34%	0.17%
Under-estimation as a % of All State GSDP	-0.01%	-0.10%	-0.02%	-0.05%	-0.05%	-0.02%	-0.03%	-0.05%

Source: Finance Accounts of States and State Budget documents (various years)

Table 3: Deviation between BE/RE and Actuals in Capital Expenditure, as % of GSDP, 2011/12-2015/16

	Capital Expenditure (total)		Social Services		Economic Services		General Services	
	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals
Over-estimation as a % of All State GSDP	0.39%	0.38%	0.15%	0.14%	0.20%	0.19%	0.08%	0.06%
Under-estimation as a % of All State GSDP	-0.02%	-0.01%	0.00%	0.00%	-0.05%	-0.02%	0.00%	0.00%

Source: Finance Accounts of States and State Budget documents (various years)

The cumulative overestimation of capital expenditure over the period under analysis was to extent of 0.38 percent of GSDP for both BE-Actuals and RE-Actuals (Table 3).

III.3.1: Mean Error (ME) and Root of Mean Error Square (RMSE)

Analyzing the mean error and root of mean squared error, we find that the values of MSE and RMSE (as a proportion of actuals) seems to be higher in the case of capital expenditure compared to revenue expenditure. This is true of almost all of states. Only in case of Haryana, Karnataka and Odisha, the MSE (as a proportion of actuals) is higher in revenue expenditure compared to capital expenditure (Table 4). Furthermore, only in Himachal, Karnataka, Kerala and Uttarakhand the RMSE as proportion of actuals is higher in case of revenue expenditure compared to capital expenditure. Secondly, the MSE and RMSE (as a proportion of actuals) is higher in case of non-tax revenue (including grants) compared to tax revenue (including tax transfers) at the all-state level. The all state ME as a proportion of actuals for total tax revenue is 0.0496 and the all-state ME for non-tax revenue as a proportion of actuals is 0.2049. Similarly in the case of RMSE, the all-state RMSE as a proportion of actuals for total tax revenue is 548.09 and the same for non-tax revenue is 1140.79. The main reason the ME and RMSE are higher for non-tax revenue is because the value of these two indicators are very high for the grants from the center. The RMSE as a proportion of actuals for grants from the center is 1157.62 and the RMSE for States own non tax revenue is only 372.02. Similarly, mean error of states own tax revenue is only 0.0544 whereas it is 0.282 for grants from the center.

Table 4: Mean Error (ME) and Root Mean Square Error (RMSE): Budget Estimates (BE) and Actuals

States	*State Own Tax Revenue*	*Share in Central Taxes*	*States Own Non Tax Revenue*	*Grants from Center*	*Revenue Expenditure*	*Capital Expenditure*	*Revenue Deficit*	*Fiscal Deficit*	*Primary Deficit*
Andhra Pradesh	0.04	0.04	-0.07	0.14	0.02	0.07	-0.45	-0.04	-0.11
	0.02	0.01	0.03	0.07	0.02	0.05	-0.17	-0.08	-0.16
Arunachal Pradesh	0.08	*0.01*	*0.22*	*0.11*	0.12	0.75	*-0.07*	*3.19*	*13.61*
	0.04	*0.00*	*0.05*	*0.06*	*0.02*	*0.17*	*0.27*	*-0.91*	*-3.98*
Assam	*0.07*	*0.05*	*0.10*	*0.51*	*0.33*	*1.56*	*1.42*	*0.64*	*0.93*
	0.02	*0.01*	*0.03*	*0.12*	*0.05*	*0.24*	*-0.50*	*-0.23*	*-0.34*
Bihar	*0.07*	*0.04*	*0.27*	*0.37*	*0.27*	*0.34*	*-1.52*	*1.18*	*2.39*
	0.02	*0.01*	*0.10*	*0.08*	*0.05*	*0.07*	*0.46*	*-0.27*	*-0.55*
Chhattisgarh	*0.11*	*0.06*	*0.26*	*0.54*	*0.17*	*0.31*	*0.96*	*0.19*	*0.26*
	0.02	*0.01*	*0.03*	*0.10*	*0.03*	*0.05*	*0.38*	*-0.13*	*-0.20*
Goa	*0.03*	*0.03*	*0.02*	*0.61*	*0.09*	*0.67*	*-8.79*	*0.90*	*4.02*
	0.01	*0.01*	*0.01*	*0.10*	*0.02*	*0.10*	*2.19*	*-0.25*	*-1.07*
Gujarat	*0.00*	*0.07*	*0.04*	*0.35*	*0.04*	*0.06*	*0.23*	*0.00*	*0.00*
	0.01	*0.01*	*0.01*	*0.07*	*0.01*	*0.02*	*0.12*	*-0.03*	*-0.12*
Haryana	*0.06*	*0.04*	*0.07*	*0.54*	*0.11*	*0.04*	*0.06*	*0.26*	*0.49*
	0.01	*0.01*	*0.02*	*0.11*	*0.02*	*0.05*	*-0.05*	*-0.11*	*-0.21*
Himachal Pradesh	-0.01	0.12	-0.02	0.08	*0.07*	*0.07*	*0.87*	*0.02*	*0.77*
	0.01	*0.03*	*0.05*	*0.02*	*0.01*	*0.01*	*-0.23*	*-0.03*	*-0.35*
Jammu and Kashmir	*0.05*	*0.04*	*0.14*	*0.19*	*0.01*	*0.56*	*7.68*	*-0.05*	*-0.16*
	0.01	*0.01*	*0.05*	*0.03*	*0.01*	*0.10*	*1.38*	*-0.29*	*-0.89*
Jharkhand	*0.15*	*0.04*	*0.19*	*0.86*	*0.22*	*0.31*	*0.81*	*0.09*	*0.20*
	0.03	0.01	0.04	0.18	0.04	0.07	0.25	-0.10	-0.21
Karnataka	-0.02	0.02	-0.06	0.34	0.25	-0.02	-0.43	0.03	0.06
	0.00	0.01	0.02	0.09	0.10	0.01	0.15	-0.03	-0.05
Kerala	0.06	0.04	0.05	0.24	0.16	0.18	0.60	0.43	0.92
	0.01	0.01	0.01	0.06	0.07	0.06	-0.36	-0.24	-0.50
Madhya Pradesh	0.01	0.05	0.02	0.29	0.10	0.07	-0.21	0.28	0.71
	0.01	0.01	0.01	0.08	0.02	0.02	0.04	-0.08	-0.20
Maharashtra	0.01	0.00	0.12	0.40	0.06	0.14	0.37	0.18	1.71
	0.00	0.00	0.02	0.08	0.01	0.02	-0.15	-0.07	-0.64
Manipur	0.08	0.04	0.30	0.15	0.15	0.33	-0.02	1.41	-4.61
	0.03	0.01	0.09	0.04	0.03	0.06	0.05	-0.32	1.05
States	*State Own*	*Share in*	*States Own*	*Grants*	*Revenue*	*Capital*	*Revenue*	*Fiscal*	*Primary*

	Tax Revenue	*Central Taxes*	*Non Tax Revenue*	*from Center*	*Expenditure*	*Expenditure*	*Deficit*	*Deficit*	*Deficit*
Meghalaya	-0.02	0.06	0.17	0.66	0.28	0.47	1.50	-0.20	-0.44
	0.03	0.01	0.08	0.14	0.07	0.09	0.34	-0.17	-0.28
Mizoram	-0.05	-0.01	0.09	0.15	0.14	0.40	-0.88	0.90	2.31
	0.01	0.01	0.04	0.03	0.03	0.08	0.54	-0.40	-0.97
Nagaland	-0.05	0.00	-0.11	0.09	0.14	0.29	-0.27	1.10	-20.32
	0.02	0.00	0.04	0.01	0.03	0.06	0.08	-0.32	5.69
Orissa	-0.01	0.02	-0.10	0.39	0.12	0.03	-0.40	0.80	2.71
	0.00	0.01	0.03	0.08	0.02	0.01	0.09	-0.22	-1.12
Punjab	0.09	0.03	0.51	0.37	0.08	0.77	-0.20	-0.49	-1.76
	0.02	0.01	0.12	0.10	0.02	0.17	-0.04	-0.18	-0.67
Rajasthan	0.02	0.00	0.01	0.17	0.06	0.12	2.16	0.18	0.31
	0.01	0.00	0.01	0.04	0.01	0.03	-0.63	-0.04	-0.07
Sikkim	-0.07	0.04	0.27	0.47	0.19	0.71	0.67	0.76	-127.83
	0.02	0.01	0.07	0.12	0.04	0.15	0.13	-0.29	34.27
Tamil Nadu	0.07	0.02	-0.02	0.10	0.05	0.14	-0.31	0.03	0.07
	0.02	0.01	0.02	0.02	0.01	0.03	-0.10	-0.02	-0.06
Tripura	0.04	0.03	0.03	0.15	0.11	0.30	0.06	1.26	-2.47
	0.02	0.01	0.03	0.03	0.02	0.05	0.04	-0.45	0.66
Uttar Pradesh	0.03	0.05	0.07	0.33	0.08	0.10	0.19	0.06	0.18
	0.01	0.01	0.03	0.09	0.01	0.02	0.08	-0.03	-0.08
Uttarakhand	-0.85	-0.48	-0.82	0.06	-0.60	-0.27	9.86	-0.74	-0.79
	0.15	0.09	0.16	0.01	0.11	0.06	1.84	-0.20	-0.26
West Bengal	0.02	0.04	0.22	0.13	0.02	0.34	-0.15	0.03	0.27
	0.01	0.01	0.11	0.04	0.01	0.06	-0.06	-0.03	-0.28

Note: the first figure is ME and the second figure is RMSE respectively.

Source: (Basic data), Finance Accounts of States and State Budget documents (various years)

Table 5: Mean Error (ME) and Root Mean Square Error (RMSE): Revised Estimates (BE) and Actuals

States	*State Own Tax Revenue*	*Share in Central Taxes*	*States Own Non Tax Revenue*	*Grants from Center*	*Revenue Expenditure*	*Capital Expenditure*	*Revenue Deficit*	*Fiscal Deficit*	*Primary Deficit*
Andhra Pradesh	0.01	0.01	-0.01	0.03	0	0.01	-0.09	-0.01	-0.02
	0.04	0.03	0.06	0.15	0.05	0.12	-0.4	-0.14	-0.27
Arunachal Pradesh	0.02	0	0.04	0.02	0.02	0.15	-0.01	0.64	2.72
	0.08	0	0.13	0.13	0.06	0.36	0.56	-2.03	-8.84
Assam	0.01	0.01	0.02	0.1	0.07	0.31	0.28	0.13	0.19
	0.05	0.03	0.07	0.26	0.17	0.79	-1.27	-0.3	-0.44
Bihar	0.01	0.01	0.05	0.07	0.05	0.07	-0.3	0.24	0.48
	0.05	0.02	0.22	0.18	0.13	0.17	1.07	-0.58	-1.18
Chhattisgarh	0.02	0.01	0.05	0.11	0.03	0.06	0.19	0.04	0.05
	0.07	0.03	0.16	0.27	0.09	0.15	0.81	-0.2	-0.31
Goa	0.01	0.01	0	0.12	0.02	0.13	-1.76	0.18	0.8
	0.02	0.02	0.02	0.34	0.04	0.32	4.7	-0.42	-1.84
Gujarat	0	0.01	0.01	0.07	0.01	0.01	0.05	0	0
	0.02	0.03	0.05	0.19	0.02	0.04	0.27	-0.04	-0.18
Haryana	0.01	0.01	0.01	0.11	0.02	0.01	0.01	0.05	0.1
	0.04	0.02	0.05	0.25	0.05	0.11	-0.1	-0.23	-0.45
Himachal Pradesh	0	0.02	0	0.02	0.01	0.01	0.17	0	0.15
	0.02	0.07	0.11	0.05	0.04	0.04	-0.66	-0.03	-0.74
Jammu and Kashmir	0.01	0.01	0.03	0.04	0	0.11	1.54	-0.01	-0.03
	0.03	0.02	0.12	0.1	0.01	0.28	3.68	-0.09	-0.23
Jharkhand	0.03	0.01	0.04	0.17	0.04	0.06	0.16	0.02	0.04
	0.09	0.02	0.09	0.41	0.1	0.15	0.56	-0.14	-0.29
Karnataka	0	0	-0.01	0.07	0.05	0	-0.09	0.01	0.01
	0.01	0.02	0.04	0.21	0.22	0.02	0.22	-0.02	-0.04
Kerala	0.01	0.01	0.01	0.05	0.03	0.04	0.12	0.09	0.18
	0.03	0.02	0.03	0.12	0.15	0.14	-0.81	-0.53	-1.12
Madhya Pradesh	0	0.01	0	0.06	0.02	0.01	-0.04	0.06	0.14
	0.02	0.03	0.04	0.17	0.05	0.05	0.17	-0.15	-0.4
Maharashtra	0	0	0.02	0.08	0.01	0.03	0.07	0.04	0.34
	0.01	0	0.05	0.2	0.03	0.08	-0.31	-0.1	-0.96
Manipur	0.02	0.01	0.06	0.03	0.03	0.07	0	0.28	-0.92
	0.07	0.03	0.2	0.08	0.07	0.15	0.12	-0.71	2.3
Meghalaya	0	0.01	0.03	0.13	0.06	0.09	0.3	-0.04	-0.09
	0.07	0.03	0.18	0.33	0.16	0.23	0.77	-0.25	-0.55
Mizoram	-0.01	0	0.02	0.03	0.03	0.08	-0.18	0.18	0.46
	0.04	0.02	0.09	0.08	0.07	0.2	1.14	-0.56	-1.44
Nagaland	-0.01	0	-0.02	0.02	0.03	0.06	-0.05	0.22	-4.06
	0.04	0	0.09	0.05	0.08	0.15	0.18	-0.52	9.73
Orissa	0	0	-0.02	0.08	0.02	0.01	-0.08	0.16	0.54
	0.01	0.02	0.06	0.19	0.06	0.03	0.18	-0.37	-1.67
Punjab	0.09	0.03	0.51	0.37	0.08	0.77	-0.2	-0.49	-1.76
	0.04	0.03	0.28	0.21	0.04	0.37	-0.1	-0.41	-1.49
Rajasthan	0	0	0	0.03	0.01	0.02	0.43	0.04	0.06
	0.02	0	0.02	0.09	0.03	0.06	-1.29	-0.08	-0.14

States	*State Own Tax Revenue*	*Share in Central Taxes*	*States Own Non Tax Revenue*	*Grants from Center*	*Revenue Expenditure*	*Capital Expenditure*	*Revenue Deficit*	*Fiscal Deficit*	*Primary Deficit*
Sikkim	-0.01	0.01	0.05	0.09	0.04	0.14	0.13	0.15	-25.57
	0.05	0.03	0.15	0.22	0.09	0.32	0.31	-0.37	62.99
Tamil Nadu	0.01	0	0	0.02	0.01	0.03	-0.06	0.01	0.01
	0.04	0.01	0.04	0.07	0.02	0.07	-0.27	-0.03	-0.07
Tripura	0.01	0.01	0.01	0.03	0.02	0.06	0.01	0.25	-0.49
	0.04	0.03	0.06	0.08	0.06	0.14	0.12	-0.65	1.33
Uttar Pradesh	0.01	0.01	0.01	0.07	0.02	0.02	0.04	0.01	0.04
	0.02	0.03	0.06	0.18	0.04	0.06	0.2	-0.06	-0.15
Uttarakhand	-0.17	-0.1	-0.16	0.01	-0.12	-0.05	1.97	-0.15	-0.16
	0.39	0.22	0.37	0.03	0.28	0.14	6.34	-0.38	-0.55
West Bengal	0	0.01	0.04	0.03	0	0.07	-0.03	0.01	0.05
	0.02	0.03	0.19	0.09	0.01	0.16	-0.14	-0.07	-0.6

Note: the first figure is MSE and the second figure is RMSE respectively.

Source: (Basic data), Finance Accounts of States and State Budget documents (various years)

III.3.2: Forecasting Errors: Overestimate or Underestimate?

One of limitations of RMSE is that we cannot find the sign of the error, i.e. whether the error was positive or negative. We attempt to calculate fiscal marksmanship indices in this section which would help us assess whether the budgetary estimates are overestimates or underestimates. This ratio would give us information on whether the BE (RE) is an underestimate or an overestimate. If the values of the ratio is above 1, this indicates that on average, the indicator has been overestimated. Conversely, if the value is below 1 it can be said that it is an underestimate. In case of BE, it can be observed that most of the categories are overestimated in both the revenue and the expenditure side.

Table 6: Descriptive Statistics of Fiscal Marksmanship Ratio: Revenue and its Components (BE/ Actuals)

	Total Revenue Receipt	Tax Revenue	States Own Tax Revenue	Share in Central Taxes	Non Tax Revenue	States Own Tax Revenue	Grants From Center
Median	1.115	1.029	1.003	1.056	1.210	1.120	1.332
Mean	1.118	1.039	1.097	1.038	1.241	1.156	1.325
Max	1.360	1.223	1.072	1.166	1.698	2.191	2.121
Min	1.012	0.916	0.952	0.866	0.839	0.828	0.803
Standard Deviation	0.087	0.056	0.077	0.053	0.199	0.280	0.269

Source: (Basic data), Finance Accounts of States and State Budget documents (various years)

On the total revenue receipt, all the states have the overall revenue overestimated ranging

from a maximum value of 1.36 (Meghalaya) and a minimum value of 1.01 (Rajasthan). The median value of total revenue receipt is 1.12 (Table 6). Correspondingly, both the tax revenue and non-tax revenue are generally overestimated. However, there are a few states where there has been underestimation of tax revenue and non-tax revenue. Tax Revenue was underestimated in Karnataka and Orissa, and Non Tax Revenues were underestimated in Tamil Nadu and Rajasthan. An interesting observation from the data is that the standard deviation of this index for the non-tax revenues (for both the components states own non-tax revenue and grants from the center) were considerably higher than the tax revenues. In the table 6, the standard deviation for tax revenue is 0.053, whereas the standard deviation of non-tax revenue is 0.199. This shows that the ratio of BE and actuals are relatively more spread compared to tax revenues. An observation which is worth noting is that the higher standard deviation of the ratio of BE and actuals for non-tax revenue compared to tax revenue complements the fact that the ME and the RMSE also had similar trend. Coupling the results from the previous and this section, one can conclude that while the BEs are generally overestimated for both tax revenues and non-tax revenues, the errors are generally higher for non-tax revenues compared to tax revenues.

Table 7: Descriptive Statistics of Fiscal Marksmanship Ratio: Revenue Expenditure

	Revenue Expenditure	Social Services	Economic Services	Non Developmental Expenditure
Median	1.072	1.074	1.069	1.040
Mean	1.094	1.086	1.117	1.055
Max	1.279	1.432	1.715	1.319
Min	0.950	0.866	0.895	0.920
Standard Deviation	0.084	0.122	0.174	0.088

Source: (Basic data), Finance Accounts of States and State Budget documents (various years)

When we consider the expenditure side, we can observe that it is generally the case that both revenue expenditure and capital expenditure have been overestimated. In case of revenue expenditure all of the states except Nagaland and Assam have underestimates. In case of capital expenditure, all the states besides Karnataka, Uttar Pradesh and Himachal Pradesh have overestimates. However, one trend that can observed is the range and standard deviation of capital expenditure is much higher compared to revenue expenditure (both overall and component wise). The maximum and the minimum of the revenue expenditure is 1.279 and 0.95 respectively for revenue expenditure (Table 7). This range is considerably lower compared to the maximum and minimum of this index for capital expenditure which is 2.476 and 0.956 respectively (Table 8).

Table 8: Descriptive Statistics of Fiscal Marksmanship Ratio: Capital Expenditure

	Capital Expenditure	Social Services	Economic Services	Non Developmental Expenditure
Median	1.269	1.306	1.185	1.368
Mean	1.335	1.446	1.197	1.941
Max	2.476	3.305	2.113	9.879
Min	0.956	0.659	0.570	0.800
Standard Deviation	0.359	0.555	0.330	1.765

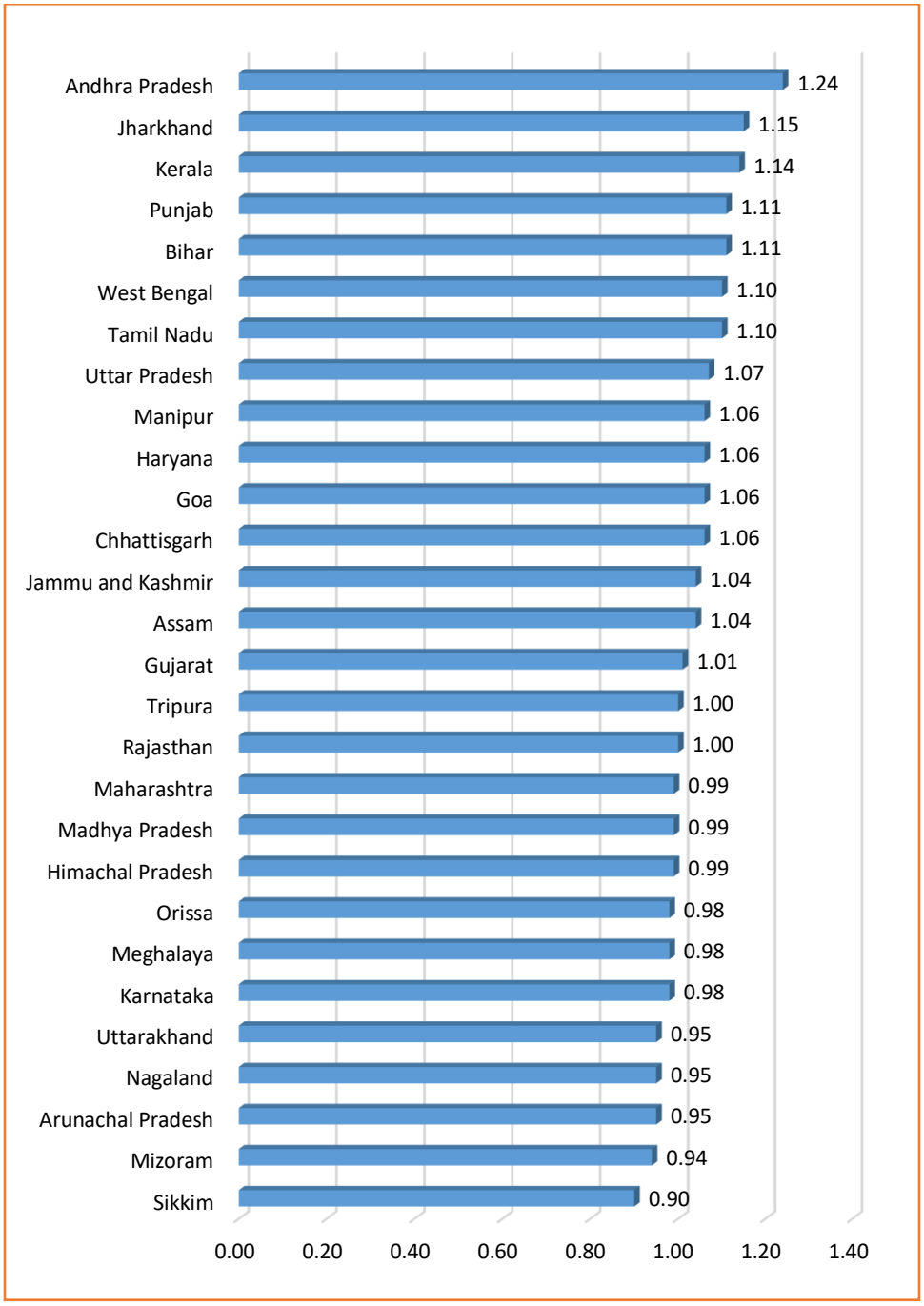
Source: (Basic data), Finance Accounts of States and State Budget documents (various years)

The standard deviation for capital expenditure is 0.359 which is around fourfold higher than the standard deviation of revenue expenditure (Table 8). It was observed in the previous section that the MSE and RMSE are higher for capital expenditure compared to revenue expenditure. Since most of the states had overestimates of both the revenue and capital expenditure it can be concluded that the forecasting errors in capital expenditure tends to be higher compared to revenue expenditure.

III.4: State-wise Fiscal marksmanship Ratios of Macro-fiscal variables

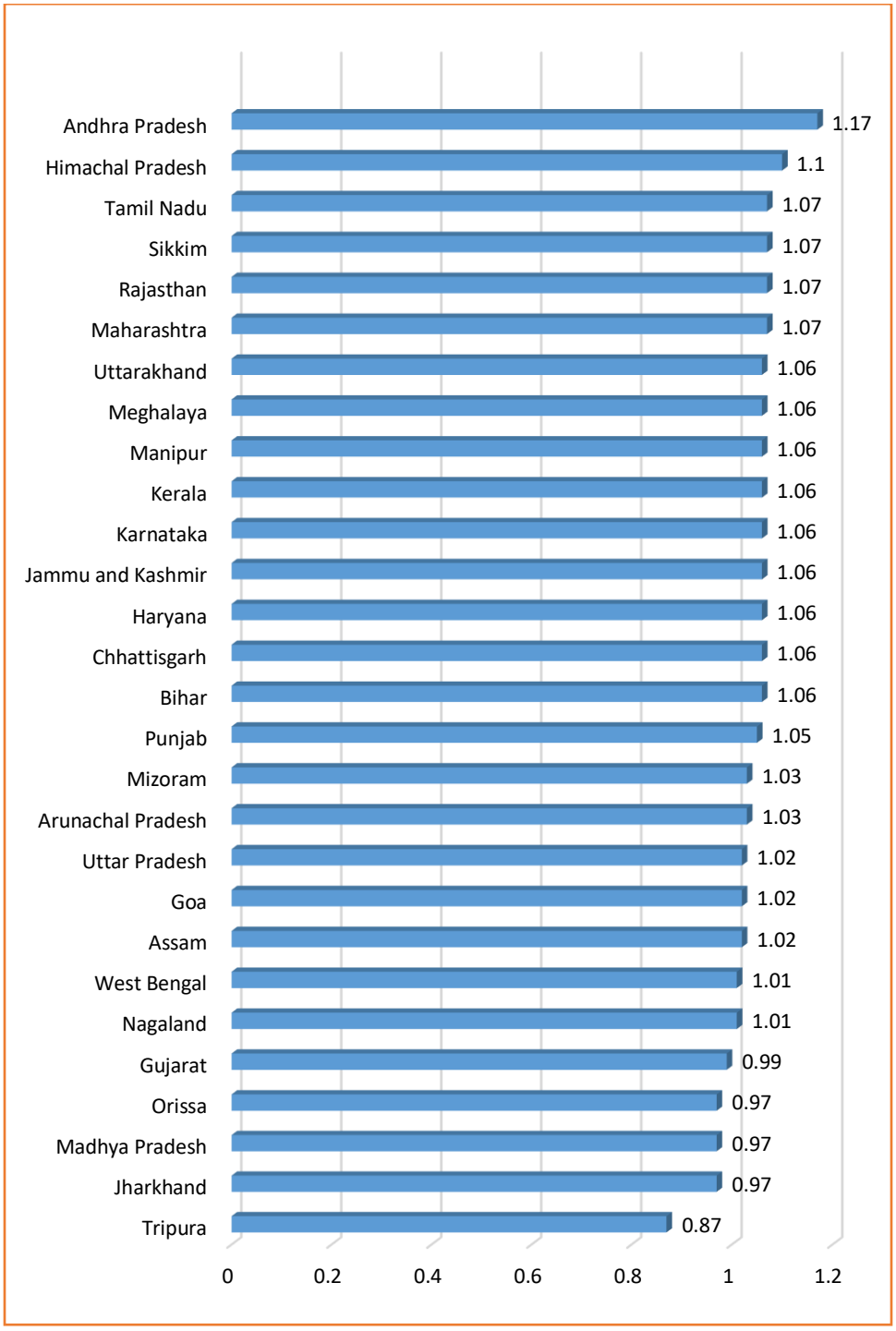
For fiscal marksmanship ratios, we have divided the BE by the Actual values and taken the average for the year 2011-12 to 2015-16. Therefore, if the values in the figures 1-5 is above 1, this indicates that on average, the indicator has been overestimated. Conversely, if the value is below 1 it can be said that it is underestimated. In case of BE, it can be observed that most of the categories are overestimated in both the revenue and the expenditure side. It can be observed that both the mean and median are over 1, indicating most of them are overestimated. When we observe the state wise trend, most of the categories have more than 20 states have an overestimate. One can observe a similar trend in the case RE. On average both the revenue and expenditure have been overestimated. In most of the categories there have been overestimate in over 20 states. It is worth noting that while most of the categories have overestimates, in case of revenue deficit, fiscal deficit and primary deficit merely 11, 18 and 16 states had underestimates. This is a trend similar to the BE. The fiscal marksmanship ratios suggest that forecast errors in grants is greater than other macro-fiscal variables (figure 3).

Figure 1: Fiscal Marksmanship Ratio of Own Tax revenue



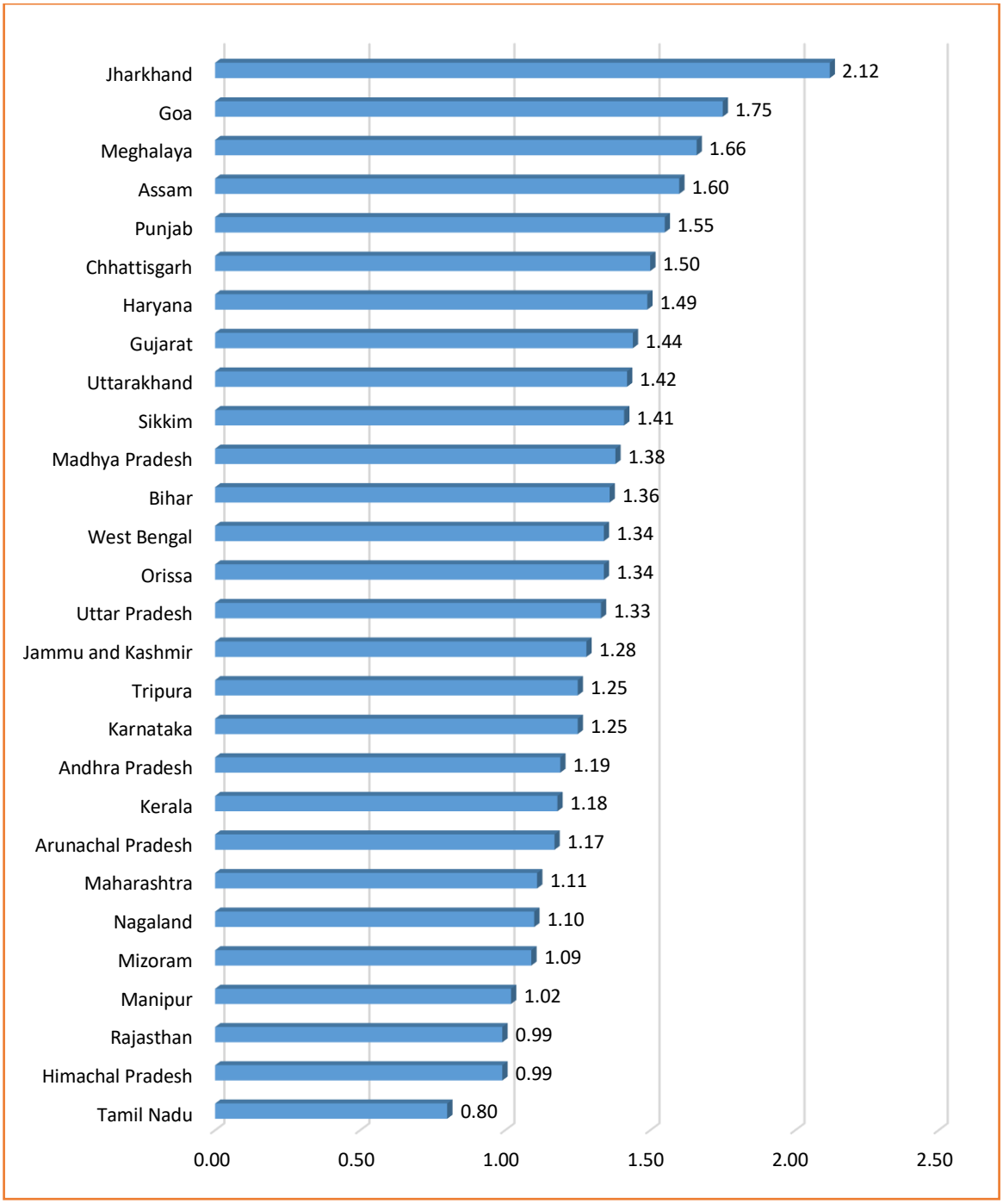
Source: Finance Accounts of States and State Budget documents (various years)

Figure 2: Fiscal Marksmanship Ratio of Tax Transfer



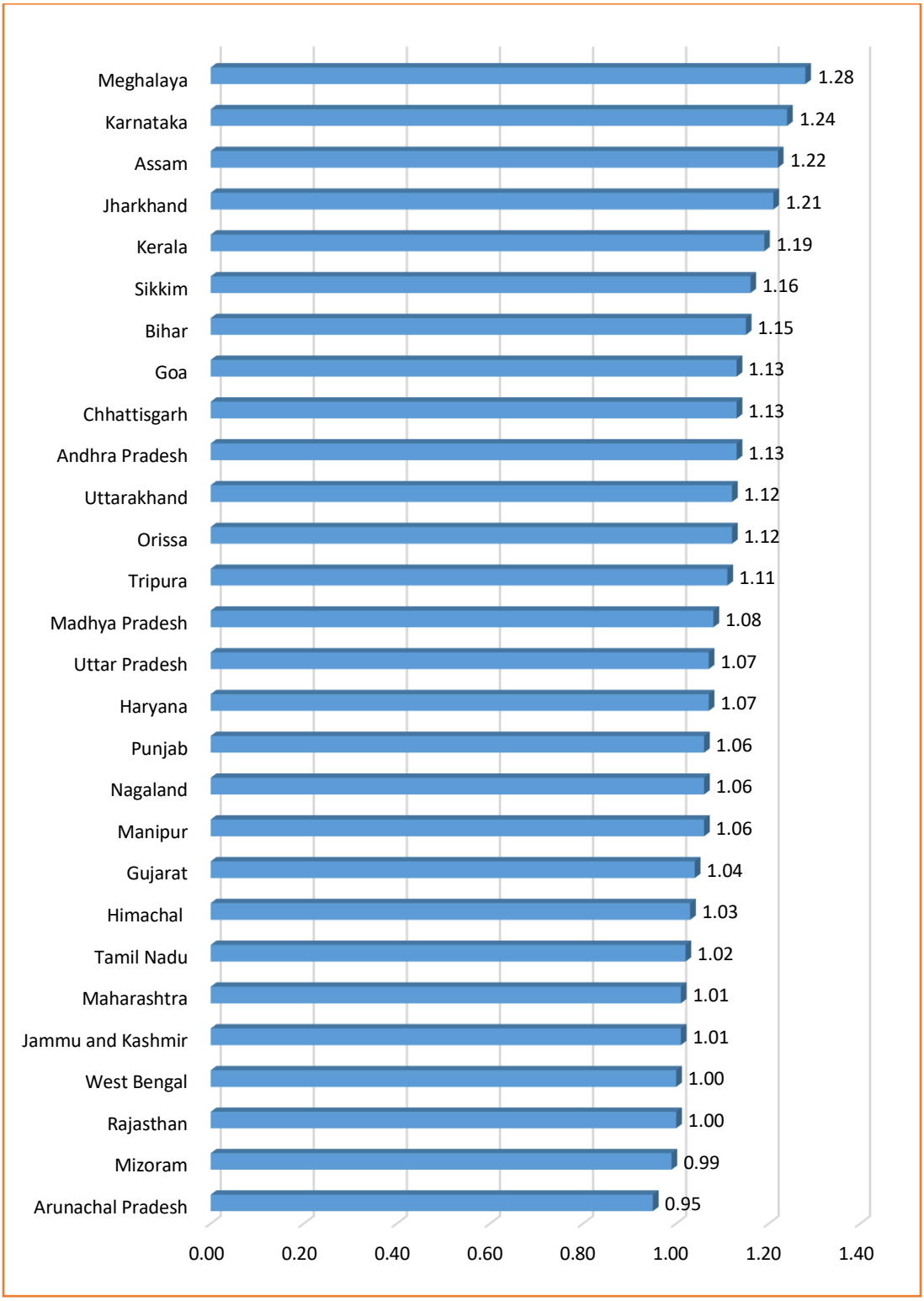
Source: Finance Accounts of States and State Budget documents (various years)

Figure 3: Fiscal Marksmanship Ratio of Grants



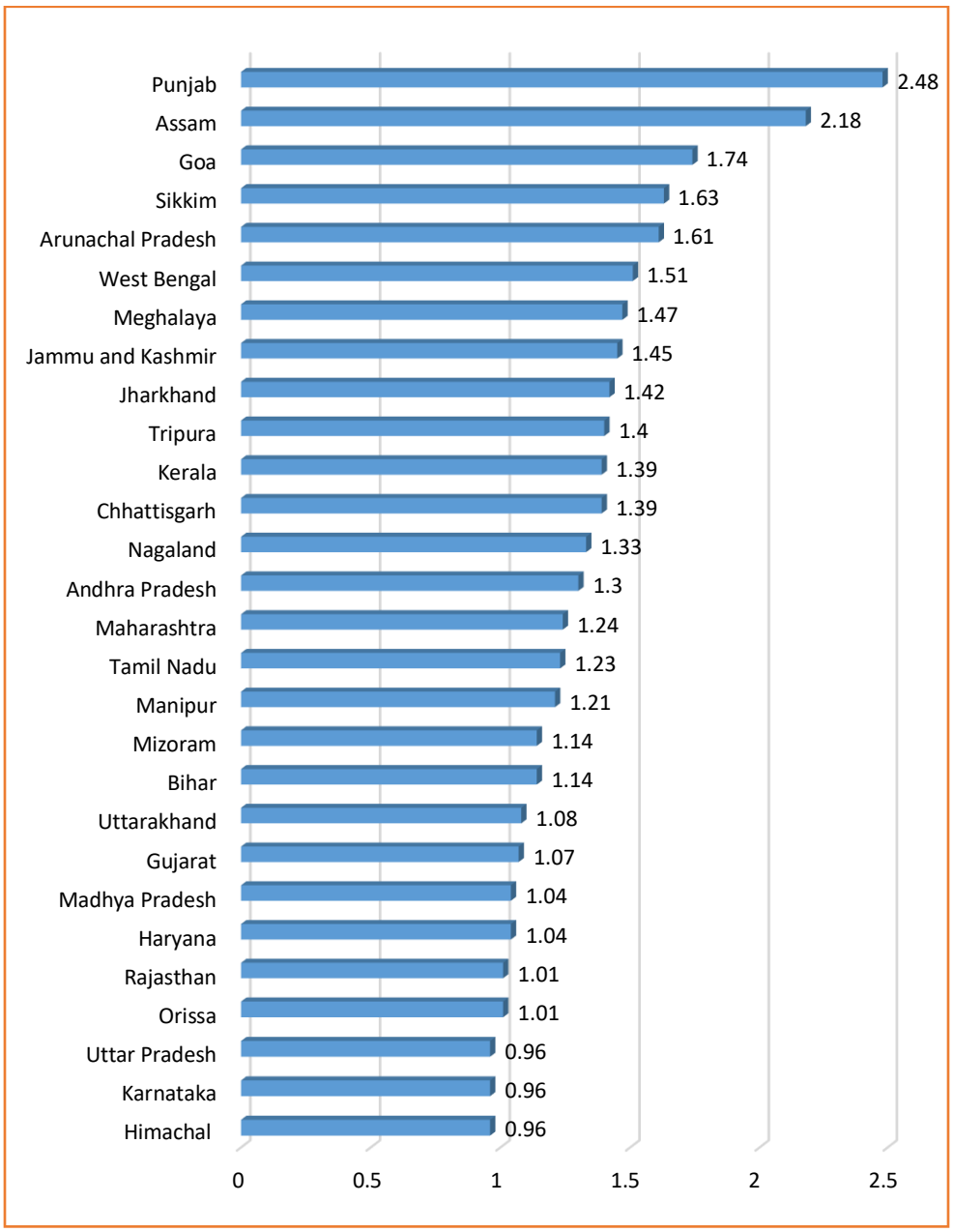
Source: Finance Accounts of States and State Budget documents (various years)

Figure 4: Fiscal Marksmanship Ratio of Revenue Expenditure



Source: Finance Accounts of States and State Budget documents (various years)

Figure 5: Fiscal Marksmanship Ratio of Capital Expenditure



Source: Finance Accounts of States and State Budget documents (various years)

V. Analyzing the Forecast Errors using Theil's U

The U_1 of the Theil's index has a lower limit of 0 (which is the case of perfect forecast) and an upper limit of 1 (which is the highest forecasting error). We will state some of the observations on the forecasting errors and elaborate on it using some basic statistical indicators.

V.1: The forecasting errors in most of the macro-fiscal indicators in most of states are generally low in both the revised and the budget estimate, to below 0.20 in a range of 0-1, with zero being perfect forecast and one, the imperfect forecast.

In the case of Budget Estimate, the average forecasting error in most of the revenue and expenditure are below 0.20. Furthermore, almost all of the variables (except the revenue deficit) is positively skewed (since median < mean). This means that a lot of the observations are clustered in to the left side of the interval of U_1 (i.e. 0 and 1), and most of them are below 0.20. One can observe that on average, both revenue and expenditure variables have low forecasting errors. We observe that the all-state average for total revenue receipt is 0.09. The all State average forecast error for the tax revenue is 0.074, and for non-tax revenue is 0.15. In case of the expenditure variables, the all India average is 0.08 for revenue expenditure and 0.177 for capital expenditure.

When we look at the error in estimating the fiscal deficit, the U_1 for fiscal deficit on average is 0.302. The states which have fiscal deficit forecast errors greater than 0.5 are only four, viz., Arunachal Pradesh (0.818), Assam (0.554), Mizoram (0.617) and Punjab (0.866). In case of revenue deficit, the value of U_1 was higher at 0.432. Seven States are with U_1 higher than 0.5, viz., Andhra Pradesh (0.672), Assam (0.94), Goa (0.59), Jammu and Kashmir (0.861), Kerala (0.532), Uttar Pradesh (0.669) and West Bengal (0.636).

A very similar observation can be made regarding the revised estimates (Tables 9 and 10). The average forecasting error in most of the revenue and expenditure are below 0.20. Similar to BE, all the variables are positively skewed. It is worth noting that in most of the major revenue and expenditure variables RE is better forecasted than BE (on average) (tables 9 and 10). For all the macro-fiscal variables among the states, the value of U_1 in RE is lower than BE.

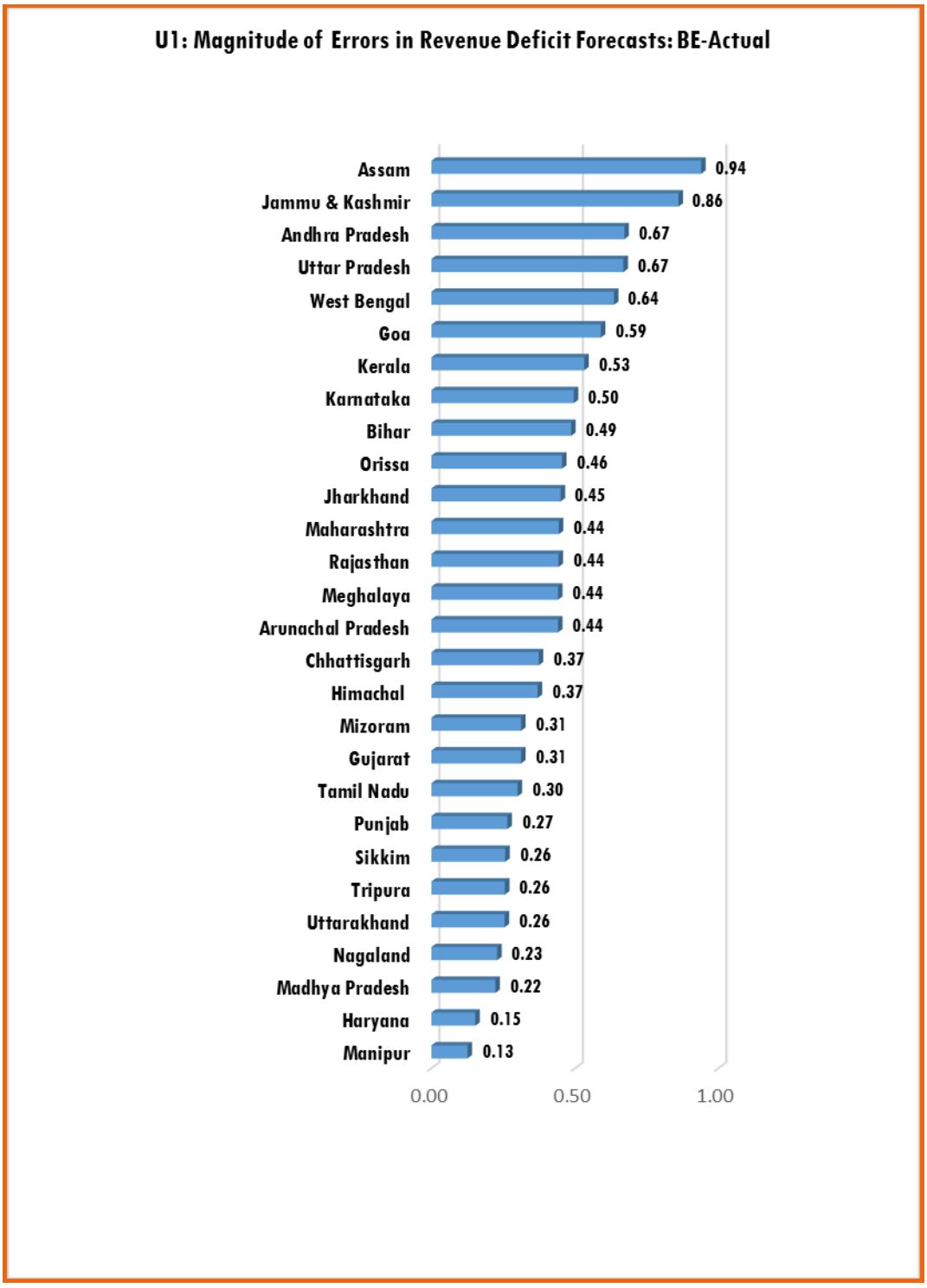
V.2: States having magnitude of errors above 0.30 threshold are as low as four in case of expenditure and 10 in case of revenue receipts

Applying the Theil's U, we have estimated the errors between the BE and the Actuals; and the RE and the Actuals. As mentioned above, the range of U_1 is between zero and one, the value zero of U_1 equals to perfect forecast. Figures 6 to 11 depict the magnitude of errors of macro-fiscal variables of subnational governments in India. The Maximum-Minimum range of U_1 for BE-Actuals revealed that the range of errors in revenue receipts is the higher than that of revenue expenditure and capital expenditure (Max for 0.83 in case of Arunachal Pradesh to minimum for 0.07 in case of Uttarakhand, figure 9).The U_1 magnitude of forecasts for the revenue receipts also revealed that around 10 States have magnitude of error greater than 0.30, viz, Arunachal Pradesh 90.83), Tripura (0.63), Punjab (0.63), Tamil Nadu (0.53), Nagaland (0.53), Mizoram (0.52), Assam (0.51), Jammu and Kashmir (0.47), Goa (0.45) and Uttar Pradesh (0.34).

On the contrary, the magnitude of errors above 0.30 threshold in case of revenue expenditure are noted for only 4 States, viz., Jammu and Kashmir (0.50), Punjab and Assam(0.37) and Arunachal Pradesh (0.30) (Figure 10). In case of capital expenditure also, magnitude of error is highest in case of Jammu and Kashmir at 0.48, followed by Punjab (0.39), Assam (0.37), Goa (0.311) and Arunachal Pradesh (0.25). The minimum error in capital expenditure forecast is noted for Karnataka at 0.034 (figure 11).

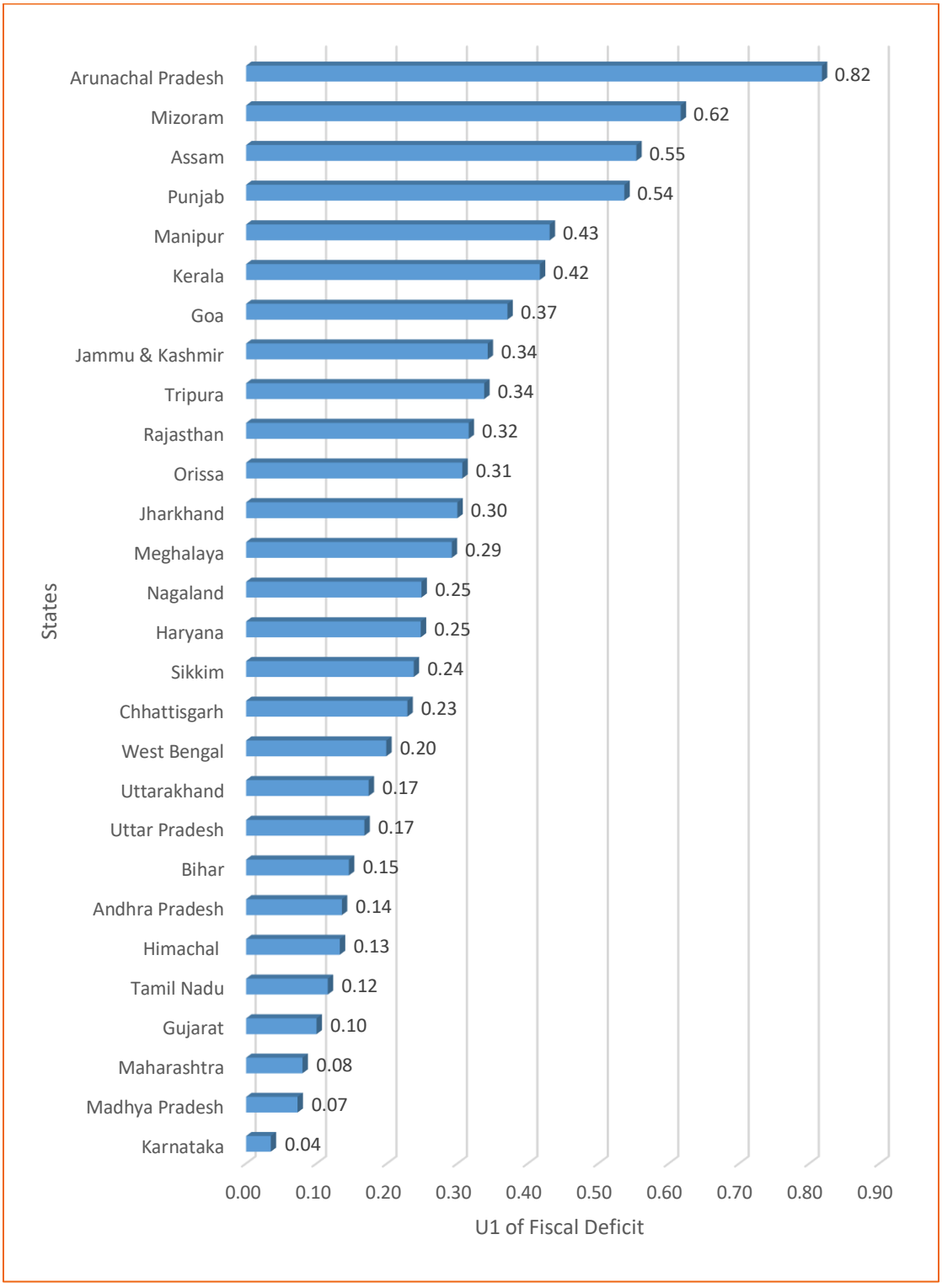
Looking at the end of the tail, around 16 states have magnitude of error lower than 0.15 threshold in case of revenue expenditure (figure 10); on the contrary the lower end of the tail is scarce for revenue receipts with only 8 state have revenue receipts forecast errors less than 0.15 threshold(figure 9). The lower end of forecast errors in capital expenditure, below 0.15 threshold was noted for 15 States.

Figure 6: U_1 for Revenue Deficit: Magnitude of Errors (BE-Actual), 2011-12 to 2015-16



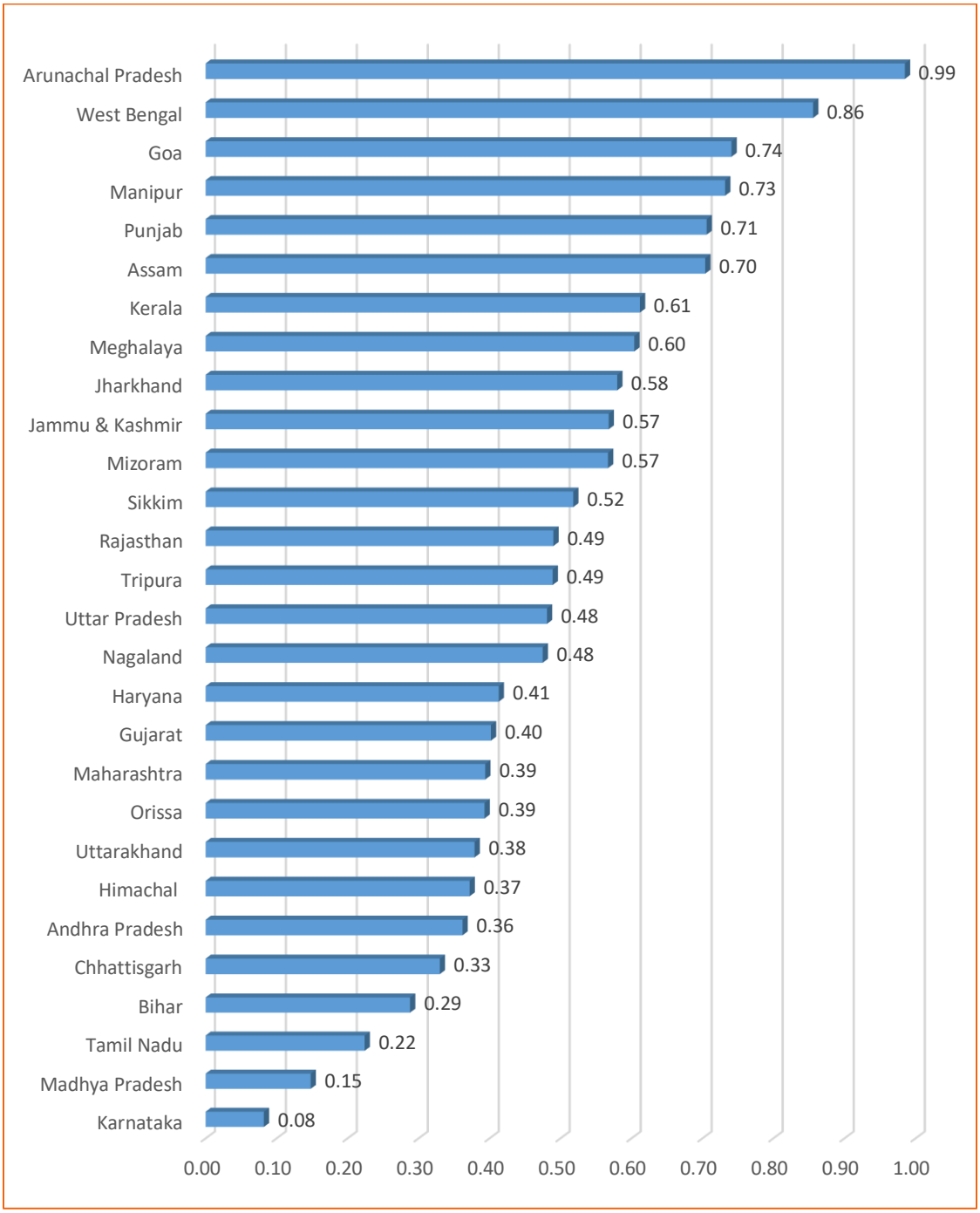
Source: Finance Accounts of States and State Budget documents (various years)

Figure 7: U_1 for Fiscal Deficit: Magnitude of Errors (BE-Actual), 2011-12 to 2015-16



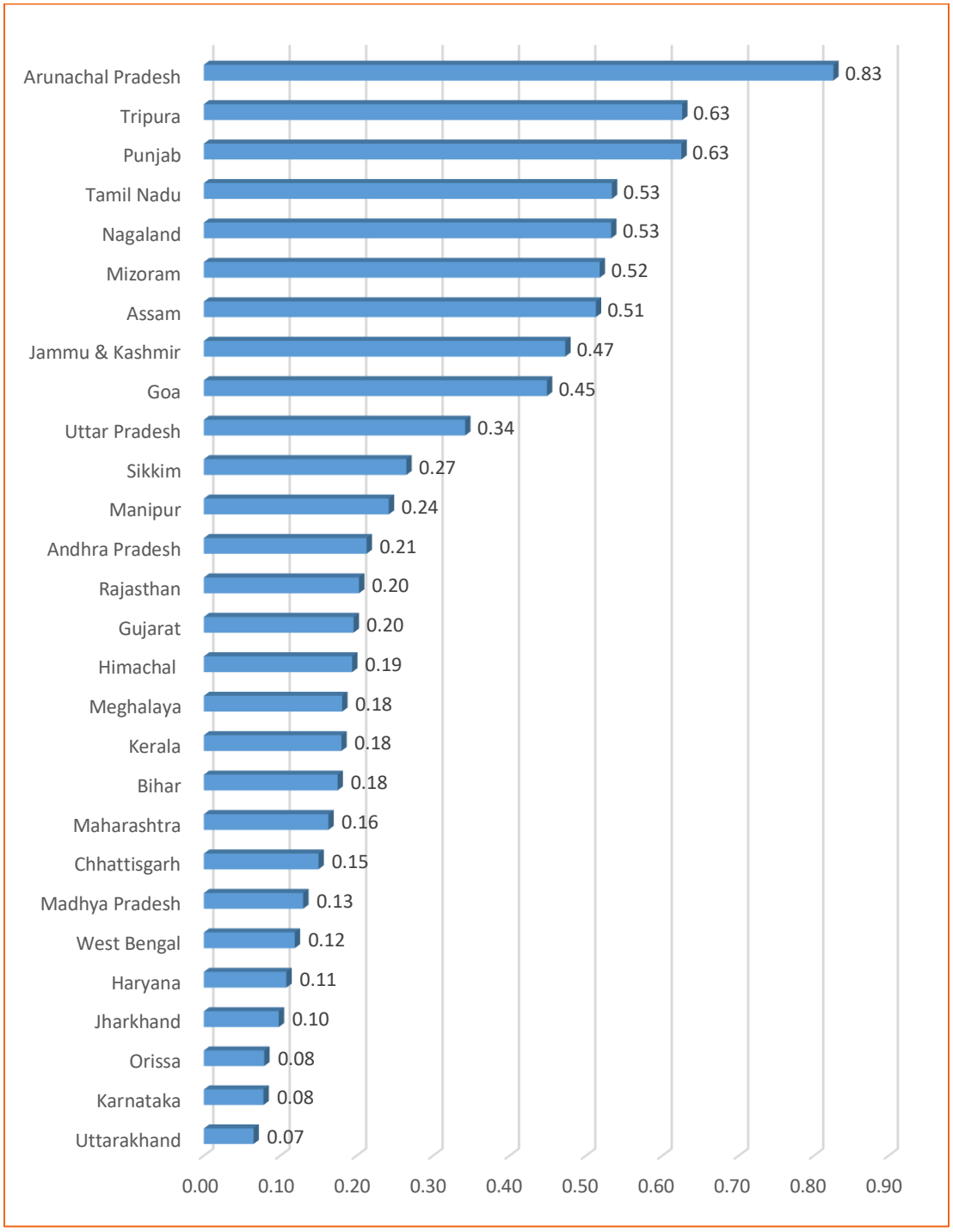
Source: Finance Accounts of States and State Budget documents (various years)

Figure 8: U_1 for Primary Deficit: Magnitude of Errors (BE-Actual), 2011-12 to 2015-16



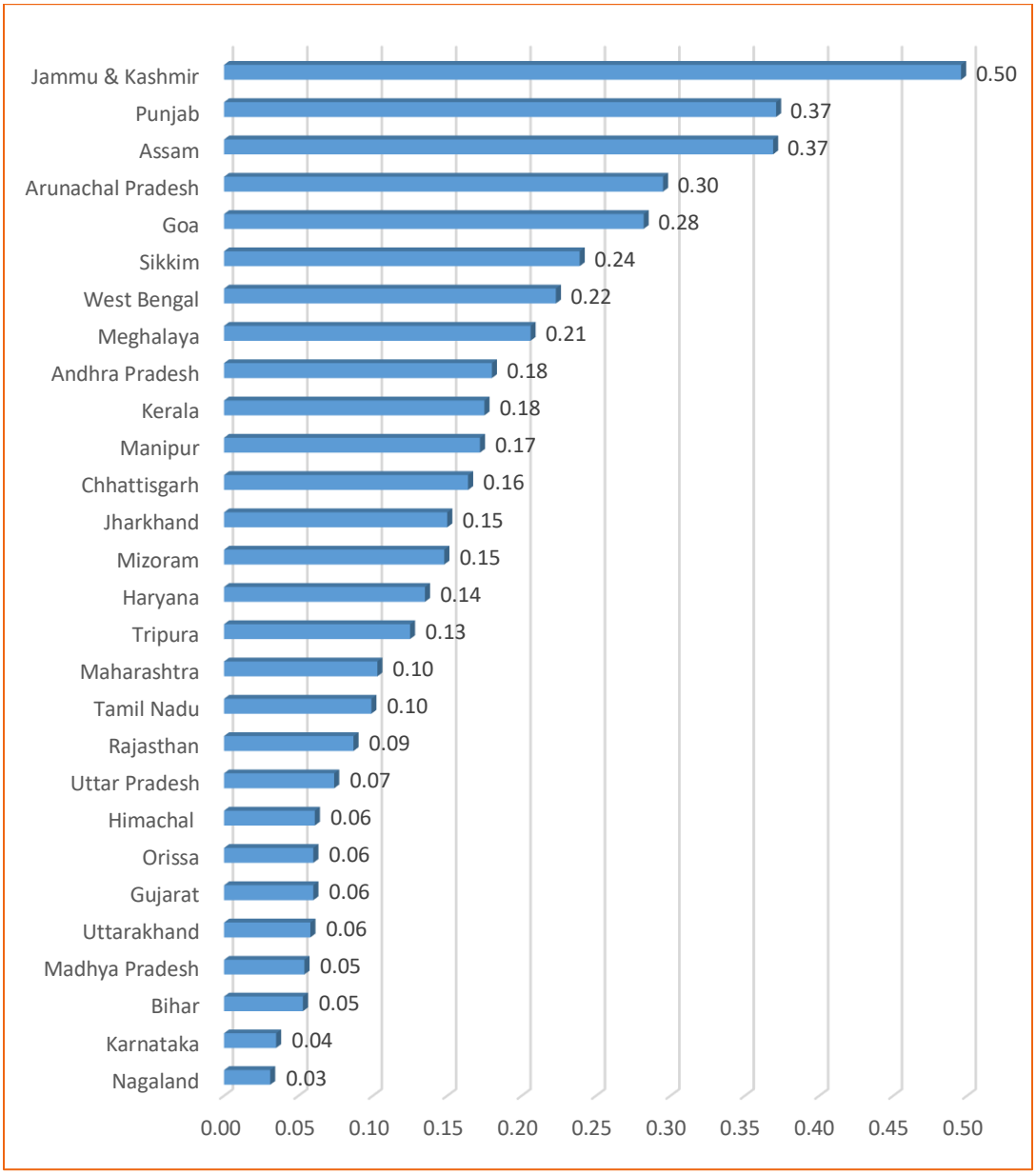
Source: Finance Accounts of States and State Budget documents (various years)

Figure 9: U_1 for Revenue Receipts: Magnitude of Errors (BE-Actual), 2011-12 to 2015-16



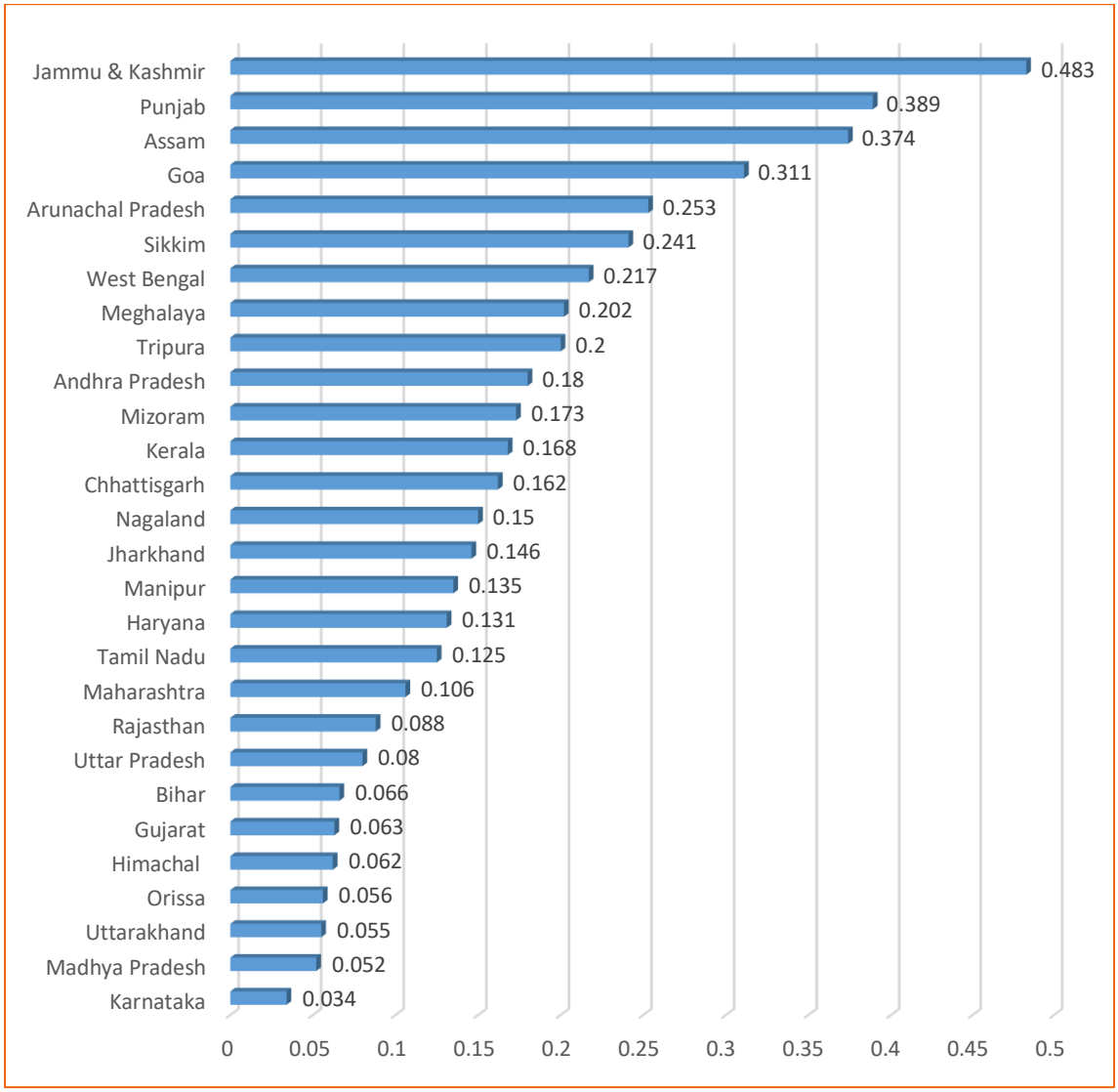
Source: Finance Accounts of States and State Budget documents (various years)

Figure 10: U_1 for Revenue Expenditure: Magnitude of Errors (BE-Actual), 2011-12 to 2015-16



Source: Finance Accounts of States and State Budget documents (various years)

Figure 11: U_1 for Capital Expenditure: Magnitude of Errors (BE-Actual), 2011-12 to 2015-16



Source: Finance Accounts of States and State Budget documents (various years)

Table 9: Magnitude of Errors in Public Expenditure: Revenue and Capital – Comparison of BE-Actuals and RE-Actuals

	Revenue Expenditure		Capital expenditure	
	BE-Actuals	**RE-Actuals**	**BE-Actuals**	**RE-Actuals**
Andhra Pradesh	0.072	0.051	0.180	0.053
Arunachal Pradesh	0.063	0.058	0.253	0.289
Assam	0.108	0.155	0.374	0.435
Bihar	0.077	0.119	0.066	0.127
Chhattisgarh	0.077	0.087	0.162	0.134
Goa	0.068	0.049	0.311	0.259
Gujarat	0.031	0.022	0.063	0.036
Haryana	0.039	0.047	0.131	0.096
Himachal	0.027	0.041	0.062	0.042
Jammu and Kashmir	0.118	0.098	0.483	0.447
Jharkhand	0.084	0.090	0.146	0.117
Karnataka	0.168	0.170	0.034	0.042
Kerala	0.152	0.126	0.168	0.115
Madhya Pradesh	0.038	0.047	0.052	0.039
Maharashtra	0.020	0.039	0.106	0.077
Manipur	0.056	0.072	0.135	0.127
Meghalaya	0.150	0.145	0.202	0.198
Mizoram	0.030	0.080	0.173	0.229
Nagaland	0.056	0.072	0.150	0.129
Orissa	0.064	0.059	0.056	0.024
Punjab	0.029	0.046	0.389	0.257
Rajasthan	0.018	0.028	0.088	0.058
Sikkim	0.089	0.091	0.241	0.271
Tamil Nadu	0.026	0.024	0.125	0.074
Tripura	0.059	0.056	0.200	0.129
Uttarakhand	0.039	0.034	0.055	0.052
Uttar Pradesh	0.082	0.055	0.080	0.105
West Bengal	0.016	0.015	0.217	0.144

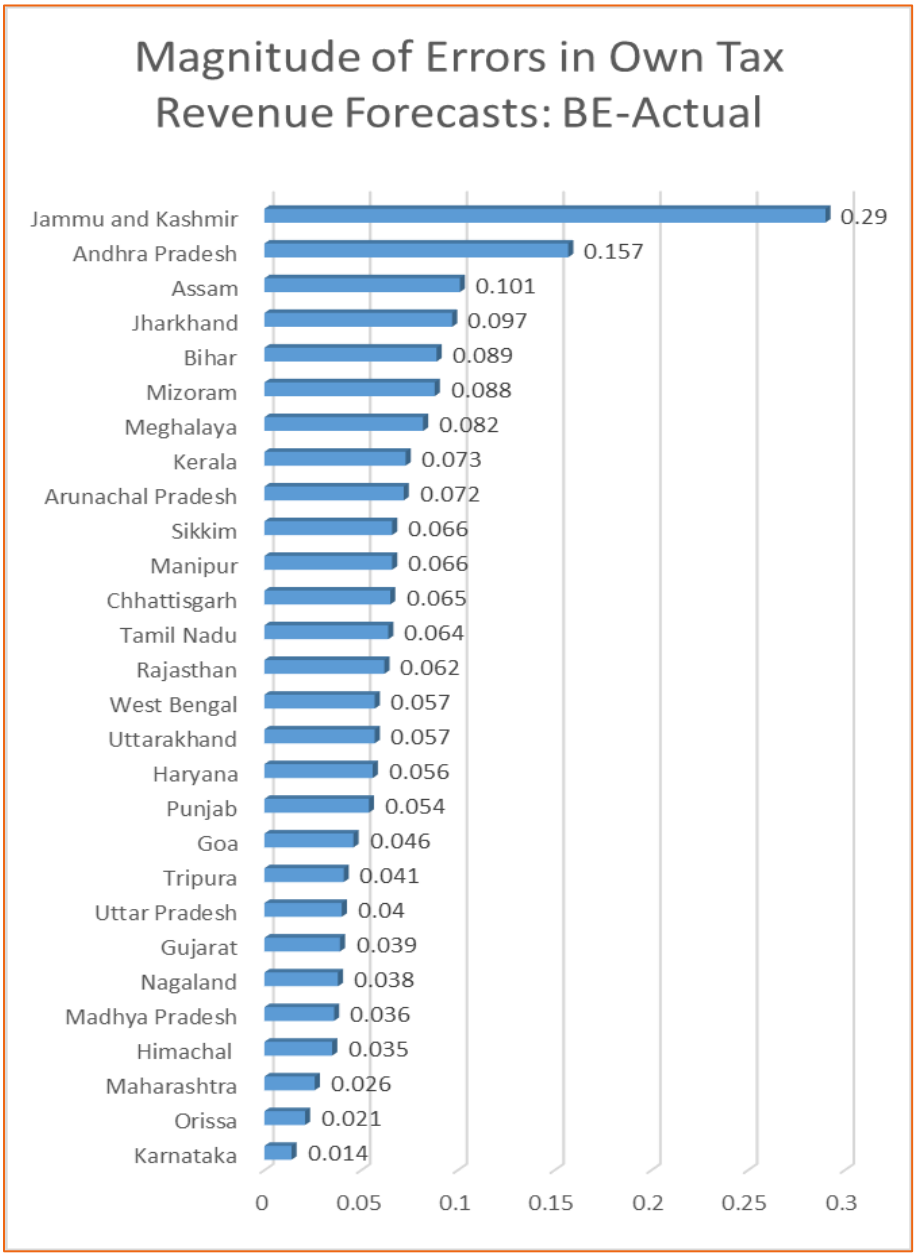
Source: Finance Accounts of States and State Budget documents (various years)

V.3: Disaggregating the Revenue Receipts

A pertinent question is, why is it that the forecasting errors are much higher in the revenue receipts in case of 10 states above 0.30 threshold as compared to capital expenditure (only 4 states) and revenue expenditure (only 4 states)? Which component of revenue receipts showed erratic range in forecasts – own tax revenue, tax transfers or grants from centre?

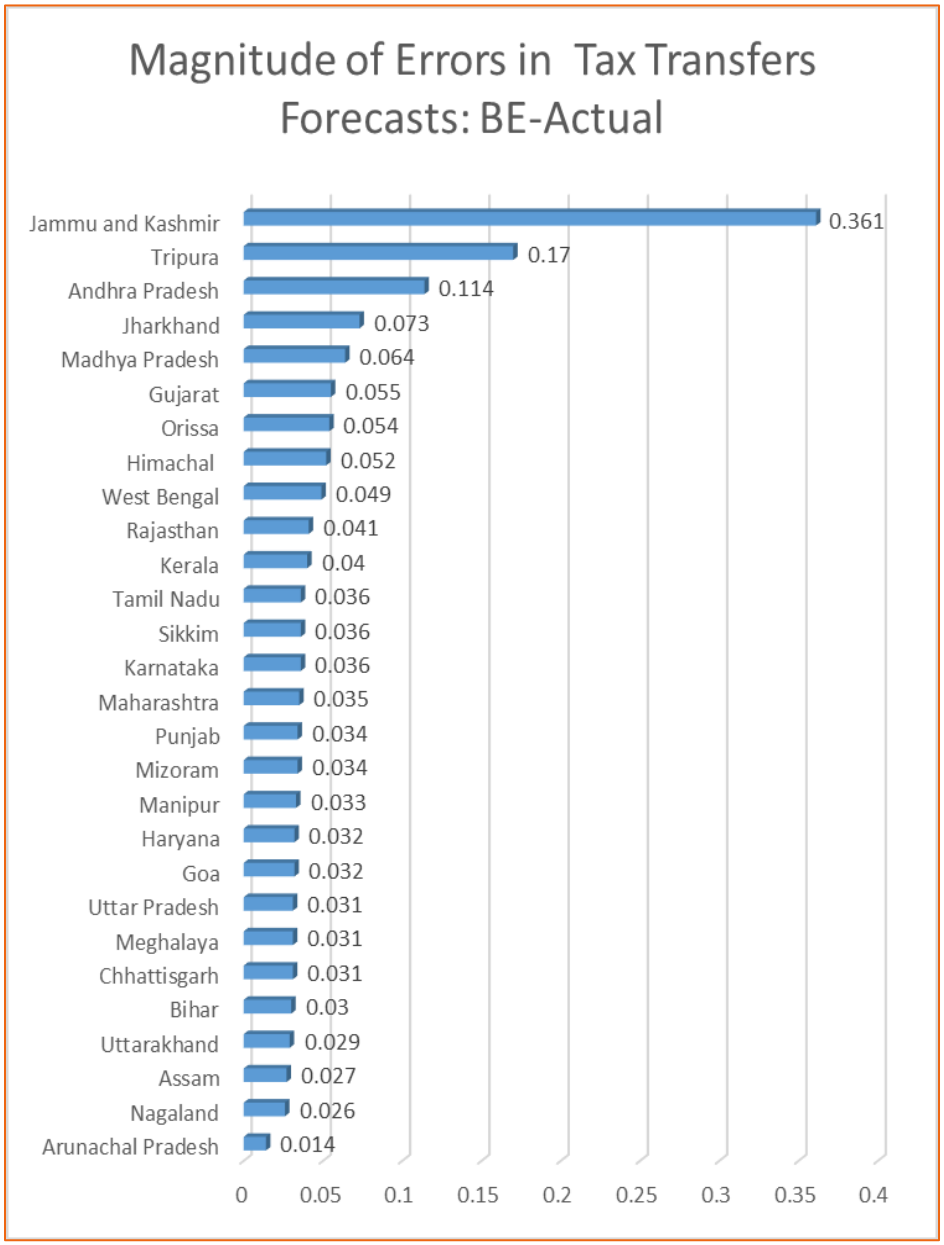
The disaggregated analysis of revenue receipts showed that magnitude of errors in grants is relatively higher than the forecast errors in own tax revenue and share in central taxes. If we take a relative threshold of magnitude of errors at 0.10 , the number of states having forecast errors above 0.10 in case of own tax revenue (figure 12) and tax transfers (figure 13) are only three states, while the number of states having forecast errors above 0.10 in case of grants is as high as 23 States (figure 14). The three states showing forecast error magnitude above 0.10 in case of own tax revenue are Jammu and Kashmir (0.361), Andhra Pradesh (0.157) and Assam (0.101). In case of tax transfers, the three states that have shown forecast errors magnitude above 0.10 are Jammu &Kashmir (0.361), Tripura (0.17) and Andhra Pradesh (0.114). As high as 23 states have shown forecast errors in grants greater than 0.10, except for Maharashtra (0.088), Nagaland (0.069), Mizoram (0.06), Manipur (0.058) and Himachal Pradesh (0.034) (figure 14).

Figure 12: Own tax revenue: Magnitude of Errors (BE-Actual), 2011-12 to 2015-16



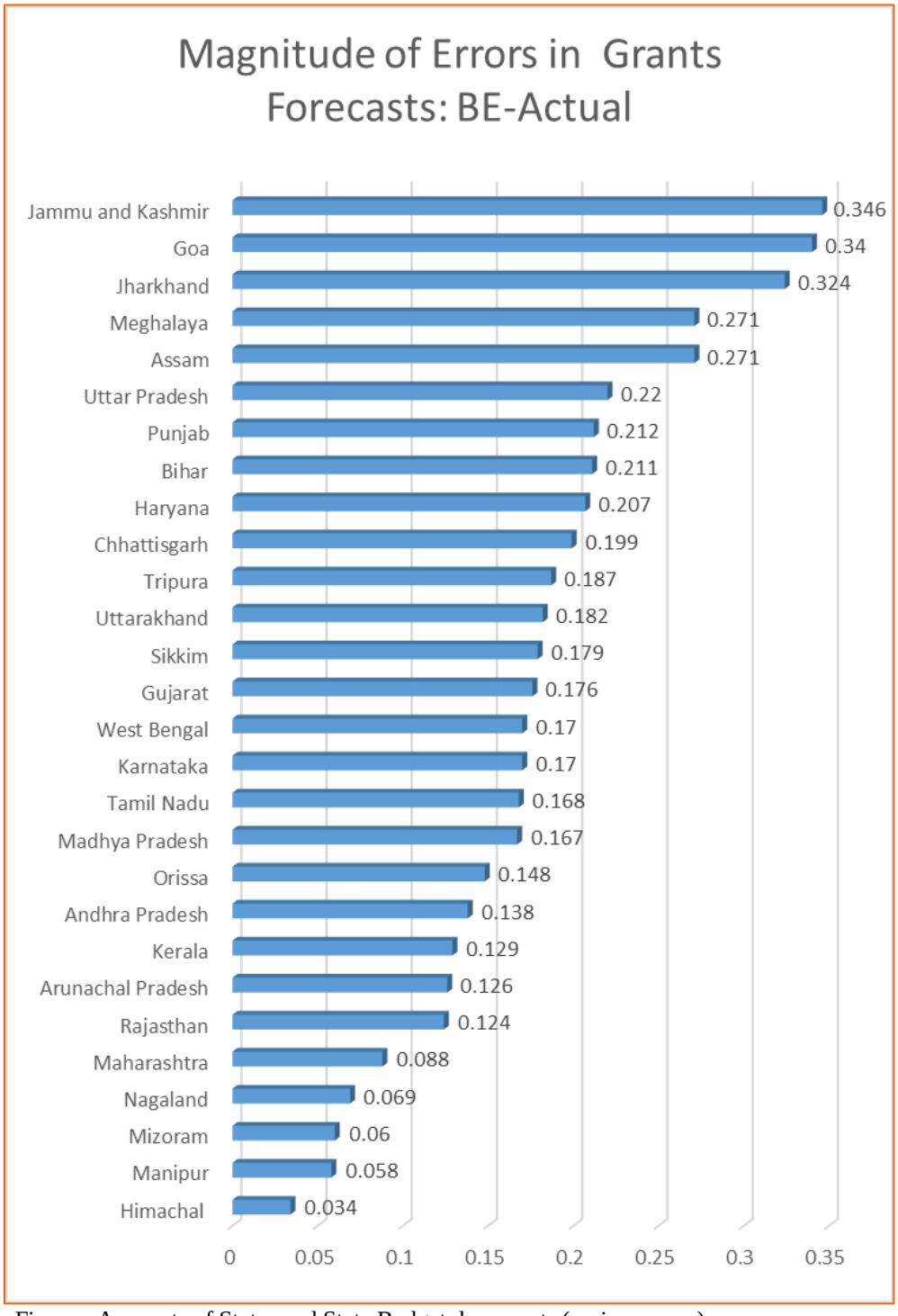
Source: Finance Accounts of States and State Budget documents (various years)

Figure 13: Tax Transfers: Magnitude of Errors (BE-Actual), 2011-12 to 2015-16



Source: Finance Accounts of States and State Budget documents (various years)

Figure 14: Grants: Magnitude of Errors (BE-Actual), 2011-12 to 2015-16



Source: Finance Accounts of States and State Budget documents (various years)

Table 10: Magnitude of Errors: Comparison of BE-Actuals with RE-Actuals for Revenue and its Components

	Revenue receipts		Own Tax Revenue		Tax Transfers		Own Non-Tax Revenue		Grants	
	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals
Andhra Pradesh	0.121	0.043	0.157	0.018	0.114	0.002	0.099	0.018	0.138	0.162
Arunachal Pradesh	0.076	0.090	0.072	0.012	0.014	0.004	0.149	0.111	0.126	0.137
Assam	0.124	0.095	0.101	0.032	0.027	0.033	0.155	0.056	0.271	0.247
Bihar	0.082	0.073	0.089	0.028	0.030	0.020	0.338	0.171	0.211	0.220
Chhattisgarh	0.090	0.094	0.065	0.054	0.031	0.025	0.152	0.146	0.199	0.200
Goa	0.060	0.027	0.046	0.018	0.032	0.016	0.078	0.030	0.340	0.298
Gujarat	0.043	0.047	0.039	0.072	0.055	0.026	0.067	0.046	0.176	0.147
Haryana	0.055	0.038	0.056	0.027	0.032	0.035	0.121	0.065	0.207	0.199
Himachal	0.054	0.054	0.035	0.141	0.052	0.059	0.130	0.112	0.034	0.041
Jammu and Kashmir	0.271	0.266	0.290	0.315	0.361	0.353	0.188	0.237	0.346	0.317
Jharkhand	0.120	0.116	0.097	0.205	0.073	0.021	0.133	0.184	0.324	0.277
Karnataka	0.064	0.081	0.014	0.095	0.036	0.013	0.045	0.067	0.170	0.165
Kerala	0.054	0.063	0.073	0.085	0.040	0.017	0.065	0.028	0.129	0.119
Madhya Pradesh	0.161	0.145	0.036	0.221	0.064	0.024	0.122	0.048	0.167	0.135
Maharashtra	0.051	0.040	0.026	0.069	0.035	0.001	0.161	0.078	0.088	0.181
Manipur	0.134	0.098	0.066	0.654	0.033	0.028	0.222	0.179	0.058	0.078
Meghalaya	0.177	0.183	0.082	0.305	0.031	0.030	0.175	0.169	0.271	0.261
Mizoram	0.095	0.115	0.088	0.532	0.034	0.023	0.116	0.103	0.060	0.089
Nagaland	0.084	0.111	0.038	0.709	0.026	0.003	0.104	0.128	0.069	0.045
Orissa	0.088	0.117	0.021	0.221	0.054	0.016	0.121	0.075	0.148	0.158
Punjab	0.080	0.067	0.054	0.070	0.034	0.023	0.254	0.170	0.212	0.176
Rajasthan	0.052	0.084	0.062	0.146	0.041	0.004	0.116	0.025	0.124	0.086
Sikkim	0.066	0.061	0.066	0.547	0.036	0.026	0.145	0.121	0.179	0.245
Tamil Nadu	0.061	0.053	0.064	0.071	0.036	0.014	0.072	0.050	0.168	0.053
Tripura	0.091	0.071	0.041	0.255	0.170	0.027	0.130	0.067	0.187	0.078
Uttarakhand	0.044	0.041	0.057	0.020	0.029	0.031	0.073	0.056	0.182	0.206

	Revenue receipts		Own Tax Revenue		Tax Transfers		Own Non-Tax Revenue		Grants	
	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals
Uttar Pradesh	0.067	0.097	0.040	0.142	0.031	0.022	0.249	0.175	0.220	0.216
West Bengal	0.122	0.141	0.057	0.223	0.049	0.025	0.270	0.200	0.170	0.116

Source: Finance Accounts of States and State Budget documents (various years)

Table 11: Magnitude of Errors: Comparison of BE-Actuals with RE-Actuals for Revenue Deficit, Fiscal Deficit and Primary Deficit

	Revenue Deficit		Fiscal Deficit		Primary Deficit	
	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals	BE-Actuals	RE-Actuals
Andhra Pradesh	0.672	0.640	0.136	0.073	0.362	0.240
Arunachal Pradesh	0.441	0.441	0.818	0.643	0.985	0.718
Assam	0.940	0.462	0.554	0.293	0.704	0.341
Bihar	0.487	0.589	0.146	0.347	0.288	0.499
Chhattisgarh	0.374	0.336	0.229	0.248	0.330	0.359
Goa	0.590	0.551	0.371	0.364	0.741	0.736
Gujarat	0.312	0.229	0.100	0.056	0.402	0.221
Haryana	0.153	0.116	0.248	0.150	0.413	0.220
Himachal	0.370	0.428	0.133	0.054	0.372	0.376
Jammu and Kashmir	0.861	0.885	0.343	0.387	0.568	0.653
Jharkhand	0.450	0.413	0.300	0.163	0.580	0.273
Karnataka	0.496	0.302	0.035	0.051	0.082	0.103
Kerala	0.532	0.501	0.417	0.376	0.612	0.572
Madhya Pradesh	0.223	0.204	0.073	0.108	0.148	0.173
Maharashtra	0.444	0.603	0.080	0.116	0.394	0.390
Manipur	0.126	0.115	0.431	0.329	0.732	0.477
Meghalaya	0.441	0.434	0.292	0.283	0.604	0.595
Mizoram	0.312	0.438	0.617	0.446	0.567	0.513
Nagaland	0.229	0.332	0.249	0.430	0.475	0.812

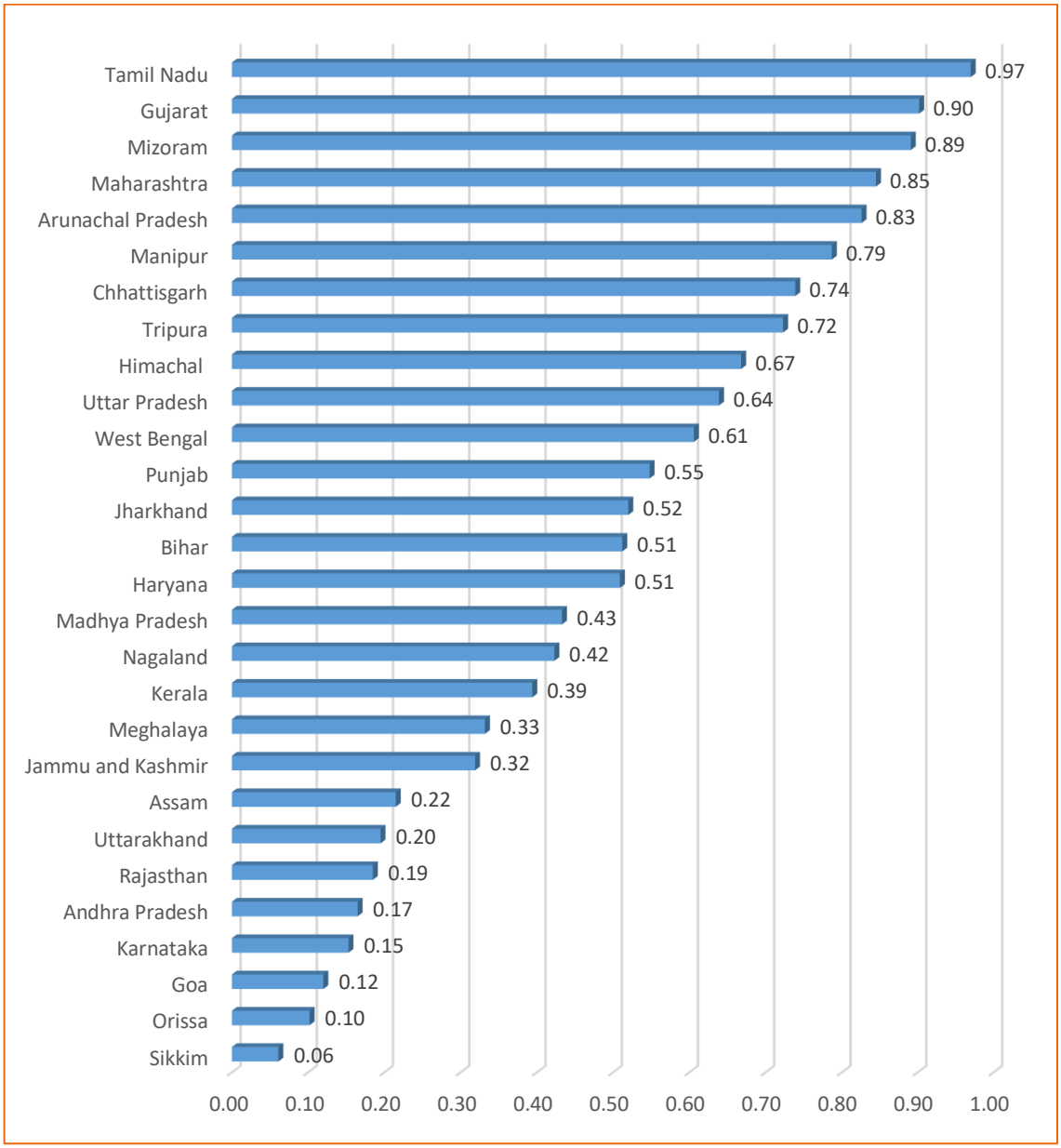
	Revenue Deficit		Fiscal Deficit		Primary Deficit	
	BE-Actuals	**RE-Actuals**	**BE-Actuals**	**RE-Actuals**	**BE-Actuals**	**RE-Actuals**
Orissa	0.455	0.251	0.307	0.236	0.393	0.269
Punjab	0.265	0.148	0.537	0.189	0.706	0.251
Rajasthan	0.443	0.123	0.316	0.055	0.490	0.075
Sikkim	0.257	0.256	0.238	0.260	0.518	0.516
Tamil Nadu	0.300	0.138	0.116	0.039	0.224	0.068
Tripura	0.256	0.125	0.338	0.307	0.489	0.482
Uttarakhand	0.255	0.154	0.174	0.051	0.379	0.104
Uttar Pradesh	0.669	0.644	0.168	0.155	0.481	0.387
West Bengal	0.636	0.166	0.199	0.067	0.856	0.399

Source: Finance Accounts of States and State Budget documents (various years)

VI.2: Decomposition of Forecast Errors

We have decomposed the error between systematic and unsystematic error. Systematic error is the sum of mean error and the slope error. The systematic error can be improved by using better forecasting techniques. The partitioning of sources of State-specific forecast errors are given in Appendix 1. Within BE-Actuals partitioning, more than 20 States showed that the source of errors was systemic for capital expenditure.

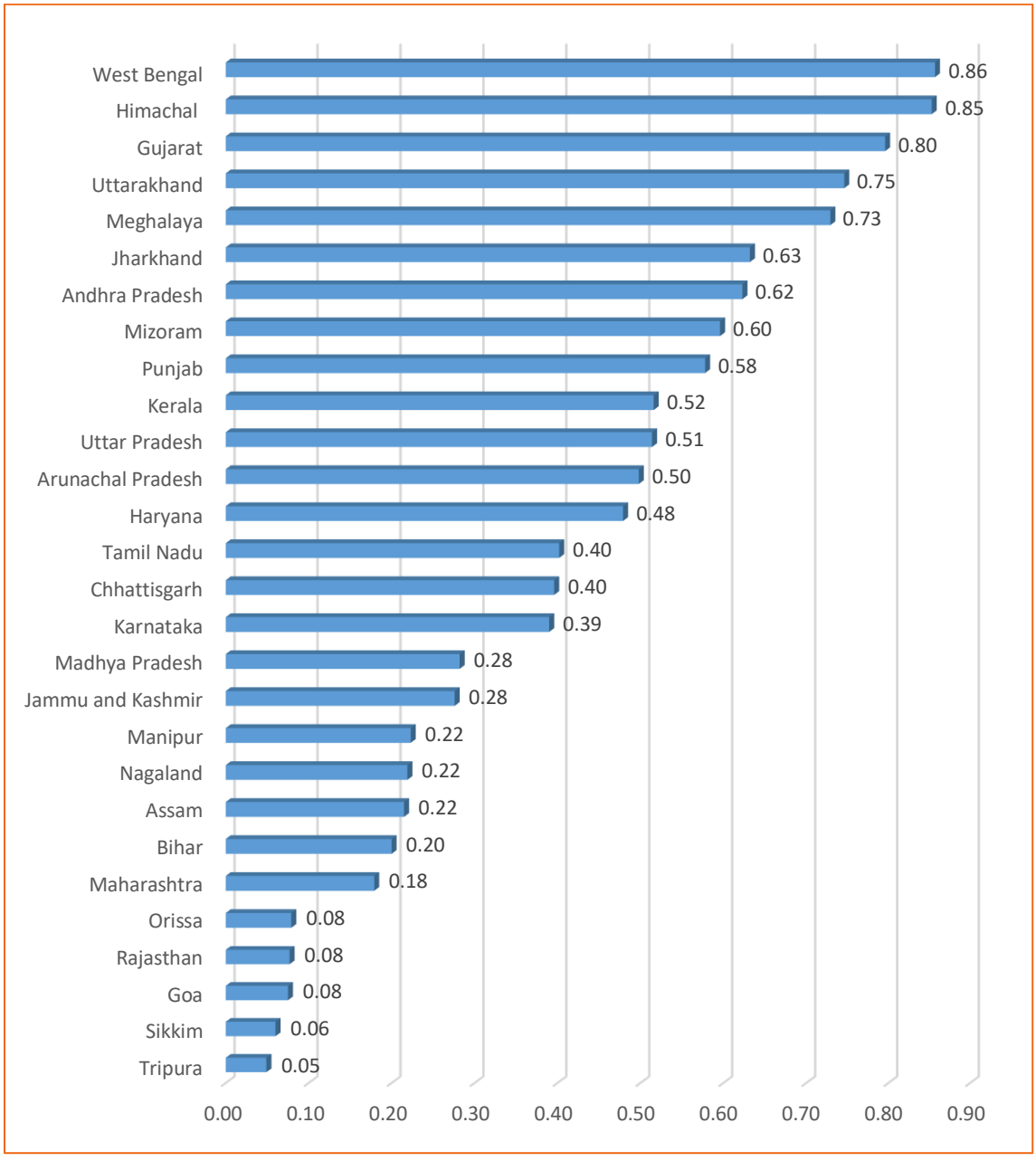
Figure 15: Randomness of Errors in Revenue Deficit (BE-Actual), 2011-12 to 2015-16



Source: Finance Accounts of States and State Budget documents (various years)

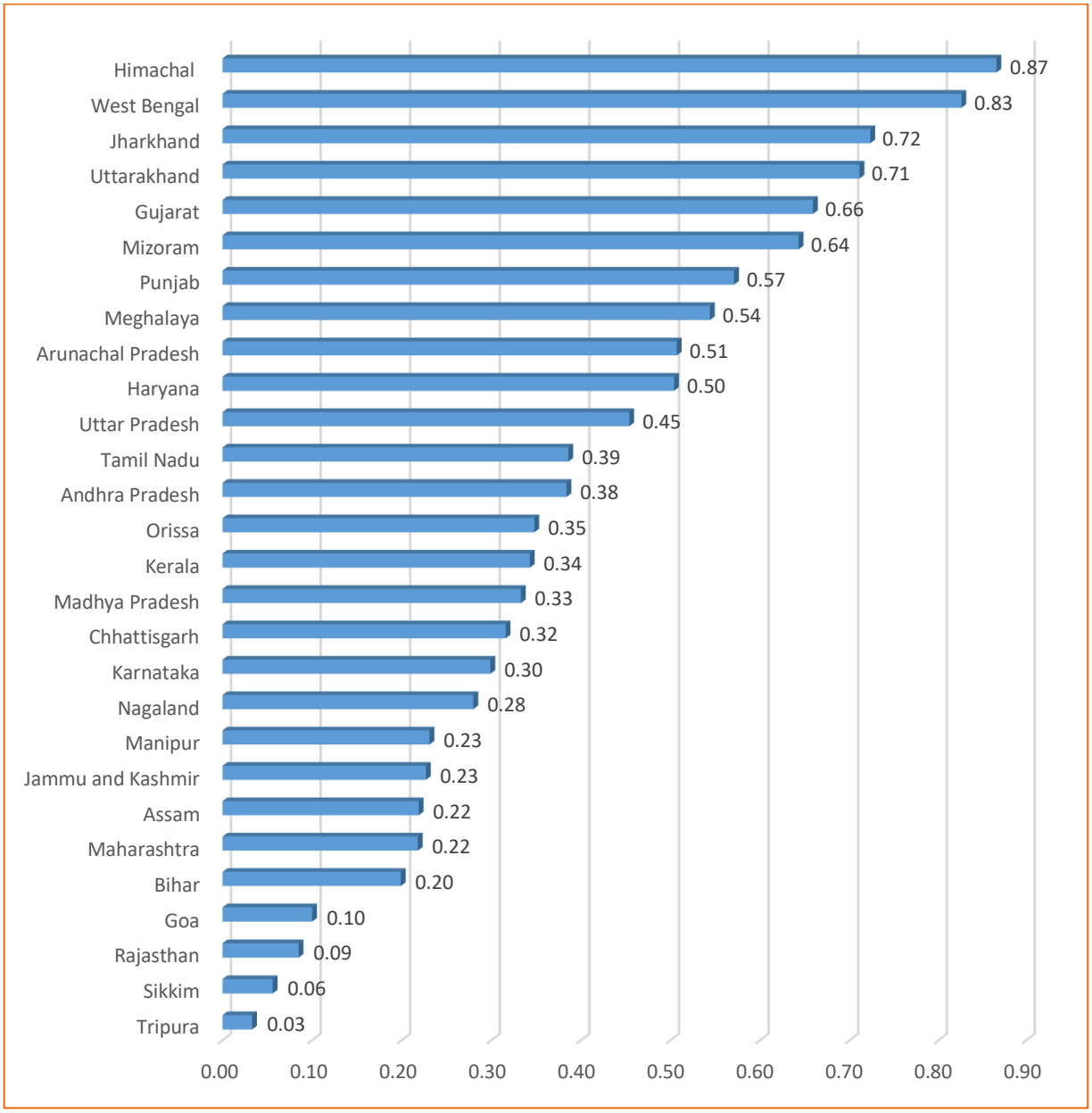
One can observe that merely 7 and 5 states in the budget estimates and revised estimates respectively of the *capital expenditure* have the random error more than 0.5. The average of the random errors of the budget estimate and the revised estimate is 0.31 and 0.24. Both the above observations tells us that the errors in capital expenditure are more because of systematic bias rather than being random.

Figure 16: Randomness of Errors in Fiscal Deficit (BE-Actual), 2011-12 to 2015-16



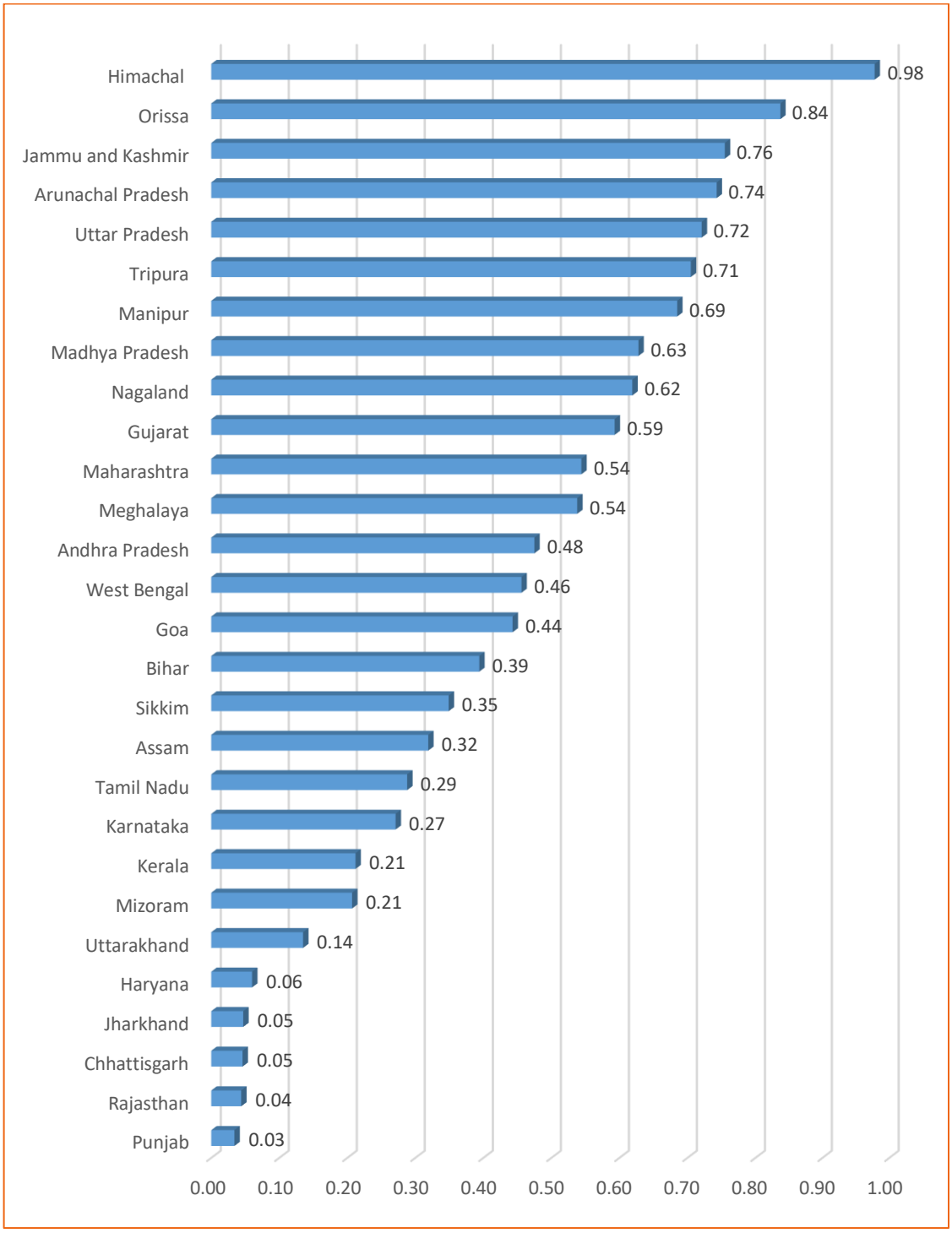
Source: Finance Accounts of States and State Budget documents (various years)

Figure 17: **Randomness of Errors in Primary Deficit (BE-Actual), 2011-12 to 2015-16**



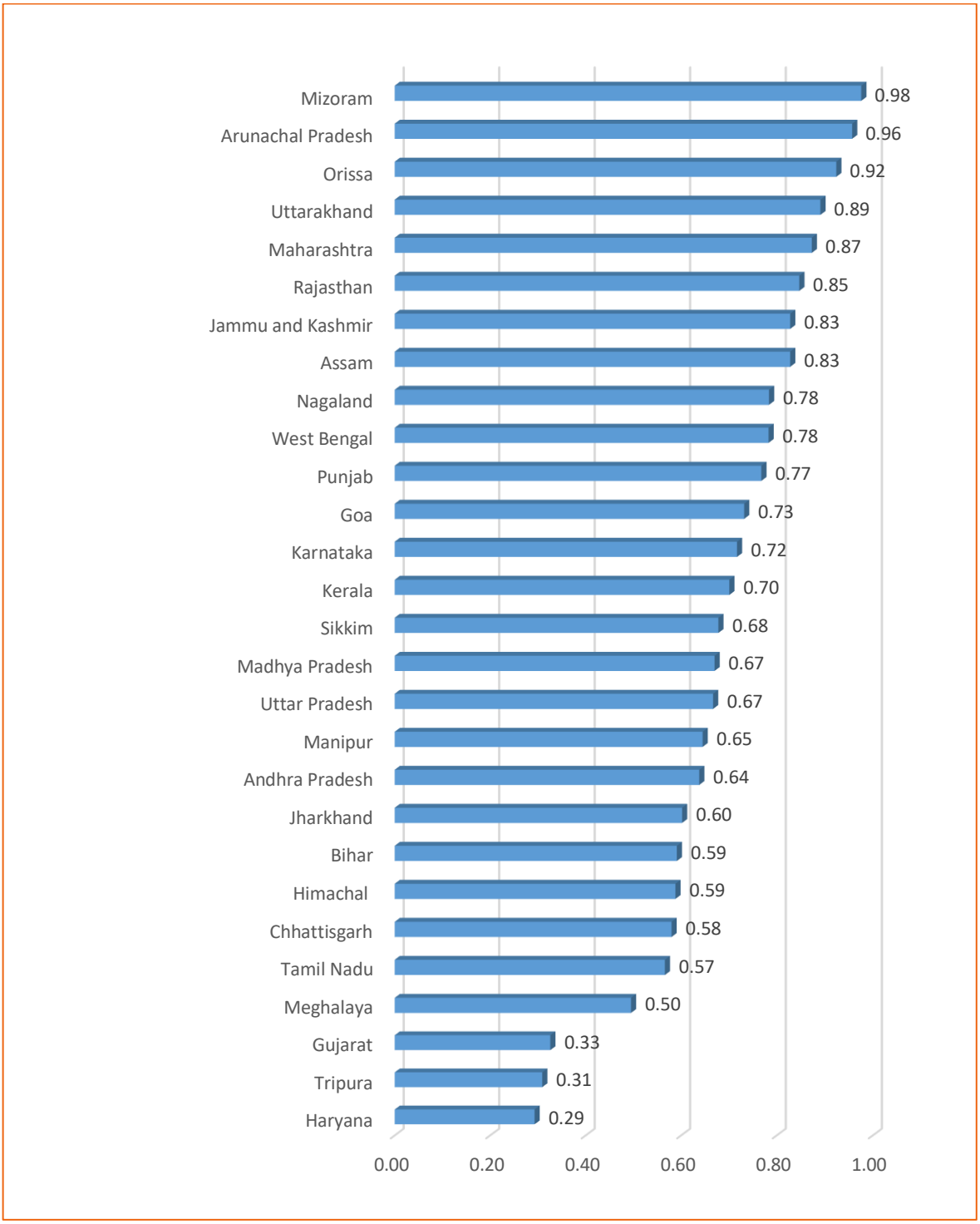
Source: Finance Accounts of States and State Budget documents (various years)

Figure 18: Randomness of Errors in Own Tax Revenue (BE-Actual), 2011-12 to 2015-16



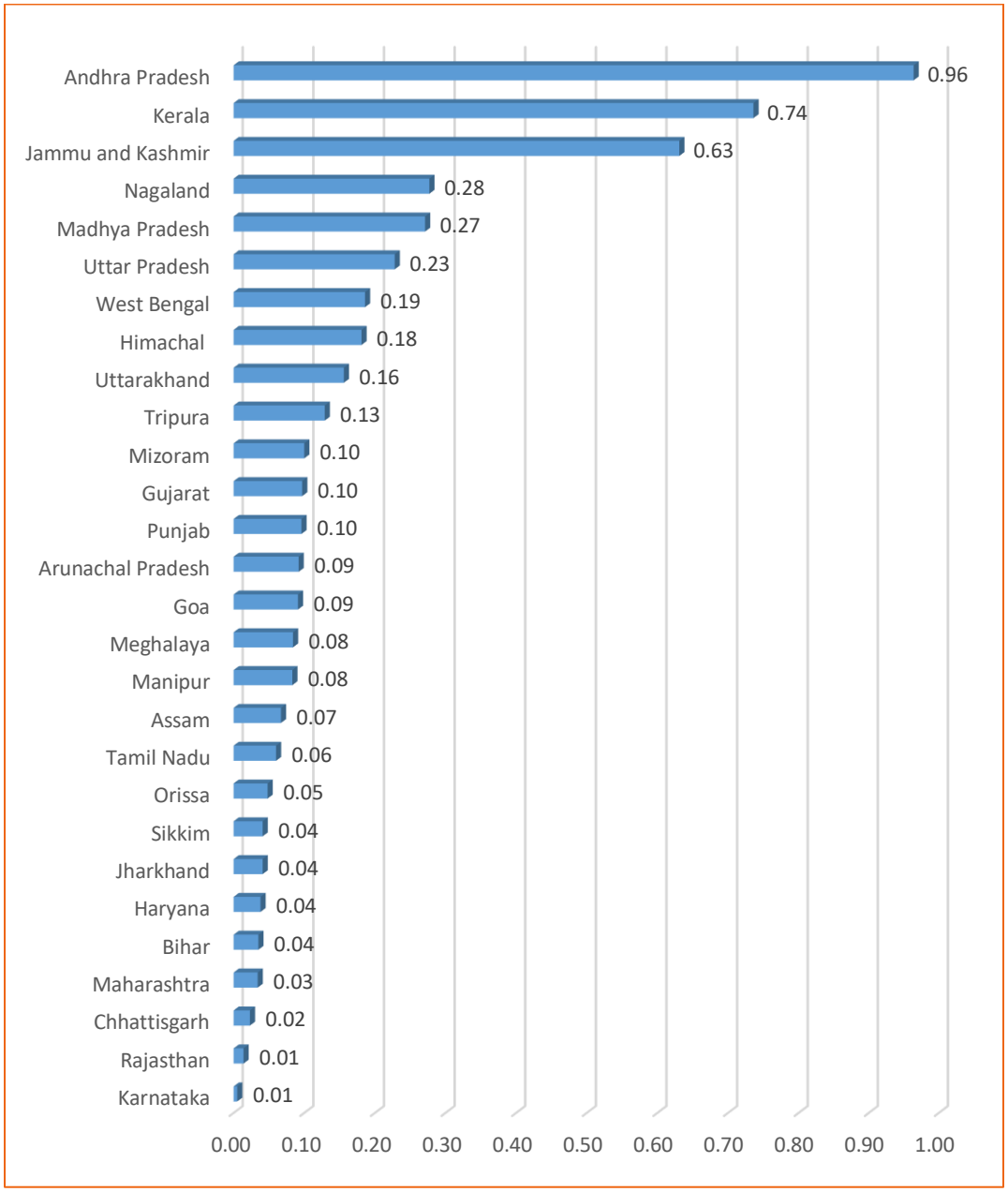
Source: Finance Accounts of States and State Budget documents (various years)

Figure 19: Randomness of Errors in Tax Transfers (BE-Actual), 2011-12 to 2015-16



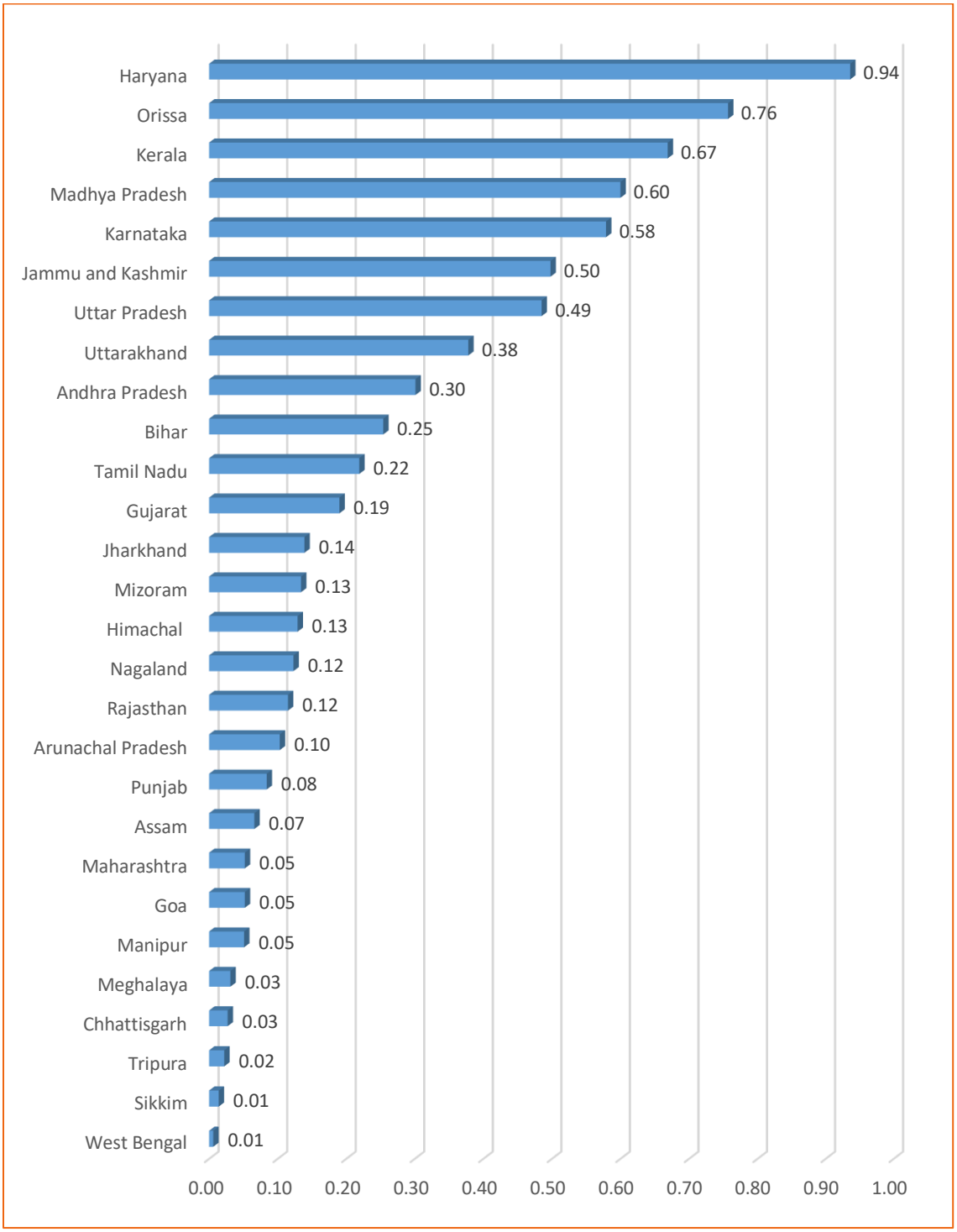
Source: Finance Accounts of States and State Budget documents (various years)

Figure 20: Randomness of Errors in Revenue Expenditure (BE-Actual), 2011-12 to 2015-16



Source: Finance Accounts of States and State Budget documents (various years)

Figure 21: Randomness of Errors in Capital Expenditure (BE-Actual), 2011-12 to 2015-16



Source: Finance Accounts of States and State Budget documents (various years)

In case of BE, it can be observed that in most of the categories, more than half of the states have random error of over 50 percent of total error. In Appendix tables on the sources of errors, it

is observed that in case of all of the revenue and expenditure variables (except share in central taxes where 4 states have systematic error of over 50%), the former trend persists.

While there have been negligible improvements from the BE to the RE , that is, on average the number of states having systematic error of more than 50 percent have changed marginally across the different categories of revenues and expenditure, the larger trend of the BE seems to persist. For instance, in categories such as tax revenue, state's own tax revenue, share in central taxes, state's own non tax revenue, revenue expenditure, revenue deficit and primary deficit, the number of states having systematic error of over fifty percent of total error has decreased. For the rest of the categories, the same has increased. However in both cases, the change has been only marginal.

VI. Conclusion

Applying Theil's U technique, we tried to analyse the errors of fiscal forecasts of subnational governments in India. The fiscal marksmanship analysis showed that the forecast errors in revenue receipts has been greater than revenue expenditure. Within revenue receipts, the forecast errors in grants is the highest. Within the public expenditure, the errors of capital expenditure forecasts showed greater deviations than revenue expenditure. The analysis shows that in more than 20 States, the sources of error for systemic than random in case of a few macro-fiscal variables, with negligible improvements from BE to RE.

Chapter 3: Tax Buoyancy

A tax buoyancy of one would imply that an increase in GDP by one percent of GDP would increase tax revenue also by one percent, thus leaving the tax-to-GDP ratio unchanged. When the tax buoyancy exceeds one, tax revenue increases more than GDP. If tax buoyancy is below unity, tax revenues are not increasing as much the increase in GDP.

Why tax buoyancy is crucial in fiscal policy practices? First, tax buoyancy reflects the role of revenue policy in fiscal consolidation efforts in India[13]. The responsiveness of tax to economic growth is crucial for fiscal sustainability in the long run. Tax buoyancy reflects both the structural policies and automatic stabilisers. The responsiveness of tax to fluctuations in output at the state level is crucial for long term fiscal frameworks of subnational governments. Second, tax buoyancy gives indication to the government, whether effective tax mobilization efforts can increase the revenue in concomitant with economic growth. The tax buoyancy estimates help the fiscal authorities to be certain about the sustained increase in tax revenue in line with GDP growth. Three, it helps in designing the structural policies relate to tax regime, and also in forecasting macro-fiscal variables towards fiscal consolidation.

VII. Data and Methodology

The data for macro-fiscal variables are organized from State Finance Accounts and Budget documents. The state wise GSDP variables collated from CSO. The data for GSDP is made comparable over the period of analysis using splicing method. We analyse the tax buoyancy for the period 2000-01 to present and specifically for the period 2011-12 to 2018-19.

The tax buoyancy is calculated using the following formula:

$\text{Log}(T) = a + b_1 \log(GSDP) + u$

Where b_1 is the tax buoyancy

T = tax revenue

GSDP = Gross State Domestic Product

We have used time series techniques to deal with the constraints of the short time series. The short run buoyancy and long run buoyancy estimates are reported with the speed of adjustment.

[13] This chapter analysis is included in the paper invited for International Institute of Public Finance Meetings on "Public Finance, Natural Resources and Climate Change" at Reykjavík, Iceland, August 12-21, 2020.

We used ARDL to estimate the dynamic time series.

Equation 1

$$\Delta \ln y_{it} = \varphi_i y_{it-1} + \beta_i' x_{it-1} + \sum_{j=1}^{p-1} \lambda_{ij} \Delta \ln y_{it-j} + \sum_{q=1}^{q-1} \gamma_{ij}' \Delta \ln x_{it-j} + \mu_i + \xi_{it},$$
$$i = 1,2, \dots, N; t = 1,2, \dots, T$$

where y_{it} is the natural logarithm of tax revenue variable, x_{it} is the natural logarithm of GDP . We have not used a set of potential controls in the regression in the initial round. The coefficient on the $\varphi_i y_{it-1}$lagged dependent are the other explanatory variables, $\varphi_i y_{it-1}$are scalar coefficients on lagged first-differences of dependent variables.

$\sum_{j=1}^{p-1} \lambda_{ij} \Delta \ln y_{it-j}$coefficient vectors on first-differences of explanatory variables and their lagged values. ξ_{it}, is independently distributed across *i* and *t*, with zero means and constant variances. Equation (1) translates that change in tax revenue can be determined by a distributed lag of order p of the dependent variable (tax), and a distributed lag of order q of GDP.

Assuming that $\theta_i' < 0$ for all *i*, there exists a long-run relationship between y_{it} and x_{it}

Equation 2

$$\ln y_{it} = \theta_i' \ln x_{it} + \eta_{it}, i = 1,2, \dots, N; t = 1,2, \dots, T$$

Equation (1) can then be rewritten as:

Equation 3

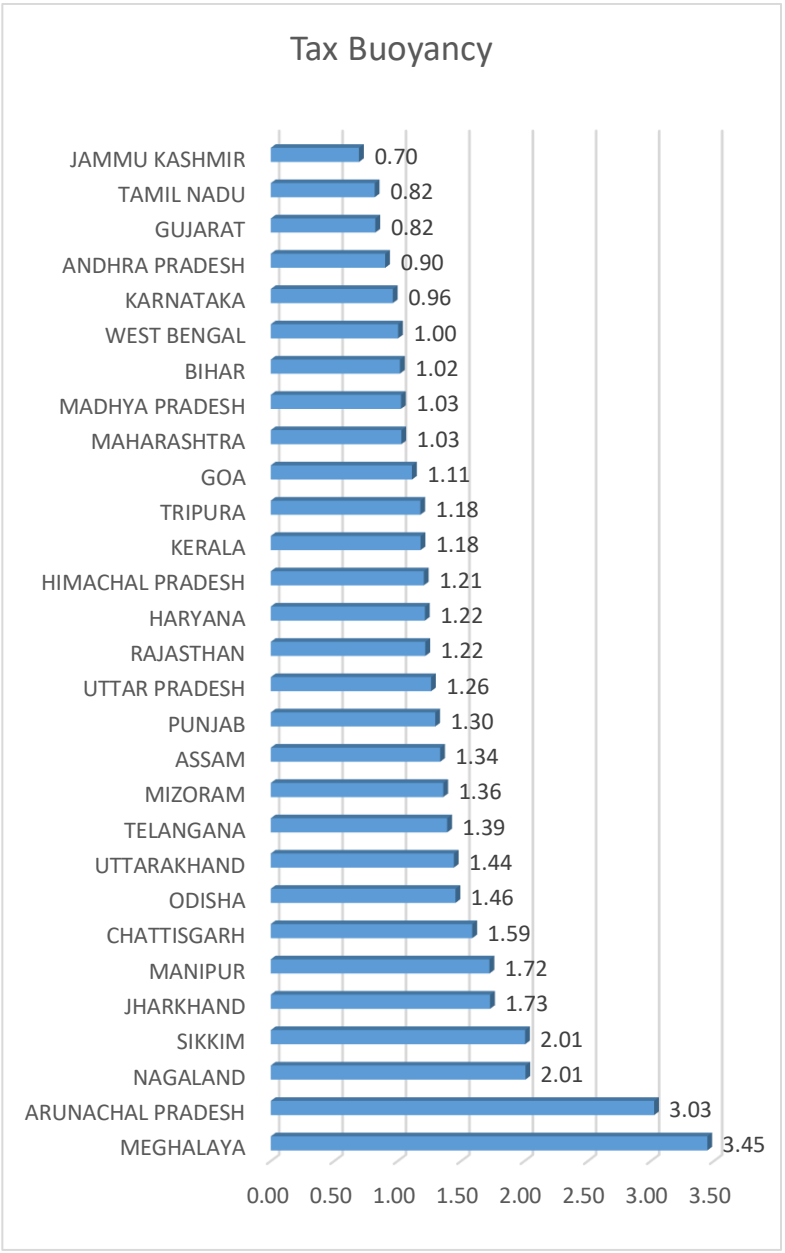
$$\Delta \ln y_{it} = \varphi_i \eta_{it-1} + \sum_{j=1}^{p-1} \lambda_{ij} \Delta \ln y_{it-j} + \sum_{q=1}^{q-1} \gamma_{ij}' \Delta \ln x_{it-j} + \mu_i + \xi_{it},$$
$$i = 1,2, \dots, N; t = 1,2, \dots, T$$

where η_{it-1} is the error correction term (that is, the deviation of variables at a certain point in time from their long run equilibrium), and φ_{i_i} is measures the speed of adjustment towards the long-run equilibrium. This specification allows capturing the idea that an equilibrium relationship links revenue and GDP in the long-run, but that the dependent variable may deviate from its equilibrium path in the short-run (due, e.g., to shocks that may be persistent) (Dudine , Paolo and Joao Tovar Jalles , 2017).

II Tax Buoyancy Estimates: Time Series Estimates of Individual States

The tax buoyancy estimates for the period 2011-12 to 2018-19 showed that all States except Jammu Kashmir, Tamil Nadu, Gujarat, Andhra Pradesh and Karnataka has tax buoyancy exceeding unity.

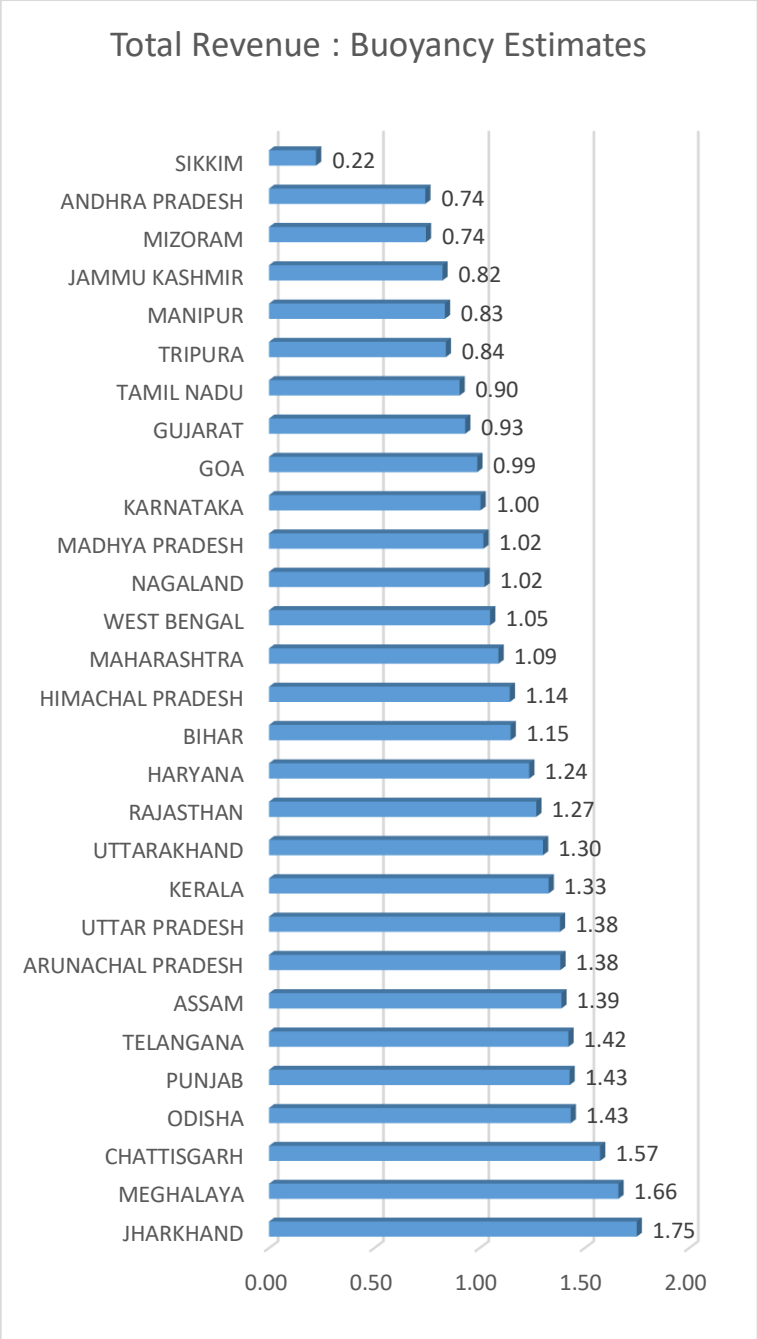
Figure 1: Tax Buoyancy across States of India, 2011-12 to 2018-19



Source: Finance Accounts of States (various years), State Budget documents (various years) and CSO (various years)

The revenue (tax plus nontax revenue) buoyancy is also calculated across states for comparison purposes (Figure 2). The total revenue buoyancy across States show that except Sikkim (0.2), Andhra Pradesh (0.74), Mizoram (0.74), Jammu Kashmir (0.82), Manipur (0.83), Tripura (0.84), Tamil Nadu (0.90), Gujarat (0.93) and Goa (0.99), all other states have revenue buoyancy exceeding unity.

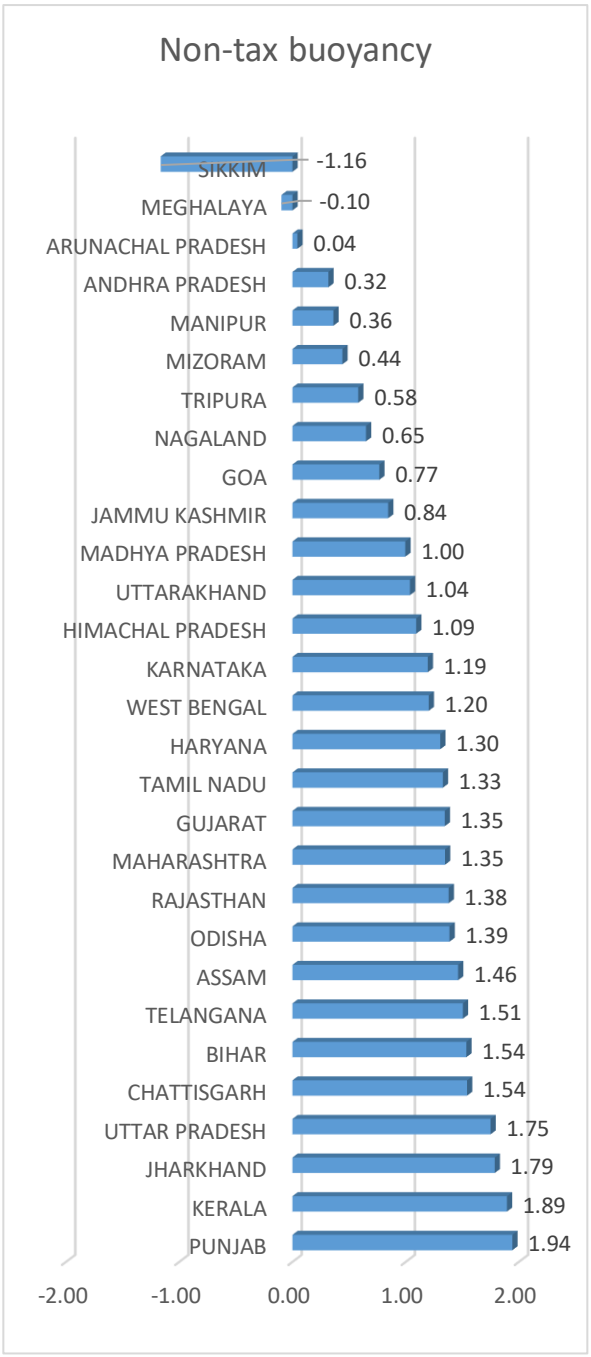
Figure 2: Total Revenue Buoyancy across States of India, 2011-12 to 2018-19



Source: Finance Accounts of States (various years), State Budget documents (various years) and CSO (various years)

The non-tax revenue buoyancy of the States revealed that except Goa, Andhra Pradesh and a few North Eastern States, all other States have non-tax buoyancy greater than one. Punjab (1.94) and Kerala (1.89) top the scale. The mining States like Jharkhand, Chhattisgarh, Odisha, and Rajasthan are also among the top States with regard to non-tax revenue buoyancy.

Figure 3: Non-Tax Revenue Buoyancy across States of India, 2011-12 to 2018-19



Source: Finance Accounts of States (various years), State Budget documents (various years) and CSO (various years)

II.1. Tax Buoyancy: ARDL Estimates

Often, fiscal stimulus is launched through the tax side than expenditure side assuming that the buoyancy of the former will ensure minimum fiscal slippage, while shoving the economy out of a glut. The general idea is that a reduction in rates will increase the tax base and compliance. This along with its positive impact on growth would lead to higher tax buoyancy. The fiscal stimulus programme announced by finance minister is also premised on similar idea. An IMF working paper titled *'How buoyant is the tax system? New evidence from a large heterogeneous panel'* by Paulo Dudine and Joao Tovar Jalles, published in 2017 finds that tax buoyancies are generally equal to unity or greater for developed as well as for less developed economies.

In our economy, the tax-GDP ratio has hovered around 14-17% for the last few decades, which is the combined figure for the Union and the States. Direct and indirect taxes contribute almost equally to the total tax revenue although the share of direct taxes is slightly higher at 52% during 2017-18. Union collects about 10% of GDP as tax revenue and the rest is by all the States together. The finance minister's stimulus package is premised on the buoyancy of these taxes. Hence, it is imperative to look at the tax buoyancy factor both at the Union and States level during the recent past.

Tax buoyancy measures the response of tax revenue to a change in national income and the tax policy. Economists generally define it as the ratio of percentage change in tax revenue to a percentage change in income. Buoyancy can be estimated for the long term as well as for the short term. Short-term buoyancy above unity signifies that the tax system acts as an automatic stabiliser. Here, the tax system itself would automatically leave a greater proportion of income with the taxpayers during a slowdown dampening the fall in demand. Similarly, during a boom, the system would automatically take away more income through taxes consequently slowing down the growth of demand. Such a tax system has a built-in-stabiliser in it. In other words, the short run buoyancy measures the instantaneous effect of a change in GDP on the tax revenue.

Long-run buoyancy is important in gauging the impact of long-run growth of the economy on fiscal sustainability. Long run buoyancy above unity would mean that faster growth would lead to better fiscal balance through the revenue side. This would be an important guiding principle while considering counter cyclical fiscal measures, meaning, an increased fiscal deficit would trigger growth, which can in turn generate more tax revenue, leading to the easing of fiscal pressure.

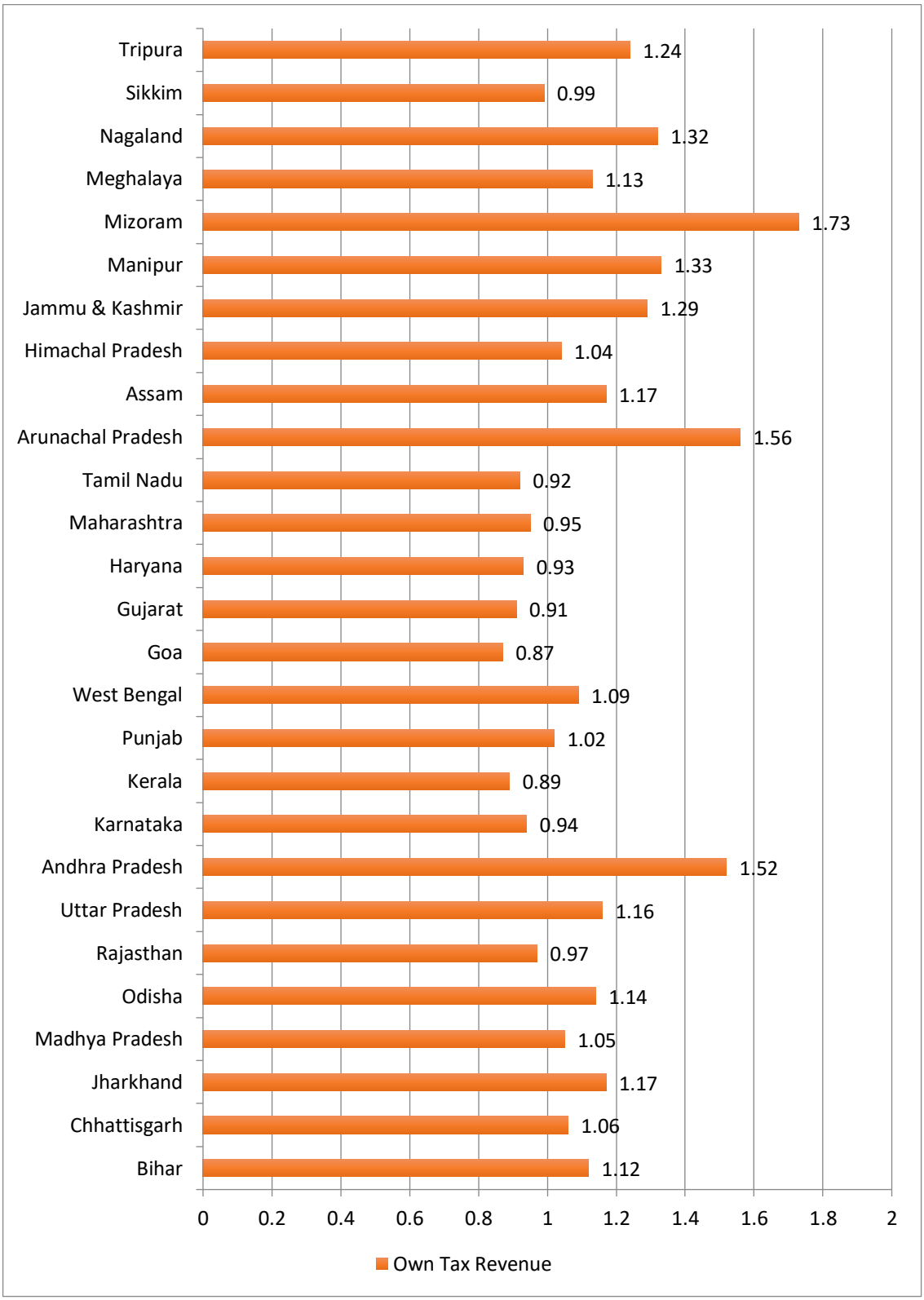
Auto Regressive Distributed Lag (ARDL) model allows us to estimate the long-run and short-run buoyancy along with the speed of adjustment. Speed of adjustment tells us how fast the buoyancy

converges to the long run equilibrium value. The estimates for the period, 2001-2017, show that the long-run and short-run buoyancy are 1.05 and 1.74, respectively, for total tax (Union and states combined). The high short-run buoyancy will mean that the current slow down would have an amplified negative impact on tax revenue in the short-run. The slow down will have a heavy impact on the Union tax revenue which has an overall short-run buoyancy coefficient which is very high. The very high short-run buoyancy of direct taxes will escalate the fiscal pressure emanating from the recent cut in corporation taxes. This will also have a deleterious effect on the fiscal health of the States as the shareable kitty will shrink substantially. Now with the 15th Finance Commission (FC) asked to consider the impact of the award of 14th FC on Union Finances, any fall in the share of the States would adversely affect the State finances.

Relatively low buoyancy for States' taxes (1.04 for the long run and 1.19 for short run) will mean a reduced adverse impact of the slowdown on States as a whole. But the effect on individual States will depend on their buoyancies and the extent of deceleration of gross state domestic product of respective States. Short run buoyancy is found to be either equal to or less than unity for all the States. Bihar, Goa, Haryana, Jharkhand, Odisha and Sikkim will be the States that would be least affected in the short run, with a buoyancy factor less than unity. For the long term, all States have buoyancies either equal to unity or greater than unity. Goa, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, West Bengal, Assam, Nagaland and Sikkim have long-run buoyancy equal to one making them less vulnerable in the long run. Interestingly, most of the richer States fall in this category.

More detailed analysis of buoyancies of individual taxes including GST (where we have only a short time series) is essential. Though we have incorporated the optimal parameterisation in the models by choosing the apt lag lengths, the estimates can be refined further by incorporating variables like inflation, structural variables, political factors and business cycles in the tax buoyancy estimation models. At disaggregate level analysis, it is also important to see whether the buoyancy of divisible pool taxes is greater than States' own taxes. Along with these, an understanding of how tax buoyancies behave in different phases of business cycle (output gap) will throw more light on the effectiveness of such polices.

Figure 4: Buoyancy of Tax Revenue



Source: Finance Accounts of States (various years), State Budget documents (various years) and CSO (various years)

Table 1: Buoyancy of Own Tax Revenue of States

	State	Long-Run Buoyancy			Short-Run Buoyancy			Speed of Adjustment
		<1	1	>1	<1	1	>1	
Low Income	Bihar		1.12*** (0.12)		0.42** (0.22)			-0.21* (0.11)
	Chhattisgarh			1.06*** (0.02)	0.81*** (0.18)			-0.97*** (0.05)
	Jharkhand			1.17*** (0.04)	0.47** (0.21)			-0.91*** (0.1)
	Madhya Pradesh		1.05*** (0.04)			0.75* (0.39)		-0.55** (0.24)
	Odisha			1.14*** (0.05)	0.07 (0.17)			-0.23** (0.09)
	Rajasthan		0.97*** (0.07)		0.25* (0.14)			-0.16 (0.1)
	Uttar Pradesh			1.16*** (0.03)		0.65** (0.28)		-0.41*** (0.13)
Middle Income	Andhra Pradesh		1.52*** (0.37)		0.05 (0.15)			-0.07 (0.07)
	Karnataka	0.94*** (0.03)			0.47*** (0.12)			-0.26* (0.15)
	Kerala	0.89*** (0.04)			0.39** (0.14)			-0.27* (0.13)
	Punjab		1.02*** (0.05)			0.63 (0.39)		-0.41** (0.17)
	West Bengal		1.09*** (0.16)		0.41 (0.29)			-0.12 (0.08)
High Income	Goa	0.87*** (0.1)			0.1 (0.15)			-0.22*** (0.07)
	Gujarat	0.91*** (0.05)			0.62*** (0.21)			-0.22* (0.12)
	Haryana		0.93***		-0.09 (0.29)			-0.18 (0.11)
	Maharashtra	0.95*** (0.02)			0.56*** (0.14)			-0.47*** (0.15)
	Tamil Nadu	0.92*** (0.03)			0.53*** (0.16)			-0.39** (0.15)
Special Category	Arunachal Pradesh			1.56*** (0.07)		0.41 (0.42)		-0.37** (0.17)
	Assam			1.17*** (0.08)		0.65** (0.25)		-0.19 (0.11)
	Himachal Pradesh		1.04*** (0.04)		0.44* (0.22)			-0.27*** (0.12)
	Jammu & Kashmir			1.29*** (0.03)		0.64** (0.26)		-0.63*** (0.19)
	Manipur			1.33*** (0.1)		0.56* (0.3)		-0.25* (0.12)

	Mizoram			1.73*** (0.29)	-0.31 (0.25)			-0.09* (0.04)
	Meghalaya		1.13*** (0.09)		0.3 (0.19)			-0.17*** (0.07)
	Nagaland			1.32*** (0.13)		0.58** (0.26)		-0.22** (0.08)
	Sikkim		0.99*** (0.08)		0.19 (0.19)			-0.23* (0.13)
	Tripura			1.24*** (0.08)	0.04 (0.14)			-0.16** (0.16)

Note: *** p<0.01, ** p<0.05 and * p<0.1; GDP and GSDP data are from RBI database
Source: (Basic data), NIPFP database of Finance Accounts (various years).[14]

Table 2: Categorisation of States as per Buoyancy

Buoyancy of Own tax Revenue		States
Short-run Buoyancy	**<1**	Bihar, Goa, Haryana, Jharkhand, Odisha, Sikkim
	=1	Andhra Pradesh, Chattisgarh, Gujarat, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal, Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland, Mizoram, Tripura
Long-run Buoyancy	**>1**	Andhra Pradesh, Bihar, Chhattisgarh, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Kerala, Uttar Pradesh, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Tripura.
	=1	Goa, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, West Bengal, Assam, Nagaland and Sikkim

Source: (Basic data), NIPFP database of Finance Accounts.

II. 2 Tax Buoyancy: Panel Group Estimates across Category of States

We have estimated dynamic panel coefficients for three categories of States –high income, middle income and low income States for the macro-fiscal variables under concern. (table 1)

The dynamic panel estimates show that the overall buoyancy of all states over the period 2011-12 to 2018-19 is less than unity at 0.98. With the categories of the states based on income, the tax buoyancy of low income states was 1.105 while the tax buoyancy of middle income states was 1.04. The tax buoyancy of high income states was relatively lower at 0.908 during this period. The output gap is estimated using the following formula.

[14] We acknowledge Thomas E for the technical assistance for the ARDL estimations.

OG=[(Actual GDP-Potential GDP)/Potential GDP] *100

Table 3: Dynamic Panel Buoyancy Estimates using Output Gap

Variables	Low Income States	High Income States	Middle Income States	All States
Tax	1.105 (0.0314) [0.0000]	0.908 (0.049) [0.0000]	1.036 (0.0336) [0.0000]	0.932 (0.03) [0.000]

Note: The figures in bracket refers to Standard Error. The figures in square parentheses refer to Probability.
Source: (basic data), Finance Accounts of States (various years), State Budget documents (various years) and CSO (various years)

This is also known as the "economic activity index" (Congdon 1998; Tanzi 1985; Chakraborty, 2016). It can be seen from equation that the "output gap," or the index of economic activity, is defined as the difference between the actual and trend/potential level of national output as a percentage of trend/potential output. Definitionally speaking, the potential level of output would be higher than the actual, as the resource utilization is maximized at the potential level. However, it is argued that cyclical factors, such as a recession or boom, could cause the actual to be below or above the potential output, respectively (Tanzi 1985). The major problem of estimation of the "output gap" lies on the estimation of potential level of output.[15]

The Hodrick-Prescott filter (HP filter) is the method used for the derivation of the potential output. The idea of this filter is to decompose a nonstationary time series, such as actual output, into a stationary cyclical component and a smooth trend component (Y_t and Y_t^* denote the logarithms of actual and trend/potential output respectively) by minimizing the variance of the cyclical component subject to a penalty for the variation in the second difference of the trend component. This results in the following constrained least-square problem:

[15] Theoretically, the "production function method" estimates the trend/potential output by determining the quantity and productivity of inputs, viz., labor and capital. The relative importance of the two inputs are determined by assuming that their return is determined by their marginal products and their share in the national output is equal to their quantity multiplied by the return (Adams and Coe 1990; Congdon 1998). Trend output estimation through the "production function method" requires data on labor force and capital stock. If data on one or both of these series are not available, one has to search for other methods of estimation of trend output. One of the most commonly used methods of estimation of trend output is the "moving average method." Another method, known as "trend through peaks" (hereafter, TTP), was developed by Klein with Wharton Econometric Forecasting Associates. The steps involved in estimation are delineated below. The first step is to plot the data on GDP adjusted for price fluctuations and identify the peaks. Second, it is assumed that identified peaks in the series are the points where resources in the economy are used at 100 percent of their capacity. The third step is to intrapolate between the major peaks, including the first and last observation. The strong assumptions beneath the TTP method itself deterred us from using it as a tool for estimating potential output.

$$Min \sum_{t=1}^{T} (Y_t - Y_t^*)^2 + \lambda \sum_{t=2}^{T-1} [(Y_{t+1}^* - Y_t^*) - (Y_t^* - Y_{t-1}^*)]^2$$

The first term in the equation is a measure of fit. The second term is a measure of smoothness. The Langrange multiplier (λ) is associated with the smoothness constraint and must be set a priori. As a weighting factor, it determines how smooth the resulting output series is. The lower the λ, the closer potential output follows actual output.

Table 4: Dynamic Panel Estimates_ Buoyancy of Royalty Revenue and Own Tax revenue – All States Analysis

VARIABLES	Royalty non tax revenue	Own Tax Revenue
Lagged variable	0.427*** (0.0273)	
Gross State Domestic Product	0.655*** (0.0276)	0.541*** (0.0151)
Lagged Own Tax Revenue		0.481*** (0.0183)
Constant	-5.745*** (0.436)	-1.754*** (0.145)
Observations	700	700
Number of states	28	28

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Source: (basic data) , Finance Accounts of States (various years), State Budget documents (various years) and CSO (various years)

We observe highly significant effects for lagged values of royalty and own tax revenue on their current values, showing that a persistent series. The revenue buoyancy of natural resources is to the tune of 0.65, whereas own tax revenue for the period in consideration stands at 0.54. The buoyancy of royalty revenue is slightly higher than the own tax revenue.

Chapter 4: Conclusions

Budget credibility, or the ability of governments to accurately forecast macro-fiscal variables, is crucial for effective public finance management. Fiscal marksmanship analysis captures the extent of errors in the budgetary forecasting. The fiscal rules can determine fiscal marksmanship; as effective fiscal consolidation procedures affect the fiscal behavior of the states in conducting the budgetary forecasts. Against this backdrop, applying Theil's technique, we analyze the fiscal forecasting errors for 28 states (except Telangana) in India for the in India. The forecast errors in revenue receipts have been greater than revenue expenditure. Within revenue receipts, the errors are more significantly pronounced in the grants component. Within expenditure budgets, the errors in capital spending are found to be greater than revenue spending in all the states. Partitioning the sources of errors, we identified that the errors were more broadly random than due to systematic bias, except for a few crucial macro-fiscal variables where improving the forecasting techniques can provide better estimates.

We examine further the emerging issues in state government finances in India based on the 2018-19 budgets of 29 states in a comparative perspective. It analyses revenue efforts of states and key sectoral spending. The study assesses the fiscal position of the union government and state governments – individually as well as in aggregate and identify the size and sources of budget forecast errors. It carries out an in-depth analysis of state budgets of all states to assess the macro-performance of state governments in recent years. While the Union government accepted the recommendations of the Fourteenth Finance Commission, it restructured central grants to states. The restructuring involved among others discontinuation of several schemes, changing the sharing pattern of a number of schemes wherein the share of general category states was increased to 40 percent and reducing the number of central schemes by bringing several smaller schemes under umbrella schemes. As a result of this restructuring, grants as percent of GDP fell from 3.47 in 2011-12 to 2.89 percent in 2018-19BE. Tax devolution on the other hand increased to 4.33 percent of GDP in 2018-19BE from 2.93 percent in 2011-12 due to higher devolution recommended by the Fourteenth Finance Commission. Although there was an increase in central aggregate transfers to states as percent of GDP, but when expressed as percentage of gross tax revenue we find central transfers to have declined from 62.8 percent in 2011-12 to 59.5 percent in 2018-19BE. This was primarily due the increase in cess and surcharge by the union government - cess and surcharge as percent of gross tax revenue of the union increased from 9.43 percent in 2011-12 to 14.29 percent

in 2018-19BE. With the exception of tax devolution, per capita distribution/availability of resources at the state level seems to be regressive – states with high per capita income have access to more resources (in per capita terms) as compared to states with low per capita income.

The study finds that states have not been raising revenues from their assigned taxes. Own tax revenues aggregated across states as percent of GSDP show a decline from 6.97 percent in 2012-13 to 6.28 percent in 2016-17. Between 2015-16 and 2016-17, 20 states show a decline in own taxes as percent of GSDP. The three most important state taxes – state sales tax/VAT, stamp and registration fees and state excise which together account for about 85 percent of tax revenues of states registered a decline during 2012-13 and 2016-17. The 2018-19 budgets were the first year when GST data was reported by the state governments and we find that there is variance among state in reporting GST data, especially IGST and GST compensation data. As a result, data on central transfers and own taxes are not comparable across states. It is therefore essential that there should be clarity and uniformity in reporting GST data in the state budgets. Total expenditure aggregates across states show an increasing trend. Both capital and revenue expenditure aggregated across states as percentage of GSDP have increased. We find that the increase in total expenditure is largely driven by the increase in expenditure on social services. The increase in social services expenditure is due to increase in expenditures in urban development, water supply and sanitation, welfare of SCs, STs and backward classes, relief on account of natural calamities and housing which account for about 39 percent of the expenditure on social services. Committed expenditures comprising salaries and wages, pension and interest payments as percent of revenue expenditure show a declining trend. However, this may increase as states start implementing the recommendations of the Seventh Central Pay Commission from 2017-18.

While states in aggregate have budgeted for a fiscal deficit as percent of GDP to be below 3 percent in 2018-19BE, the study finds that in recent years, states in aggregate had a fiscal deficit-GDP ratio that is higher than 3 percent. This is primarily due to taking over of DISCOM liabilities by state governments in 2015-16 and 2016-17 under UDAY. The new framework of borrowings recommended by the Fourteenth Finance Commission also contributed to the increase in fiscal deficit of states eligible for higher borrowings. Although in aggregate the states have budgeted for a surplus in the revenue account, but since 2013-14 we see emergence of revenue deficits. Given that states have not been raising resources from their own sources, the revenue deficit is likely to increase as all state governments implement the recommendations of the Seventh Central Pay Commission.

Effective fiscal consolidation path can be attained through better tax buoyancy rather than expenditure compression. A tax buoyancy of one would imply that an increase in GDP by one

percent of GDP would increase tax revenue also by one percent, thus leaving the tax-to-GDP ratio unchanged. When the tax buoyancy exceeds one, tax revenue increases more than GDP. In chapter 3, using the ADRL methodology, we have tried to estimate the revenue buoyancy within States and between States in a panel, and analysed the short run and long run coefficients and their speed of adjustment. Using HP filter, we tried to estimate the potential GDP, and also analysed the cyclicality of tax buoyancy using output gap variable across states. Our findings revealed that own taxation is a buoyant source of revenue, though the coefficients are always not remarkably above unity across States.

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Appendix 1: State-wise Partitioning the Errors

Table 1: REVENUE DEFICIT: Sources of Forecast Errors (BE-ACTUALS & RE_ACTUALS)

	BE-Actuals			RE-Actuals		
	Sources of Error			Sources of Error		
	Bias	Variance	Random	Bias	Variance	Random
Andhra Pradesh	0.375	0.267	0.358	0.264	0.570	0.165
Arunachal Pradesh	0.437	0.006	0.556	0.007	0.166	0.826
Assam	0.193	0.013	0.794	0.461	0.324	0.215
Bihar	0.394	0.089	0.517	0.437	0.051	0.512
Chhattisgarh	0.247	0.250	0.503	0.035	0.226	0.739
Goa	0.206	0.249	0.544	0.723	0.157	0.120
Gujarat	0.001	0.105	0.895	0.013	0.085	0.902
Haryana	0.587	0.206	0.207	0.000	0.491	0.509
Himachal	0.294	0.001	0.705	0.163	0.170	0.668
Jammu and Kashmir	0.448	0.384	0.167	0.333	0.348	0.319
Jharkhand	0.707	0.001	0.292	0.366	0.114	0.520
Karnataka	0.432	0.524	0.044	0.600	0.246	0.153
Kerala	0.056	0.711	0.233	0.073	0.534	0.394
Madhya Pradesh	0.396	0.115	0.489	0.444	0.123	0.433
Maharashtra	0.385	0.393	0.222	0.025	0.129	0.845
Manipur	0.000	0.018	0.982	0.018	0.308	0.787
Meghalaya	0.767	0.022	0.210	0.668	0.000	0.332
Mizoram	0.626	0.208	0.166	0.108	0.001	0.891
Nagaland	0.498	0.327	0.175	0.343	0.235	0.423
Orissa	0.892	0.023	0.085	0.897	0.001	0.102
Punjab	0.710	0.185	0.105	0.080	0.371	0.548
Rajasthan	0.270	0.516	0.214	0.500	0.315	0.185
Sikkim	0.893	0.000	0.106	0.937	0.002	0.061
Tamil Nadu	0.258	0.005	0.738	0.029	0.001	0.970
Tripura	0.063	0.673	0.265	0.042	0.234	0.723
Uttarakhand	0.176	0.260	0.564	0.154	0.651	0.195
Uttar Pradesh	0.076	0.619	0.305	0.286	0.075	0.639
West Bengal	0.873	0.001	0.127	0.389	0.005	0.606

Source: Finance Accounts of States and State Budget documents (various years)

Table 2: FISCAL DEFICIT: Sources of Forecast Errors (BE-ACTUALS & RE_ACTUALS)

	BE-Actuals			RE-Actuals		
	Sources of Error			Sources of Error		
	Bias	Variance	Random	Bias	Variance	Random
Andhra Pradesh	0.077	0.309	0.613	0.076	0.302	0.623
Arunachal Pradesh	0.018	0.256	0.726	0.430	0.072	0.498
Assam	0.008	0.147	0.846	0.780	0.005	0.215
Bihar	0.061	0.503	0.437	0.785	0.015	0.200
Chhattisgarh	0.313	0.116	0.571	0.398	0.206	0.396
Goa	0.830	0.068	0.102	0.848	0.077	0.075
Gujarat	0.341	0.003	0.656	0.132	0.073	0.796
Haryana	0.021	0.490	0.490	0.143	0.378	0.479
Himachal	0.173	0.000	0.827	0.105	0.042	0.853
Jammu and Kashmir	0.450	0.474	0.076	0.184	0.540	0.276
Jharkhand	0.172	0.724	0.104	0.015	0.354	0.632
Karnataka	0.025	0.555	0.420	0.006	0.603	0.390
Kerala	0.084	0.562	0.354	0.077	0.407	0.516
Madhya Pradesh	0.280	0.465	0.255	0.701	0.017	0.282
Maharashtra	0.090	0.566	0.344	0.690	0.132	0.179
Manipur	0.302	0.366	0.332	0.787	0.022	0.223
Meghalaya	0.139	0.133	0.729	0.093	0.178	0.729
Mizoram	0.181	0.688	0.131	0.385	0.019	0.596
Nagaland	0.134	0.152	0.714	0.707	0.075	0.219
Orissa	0.845	0.001	0.154	0.921	0.000	0.079
Punjab	0.362	0.110	0.527	0.097	0.326	0.578
Rajasthan	0.183	0.301	0.517	0.921	0.002	0.077
Sikkim	0.462	0.094	0.444	0.860	0.080	0.060
Tamil Nadu	0.153	0.539	0.307	0.336	0.262	0.402
Tripura	0.772	0.153	0.075	0.759	0.192	0.049
Uttarakhand	0.243	0.317	0.440	0.254	0.000	0.746
Uttar Pradesh	0.002	0.375	0.623	0.016	0.470	0.514
West Bengal	0.744	0.052	0.204	0.007	0.136	0.857

Source: Finance Accounts of States and State Budget documents (various years)

Table 3: PRIMARY DEFICIT: Sources of Forecast Errors (BE-ACTUALS & RE_ACTUALS)

	BE-Actuals			RE-Actuals		
	Sources of Error			Sources of Error		
	Bias	Variance	Random	Bias	Variance	Random
Andhra Pradesh	0.224	0.510	0.266	0.112	0.504	0.384
Arunachal Pradesh	0.024	0.320	0.655	0.430	0.063	0.507
Assam	0.009	0.137	0.854	0.777	0.003	0.219
Bihar	0.123	0.524	0.352	0.778	0.024	0.199
Chhattisgarh	0.303	0.218	0.479	0.373	0.311	0.316
Goa	0.853	0.017	0.129	0.867	0.033	0.100
Gujarat	0.309	0.087	0.604	0.116	0.225	0.659
Haryana	0.032	0.497	0.471	0.142	0.353	0.504
Himachal	0.124	0.025	0.851	0.047	0.087	0.866
Jammu and Kashmir	0.381	0.552	0.067	0.180	0.594	0.227
Jharkhand	0.166	0.644	0.189	0.016	0.261	0.723
Karnataka	0.200	0.379	0.420	0.008	0.693	0.299
Kerala	0.084	0.693	0.223	0.080	0.578	0.343
Madhya Pradesh	0.118	0.584	0.299	0.666	0.001	0.333
Maharashtra	0.072	0.545	0.383	0.692	0.090	0.218
Manipur	0.337	0.341	0.322	0.787	0.015	0.231
Meghalaya	0.142	0.304	0.554	0.099	0.357	0.544
Mizoram	0.283	0.569	0.148	0.351	0.006	0.643
Nagaland	0.028	0.019	0.954	0.714	0.007	0.280
Orissa	0.632	0.005	0.363	0.637	0.015	0.348
Punjab	0.360	0.078	0.562	0.098	0.331	0.571
Rajasthan	0.183	0.363	0.454	0.915	0.000	0.085
Sikkim	0.437	0.119	0.444	0.851	0.093	0.056
Tamil Nadu	0.170	0.590	0.241	0.313	0.301	0.386
Tripura	0.795	0.130	0.075	0.689	0.279	0.033
Uttarakhand	0.231	0.389	0.380	0.288	0.000	0.711
Uttar Pradesh	0.017	0.399	0.584	0.025	0.521	0.454
West Bengal	0.761	0.001	0.239	0.002	0.172	0.826

Source: Finance Accounts of States and State Budget documents (various years)

Table 4: REVENUE RECEIPTS: Sources of Forecast Errors (BE-ACTUALS & RE_ACTUALS)

	BE-Actuals			RE-Actuals		
	Sources of Error			Sources of Error		
	Bias	Variance	Random	Bias	Variance	Random
Andhra Pradesh	0.478	0.191	0.331	0.365	0.375	0.260
Arunachal Pradesh	0.482	0.004	0.513	0.286	0.078	0.635
Assam	0.750	0.217	0.033	0.847	0.023	0.130
Bihar	0.773	0.081	0.146	0.657	0.187	0.156
Chhattisgarh	0.672	0.219	0.109	0.637	0.287	0.075
Goa	0.772	0.068	0.160	0.721	0.051	0.229
Gujarat	0.022	0.008	0.970	0.061	0.131	0.807
Haryana	0.874	0.032	0.094	0.785	0.033	0.181
Himachal	0.071	0.283	0.647	0.087	0.510	0.404
Jammu and Kashmir	0.403	0.100	0.497	0.092	0.050	0.859
Jharkhand	0.344	0.061	0.595	0.080	0.083	0.836
Karnataka	0.073	0.151	0.776	0.144	0.273	0.582
Kerala	0.380	0.001	0.619	0.004	0.290	0.706
Madhya Pradesh	0.904	0.032	0.065	0.217	0.062	0.721
Maharashtra	0.962	0.000	0.038	0.041	0.092	0.867
Manipur	0.711	0.024	0.265	0.491	0.016	0.493
Meghalaya	0.718	0.162	0.120	0.272	0.308	0.421
Mizoram	0.007	0.015	0.977	0.027	0.501	0.472
Nagaland	0.764	0.139	0.098	0.610	0.202	0.188
Orissa	0.078	0.013	0.909	0.136	0.155	0.709
Punjab	0.394	0.142	0.463	0.143	0.284	0.573
Rajasthan	0.050	0.016	0.935	0.181	0.195	0.624
Sikkim	0.006	0.650	0.343	0.017	0.427	0.556
Tamil Nadu	0.895	0.020	0.085	0.078	0.038	0.884
Tripura	0.363	0.599	0.038	0.016	0.022	0.961
Uttarakhand	0.762	0.194	0.044	0.640	0.139	0.221
Uttar Pradesh	0.651	0.124	0.225	0.072	0.003	0.925
West Bengal	0.795	0.112	0.092	0.373	0.301	0.326

Source: Finance Accounts of States and State Budget documents (various years)

Table 5: OWN TAX REVENUE: Sources of Forecast Errors (BE-ACTUALS & RE_ACTUALS)

	BE-Actuals			RE-Actuals		
	Sources of Error			Sources of Error		
	Bias	Variance	Random	Bias	Variance	Random
Andhra Pradesh	0.434	0.054	0.513	0.335	0.190	0.475
Arunachal Pradesh	0.102	0.401	0.497	0.135	0.122	0.743
Assam	0.182	0.781	0.037	0.205	0.476	0.319
Bihar	0.513	0.411	0.076	0.424	0.182	0.394
Chhattisgarh	0.364	0.588	0.049	0.422	0.531	0.046
Goa	0.663	0.210	0.128	0.500	0.057	0.443
Gujarat	0.120	0.796	0.084	0.004	0.402	0.593
Haryana	0.558	0.374	0.068	0.625	0.315	0.060
Himachal	0.001	0.000	0.998	0.021	0.001	0.978
Jammu and Kashmir	0.212	0.028	0.760	0.205	0.040	0.755
Jharkhand	0.664	0.295	0.041	0.574	0.379	0.047
Karnataka	0.285	0.576	0.139	0.729	0.000	0.271
Kerala	0.796	0.123	0.081	0.691	0.098	0.212
Madhya Pradesh	0.006	0.891	0.103	0.000	0.371	0.628
Maharashtra	0.000	0.719	0.280	0.067	0.389	0.544
Manipur	0.164	0.702	0.135	0.184	0.228	0.685
Meghalaya	0.014	0.458	0.529	0.053	0.408	0.538
Mizoram	0.391	0.326	0.283	0.346	0.447	0.207
Nagaland	0.272	0.434	0.294	0.365	0.016	0.619
Orissa	0.068	0.001	0.931	0.163	0.000	0.837
Punjab	0.864	0.048	0.088	0.873	0.092	0.034
Rajasthan	0.084	0.859	0.058	0.162	0.795	0.044
Sikkim	0.649	0.007	0.344	0.534	0.117	0.349
Tamil Nadu	0.434	0.385	0.181	0.601	0.111	0.288
Tripura	0.001	0.368	0.631	0.146	0.150	0.705
Uttarakhand	0.589	0.383	0.028	0.421	0.444	0.135
Uttar Pradesh	0.019	0.879	0.102	0.115	0.164	0.721
West Bengal	0.693	0.063	0.244	0.438	0.106	0.456

Source: Finance Accounts of States and State Budget documents (various years)

Table 6: TAX TRANSFERS: Sources of Forecast Errors (BE-ACTUALS & RE_ACTUALS)

	BE-Actuals			RE-Actuals		
	Sources of Error			Sources of Error		
	Bias	Variance	Random	Bias	Variance	Random
Andhra Pradesh	0.230	0.002	0.768	0.362	0.000	0.638
Arunachal Pradesh	0.435	0.286	0.279	0.039	0.004	0.957
Assam	0.001	0.251	0.748	0.055	0.117	0.828
Bihar	0.387	0.004	0.609	0.391	0.017	0.591
Chhattisgarh	0.391	0.036	0.572	0.420	0.000	0.580
Goa	0.001	0.094	0.905	0.109	0.159	0.732
Gujarat	0.006	0.124	0.871	0.653	0.022	0.326
Haryana	0.142	0.288	0.571	0.491	0.216	0.293
Himachal	0.458	0.001	0.541	0.402	0.009	0.588
Jammu and Kashmir	0.223	0.000	0.777	0.171	0.002	0.828
Jharkhand	0.047	0.220	0.732	0.119	0.279	0.602
Karnataka	0.092	0.146	0.762	0.261	0.022	0.717
Kerala	0.079	0.084	0.837	0.279	0.020	0.701
Madhya Pradesh	0.075	0.215	0.710	0.321	0.009	0.670
Maharashtra	0.175	0.257	0.568	0.037	0.090	0.873
Manipur	0.707	0.004	0.288	0.332	0.115	0.645
Meghalaya	0.727	0.004	0.269	0.434	0.071	0.495
Mizoram	0.000	0.142	0.857	0.018	0.006	0.976
Nagaland	0.018	0.243	0.739	0.143	0.073	0.784
Orissa	0.112	0.182	0.706	0.048	0.028	0.924
Punjab	0.090	0.461	0.449	0.213	0.018	0.768
Rajasthan	0.215	0.173	0.612	0.143	0.010	0.847
Sikkim	0.651	0.002	0.346	0.317	0.005	0.678
Tamil Nadu	0.263	0.202	0.535	0.423	0.012	0.566
Tripura	0.164	0.532	0.304	0.168	0.523	0.309
Uttarakhand	0.023	0.224	0.753	0.057	0.052	0.891
Uttar Pradesh	0.169	0.305	0.526	0.332	0.001	0.667
West Bengal	0.006	0.469	0.525	0.214	0.003	0.783

Source: Finance Accounts of States and State Budget documents (various years)

Table 7: OWN NON-TAX REVENUE: Sources of Forecast Errors (BE-ACTUALS & RE_ACTUALS)

	BE-Actuals			RE-Actuals		
	Sources of Error			Sources of Error		
	Bias	Variance	Random	Bias	Variance	Random
Andhra Pradesh	0.098	0.000	0.901	0.201	0.057	0.743
Arunachal Pradesh	0.186	0.337	0.477	0.431	0.029	0.540
Assam	0.620	0.157	0.223	0.375	0.000	0.625
Bihar	0.796	0.013	0.191	0.268	0.051	0.681
Chhattisgarh	0.652	0.268	0.080	0.546	0.351	0.103
Goa	0.526	0.014	0.459	0.027	0.417	0.556
Gujarat	0.047	0.060	0.893	0.240	0.335	0.425
Haryana	0.446	0.363	0.191	0.503	0.179	0.318
Himachal	0.007	0.070	0.923	0.018	0.042	0.940
Jammu and Kashmir	0.207	0.017	0.776	0.320	0.055	0.625
Jharkhand	0.429	0.316	0.255	0.453	0.375	0.172
Karnataka	0.274	0.573	0.153	0.000	0.582	0.418
Kerala	0.001	0.490	0.509	0.763	0.069	0.169
Madhya Pradesh	0.009	0.166	0.824	0.189	0.016	0.795
Maharashtra	0.522	0.340	0.138	0.719	0.072	0.209
Manipur	0.923	0.063	0.014	0.536	0.118	0.404
Meghalaya	0.188	0.000	0.811	0.121	0.013	0.866
Mizoram	0.038	0.601	0.362	0.016	0.573	0.411
Nagaland	0.726	0.163	0.110	0.431	0.016	0.552
Orissa	0.204	0.549	0.247	0.388	0.314	0.298
Punjab	0.127	0.073	0.801	0.651	0.019	0.331
Rajasthan	0.010	0.414	0.576	0.067	0.281	0.651
Sikkim	0.661	0.195	0.144	0.561	0.045	0.394
Tamil Nadu	0.390	0.030	0.580	0.007	0.077	0.916
Tripura	0.016	0.329	0.655	0.025	0.245	0.730
Uttarakhand	0.261	0.435	0.304	0.224	0.237	0.540
Uttar Pradesh	0.405	0.231	0.364	0.297	0.056	0.647
West Bengal	0.344	0.056	0.600	0.150	0.050	0.800

Source: Finance Accounts of States and State Budget documents (various years)

Table 8: GRANTS: Sources of Forecast Errors (BE-ACTUALS & RE_ACTUALS)

	BE-Actuals			RE-Actuals		
	Sources of Error			Sources of Error		
	Bias	Variance	Random	Bias	Variance	Random
Andhra Pradesh	0.329	0.242	0.429	0.310	0.159	0.532
Arunachal Pradesh	0.375	0.091	0.534	0.243	0.234	0.523
Assam	0.830	0.084	0.085	0.804	0.026	0.170
Bihar	0.622	0.166	0.212	0.619	0.248	0.133
Chhattisgarh	0.766	0.159	0.074	0.739	0.197	0.064
Goa	0.755	0.000	0.245	0.671	0.000	0.328
Gujarat	0.627	0.037	0.336	0.646	0.121	0.233
Haryana	0.834	0.024	0.143	0.913	0.001	0.086
Himachal	0.026	0.024	0.950	0.417	0.047	0.536
Jammu and Kashmir	0.453	0.031	0.516	0.332	0.017	0.651
Jharkhand	0.893	0.011	0.096	0.778	0.084	0.139
Karnataka	0.179	0.013	0.808	0.339	0.036	0.625
Kerala	0.494	0.010	0.496	0.749	0.010	0.241
Madhya Pradesh	0.508	0.151	0.341	0.537	0.086	0.378
Maharashtra	0.393	0.008	0.600	0.784	0.208	0.009
Manipur	0.026	0.000	0.974	0.571	0.370	0.068
Meghalaya	0.783	0.210	0.008	0.692	0.298	0.010
Mizoram	0.660	0.301	0.039	0.722	0.000	0.278
Nagaland	0.698	0.082	0.220	0.678	0.002	0.320
Orissa	0.764	0.153	0.083	0.847	0.065	0.089
Punjab	0.903	0.008	0.089	0.586	0.018	0.397
Rajasthan	0.041	0.000	0.959	0.809	0.152	0.039
Sikkim	0.835	0.006	0.159	0.416	0.011	0.072
Tamil Nadu	0.060	0.011	0.929	0.414	0.399	0.187
Tripura	0.331	0.344	0.325	0.671	0.228	0.101
Uttarakhand	0.678	0.280	0.042	0.316	0.267	0.026
Uttar Pradesh	0.769	0.194	0.037	0.693	0.205	0.102
West Bengal	0.683	0.044	0.273	0.517	0.042	0.442

Source: Finance Accounts of States and State Budget documents (various years)

Table 9: REVENUE EXPENDITURE: Sources of Forecast Errors (BE-ACTUALS & RE_ACTUALS)

	BE-Actuals			RE-Actuals		
	Sources of Error			Sources of Error		
	Bias	Variance	Random	Bias	Variance	Random
Andhra Pradesh	0.467	0.260	0.273	0.035	0.001	0.964
Arunachal Pradesh	0.152	0.708	0.140	0.684	0.224	0.092
Assam	0.877	0.100	0.023	0.847	0.086	0.067
Bihar	0.793	0.100	0.107	0.837	0.128	0.035
Chhattisgarh	0.678	0.285	0.037	0.735	0.242	0.023
Goa	0.881	0.079	0.040	0.847	0.062	0.091
Gujarat	0.612	0.255	0.132	0.608	0.295	0.097
Haryana	0.829	0.088	0.083	0.952	0.010	0.038
Himachal	0.465	0.174	0.361	0.386	0.433	0.181
Jammu and Kashmir	0.195	0.177	0.629	0.166	0.203	0.631
Jharkhand	0.902	0.002	0.095	0.902	0.056	0.041
Karnataka	0.004	0.001	0.011	0.000	0.004	0.005
Kerala	0.226	0.174	0.600	0.206	0.057	0.736
Madhya Pradesh	0.594	0.074	0.331	0.630	0.099	0.271
Maharashtra	0.179	0.584	0.236	0.745	0.221	0.034
Manipur	0.240	0.006	0.754	0.739	0.189	0.083
Meghalaya	0.640	0.289	0.071	0.540	0.377	0.084
Mizoram	0.002	0.631	0.367	0.730	0.170	0.100
Nagaland	0.375	0.405	0.221	0.594	0.129	0.277
Orissa	0.762	0.174	0.064	0.867	0.086	0.048
Punjab	0.961	0.001	0.038	0.842	0.062	0.096
Rajasthan	0.030	0.500	0.470	0.856	0.131	0.014
Sikkim	0.720	0.193	0.087	0.791	0.167	0.041
Tamil Nadu	0.263	0.411	0.326	0.830	0.110	0.060
Tripura	0.781	0.147	0.072	0.771	0.100	0.129
Uttarakhand	0.659	0.034	0.307	0.787	0.057	0.156
Uttar Pradesh	0.695	0.220	0.085	0.770	0.002	0.228
West Bengal	0.116	0.384	0.499	0.811	0.004	0.186

Source: Finance Accounts of States and State Budget documents (various years)

Table 10: CAPITAL EXPENDITURE: Sources of Forecast Errors (BE-ACTUALS & RE_ACTUALS)

	BE-Actuals			RE-Actuals		
	Sources of Error			Sources of Error		
	Bias	Variance	Random	Bias	Variance	Random
Andhra Pradesh	0.357	0.236	0.407	0.053	0.646	0.301
Arunachal Pradesh	0.828	0.006	0.166	0.893	0.004	0.103
Assam	0.813	0.112	0.075	0.767	0.167	0.066
Bihar	0.756	0.003	0.241	0.738	0.009	0.254
Chhattisgarh	0.894	0.073	0.033	0.851	0.122	0.027
Goa	0.806	0.152	0.042	0.807	0.141	0.052
Gujarat	0.481	0.199	0.321	0.638	0.172	0.190
Haryana	0.105	0.008	0.887	0.018	0.046	0.936
Himachal	0.196	0.005	0.800	0.554	0.317	0.129
Jammu and Kashmir	0.443	0.035	0.522	0.461	0.041	0.498
Jharkhand	0.728	0.205	0.067	0.791	0.070	0.139
Karnataka	0.484	0.036	0.480	0.330	0.092	0.579
Kerala	0.409	0.000	0.591	0.094	0.237	0.669
Madhya Pradesh	0.317	0.532	0.152	0.315	0.085	0.600
Maharashtra	0.980	0.001	0.019	0.696	0.252	0.052
Manipur	0.463	0.256	0.281	0.906	0.050	0.051
Meghalaya	0.854	0.127	0.019	0.777	0.192	0.031
Mizoram	0.260	0.376	0.364	0.657	0.209	0.134
Nagaland	0.918	0.004	0.079	0.722	0.154	0.123
Orissa	0.024	0.910	0.065	0.064	0.179	0.757
Punjab	0.797	0.001	0.202	0.909	0.007	0.084
Rajasthan	0.167	0.061	0.772	0.872	0.013	0.115
Sikkim	0.959	0.023	0.018	0.969	0.017	0.014
Tamil Nadu	0.525	0.135	0.340	0.735	0.046	0.219
Tripura	0.595	0.374	0.032	0.910	0.069	0.022
Uttarakhand	0.027	0.047	0.926	0.529	0.094	0.378
Uttar Pradesh	0.314	0.005	0.681	0.482	0.033	0.485
West Bengal	0.864	0.041	0.095	0.854	0.140	0.006

Source: Finance Accounts of States and State Budget documents (various years)

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