



A Study of the Fiscal Marksmanship of Capital Expenditure Among Indian State Governments

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Introduction

One of the central challenges that economics, as a discipline, addresses is the issue of scarcity: an economy has limited resources, but numerous priorities. Inadequate state capacities and planning impair the policies that are needed to alleviate the problems of developing economies and to meet the Sustainable Development Goals.

Budgeting is a time-tested tool used by governments for sound fiscal management. It entails planning and allocating limited resources. Fiscal marksmanship examines the degree of correspondence between budgeted projections of revenue and expenditure, and actual receipts and spending. Emerging yet limited evidence on marksmanship among Indian state governments reveals that states have been overestimating their receipts and expenditures. The literature also finds that budget credibility is precarious, especially in the context of grants and overall capital expenditure.

In the Indian scenario, there have been limited attempts to understand the fiscal marksmanship of capital expenditure and its components among state governments. This is despite the fact that states in India contribute about two-thirds of total public expenditure (Kala & Khullar, 2018). In this paper, we attempt to comprehensively analyse and understand subnational fiscal marksmanship, especially related to spending in the social sector. Assessing budget credibility through fiscal marksmanship analysis is critical in light of the COVID-19 pandemic, which has affected the revenue-raising capacity of states. In particular, this has resulted in reduced fiscal space for undertaking developmental expenditure. A credible budget would reflect the ability of a state to accurately predict its actual expenditures, which will in turn determine how rapidly it can embark on a fiscal consolidation path.

This paper's analysis of the fiscal marksmanship of Indian subnational governments covers the period of 2010-2018, and looks at marksmanship ratios and forecast errors across the years. It also carries out an assessment using the Public Expenditure and Financial Accountability (PEFA) framework. Further, it attempts to understand the sources of the error in the Social Services expenditure component (and its sub-components) of total capital outlay. This has important implications for policy-making, as it indicates whether errors in the budget can be improved upon or not. Lastly, it makes an attempt to understand some of the causes behind the observed trends in subnational fiscal marksmanship.

The paper is organised as follows. In the subsequent section, the importance of fiscal marksmanship is discussed. The third section reviews the literature on marksmanship, with a special focus on the Indian context. The fourth section covers marksmanship ratios in expenditure forecasting in subnational governments, with a nuanced emphasis on the errors in total capital outlay, its component of Social Services, and its sub-components. The fifth section looks at trends in forecast errors to better understand the implications of the changing fiscal landscape since the award of the Fourteenth Finance Commission. The sixth section makes a PEFA assessment, and ranks states accordingly. The seventh section decomposes the sources of errors within the components to understand whether the errors are systematic or random in nature. This is done by employing Theil's technique and by partitioning the errors. The eighth section examines the causes behind poor marksmanship, and the final section concludes, and identifies areas for future research.

Importance of Fiscal Marksmanship

Fiscal marksmanship is an essential criterion for evaluating budgetary policy and practice. To illustrate this, we look into the several dimensions in which marksmanship plays a significant role.

The budget reflects the economic aspirations, goals, and priorities of a society. Policy-makers use the budget as a tool to maintain allocative efficiency across various sectors through optimum resource allocation, ensuring that benefits percolate to various sectors and regions. If the budget itself is

not credible, this objective is undermined. After all, unpredictability in government revenues and expenditures makes it harder to formulate and execute effective policies. Fiscal marksmanship also forms an integral part of the Public Financial Management (PFM) system, since the budget cycle is one of the central components of this system. Budget formulation, execution, and monitoring are all fundamental parts of this process. It broadly starts with estimates of the financial resources needed by the various departments, ministries, line departments at the block level, and local bodies. The next step involves earmarking funds across different areas based on needs and priorities, and the budget ceiling, after consultations with various stakeholders. Based on this, budgetary forecasts are formulated. Inaccurate forecasts naturally result in larger deviations, and represent a lack of integration between policy goals and implementation.

The budget also represents a commitment that agents responsible for the implementation of programmes and policies will use the allocated funds in the prescribed manner. Significant deviations from this can impair democratic accountability (Schick, 2011). Budget preparations and forecasts also represent the government's commitment to ensuring public service delivery. Consistently large deviations from budgetary forecasts can erode public trust in governments and signal a lack of commitment (International Budget Partnership, 2018). Improving forecasting techniques can restore public trust, and serve as a step towards stabilising fiscal policy. On the other hand, a lack of concern about re-calibrating and checking inefficient budget forecasting mechanisms makes it unlikely that fiscal policy objectives will be met any time soon.

In the context of expenditure, budgetary forecasts act as physical signals for rational agents to form their expectations and for private consumers to base their decisions. Businesses look forward to budget presentations as these enable them to plan decisions and undertake expenditures. Poor fiscal marksmanship in expenditure leads to reductions in net welfare gains as a result of reduced private investment and consumption. Reduced investment also has long-term implications in terms of reducing the creation of capital assets and diluting the effect of multipliers. Studies find that the multiplier effects of capital expenditures are significant (Jain & Kumar, 2013; Bose & Bhanumurthy, 2015). Therefore, it is crucial to improve forecasting of the capital expenditure budget in order to ensure that policy goals are met.

Additionally, persistent under-spending in crucial developmental areas leads to economic distortions and a lower than targeted accumulation of social overheads, which are the foundations of a growing economy. A substantial lack of such social overheads makes the economy highly vulnerable to external economic shocks (International Budget Partnership, 2018). For instance, the inability to spend the forecasted amounts in crucial areas like health and education has resulted in deep under-spending in developmental infrastructure over the years. The lack of such infrastructure has exposed the weaknesses of economies and reduced their ability to combat external shocks, as highlighted by the COVID-19 pandemic. Moreover, if revenue realisations are lower than budgeted, governments are forced to resort to borrowing to finance the deficit and meet expenditure targets. Therefore, fiscal marksmanship, by assessing the extent of forecast errors, plays a significant role in determining future borrowing requirements.

Fiscal rules prescribe targets for indicators like fiscal and primary deficits and the public debt. In some cases, they also enforce targets for the aggregate level of expenditure. The objective is to maintain fiscal sustainability (Akun et al, 2017). In India, fiscal rules are found in the Fiscal Responsibility and Budget Management or FRBM Acts at the centre and state levels. By and large, these laws require governments at the centre and states to reduce their fiscal deficits to 3 per cent of their gross domestic product. Budget accuracy is important for sound fiscal consolidation and meeting these fiscal targets. If revenues fall short, then expenditure compression tends to follow, in order to meet these legislated targets. This compromises the growth-enhancing capability of an economy.

Finally, budget credibility plays a significant role in meeting the Sustainable Development Goals, especially the goal of building effective, accountable, and inclusive institutions at all levels (Jena & Sikdar, 2019). One of the indicators under this goal is primary government expenditure as a proportion of the original approved budget, by sector, thus underlining the importance of good marksmanship.

Literature Review

One of the early studies in fiscal marksmanship investigated budget errors between 1951 and 1963 in the UK (Allan, 1965). It found that endogenous sources of errors were more prominent than exogenous sources of error (which are harder to control).¹ In another study, the forecast errors in budgetary estimates in Canada were analysed over three-time intervals (Auld, 1970). The study analyses fiscal marksmanship by employing an inequality coefficient² to identify the sources of errors, to check whether they were systematic or random. It revealed that accurate forecasting of government revenues is important in ensuring efficient financing of large, future public expenditures. When the errors in the budget heads in Pakistan were analysed in another study, it was observed that the degree of errors in forecasting revenues was fairly similar to that for expenditure (Zakaria & Ali, 2010). No trend was found in the errors, ruling out any form of adaptive expectations that might have existed in the forecasting of revenues and expenditures.

In India's context as well, many studies have tried to capture the presence and magnitude of the budget forecast errors of the central government. An important study evaluated the revenue and expenditure forecasting of the central government for the period 1967-1976, employing various techniques to evaluate these errors (Asher, 1978). Its analysis revealed that both heads of the budget had been hugely underestimated, with the extent of underestimation being higher for expenditures.³ This implies that expenditures have been expansionary in nature, rather than planned. It compared India's forecasting with that of advanced economies and observed that there is huge scope for improvement. For instance, the gross mean error in forecasting of revenues for India was found to be 5.8%, while for the UK over a roughly similar time period, it was 2.8%. It recommended investing in improving the technical sophistication of the forecasting process, as this would be highly rewarding.

A more recent study on the central government, covering the period 1990-1991 to 2011-2012 employs mean error along with Theil's coefficient and error partitioning to understand the extent and nature of errors (Nithin & Roy, 2015). It found that expenditures had been hugely underestimated, while revenues had been overestimated. Further, it found that the predictability of expenditures was lower than in revenues, primarily because of the predominance of random errors in revenues, compared to expenditures.

Comparatively little research has been conducted on budget credibility in the context of subnational governments in India. The few studies that have been carried out limit themselves to studying the broader budgetary heads, without analysing the components.

¹ Allan (1965) distinguishes between two kinds of errors in budgetary forecasts: endogenous and exogenous sources of error. Endogenous errors arise from failures to see how changes introduced in the budget might affect the level or quality of economic activity, and ultimately, actual government revenues and expenditures. Exogenous errors, on the other hand, are impossible to foresee at the time of budget formulation, such as the Suez crisis which led to higher defence expenditure for the UK government in 1957.

² Theil's coefficient was used here, because it reveals how well a time series of estimated values matches a corresponding time series of observed values.

³ In percentage terms, Asher (1978) found the revenue account gross error for the years 1967-68 to 1975-76 to be 0.9%. But for disbursement in capital and revenue account, the error percentage was a much higher 7.8%. In absolute terms for the same time reference, the mean gross error in revenue receipts was found to be Rs. 46.3 crore, and for expenditure, it was Rs. 564.5 crores.

A study that sought to identify the impact of central government forecasting errors on subnational forecasting found that the centre typically made unrealistic budget projections for both revenues and expenditures (Jena, 2006). These projections appeared to be more akin to targets, than to realistic amounts the government was expecting. These targets were rarely met. This impacted not only the centre's own fiscal management, but also led to volatility in transfers to states, which in turn affected states' fiscal marksmanship as well. Examining the broader trends in receipts and expenditures of states, the study found that states were plagued by their own financial mismanagement in addition to suffering from the unpredictability of revenues from the centre. The lack of concern about correcting this, Jena (2006) noted, posed a serious challenge for proper budget forecasting.

One of the most significant studies regarding subnational fiscal marksmanship in India was carried out by Chakraborty et al (2020). It presented an extensive picture of the marksmanship landscape for the years 2011-2015, finding that both revenues and expenditures had been overestimated. Within revenues, grants were most overestimated, while under expenditures, it was capital expenditure. A more recent attempt at understanding the errors in budgets and actuals in revenue and its components can be found in a study by Srinivasan and Misra (2020). The focus of their study, which looked at the years 2011-2012 to 2016-2017, was to analyse grants from the centre, as the component with an especially high forecast error.

The existing literature has not looked at marksmanship within the individual components of subnational capital expenditure, or identified the sources and causes of forecasting errors within these components. This paper thus adds to the existing literature on marksmanship of subnational governments, with its inclusion of more recent financial years, and its greater focus on examining the marksmanship of the components (and sub-components) of capital expenditure. This is critical, given the role of capital expenditure in creating assets in the social sector that drive socio-economic development.

Fiscal Marksmanship Analysis of Receipts and Expenditure

The data used in this study on subnational governments are compiled from the Comptroller and Auditor General (CAG) Finance Accounts reports, spanning the financial years 2010-2011 to 2018-2019. The 15 states that are covered in this study include Karnataka, Madhya Pradesh, Haryana, Odisha, Gujarat, Uttar Pradesh, Andhra Pradesh, Rajasthan, Maharashtra, Bihar, Tamil Nadu, Kerala, Chhattisgarh, West Bengal, and Punjab.⁴

Marksmanship ratios have been calculated using the same methodology that was used by Chakraborty et al (2020). In doing so, our aim is to present a descriptive analysis of the forecast for the reference period 2010-2011 to 2018-2019. Marksmanship ratios are calculated by taking the Budget Estimates (BE) of a particular year and dividing it with Actual Values (AV) for that year, and then taking the average for the time period 2010-2018. The extent of overestimation and underestimation is calculated as follows:

Ratio (r) =	$\frac{BE}{AV}$
(r) >1	indicates an overestimation of macro-fiscal variables
(r) <1	indicates an underestimation of macro-fiscal variables
(r) =1	indicates a perfect forecast of macro-fiscal variables

Descriptive statistics are then computed after taking the marksmanship ratios for each state across the time period 2010-2018. Thereafter, we have calculated the descriptive statistics for each of the macro-fiscal variables.

⁴ The 15 states in the study are non-special category states, and have been selected on the basis of the magnitude of their capital expenditures.

A. Fiscal marksmanship of expenditure

On the expenditure side, both capital expenditure and revenue expenditure have been overestimated (Table 1), but the extent of overestimation is more pronounced for capital expenditure.⁵ Further, the range and standard deviation are higher for capital expenditure than for revenue expenditure. This indicates a wider spread. This broadly confirms the findings in Chakraborty et al (2020).

Table 1: Marksmanship Ratios (r) for all 15 States: Capital Expenditure and Revenue Expenditure (2010-2018)

	Mean	Median	Min	Max	Standard Deviation	Range
Total Capital Outlay	1.268	1.189	0.97	2.325	0.335	1.355
Social Services	1.472	1.341	1.014	3.129	0.501	2.115
Economic Services	1.187	1.103	0.959	1.845	0.245	0.886
Non-Development Expenditure (General Services)	1.551	1.49	1.042	2.777	0.525	1.735
Total Revenue Expenditure	1.06	1.05	0.99	1.14	0.04	0.15
Social Services	1.070	1.052	0.986	1.172	0.062	0.19
Economic Services	1.047	1.032	0.957	1.183	0.063	0.23
Non-Developmental Expenditure (General Services)	1.060	1.063	0.970	1.254	0.075	0.28

Source: Authors' calculations based on CAG Finance Accounts data

The expenditure categories of a budget can be broadly classified under developmental and non-developmental expenditure. Developmental expenditure has two components, viz. Social Services and Economic Services. Social Services encompass crucial areas of spending like Education, Health, Water Supply, Urban Development, and Welfare of Scheduled Castes (SCs) and Scheduled Tribes (STs). The spending areas under Economic Services, on the other hand, include Agriculture, Rural Development, Energy, and Industry, among others.

Disaggregating total capital outlay into its components, we observe that Social Services and non-developmental services had high marksmanship ratios, with the budgeted figures being overestimated. Further, the minimum ratios of 1.01 in Social Services and 1.04 in non-developmental General Services indicate that, so far, no state has been able to correctly predict its expenses; and that no state had underestimated its expenses (and overspent) under these heads either.

In this paper, we focus on studying the marksmanship of subnational capital expenditure, its component Social Services, and its sub-components. States play a significant role in public service delivery in the social sector, which has high spill-over effects on the economy. The presence of high marksmanship ratios across these areas implies that the budget was consistently overestimated, and that actual expenditure was far lower than projected. This indicates a cutback of crucial public expenditures, considered necessary for developmental outcomes by the government, given its own budgetary figures. Moreover, capital expenditure has growth-inducing multiplier effects which contribute significantly to raising the standard of living. Low capital expenditure leads to inadequate infrastructure in areas such as health, education, and housing, which impairs an economy's ability to insulate itself from external shocks such as the COVID-19 pandemic. In light of this, and given

⁵ The minimum and maximum values in the tables correspond to individual states' marksmanship ratios. The descriptive statistics of each state were obtained prior to calculating these.

India's regional inequities, it is also important to gauge which states have been able to meet their self-determined budgetary commitments, and where improvement is required.

Looking at the composition of the expenditure profile within Social Services, we find that the areas of Education, Sports, Art and Culture, Medical and Public Health, Water Supply and Sanitation, and Urban Development together comprise almost three-fourths of total expenditure. Given the critical and growing importance of subnational capital expenditure in the social sector, and the lack of literature analysing the fiscal marksmanship of such expenditure, this paper focuses further on these components.

Table 2: Marksmanship Ratios (r) of the Sub-components of Social Services (2010-2018)

	Mean	Median	Min	Max	Standard Deviation	Range
Education, Sports, Art and Culture	1.822	1.638	1.086	2.813	0.6	1.727
Medical and Public Health	1.303	1.248	0.875	1.684	0.23	0.809
Family Welfare	1.549	1.023	0.817	3.333	1.194	2.516
Water Supply and Sanitation	1.413	1.259	0.971	3.528	0.611	2.557
Housing	1.966	1.869	1.091	3.636	0.739	2.545
Urban Development	1.811	1.499	0.118	8.077	0.541	7.959
Welfare of Scheduled Castes, Scheduled Tribes, and Other Backward Classes	1.973	1.999	0.979	3.204	0.703	2.225
Social Security and Welfare	2.416	1.7	0.844	4.39	1.126	3.546
Others	1.775	1.689	0.438	2.89	0.622	2.452

Source: Authors' calculations based on CAG Finance Accounts data⁶

It can be seen from Table 2 that the marksmanship ratios for most of the important components are generally high, indicating overestimation (and underspending). Assessing these marksmanship ratios (which are averages across the reference period), we find that:

- In total capital outlay, Punjab (2.3), West Bengal (1.6), and Chhattisgarh (1.4) had the highest degree of overestimation, while Karnataka (1), Haryana (1.1), and Madhya Pradesh (1.1) were able to spend nearly as much as they forecasted.
- In the Social Services component of total capital outlay, Punjab (3.8), West Bengal (1.8), and Andhra Pradesh (1.6) had the highest overestimation, and Karnataka (1), Odisha (1), and Madhya Pradesh (1.2) had the most accurate budgets.
- Within the sub-components of Social Services,
 - In Education, we find that Punjab (2.8), Tamil Nadu (2.8), and Andhra Pradesh (2.7) are the most inaccurate, while Haryana (1.1), Kerala (1.1), and Karnataka (1.2) are the most accurate.
 - In Medical and Public Health, Chhattisgarh (1.7), Rajasthan (1.7), and Haryana (1.6) are the most inaccurate, and Gujarat (1), Karnataka (0.9), and Kerala (1.1) are the most accurate.
 - In Urban Development, the study indicates that Haryana (2.4), Chhattisgarh (1.9), and West Bengal (1.8) are the most inaccurate, while Bihar (1) is the most accurate.
 - In Water Supply and Sanitation, Chhattisgarh (3.5), Uttar Pradesh (1.7), and Punjab (1.5) emerge as most inaccurate, while Gujarat (1), Karnataka (1.1), and Maharashtra (1.1) are most accurate.

⁶ The outlier marksmanship ratios of Punjab and West Bengal in Medical and Public Health, and in Water Supply and Sanitation were removed from this analysis in order to prevent a biased mean.

Figure 1: Marksmanship Ratios (r) of Selected States



Source: Authors' calculations based on CAG Finance Accounts data

Overall, on the basis of the above analysis using marksmanship ratios, we find that states have mostly overestimated their capital expenditure to a greater extent compared with their revenue expenditure. This confirms the findings of the existing literature. When analyzing the components, we find concerning evidence of a few states, like Punjab, with significantly high marksmanship ratios throughout the decade. On the other hand, some states, like Karnataka, have performed well within the components. However, since these ratios are averages across the decade, they do not reveal whether individual states have improved (or worsened) in their budget forecasting over the years. To gauge these year-on-year variations, in subsequent sections we analyze the magnitude of errors over the years.

B. Fiscal marksmanship of receipts

The revenue sources of Indian states can be broadly divided into four categories: own tax revenue, own non-tax revenues, share in central taxes, and grants from the centre. The revenues raised by states through their own means comprise their own sources of revenues.

There are wide variations among states in terms of their ability to raise revenues through their own means, owing to differences in tax bases, capacities, and other constraints (Rao, 2017). Constitutionally, the bulk of the revenue-raising powers has been allocated to the centre, whereas the greater share of expenditure responsibilities has been assigned to states. To address these resource constraints and the vertical and horizontal fiscal imbalances, the Constitution provides for a Finance Commission which makes recommendations regarding inter-governmental tax-sharing and grants-in-aid. States rely on these fiscal transfers from the centre, with poorer states with relatively lower revenue-raising capacity being more revenue-dependent on the centre than the richer states (Jena, 2006). Variations or unpredictability in central transfers can result in hurdles in the delivery of public services by states. This highlights the importance of resource predictability.

When the shares of revenue sources are computed across the time reference, it is observed that revenue realisation from their own sources is the highest source of revenue for states. Grants from the centre is the third most important source of revenue.⁷

Several past studies have indicated that states are poor at forecasting grants from the centre (Srinivasan & Misra, 2021; Chakraborty et. al, 2020). A disaggregation of the data reveals that among all the sources of revenue receipts, overestimation is most pronounced among grants. This confirms the findings of the existing literature that grants from the centre are highly unpredictable.

⁷ The shares, however, differ across states as they are averages computed over the period of the study. Moreover, the shares in central taxes are not uniform across all states, but depends on the criteria for horizontal devolution formulated and recommended by the Finance Commissions.

Table 3: Marksmanship Ratios (r) of Receipts (2010-2018)

Budget Heads	Mean	Median	Min	Max	Standard Deviation	Range
Total Revenue	1.07	1.08	1.00	1.15	0.05	0.15
Tax Revenue	1.03	1.03	0.98	1.11	0.04	0.13
State's Own Tax Revenue	1.04	1.02	0.96	1.13	0.05	0.17
Share in Central Taxes	1.04	1.04	0.98	1.09	0.03	0.11
Non-Tax Revenue	1.21	1.23	0.96	1.48	0.14	0.52
State's Own Non-Tax Revenue	1.13	1.06	0.87	1.77	0.22	0.91
Grants From the Centre	1.30	1.32	1.01	1.56	0.14	0.55

Source: Authors' calculations based on CAG Finance Accounts data

Disaggregating grants further, the figures in Table 4 reveal the high marksmanship ratios of Central Plan Schemes⁸ (2.8) and Centrally Sponsored Schemes⁹ (2.8). The large overestimation of Central Plan Schemes is partly explained by the exceptional overestimation of revenue forecasts from these schemes by some states, such as Punjab (54.4), Haryana (48.2), and Madhya Pradesh (23.9). We also find substantial variation among states across different categories of grants.

Table 4: Marksmanship Ratios (r) of Components of Grants from the Centre (2010-2018)

	Mean	Median	Min	Max	Standard Deviation	Range
State Plan Schemes	1.47	1.41	0.87	2.69	0.42	1.82
Central Plan Schemes	2.75	1.48	-9.62	13.28	5.13	22.90
Centrally Sponsored Schemes	2.75	1.57	0.98	13.22	3.17	12.24
Non-Plan Grants	1.60	1.02	0.56	8.85	2.04	8.29

Source: Authors' calculations based on CAG Finance Accounts data¹⁰

This is true for Centrally Sponsored Schemes too, which are now grouped under the categories of core, core of the core, and optional schemes. States have not only been overestimating receipts from these schemes, but also the extent of this overestimation, compared to errors in forecasting other types of grants from the centre, is fairly high. The trends in these shares indicate that recently there has been a growing importance of Centrally Sponsored Schemes (share of about 51.6% in 2018) in the overall grants of all the major states combined.

What explains this trend? This is an important question, given that a shortfall in central grants under Centrally Sponsored Schemes often directly results in lesser developmental expenditure undertaken by states (Rao, 2017). Such a shortfall might occur due to many reasons, ranging from the centre's own poor marksmanship in terms of predicting its revenues, to an inability on the part of states (especially poorer states) in making matching grants under these schemes. If the centre receives lesser revenues than it projected, it will likely reflect in a shortfall in its contribution under

⁸ Central Plan Schemes are funded and executed by the central government for subjects in the Union List of the Seventh Schedule of the Constitution.

⁹ Centrally Sponsored Schemes are typically funded by both the central and state governments, but are implemented through state agencies. The ratio of cost-sharing depends on the category of state and the kind of scheme.

¹⁰ Certain outliers were removed from this analysis in order to prevent a biased mean. Also, the negative numbers in this table are due to the clearing of outstanding amounts under certain heads by Andhra Pradesh on the Reserve Bank of India's advice.

Centrally Sponsored Schemes. Similarly, if states do not make their matching grants towards the scheme, the centre does not release its grant either. All of this contributes to poor marksmanship in Centrally Sponsored Schemes. However, more research needs to be undertaken to identify and elaborate on the causes that might fully explain this concerning trend.

Magnitude of Forecast Errors: Interstate Variations

In February 2015, the central government accepted the Fourteenth Finance Commission's recommendation to increase the percentage of vertical tax devolution to states from 32 per cent to 42 per cent. In theory, this would provide states with more untied resources to use as per their unique needs, and free them from the need to meet centrally imposed conditions. The award period became effective from April 2015.

This recommendation appeared to be based on the need to balance the central government's increasing interference in the constitutional domain of states, as evidenced by the proliferation of Centrally Sponsored Schemes (Rao, 2017). It afforded greater flexibility and fiscal space to states to carry out reforms and meet their revenue requirements. However, during the award period of the Fourteenth Finance Commission, the increase in the share of general-purpose transfers was countered by a reduction in the share of specific-purpose transfers (Chakraborty & Gupta, 2016; Rao, 2017).¹¹ Our primary objective, in this section, is to ascertain the impact of the changing fiscal landscape, as described above, on the subnational forecasting of expenditure.

We calculate the magnitude of forecast error as follows: . If the value is greater than 0, then the forecast error is in the form of an overestimation, and if the value is less than 0, then it is a case of underestimation.¹²

A broad overview of Table 5 reveals that there are significant errors in the forecasting of total capital outlay across states. In 2014-2015, all the states, barring two, had significantly overestimated their budget outlay for capital expenditure (by more than 10%). The magnitude of overestimation was exceptionally high for some states, such as Punjab (48.6%) and Kerala (35.9%).

We now attempt to understand the trends in subnational fiscal marksmanship over the years. Beyond looking at the magnitude of errors, we also look at whether these errors were in the nature of overestimation (and underspending) or underestimation (and overspending).

Looking at the lower-income states first, we find that Chhattisgarh and Bihar have been overestimating and underspending in their total capital outlay. Chhattisgarh has also overestimated its outlays in all the individual components of Social Services. Bihar, on the other hand, has improved its forecasting significantly on most components, especially in Education and Medical and Public Health. In its case, the higher errors in forecasting of its capital budget were mostly a result of errors in forecasting Economic Services. Interestingly, among the lower-income states, Odisha has substantially reduced its errors in forecasting its total capital outlay since 2014-2015. The errors in its capital outlay on Social Services and its components were well below 5 per cent, except in Medical and Public Health which registered a sharp increase in forecasting errors.

¹¹ General-purpose transfers are the unconditional tax devolution amounts that are transferred by the Centre to the States, and represent the States' share in the divisible pool of central taxes. The percentage of tax devolution is determined by Finance Commissions. Specific-purpose transfers, on the other hand, are the conditional grants that are made by the Centre to the States, usually as part of Centrally Sponsored Schemes in particular policy areas (such as the National Health Mission). These schemes are usually co-financed and require the States to contribute as well. A reduction in the Centre's share of specific-purpose transfers thus leads to States having to increase their own contribution.

¹² The forecast errors have been calculated following the methodology employed by Srinivasan and Misra (2021). The states have been arranged according to their GSDP as of 2018-2019.

Among the higher-income states, we find that Maharashtra and Gujarat have improved their marksmanship significantly, by reducing their errors to below 10 per cent and 13 per cent, respectively. However, across the sub-components of Social Services, Gujarat's performance did not change significantly, and nor did Maharashtra's although it was volatile. Notably, Maharashtra has been spending astronomically higher amounts in Urban Development compared to its estimates.

Remarkably, Karnataka's budget in 2018-2019 predicted its spending on total capital outlay and Social Services almost perfectly. In all the other categories as well, its marksmanship has been better than all the other states. In marked contrast, Punjab's forecast errors in capital expenditure have been the highest, especially across Social Services and its sub-components. In Medical and Public Health, for instance, the budget was overestimated by 99 per cent in 2014-2015, and similar errors were observed again in 2017-2018.

For better portraying the extent of errors, mean errors were computed separately for 2010-11 to 2014-15 and for 2015-16 to 2018-19. It was found that lower-income states except Chhattisgarh have managed to reduce the gap in Total capital outlay, but the magnitude of errors fairly remained high for most states except Odisha (7.3%). Observing the same trends in Social services we find that here however, Chhattisgarh managed to reduce the errors along with other lower-income states. But Haryana largely registered an increase in error post 2014-15. Thus, it can be concluded that Chhattisgarh's high errors in total capital outlay post 2014-15 is primarily attributable to high errors in Economic services. Likewise, Haryana which managed to reduce the errors in capital outlay post 2014-15 failed miserably at closing the gap in social services. For some middle-income states and high-income states too, we find a similar pattern that despite managing to reduce the errors in total capital outlay the extent of reduction was either low in social services or had increased social services. Thus, to sum up, no conclusive evidence could be drawn from such an exercise to ascertain that post the increasing devolution of untied funds by the fourteenth finance commission all states have registered a uniform decline in error or all lower income or higher income states have uniformly registered a decline.

Table 5: Forecast Error of Total Capital Outlay (as a percentage of Budget Estimates)

State	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	Mean error (2010-11 to 2018-19)	Mean error (2010-11 to 2014-15)	Mean error (2015-16 to 2018-19)
Chhattisgarh	27.44	20.1	31.58	36.72	20.68	27.78	27.18	30.8	38.4	28.96	27.30	31.04
Bihar	11.86	22.68	28.54	1.38	14.18	3.56	9.62	10.22	35.04	15.23	15.73	14.61
Odisha	7.9	20.6	20.18	1.06	18.92	12.82	10.28	1.62	4.42	10.87	13.73	7.285
Punjab	22.14	70.5	67.06	69.78	48.6	37	9.52	61.8	62.22	49.85	55.62	42.64
Haryana	14.66	15.76	23.6	31.76	35.36	17.02	22.16	21.72	3	20.56	24.23	15.98
Madhya Pradesh	9.66	3.82	6.9	2.7	16.02	7.18	11.24	1.58	0.28	6.60	7.82	5.07
Kerala	18.86	0.48	29.78	50.26	35.88	18.66	5.78	3.4	28.08	21.24	27.05	13.98
Andhra Pradesh	22.42	23.14	24.16	28.18	61.32	44.34	1.34	38.56	30.34	30.42	31.84	28.65
Rajasthan	29.36	16.74	10.26	2.78	21.7	5.9	27.5	19.44	23.7	17.49	16.17	19.14
West Bengal	58.84	59.7	45.08	25.66	34.66	20.52	40.92	0.96	7.92	32.70	44.79	17.58
Karnataka	13.4	12.74	7.08	3.86	1.96	0.72	9.46	4.26	1.66	6.13	7.81	4.025
Uttar Pradesh	11.64	11.38	11.66	0.3	4.8	2	2.9	26.6	15.86	9.68	7.96	11.84
Gujarat	5.78	3.22	3.36	7.06	16.9	16.56	17.32	9.04	7.52	9.64	7.26	12.61
Tamil Nadu	1.24	2.88	30.16	23.7	24.84	21.88	7.42	27.3	14.04	17.05	16.56	17.66
Maharashtra	10.34	20.32	22.48	16.2	27.46	15.9	17.6	20.6	3.44	17.15	19.36	14.39

Source: Authors' calculations based on CAG Finance Accounts data

Table 6: Forecast Error in Social Services Within Total Capital Outlay (as a percentage of Budget Estimates)

State	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	Mean error (2010-11 to 2018-19)	Mean error (2010-11 to 2014-15)	Mean error (2015-16 to 2018-19)
Chhattisgarh	35.62	33.4	35	54.68	23.92	27.28	16.92	23.72	54.64	33.91	36.52	30.64
Bihar	29.74	35.04	33	1.28	52.46	32.24	8.46	17.9	21.6	25.75	30.30	20.05
Odisha	4.16	39.78	10.04	0.66	22.48	3.6	-2.28	9.38	0.14	9.77	15.42	2.71
Punjab	46.52	84.28	71	73.9	68.34	20.54	29.3	72.16	69	59.45	68.81	47.75
Haryana	-49.88	24.84	22.18	30.78	22.74	46.06	35.48	26.64	21.86	20.08	10.13	32.51
Madhya Pradesh	-23.06	-8.76	14.12	5.5	33.4	15.58	34.52	20.66	24.46	12.94	4.24	23.81
Kerala	-49.06	1.66	-4.92	32.38	30.6	23.08	24.66	12.3	32.22	11.44	2.13	23.07
Andhra Pradesh	46.48	23.06	37.34	56.7	-4.22	-8.42	50.34	40.1	39.26	31.18	31.87	30.32
Rajasthan	24.9	34.86	10.92	8.74	26.12	19.06	35	26.92	26.52	23.67	21.11	26.88
West Bengal	71.72	55.38	47.5	19.74	40.92	28.6	48.04	-3.02	30.44	37.70	47.05	26.02
Karnataka	-1.76	-10.28	-8.38	23.52	13.36	-18.72	-0.04	-0.44	1.02	-0.19	3.29	-4.55
Uttar Pradesh	6.2	14.68	18.42	19.02	10.24	23.38	9.78	23.06	52.82	19.73	13.71	27.26
Gujarat	18.26	9.96	-2.32	9.78	28.08	31.26	26.96	16.08	13.12	16.80	12.75	21.86
Tamil Nadu	15.22	34.5	42.14	26.2	38.4	10.14	16.08	40.18	24.1	27.44	31.29	22.63
Maharashtra	16.1	30.4	41.98	23.42	46.86	32.32	30.38	28.96	-9.22	26.80	31.75	20.61

Source: Authors' calculations based on CAG Finance Accounts data

Table 7: Forecast Error in Education Within Social Services (as a percentage of Budget Estimates)

State	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	Mean error (2010-11 to 2018-19)	Mean error (2010-11 to 2014-15)	Mean error (2015-16 to 2018-19)
Chhattisgarh	25.8	55.96	53.62	38.58	40.12	30.64	27.76	25.48	49.3	38.58	42.82	33.30
Bihar	29.96	52.76	-26.08	-78.62	74.58	57.46	-2.06	10.58	8.88	14.16	10.52	18.72
Odisha	57.7	73.72	83.16	39.94	19.54	-4.42	-0.4	16.4	2.8	32.05	54.81	3.60
Punjab	3.18	77.44	67.4	15.52	71.38	27.68	36.5	83.54	67.46	50.01	46.98	53.80
Haryana	-7.84	6.88	-92.64	24.46	15.1	20.52	44.24	41.08	15.68	7.50	-10.81	30.38
Madhya Pradesh	-83.36	-42.96	-21.78	15.36	9.02	0.52	38.14	64.82	48.52	3.14	-24.74	38.00
Kerala	-89.8	52.76	-1.62	34.5	6.14	-24.96	5.2	-76.86	11.88	-9.20	0.40	-21.19
Andhra Pradesh	87.3	26.02	34.74	68.54	-79.4	-65.08	75.64	49.48	63.7	28.99	27.44	30.94
Rajasthan	-16.96	16.08	21.6	55.36	60.8	-32.6	50.18	41.64	0.82	21.88	27.38	15.01
West Bengal	74.9	67.4	61.28	4.66	75.76	26.94	68.32	43.86	33.4	50.72	56.80	43.13
Karnataka	-28.56	17.98	0	15.08	54.34	-1.74	-31.76	1.96	7.84	3.90	11.77	-5.93
Uttar Pradesh	-36.14	44.86	20.18	33.54	31.12	60.84	45.48	45.5	52.12	33.06	18.71	50.99
Gujarat	36.88	9.34	7.98	13.48	58.7	44.42	39.28	51.64	46.64	34.26	25.28	45.50
Tamil Nadu	5.1	73.74	89.06	83.08	-2.8	-69.22	4.46	4.5	15.2	22.57	49.64	-11.27
Maharashtra	-280.16	25.72	-1.72	56.96	57.64	51.7	63.34	43.44	-82.68	-7.31	-28.31	18.95

Source: Authors' calculations based on CAG Finance Accounts data

Table 8: Forecast Error in Medical and Public Health Within Social Services (as a percentage of Budget Estimates)

State	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	Mean error (2010-11 to 2018-19)	Mean error (2010-11 to 2014-15)	Mean error (2015-16 to 2018-19)
Chhattisgarh	50.96	47.46	26.7	56.38	20.4	4.54	22.6	19.8	63.18	34.67	40.38	27.53
Bihar	14.6	23.42	-5.56	19.52	56.06	25.84	5.88	31.44	-3.38	18.65	21.61	14.95
Odisha	5.3	59.58	24.3	13.8	12.8	9.02	-6.18	28.66	28.36	19.52	23.16	14.97
Punjab	44.94	76.52	55.72	82.74	99.92	47.5	-350	98.92	72.12	25.38	71.97	-32.87
Haryana	-125.6	33.52	-2.5	54.1	37.78	10.44	57.76	54.98	53.64	19.35	-0.54	44.21
Madhya Pradesh	-46.18	20.8	48.5	26.64	12.26	19.22	-22.86	12.98	10.9	9.14	12.40	5.06
Kerala	7.84	-55.08	-40.22	24.68	19.76	16.14	29.12	4.48	34.22	4.55	-8.60	20.99
Andhra Pradesh	63.06	-129.06	35.92	-23.98	-206.84	43.56	17.52	55.12	64.4	-8.92	-52.18	45.15
Rajasthan	-4.04	29.68	-14.02	9.52	54.9	46.14	59.16	50.58	48.78	31.19	15.21	51.17
West Bengal	33.16	-5.94	65.8	4.92	21.2	-49.8	12.96	4.8	-8.6	8.72	23.83	-10.16
Karnataka	-9.66	14.62	1.56	-32.5	-52.14	-40.6	-18.02	-53.28	13.26	-19.64	-15.62	-24.66
Uttar Pradesh	-26.78	21.86	21	27.46	2.5	-4.92	16.14	9.44	19.28	9.55	9.21	9.99
Gujarat	24.7	0.48	0.94	7.4	5.62	14.42	19.42	4.44	-5.72	7.97	7.83	8.14
Tamil Nadu	21.52	52.88	40.64	7.52	9.38	-45.6	-78.54	27.48	8.34	4.85	26.39	-22.08
Maharashtra	-26.02	15.76	8.62	31.68	16.5	-17.9	1.4	44	17.54	10.18	9.31	11.26

Source: Authors' calculations based on CAG Finance accounts data

Table 9: Forecast Error in Water Supply and Sanitation Within Social Services (as a percentage of Budget Estimates)

State	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	Mean error (2010-11 to 2018-19)	Mean error (2010-11 to 2014-15)	Mean error (2015-16 to 2018-19)
Chhattisgarh	58.42	76.71	76.58	92.83	15.55	17.59	10.55	30.83	46.61	47.30	64.02	26.40
Bihar	27.6	21.87	29.36	-23.29	35.71	26.74	12.8	2.55	30.13	18.16	18.25	18.06
Odisha	23.94	55.69	11.52	-36.46	36.67	-58.41	-12.07	-6.1	-20.31	-0.61	18.27	-24.22
Punjab	32.36	52.79	23.28	51.45	16.15	7.84	-19.31	38.31	71.82	30.52	35.21	24.67
Haryana	-7.5	18.35	28.06	-1.17	4.02	19.22	22.66	18.99	16.74	13.26	8.35	19.40
Madhya Pradesh	2.36	-9.27	-5.38	-3.98	22.82	29.16	58.55	-4.46	-39.57	5.58	1.31	10.92
Kerala	-98.95	-170.24	-166.67	10.22	36.89	41.12	62.11	36.78	48.25	-22.28	-77.75	47.07
Andhra Pradesh	-47.09	36.81	-80.83	23.12	66.48	-13.88	-14.94	-4.86	34.55	-0.07	-0.30	0.22
Rajasthan	22.13	35.1	12	-7.88	3.2	6.28	22.93	18.13	29.75	15.74	12.91	19.27
West Bengal	99.39		42.39	22.78	47.75	27.74	65.91	-1725.1	-6.42	-178.19	53.08	-409.47
Karnataka	-8.26	-44.39	-25.99	55.63	0.94	9.29	12.59	14.26	-3.63	1.16	-4.41	8.13
Uttar Pradesh	33.89	74.43	-0.58	-4.67	-21.66	17.33	-1.53	56	8.28	17.94	16.28	20.02
Gujarat	0	-13.98	-41.93	0.71	6.29	16.97	2.14	-9.99	-5.97	-5.08	-9.78	0.79
Tamil Nadu	20.27	-5.26	25.2	-0.74	10.75	-2.66	13.75	44.52	43.65	16.61	10.04	24.82
Maharashtra	-1.52	0.93	2	4	24.44	12.37	-12.38	44.72	0	8.28	5.97	11.18

Source: Authors' calculations based on CAG Finance Accounts data¹³

¹³ The blanks in this table represent data unavailability for the corresponding year.

Table 10: Forecast Error in Urban Development Within Social Services (as a percentage of Budget Estimates)

State	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	Mean error (2010-11 to 2018-19)	Mean error (2010-11 to 2014-15)	Mean error (2015-16 to 2018-19)
Chhattisgarh	60.6	19	35.56	87.34	14.62	40.1	14.62	20.72	67.92	40.05	43.42	35.84
Odisha	3.92	9.38	-9.66	17.94	5.82	76.9	-38.66	0.6	-17.6	5.40	5.48	5.31
Punjab	69.24	97.06	86.16	91.78	78.2	-154.92	62.82	81.82	64.74	52.99	84.49	13.62
Haryana		29.7	21.46	54.42	46.52	78.72				46.16	38.03	78.72
Madhya Pradesh	4.92	5.2	4.66	3.44	-19.14	-43.26	51.26	-28.98	47.6	2.86	-0.18	6.66
Kerala		-47.96		0	24.5	29.5	-86			-15.99	-7.82	-28.25
Rajasthan	40.66	42.78	1.58	26.84	56.6	42.6	50.38	28.46	11.28	33.46	33.69	33.18
West Bengal	68.16	56.56	44.18	36.88	24.84	50.6	41.8	5.82	30.66	39.94	46.12	32.22
Karnataka	3.06	0	-87.02	52.14	36.98	-139.14	5.18	4.66	7.8	-12.93	1.03	-30.38
Uttar Pradesh	21.18	-25.74	29.26	9.88	5.04	-52.04	8.14	28.88	36.12	6.75	7.92	5.28
Gujarat	1.66	15.98	-12.64	-4.14	22.52	66.76	67.2	-24.08	44.08	19.70	4.68	38.49
Tamil Nadu	58.34	58.56	17.84	29.88	39.28	42.74	23.56	46.92	19.12	37.36	40.78	33.09
Maharashtra		-19900	-415.4	-574700	-3909.4	-423400	-273.4	-148.02	-487.94	#####	#####	#####

Source: Authors' calculations based on CAG Finance Accounts data¹⁴

¹⁴ The blanks in this table represent data unavailability for the corresponding year.

A significant reduction in forecasting errors, over the years, potentially reflects a state's commitment to fiscal consolidation and sustainability. Analysing the data above, with states arranged in an ascending order from lower-income to higher-income, and bearing in mind the changes in the fiscal landscape from 2014-15 onwards, it is observed that most states managed to close the gap but the magnitude of errors still remains quite high. The reduction post-2014-15, however, is not uniform across all states and across all budget heads. Neither is the error reduction uniform among lower-income states, or among higher-income ones. Thus, no conclusive trend emerges. That being said, it is interesting to note that Odisha and Karnataka have performed quite well in closing the gap for total capital outlay, social services, and its components. Punjab, on the other hand, has a relatively high magnitude of errors despite managing to reduce its errors post 2014-15 in total capital outlay and social services.

Public Expenditure and Financial Accountability [PEFA] Assessment

One of the pillars of the PEFA framework is government budget reliability. In this section, we employ the PEFA methodology, following PEFA (2016), to assess the degree to which actual expenditure in total capital outlay, its component of Social Services, and its sub-components, have deviated from the budgeted estimates.¹⁵ The relevant scoring mechanism under the PEFA framework for this is as follows:

Score	Mechanism
A	Actual expenditure is between 95% and 105% of budgeted expenditure in at least two of the last three years.
B	Actual expenditure is between 90% and 110% of budgeted expenditure in at least two of the last three years.
C	Actual expenditure is between 85% and 115% of budgeted expenditure in at least two of the last three years.
D	Performance is worse than in "C".

We included financial years 2016-17, 2017-18, and 2018-19 for the analysis presented in Table 11.

¹⁵ The authors are grateful to Lekha Chakraborty for suggesting this framework.

Table 11: Deviation in Expenditure Compared to Budget Estimates, as per PEFA Scoring Mechanism

State	Total Capital Outlay	Social Services	Education	Medical Public Health	Water Supply and Sanitation	Urban Development
Chhattisgarh	D	D	D	D	D	D
Bihar	C	D	B	B	C	D
Odisha	A	A	A	D	A	A
Punjab	D	D	D	D	D	D
Haryana	A	D	D	D	D	A
Madhya Pradesh	A	D	D	C	A	D
Kerala	A	D	B	D	D	D
Andhra Pradesh	D	D	D	D	A	D
Rajasthan	D	D	D	D	D	D
West Bengal	C	D	D	A	A	D
Karnataka	A	A	A	A	C	B
Uttar Pradesh	D	D	D	D	B	D
Gujarat	B	D	D	A	A	D
Tamil Nadu	C	D	A	B	D	D
Maharashtra	D	D	D	D	A	A

Source: Authors' analysis based on CAG Finance Accounts data

The analysis in Table 11 once again reveals the poor quality of fiscal marksmanship across most states in these crucial areas. Very few states have secured a score of A in recent years.

Decomposing the Sources of Error

Beyond describing the trends in the magnitude of forecasting errors across states and components, we attempt to understand the source of these errors. For this, several studies have used the analytical framework of Theil's inequality coefficient and partitioned the errors.¹⁶

Theil's coefficient U_1 is a measure of the accuracy of budgetary forecasts.¹⁷

$$U_1 = \frac{\sqrt{1/n \sum_{t=1}^n (BE_t - AV_t)^2}}{\sqrt{1/n \sum_{t=1}^n (BE_t)^2 + 1/n \sum_{t=1}^n (AV_t)^2}}$$

Theil's coefficient¹⁸ reveals how well a time series of estimated values matches a corresponding time series of observed values. In other words, it measures the degree to which one time series differs from another. The value ranges from 0 to 1, and the closer it is to 0, the better the forecast. This

¹⁶ In the Indian context, this exercise has been carried out in several studies, including Nithin and Roy (2015), which studied central government data from 1990-1991 to 2011-2012 and investigated the sources of errors across the revenue and expenditure components using Theil's coefficient. More recently, Chakraborty et al (2020) also analysed the nature of errors in subnational marksmanship under broader budget heads.

¹⁷ This section draws from research by Theil (1961), Zakaria and Ali (2010), Nithin and Roy (2014), and Chakraborty et. al (2020).

¹⁸ The numerator in the right hand side of the equation above shows the root mean square error, i.e., the square root of the sum of the square of deviations of predicted values (BE) to actuals (AV) over the time reference. The denominator shows the sum of the square root of the predicted value squares over the times reference, and the square root of the actual value squares over the time reference.

makes it very useful for analysing fiscal marksmanship, and it is widely used for this purpose. Here, the estimated values are the budget estimates or BE, and the observed values are the actual values or AV. A value of 0 would imply a perfect forecast, where $AV = BE$, and 1 would imply a poor forecast.

The errors based on U_1 have been decomposed and partitioned into two components in order to ascertain the systematic and random sources of error. U^m is the proportion of total forecast error that is due to bias, and U^s is the proportion of total forecast error that is due to variance. U^m and U^s combined constitute the systematic source of error (Morrison, 1986; Zakaria and Ali, 2010). In contrast, U^c signifies random error.

$$U^m = \frac{(\overline{BE} - \overline{AV})^2}{1/n \sum_{t=1}^n (BE_t - AV_t)^2} \quad U^s = \frac{(S_B - S_A)^2}{1/n \sum_{t=1}^n (BE_t - AV_t)^2} \quad U^c = \frac{2(1-r)S_B S_A}{1/n \sum_{t=1}^n (BE_t - AV_t)^2}$$

Where the sum = $U^m + U^s + U^c = 1$

BE: Budget Estimates

AV: Actual Values

S_B : standard deviation of BE

S_A : standard deviation of AV

r: correlation coefficient between BE and AV

Systematic errors occur due to improper forecasting mechanisms employed by the institutions involved in the process. This could be down to inefficient budgetary practices, where there is scope for improvement. Methods which lead to miscalculations, wrong judgements, and ad-hoc approaches followed during the budget-making processes of line departments are examples of contributors to this category of errors. The presence of systematic errors in budget forecasts undermines the credibility of the forecasting mechanism, and of the budget as a whole.

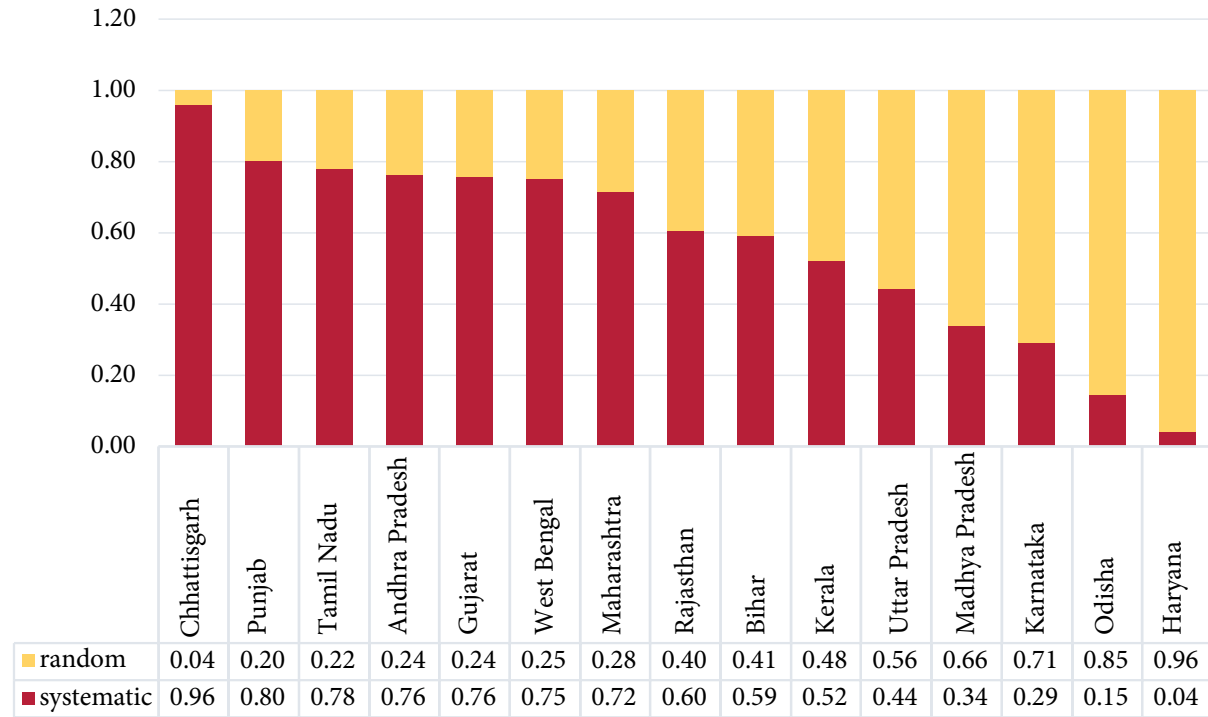
On the other hand, random errors occur because of unforeseen contingencies in expenditure and budget management. As such, there is little scope to reduce this type of error. These contingencies are unanticipated, exogenous shocks such as natural disasters and health emergencies such as the COVID-19 pandemic. Such events lead to a complete reorientation of expenditure priorities. Forecasting errors that are linked to such contingencies are generally beyond the control of the forecaster, thus it is very difficult to improve marksmanship if the forecasting error is attributable to a random error (Theil, 1966; Pindyck & Rubenfield, 1998; Zakaria & Ali, 2010).

In previous sections we have analysed the combined marksmanship ratios of the states as well as of individual states. Then, to understand year-on-year variations, we studied the magnitude of errors over the years, including overestimation and underestimation. Given the importance of good marksmanship, as explained earlier, a policymaker should aim to reduce errors and improve the quality of forecasting. However, if the source of the error is not known, then attempts to improve marksmanship will not yield the desired results. Further, if the forecasting error is primarily attributable to random errors, then even using better forecasting techniques will not result in better marksmanship. The extent of randomness in the error of a forecast can thus also reveal the quality of the forecasting mechanism employed. In this section, we aim to decompose the forecasting errors in subnational marksmanship to identify the sources of these errors.

Decomposing the errors reveals that, relatively speaking, the nature of errors has predominantly been systematic. This is the case not only in total capital outlay, but also in Social Services and its various sub-components: 10 out of 15 states have systematic errors in predicting their capital expenditure. This implies that inefficient forecasting is the root cause of poor marksmanship among these states, leaving extensive scope for improvement in reducing these errors. Further, all states (except two) primarily have systematic errors in predicting expenditure in Social Services as well.

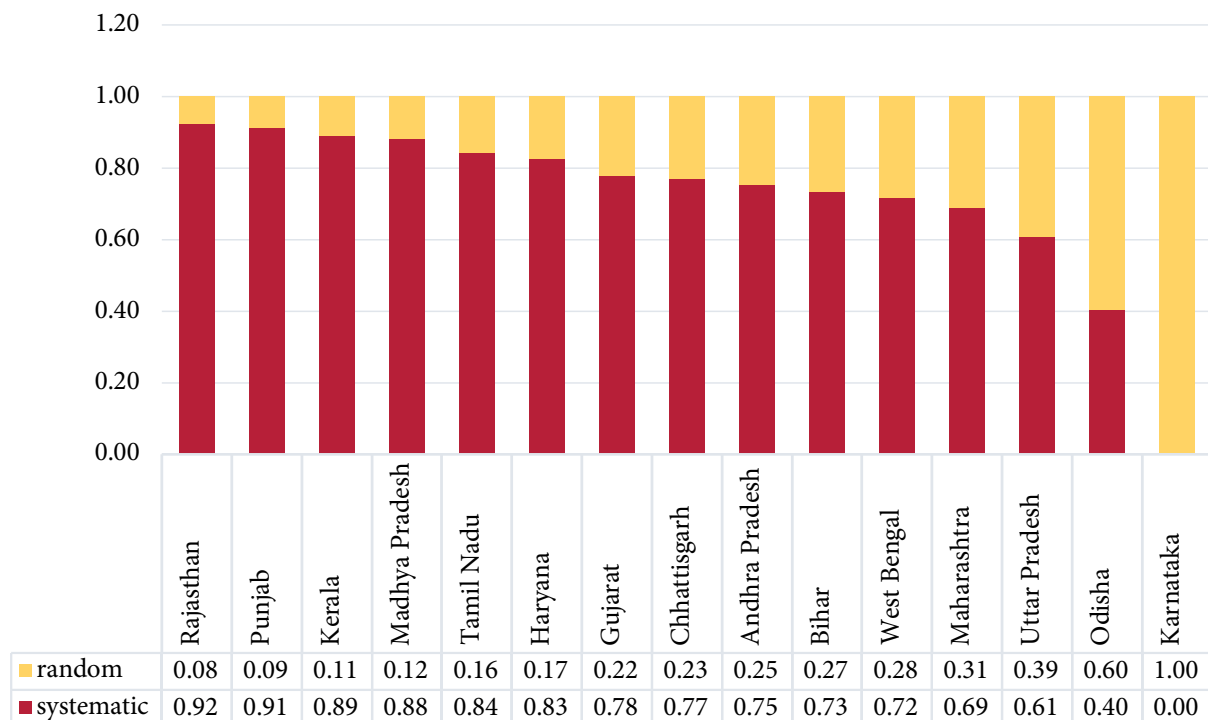
This again implies that inefficient fiscal forecasting is the primary cause of poor marksmanship in Social Services. Further, across the components of Social Services, such as Medical and Public Health, Education, Water Supply and Sanitation, and Urban Development, we find that most states have a higher proportion of systematic errors than random ones.

Figure 2: Decomposition of Errors in Total Capital Outlay



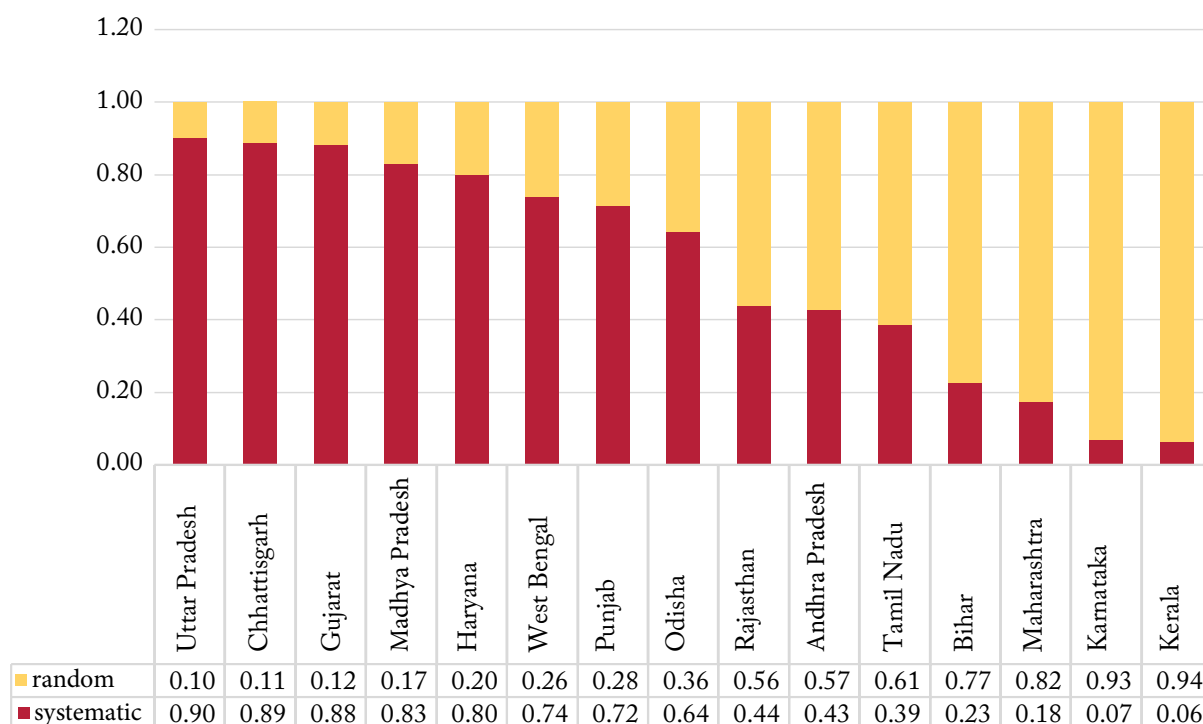
Source: Authors' calculations based on CAG Finance Accounts data

Figure 3: Decomposition of Errors in Social Services Within Total Capital Outlay



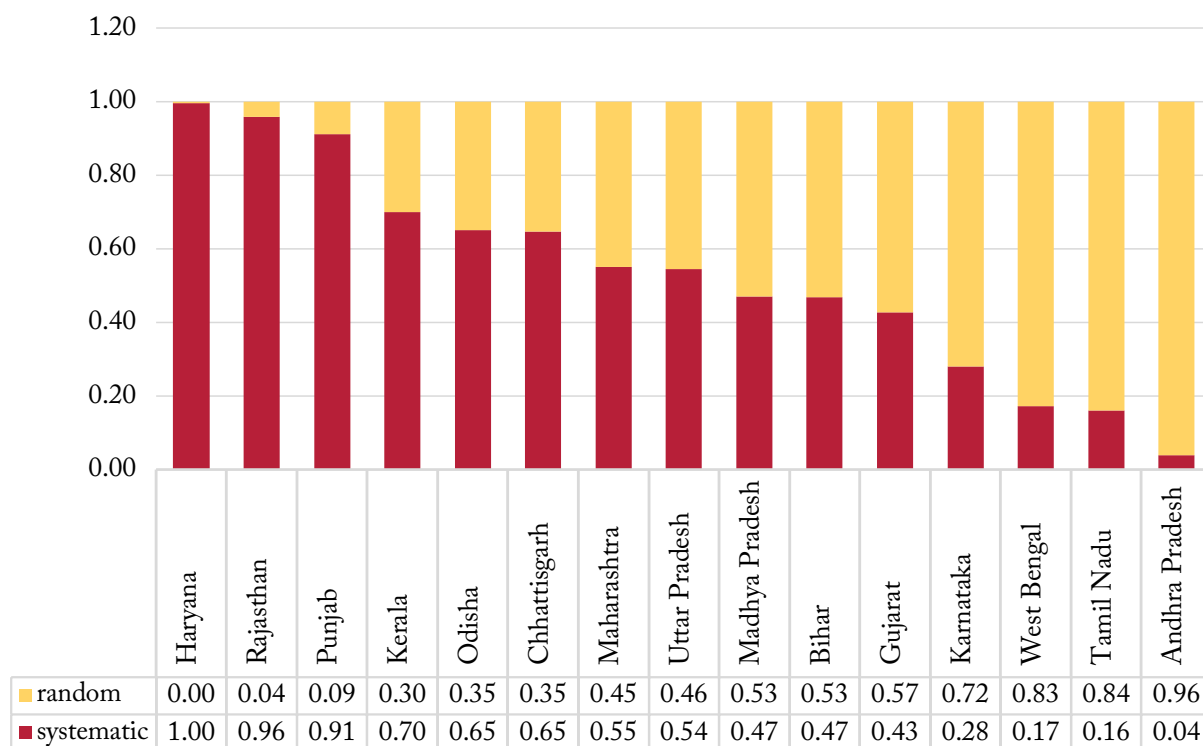
Source: Authors' calculations based on CAG Finance Accounts data

Figure 4: Decomposition of Errors in Education Within Social Services



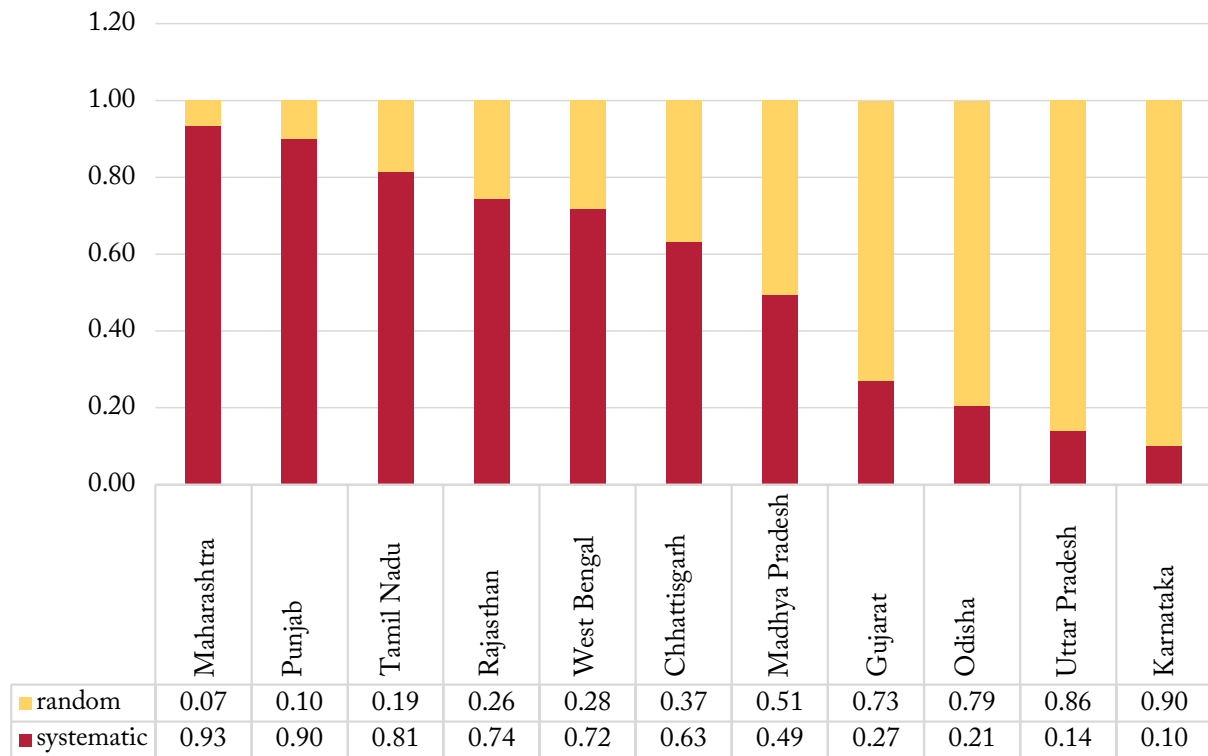
Source: Authors' calculations based on CAG Finance Accounts data

Figure 5: Decomposition of Errors in Medical and Public Health Within Social Services



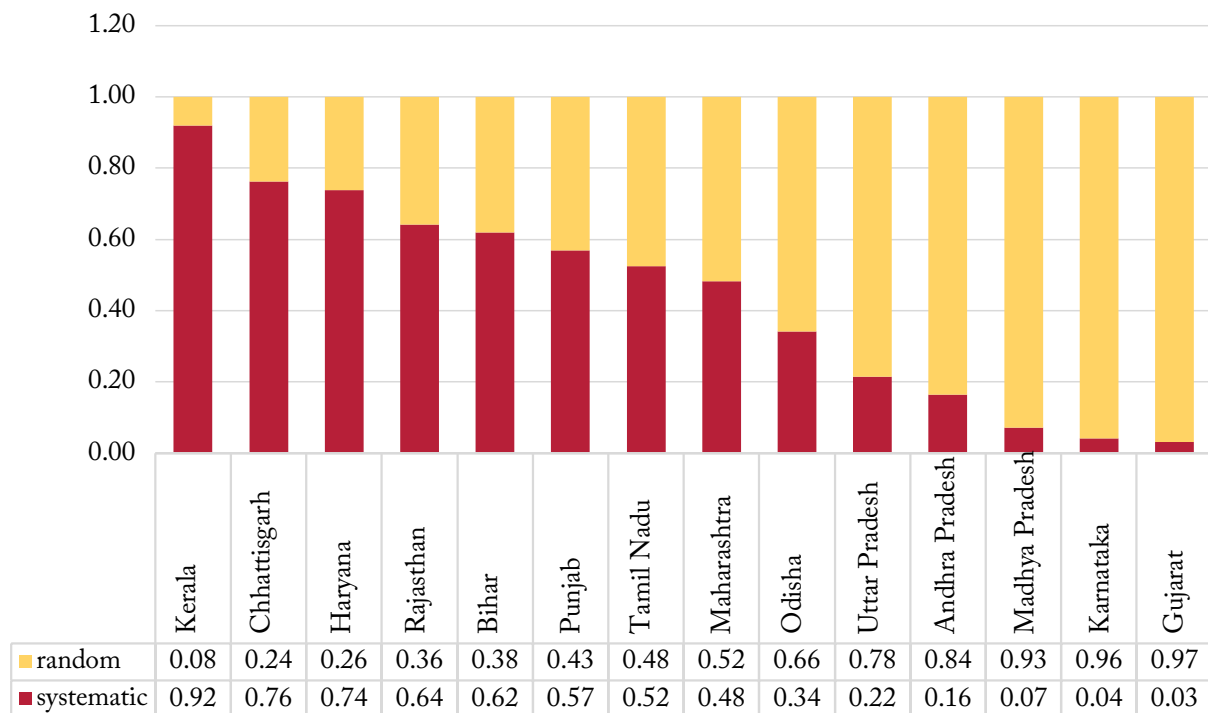
Source: Authors' calculations based on CAG Finance Accounts data

Figure 6: Decomposition of Errors in Urban Development Within Social Services



Source: Authors' calculations based on CAG Finance Accounts data

Figure 7: Decomposition of Errors in Water Supply and Sanitation Within Social Services



Source: Authors' calculations based on CAG Finance Accounts data

Table 12: Magnitude of Systematic Errors Across Components: Ranking the States

States	Social Services Rank	Medical and Public Health Rank	Education Rank	Water Supply and Sanitation Rank	Urban Development Rank
Karnataka	1	4	2	2	1
Odisha	2	11	8	6	3
Uttar Pradesh	3	8	15	5	2
Maharashtra	4	9	3	7	11
West Bengal	5	3	10	NA	7
Bihar	6	6	4	10	NA
Andhra Pradesh	7	1	6	4	NA
Chhattisgarh	8	10	14	13	6
Gujarat	9	5	13	1	4
Haryana	10	15	11	12	
Tamil Nadu	11	2	5	8	9
Madhya Pradesh	12	7	12	3	5
Kerala	13	12	1	14	NA
Punjab	14	13	9	9	10
Rajasthan	15	14	7	11	8

Source: Authors' calculations based on CAG Finance Accounts data

In Table 12, states are ranked on the basis of the magnitude of their systematic errors across components, in ascending order. Apart from a few states like Karnataka, the rankings differ for states across different departments. For instance, Kerala has the least systematic error when it comes to Education, but Water Supply and Sanitation is at the opposite end of the spectrum. Similarly, Gujarat ranks first in Water Supply and Sanitation, but in Education it lags with a rank of 13. Thus, we find that the sources of forecasting errors for individual states are not uniform across their departments.

Understanding the Causes of Poor Marksmanship

Central grants are directly linked to state expenditures on social and economic services, a large segment of which is financed by Central Plan Schemes and Centrally Sponsored Schemes. A shortfall in the receipt of grants under these schemes thus results in states spending less, in per capita terms, on major social and economic services, especially by poorer states (Rao, 2017). Such shortfalls tend to occur more frequently in central grants that are part of Centrally Sponsored Schemes for various reasons: most of these schemes are co-financed and require grants from the state as well; if a state is unable to contribute its share, it does not receive the centre's grant. Rao (2017) notes too that there are significant variations between allocations and actual transfers, indicating uncertainties that ultimately affect the implementation of these schemes.

The centre's accuracy (or lack thereof) in forecasting its revenues and expenditures thus impacts states' forecasting ability as well, since central transfers comprise a significant proportion of state revenues. Since the centre often overestimates its revenues, it also spends less than its projections, resulting in lower transfers to states (Jena, 2006). This tends to happen more in the case of grants, since vertical and horizontal tax devolution are, in practice, determined by Finance Commission recommendations. As mentioned previously, the centre has also reduced its grants in order to offset

the increased amount it has to transfer via devolution since the Fourteenth Finance Commission's recommendations.

This volatility in central transfers has a detrimental effect on state finances. The poorer states, which are more dependent on central transfers than richer states, are naturally more affected by this uncertainty. Additionally, the shortfall in revenue realization at the end of the year compounds problems for such states, resulting in inadequate resource allocation and a falling short of budgeted targets. The non-receipt of revenues at the end of the year leads to expenditure compression and ad-hoc techniques which are not based on sound economic judgement (Jena, 2006).

In any case, the states' own budgeting exercises are already impaired since departments rely on unreliable village-level information to make projections. If this information is unavailable, budgets are projected based on previous years' estimates, with an error band of 10 per cent, and submitted to the Finance Commission (Srinivasan & Misra, 2021). The fund flow mechanism is also riddled with several constraints like inadequate staff and human resources, along with technical and infrastructural bottlenecks. The situation is quite dire – given their resource constraints and fiscal responsibility mandates, some states have reportedly completely stopped recruiting relevant technical staff (Acharya & Bose, 2020).

The CAG, in various reports on state finances, has noted that departments in several state governments have not been utilising the full amounts appropriated under their Appropriation Acts, following the state budget. It also found that frequently there was a rush of expenditure in the last quarter of the financial year in almost every department in several states. The CAG observed that this is indicative of inefficient financial control and management on the part of states. It also noted that most states resorted to supplementary grants, which are meant for when they anticipate that expenditure for certain heads is likely to exceed the originally appropriated amount. And yet, even the amounts obtained via these supplementary grants were not fully utilised. The states have provided several reasons for this non-utilisation of funds and the year-end rush of expenditure, including revisions in plan outlays, and non-receipt of administrative approvals and funds from nodal agencies. But their most commonly stated reason was the non-receipt of central transfers in the anticipated manner.

This means that any effort towards improving subnational fiscal marksmanship in India needs to also account for the unpredictability of central transfers. However, it is also clear that this is not the only cause of poor subnational marksmanship. While it is difficult to determine at this stage whether it is the predominant factor in the poor marksmanship, it is clearly an important one.

Conclusion

Fiscal marksmanship is a critical aspect of fiscal management, as reliable budget numbers contribute to fiscal consolidation and policy implementation. Given the share of Indian subnational governments in overall public expenditure, subnational marksmanship needs to be robust. Estimates by the National Institute of Public Finance and Policy show that capital expenditure multipliers for India are around 2.5, signifying its immense growth-stimulating potential (Bose & Bhanumurthy, 2015). This multiplier effect can also crowd-in private investment. Subnational capital expenditure plays a big role in generating the long-term assets that a developing economy requires, and as such it is paramount to accurately forecast and predict this expenditure.

The marksmanship ratios in Social Services, as part of total capital outlay, for the time period studied in this paper, were higher than those in Economic Services. No state, across the reference period, has been able to predict its Social Services budget successfully. Disaggregating Social Services into some of its important sub-components such as Education, Medical and Public Health, Water Supply and Sanitation, and Urban Development, we found that expenditure in these components was generally overestimated.

The Fourteenth Finance Commission had recommended a significant increase in the share of vertical tax devolution to states. Looking at the magnitude of forecast errors across the years, and especially after the Commission's award, we see that, broadly, higher-income states were better able to predict their total capital outlays (though some predictions were somewhat volatile, especially in the sub-components of total capital outlay). But lower-income states, like Chhattisgarh, have consistently overestimated their budgets in the Social Services and its sub-components, while others like Bihar, and particularly Odisha, have done well in reducing their forecasting errors. The PEFA assessment we carried out indicates that apart from Karnataka and Odisha, no state has been able to bring actual expenditure on Social Services to within 95 per cent of the expenditure projected in the budget.

To examine the source of these forecasting errors, which is important to guide efforts to improve marksmanship, we decomposed the errors. We found that 10 out of 15 states had more systematic than random errors in their total capital outlays, as well as in Social Services and its sub-components. This indicates scope for improvement. Another key insight from this exercise was that within the same state, there was huge variability in systematic errors across individual departments. This lack of intra-state homogeneity means that inter-state comparisons on this point could be misleading, as individual departments across states might be significantly over- or under-performing compared to the state average.

This raises the question of causality: What explains these trends in subnational marksmanship? We attempted to outline some possible explanations for the poor subnational marksmanship we found in our analyses. Given the complicated and ever-changing landscape of fiscal federalism, especially in recent years, the factors that impact subnational capital expenditure and its marksmanship are manifold. Future research, informed by the insights of this paper, could aim to comprehensively identify and distinguish the causes behind poor subnational marksmanship, and suggest recommendations to improve it.

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Annex

Table A1: Theil's Coefficient U_1 for Total Capital Outlay and Social Services

State	Total Capital Outlay	Social Services
Chhattisgarh	0.184	0.222
Bihar	0.106	0.154
Odisha	0.049	0.055
Punjab	0.396	0.530
Haryana	0.091	0.167
Madhya Pradesh	0.038	0.140
Kerala	0.148	0.155
Andhra Pradesh	0.166	0.261
Rajasthan	0.112	0.155
West Bengal	0.147	0.205
Karnataka	0.029	0.042
Uttar Pradesh	0.066	0.182
Gujarat	0.066	0.123
Tamil Nadu	0.117	0.181
Maharashtra	0.097	0.181

Source: Authors' calculations based on CAG Finance Accounts data

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