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Budget Analysis and Fiscal Marksmanship: Evidence from Pakistan

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ABSTRACT

The role of the government budget estimates and how these initial budget estimates diverts from actual spending or revenue has gain attention after the post reform era. However, in Pakistan there are very few studies that focus on the issue of fiscal marksmanship (analysis of budget errors). Especially, budget errors are not analyzed at the composition level. Hence, keeping in view the importance of fiscal marksmanship, the objective of this study is to fills the gap in literature by analyzing the errors in government budgeted expenditures at composition or disaggregated level. To measure these deviations Theil' U Inequality coefficient, MPE and MAPE are used. The results show that out of aggregate expenditures, government is making large errors in the estimation of development expenditures. Out of aggregate capital expenditures, large errors are being made in agriculture sector. While for recurrent expenditures, larger share of government budget estimate errors goes to subsidies sector. Hence, to increase the credibility of the budget government should focus to decrease these errors through better estimation techniques and well-coordinated institutions.

| **KEYWORDS** | Budget Errors, Fiscal Marksmanship, Government, Expenditures |

Introduction

The budget analysis interest has been on the rise since the post-reforms period. Today there are innumerable actors working on this field. India is among those few who have embarked quite early in this field of operation with regard to budget transparency. However, in Pakistan, very few researches have focused on strengthening the role of budget and accuracy of forecast errors. Budget is an area in which there needs a diverse field of skills. The bright side however is that in spite of the fact that it needs expertise in the subject; anyone can easily pick up the logic and work with simple techniques of balancing the numbers. Deviations to fiscal policy targets, according to End (2021), influence expectations and, consequently, intertemporal allocations; hence, it ought to influence the sovereign interest rates, consumption choices, and investment choices. When the agents of the market are not convinced that the government is capable of fulfilling its fiscal commitments they may fear that it will engage in future fiscal tightening rounds, and can respond in the same way that they would do under Ricardian equivalence, but due to a completely different cause.

Hence, keeping in view the significance of Budget and the gap in literature on Fiscal Marksmanship analysis of Pakistan at sector level (the difference between budget estimates and final results) this study aims at addressing all the issues and concerns associated with budget and budget deviations in aggregate expenditures and its different compositions.

Literature Review

Federal Budget is considered as the common budget in Pakistan. It is known as ABS (Annual Budget Statement) in the Constitution, which is prepared and presented in the National Assembly (lower house) by the Federal government yearly. It represents a report of the projected Federal government receipts and expenditure of a specific financial year

which begins from 1st July and terminates on 30th June. This is also referred to as fiscal year.

Structure of the Budget

The Federal Budget of Pakistan consists two types of budgets; Capital Budget and Revenue Budget. Capital Budget consists of both Capital Receipts and Developmental Expenditure. On the other hand, Revenue Budget is made up of both Revenue Receipts along with the Current Expenditures. The difference in capital budget and revenue budget is irrelevant as the two complement each other in the budgeting process. In order to understand the preparation of the budget, it is essential to understand how the budget is categorised in the heads of expenditures and receipts.

Development and Non-Development/Current Expenditures:

The first distinction between development and non-development expenditures is the distinction of significance. The *Current expenditures* are those which needed by the government for their day to day requirements. This comprises of the "General Public Services" which involves maintenance of the administrative, executive as well as legislative issues of the country, maintenance of national defence, foreign and local debt servicing and repayment of foreign loan. More to the point, it consists of different spheres of economic activity, as well (agriculture and its related processes, energy, mining and production, transportation and communication); ecology (water waste management); residential infrastructure and social facilities, healthcare and education, etc. The current spending is funded by the revenue budget. If the money collected from taxes and other sources is more than the money spent, the extra is added to the capital budget to help with development projects. But if the money collected is less than what is needed for regular expenses, the government has to borrow money to cover the gap. The ministry of finance plays a very important role in managing current spending in Pakistan.

Developmental expenditure refers to money that is used to improve physical infrastructure, increase people's skills and knowledge, and make better use of existing resources.

The development budget is meant to create resources that boost the country's economy. It includes construction projects and buying permanent assets for public use as outlined in the PSDP (Public Sector Development Programme). Investment in development is crucial for long-term economic growth, and this is why capital budgeting has become more important. Capital expenditure is often called developmental expenditure. The extra money from the revenue budget, along with savings and borrowed funds, is used to support capital spending. Development expenditure is included in the budget based on the ADP (Annual Development Programme), which is prepared by the Planning Commission after discussions with the Ministry of Finance and provincial governments and approved by the National Economic Council.

Resource Mobilisation

Once the priority areas are set for the expenditures on various heads, the next step is how to finance these. The resource mobilisation is to be carried out in two sources; External Receipts and Internal Receipts.

External Receipts

The external sources primarily include loans, credits and grants either by friendly countries and the special international agencies or by specific country programmes. The Foreign Aid is broadly categorized into three groups; commodity aid, project aid and all

other kind of aid. These are used to cover any shortfalls in the money collected from within the country.

Internal Receipts

The internal resources include Revenue Receipts (both tax and non-tax), finance PSDP by the provinces, net Capital Receipts and change in provincial cash balance. The Revenue Receipts are further subdivided into different Heads of Tax Revenue i.e., Direct Taxes, Indirect Taxes and Surcharges and Other (Non-Tax Revenue).

Budget Cycle

The budget cycle contains typically four phases:

- Budget formulation, where the budget plan is compiled by the executive arm of government;
- Enactment, at which the budget plan can be discussed, amended and passed by the legislative body;
- Execution, by which the government implements the policies of the budget; and
- Auditing and assessment, i.e., when the real expenses of the budget are recorded and measured at efficiency.

Preparation and formulation stage

The early budget formulation process is done virtually in the executive arm of the government but may involve a variety of actors in the executive arm. The preparation of the budget, seeking information about each department, and suggesting trade-offs that would need to be made to incorporate competing government priorities into the budget expenditure amounts, is normally coordinated and managed by the Ministry of Finance or a department within it. This may consume several weeks to even months, much dependent on the level of involvement of department and their opinion being considered.

The quantum and size of the budget is highly predetermined by the projections of the budget of the major parameters of economic growth, inflation or demographic shifts, priorities and seriousness of welfare programs that will predetermine the overall revenues and expenditures. Budget contours are also affected by looking at what they want to achieve in terms of keeping the deficit or debt at a given level, raising or lowering taxes or spending more money on specific areas of priority.

Enactment stage

The second phase of budget cycle takes place when the budget of the executive is debated in the legislature and thus, passed into law. This is initiated when the executive initiates the budget in legislature through a formal proposal. The budget is then debated by the legislature that may involve public hearings and votes by the legislative committees. This process stops when the budget is passed by the legislature in its original form or with modifications. The legislature may also reject the budget and in certain countries replace it with a proposal by the legislature.

Implementation Stage

The second phase of the procedure is achieved after the budget is passed. Practically budgets are not always carried out in the same manner in which they were initially passed. Finance ministries, departments and agencies are advised by a letter of release by the Finance Ministry to their respective offices of the AGPR (Accountant General of Pakistan Revenue) or AG (Accountant general) that they are having funds availed against their

budgets after legislative and executive approval of the Budget. AGPR offices finally notify the district accounting and/or treasury offices about the disposal of their funds.

The federal releases are disbursed at certain intervals based on certain formulae and percentages. The provinces submit allocations to the district governments at the beginning of each month in order that funds can be available during the next month.

Audit

The final phase of budget cycle involves several activities, which attempt to gauge the efficiency of utilizing the public resources. Preferably, the executive arm is expected to provide much information on its financial undertakings to the legislative body as well as the people. Such fiscal operations must also be reviewed periodically by a known independent and professional organization, either, audit institutions, or Auditor General. Audit office is expected to be able to make the right reports and in a timely manner.

Analysis of the Fiscal Marksmanship

Fiscal marksmanship refers to the level of precision between forecasts and real of budgetary information. When the forecasting errors are very large, it represents the lack of fiscal marksmanship. The inaccuracy in the forecast of the budget might lead to distortions in the fiscal management of the budget. Further, larger differences between budget estimates and actual data put a question mark on the sanctity of budget.

Importance of the Fiscal Marksmanship

According to Baker et al. (2016), the supreme contributor to uncertainty in the policy is fiscal policy; anchoring expectations would therefore make fiscal policies foreseeable and effective.

In an efficient market, the economic agents make predictions based on rational expectations. According to the rational expectations hypothesis economic agents are capable of using all information available to them in the most effective way so that they are able to make expectations regarding upcoming economic conditions. Rational expectations hypothesis has been applied in literature to make predictions of different macroeconomic factors, like gross domestic product (GDP), inflation and unemployment among others. But there has been minimal effort towards effective budgetary forecasts of the budget and its components (revenue and expenditure) with the rational expectations especially in developing nations, where the large dispersion on the budgetary forecast errors have major macroeconomic consequences.

First, the level of difference between the actual data of revenue and expenditure as compared to the projected magnitude of budgetary sources can show the non-optimal or non-achievement of the targeted aims of the fiscal policy. Second, over financing of deficits will be the case when actual expenditure surpasses forecasted expenditure as well as cutbacks in essential expenditures on the government as actual revenue decreases below the budget. Third, a budget is an important interconnection between the preparation and execution of five-year plans; without proper budgetary projections, favorable integration of the plan-making process and implementation will not be possible. Fourth, continuously larger than budgeted spending, much of which is unplanned in nature, leads to low connection of plans with budgetary policy creating distortions in accomplishment of government plans. Fifth, huge mistakes in predicting the fiscal variables undermine the effectiveness of the central government and fiscal discipline in the country. It is hard to imagine that without high fiscal discipline, it is possible to instill discipline in other spheres which is such an important area of development. Sixth is that since resources available to the government are limited, the government has to redistribute the resources between two

sectors which is easily noticed by checking the deviations between the estimated and actual outcome of various sector within a year. The last but most important aspect of budget deviations is that it may be a fair reflection of the aggregate policy uncertainty in the economy provided that the deviations are primarily caused by any uncertain event or the macroeconomic risks.

Empirics on Fiscal Marksmanship

Although the literature on fiscal marksmanship analysis is done for many countries but it is extensively analyzed in Eurozone and India. One of the former cases of discussion of forecast errors in fiscal forecasting was done by Allan (1965) in Britain. Allan notes that fiscal marksmanship was significant at that period of time since there was a narrow margin of error due to the trade-off between full employment and inflation. The correct forecasts of budgetary estimates, in this case, were significant to achieve the fiscal policy goals of full employment without the unwanted high inflation. Auld (1970) has conducted a fiscal marksmanship exercise of Canada during the postwar period (up to 1968). According to Auld, the government should fund its long-term programs, and this means that it should make accurate predictions. In a subsequent study, Davis (1980) followed the work of Allan, but extended time series from 1951 to 1978. Morrison (1986) has the fiscal marksmanship exercise of the United States for the period 1950-83. While Cassidy, Kamlet, and Nagin (1989) done the analysis of revenue forecast bias for Europe.

While focus on the political economy of budget deficits and other macro-fiscal variables began in the 1990s (Alesina and Perotti 1995; Blanchard 1990). Bruck and Stephan (2005) have estimated the political economy determinants of errors in forecasting budget deficits in the context of the euro zone. Their results indicate that political factors, election cycles and institutional structure of governments have an impact on the quality of fiscal projections. In the same manner, Rullan and Villalonga (2018) also investigated the connection between fiscal rules and budgetary previews under the analysis of the relevance of political and institutional factors in the euro zone. Their results reveal that the quantity of the government debt in the public sector is vital in explaining budgetary forecast errors. The other important determinants of forecast errors are the electoral mandate, political orientation of ruling parties, tax autonomy and per capita revenue. The research extended the literature to sub government levels in 15 countries in Europe as compared to the previous researches in the euro zone setting which only analyzed the situation based on a macroeconomic setting at national government levels. Giuriato, Cepparulo and Barberi (2016) compared the quality of fiscal forecasts of 13 eurozone countries based on annual forecasts of the 1999- 2013 period in terms of the stability and convergence programmes. They discovered that when fiscal rules are used to overcome monopoly of fiscal forecasts by the executive, reinforcement of the legislature formal powers affects the fiscal forecast negatively. A budget balance projection that was presented by 15 European countries in their Excessive Deficit Procedure (EDP) reporting was analyzed by Pina and Venes (2011). They discovered that the forecast errors are influenced by growth surprises, fiscal institutions, election periods, forms of fiscal governance and numerical expenditure rules (as opposed to deficit and debt rules).

Fiscal marksmanship exercises have been conducted for several times in the instance of India. Samuel and Rangararjan (1974), in one of their earlier attempts to analyse budgetary estimates in India (that is during 1956-64), undertook the analysis of two elements of the capital expenditure of state and union budgets on construction and industrial development (they carried out this analysis on these only due to the scope of the subject matter they were dealing with). The error analysis of forecasting in this study was done on the basis of the graphs of the actual expenditure and the budget estimates to a considerable extent. In their analysis, it is mentioned that although in both components budget estimate of the central government was more precise than that of the state, this discrepancy was explained by the difference in the efficiency of budgetary process.

A more extensive fiscal marksmanship exercise of India was done by Asher (1978) on both the revised and budget estimate in the 196776 period. The research revealed that both expenditures and revenues that existed at the time had always been underestimated. It was however noted that the margin of the mistake on the expenditure side was greater.

Chakrabarty and Varghese (1982) have utilized data of 1970-80. Among the key results of the given study was the fact that revenues and expenditure are underestimated. Pattnaik (1990) has conducted fiscal marksmanship analysis using Theil index covering the period of 1951-89. The research notes that the errors in the updated estimates are reduced as compared to the errors in the budget estimates (even though both have enormous errors). It added that the mistakes in the estimates were mostly systematic both over the whole period and over short periods of the whole (the systematic errors were maximum during the period of 1981-1989).

Other more recent Indian fiscal marksmanship research has an alternate conclusion. According to a study by Nitin and Roy (2015) based on 1990- 2012 data, the source of error in such components as tax revenue, nontax revenue, interest payments, defense revenue expenditure, and fiscal deficit is attributed to random error (in their paper, the proportion of the random error is greater than the bias components or the error in variance). The other components, subsidy expenditures, capital expenditure and non-debt capital receipts recorded a larger systematic error (mean error and slope error). One of the most interesting aspects of the paper is that despite an attempt to have fiscal consolidation through managing expenditure, predictability of the expenditure is very low as compared to the predictability of revenue. In this regard, a similar inference was drawn by Chakraborty and Sinha (2018) by using the data from 1990 to 2017. One trend that can be identified based on the empirical literature of 1951-1990 is that the systematic component of the error was greater, whereas in 1990-2017 the random component is greater. It is notable that the above studies are anchored on the data of the federal government. The only study which has investigated the fiscal marksmanship through the state of India is Shrestha and Chakraborty (2019). They conducted a study in Kerala and established forecast errors in terms of the tax revenues projections.

For Pakistan, the work on fiscal marksmanship is only limited to the aggregate revenue and expenditures data, while sector are mostly underrated in this regard. By using the Theil's U inequality coefficient and rational expectation hypothesis, Zakaria and Ali, (2010), calculated the forecasting efficiency of the both the initial and revise budget estimates of the federal government. The results revealed that budgetary forecasting during the period for 1987/88 to 2007/08 is not efficient in Pakistan and the major share in these errors is of exogenous factors. Further, budget forecasting in Pakistan do not meet the criteria of rational expectations for both the initial budget estimates and revised budget estimates of expenditure and revenue. Moreover, the efficiency of these forecasts has not improved during the period under observation. . While Khan et.al, (2018) repeat the same exercise for fiscal and provincial data, especially focusing on the Khyber Pakhtunkhwa province. Their results favor the findings of (Zakaria and Ali, 2010) that government forecasting efficiency for budget estimates had decreased over time and the larger share of government budget errors goes to the random factors.

Material and Methods

After putting so much effort to estimate the government budget, the historical review of the fiscal data in Pakistan shows that there are still very large differences between what was approved and what actually spend. This is reflected by analyzing the data in the form of deviations between actual and projections. In fact, it directly affects the show of fiscal marksmanship and transparency of budgets.

Hence, to analyze the budget errors of government expenditures at aggregate as well as sector level, three indicators have been used named MPE (Mean Percent Errors), MAPE (Mean Absolute Percent Errors) and Theils 'U Inequality Coefficient.

Where,

$$\text{Percent Error} = 100 * \left(\frac{A_t - B_t}{A_t} \right)$$

$$\text{Mean Percent Errors} = 100 * \sum_{t=1}^{k} \left(\frac{A_t - B_t}{A_t} \right) / n$$

$$\text{Mean Absolute Percent Errors} = 100 * \sum_{t=1}^{k} \left(\left| \frac{A_t - B_t}{A_t} \right| \right) / n$$

Here, Error represents budget errors in percentages. A_t is the actual spending which is different from the revised estimates as revised estimates only represent the data of first three quarters. While, B_t represents initial budget estimates of government spending. Subscript 't' stands for time period which is ranging from 1973-2020.

Data Source

All the data is collected from Pakistan Economic Survey (different issues;1973-2022) and Annual budget statements.

Construction of Variables

All the variables are taken as described in the Pakistan Economic Survey. However, due to the lack of proper data for compositions of development expenditures, capital expenditures are taken as a proxy for development expenditures. Where the data is collected from both "Revenue account" and " Capital account" for all type of expenditures.

Results and Discussion

Table 1
Results of MPE and MAPE

Budget Errors Averages	MPEs					MAPEs
	1970s	1980s	1990s	2000s	2010s	
Aggregate Expenditures	8.50%	1.48%	1.59%	7.09%	0.41%	5.57%
Development Expenditures	14.68%	-3.76%	-1.17%	-2.77%	-15.01%	11.55%
Current Expenditures	6.19%	3.70%	2.22%	9.59%	4.72%	6.72%
Defense Expenditures	15.28%	15.34%	9.40%	9.13%	7.60%	13.24%
Interest Payments	14.88%	22.36%	16.82%	9.63%	10.73%	17.35%
Subsidies	8.87%	8.61%	9.43%	22.79%	-2.91%	35.60%
Agriculture Expenditures	35.47%	2.24%	-16.79%	32.85%	-2.45%	37.00%
Industry Expenditures	23.88%	0.20%	11.84%	-0.57%	4.55%	29.91%
Services Expenditures	28.84%	16.11%	13.81%	1.49%	11.31%	24.70%

Aggregate expenditures in table 1 represent the deviations of the total government spending from their initial budget estimates. Aggregate expenditures are distributed between Development expenditures and Current expenditures. Development expenditures are further decomposed into; agriculture, industry and services. On the other hand, Current

expenditures are divided into defense, subsidies and interest payments. The positive averages are representing that actual expenditure was higher than the initial budget estimated while the negative holds the reverse.

If we describe the data under observation decade wise in terms of macroeconomic and specific risks that leads to potential deviations in government spending as compare to the initial budget estimates, then 1970s was the decade of nationalization and its upshot. 1972-77 was the period of worst inflation when prices increased by fifteen percent per annum. In 1973, the import bill of Pakistan was increased because of the "world oil price shock". Further, a hike of "global recession" from 1974-1977 badly effect the economy of Pakistan (Anjum and Sgro, 2017). Along with these external factors some internal factors like failure of cotton crops due to the pest attacks in fiscal year 1975 and massive floods occurred in fiscal year 1973, 1974 and 1977, contributed to the high deviations of government actual expenditures from their initial budget estimates of 8.5 percent. Development expenditures increased in this time period about 15 percent more than its initial budget while for agriculture sector it was about 35 percent.

1980s was the period of revival of high economic growth. On average, per capita GDP growth rate for this decade was 2.8% and aggregate budget deviations reduced from 8.5% to about 1.5%. Except for the 1985, no significant spikes of budget deviations are prevalent in this decade. The main reasons for the spikes in 1985 and 1986-87 were negative public saving and large fiscal deficits which put pressure on debt servicing. Government interest payments went far above than the estimated. Hence, interest payments budget error in 80s was about 22 percent.

1990s was the decade of large debt crisis. Growth rate of GDP per capita decreased from 2.8 percent to 1.0 percent and budget deviations amplified from 1.5 percent to 1.6 percent, for aggregate expenditures. Large spikes of deviations can be seen during the late 1990s due to the high volatility in external and internal debt by GDP ratio. During the start of the fiscal year 1996, domestic debt by GDP ratio reached to 42 percent and external debt by GDP ratio reached to 50 percent. Another wave of crisis aroused when in 1999 public debt by GDP ratio reached to 102 percent. Further, in response to Pakistan nuclear test conducted in May 1988 Western Economic Sanctions were imposed which increase the chances of external debt default occurred in 1999 (Anjum and Sgro, 2017). Interest payments, on average, went to 22 percent higher than its initial budget estimates while development expenditure was lesser than the initial budget estimates by about 1.1 percent. However, the major cost was paid by the agriculture sector development expenditures where the budget error went to about -17 percent.

The very first decade of 21st century (2001-2010) is renowned as the period of large economic crisis in Pakistan. Although aggregate budget errors, on average, increased in this decade from 1.6 percent to 7 percent but GDP per capita growth is also increased from 1.0 percent to 1.8 percent. This increased in GDP per capita growth rate was due to the good performance of the economy in the early years of the decade and a massive foreign aid due to the earthquake of 2005. Hence, even with this devastating natural hazard GDP per capita growth reached to 5 percent in fiscal year 2005. But, after 2005 GDP per capita start to decrease and eventually reached to -0.6 percent in the year 2010. Regarding event analysis, fiscal year 2010 was embarked with the devastating floods and a period of bloody battle against terrorism started. The damage from flood was unprecedented as it affected almost 78 districts and more than 20 million people. About 2085400 hectares of cropped lands, 23,831 km of roads, and 1.6 million houses were destroyed. Hence, due to this flood together with acute energy shortages, government had to spend more than its budgeted amount for the agriculture sector development and subsidies were given to the devastating areas both in form of cash and in non-cash form. All this resulted in the positive budget errors of about 23 percent for subsidies and about 33 percent for agriculture sector development.

From 2011 to 2020, GDP per capita growth increased from 1.8 percent to 3.6 percent while deviations in aggregate expenditures decreased to 0.41 percent on average. Fiscal year 2013 and 2016 were the periods of exceptionally low budget deviations and growth rate of GDP per capita increased from almost zero percent to 2.1 percent in 2013 and 3.2 percent in 2016, respectively. Interest expense was projected to stay considerably less than the budgeted amount in 2019-20 due to transferring of short-term debt into long-term and drop in cost of borrowing in longer tenor. But the out-break of the COVID-19 epidemic changed the near-term stance. It brought momentous challenges for the economy; particularly for fiscal accounts, which had been constantly tried to improve considerably, but went under pressure due to the pandemic. To lessen the impact of the pandemic on the economy the government increased their spending for public health and social safety programs, along with introducing various other measures. Resultantly, the budget was temporarily deviated from the initial target. In this period large negative errors can be seen only in development expenditures. In short, the development expenditures had to pay the cost of increased current expenditures.

The data given in the table 1.1 shows that, on average, in most of the decades development expenditures were below the initial budget estimates while current expenditures were all the time above its estimated budget. Again, the compositions of current expenditures are also showing that on average actual defense expenditures, interest payments and subsidies remained above the initial budget estimates except for the last decade where subsidies turned negative deviations. While, on the compositions of development expenditures, the negative deviations are more prominent especially in the agriculture sector. However, if we compare all the data by total averages then it seems that the magnitude of the development errors is very low as compare to the others. But, in reality this is not the case. In 70s, on average, government development budget was under-estimated by about 15% while in the decade of 2010s it was over-estimated by about 15 percent. Hence, in total these two will cancel each other. This is actually the drawback of using arithmetic mean. One solution to this problem is that we can use the absolute means which can be calculated without considering the sign. However, the problem with this approach is that we will loss the information about which sector was over-estimated and which was under-estimated. It means that the direction of change within a year will be lost. Second problem arises with the use of percentage errors is that what should be the denominator, estimates or actuals? Although there are many options available to check the average accuracy of these budget errors. But, the more frequently use measure is Theil's (1958) inequality coefficient (U) defined as;

$$U = \frac{\sqrt{\sum (A_t - B.E_t)^2 / n}}{\sqrt{\sum (A_t)^2 / n} + \sqrt{\sum (B.E)^2 / n}}$$

Where 'U' ranges from zero to one. U=0 indicates the perfect fit and U=1 represents that all budget estimates are completely different actual expenditures and the magnitude of these deviations is very large.

'U' is further decomposed into two errors; systematic errors and random errors. The systematic part of the error is further sub-divided into 'bias' and 'variance'.

$$1 = \frac{(\bar{A} - \overline{BE})^2}{1/n\sum(A - BE)^2} + \frac{(\sigma A - \sigma BE)^2}{1/n\sum(A - BE)^2} + \frac{2(1 - r)(\sigma A)(\sigma BE)}{1/n\sum(A - BE)^2}$$

Here, $\bar{A}$ is the mean value of actual government expenditures and $\overline{BE}$ is the mean of budget estimates of government expenditures. σA is the standard deviation of the actual expenditures and σBE is the standard deviation of the budget estimates of government expenditures. The first two terms of the right-hand side of the equation makes the "systematic" part of the error while to find out the "random" error we have subtracted the

systematic error from '1'. Where '1' indicates that all of the errors should sum to one because errors are calculated as a portion of total error where the denominator indicates the total error. Out of systematic error first term is called the biased proportion of the systematic error which arises due to the under or over estimation of the mean or average value. In other words, it represents the difference of the trends between two series. Second part of error is about the difference of the variations of the two series. It represents the over or under prediction of the variance of the series.

Table 2
Results of Theil's U coefficient and its decompositions for Budget Errors

Budget Errors	Theil's U	Bias	Variance	Random
Aggregate Expenditures	0.0214	0.0165	0.0044	0.9789
Development Expenditures	0.1032	0.0215	0.0003	0.9784
Recurrent Expenditures	0.0235	0.0019	0.0036	0.9944
Defense Expenditures	0.0841	0.0291	0.0011	0.9696
Interest Payments	0.0671	0.0053	0.0008	0.9938
Subsidies	0.2449	0.0241	0.0359	0.9398
Agriculture Expenditures	0.3330	0.0174	0.0991	0.8834
Industry Expenditures	0.2740	0.0344	0.0423	0.9232
Services Expenditures	0.1280	0.0066	0.0101	0.9832

The results from table 2 show that as compare to the recurrent expenditures, errors are much higher for government development/investment expenditures. Out of compositions of investment expenditures larger errors are prevalent in the agriculture sector, then industry and then services sector. While, on the recurrent side, larger errors are coming from subsidies as compare to the defense and interest payments. On the other hand, the decomposition of the error shows that the share of the random errors is much higher as compare to the systematic errors for all types of government expenditures. While, out of systematic errors, the highest share of bias errors is coming from industry sector and the share of variance errors is highest in the agriculture sector.

Conclusion

Fiscal marksmanship analysis plays a critical role in ensuring that public finances are managed with a high degree of precision, which is essential for achieving sustainable economic growth and stability. The analysis of budget errors by using MPE, MAPE and Theils' U coefficient for aggregate and compositions of government expenditures of Pakistan is showing that budget is not credible and large errors are being made in the development expenditures. While, the composition of expenditures are showing that out of public investment expenditures large errors are being made in the agriculture sector and out of current expenditures subsidies are the most prominent candidate. While, decomposition of Theil's U coefficient is showing that the part of random errors is high for all of the expenditures types. It indicates that contribution of the exogenous factor is very high in these errors. While, in agriculture sector share of variance is high and in industry sector share of bias is high as compare to other sectors.

Policy Recommendations

Hence based on the results it can be suggested that governments should give more attention to control budget errors in the development expenditures and its different compositions especially the agriculture sector.

Secondly, they struggle hard to build and retain credibility and reduce uncertainty about fiscal indicators through better institutions, more cautious forecasts, and regular communication to the people towards targets.

References

Allan, C M, (1965). Fiscal Marksmanship, 1951-63, *Oxford Economic Papers*, New Series, Volume 17.

Alesina, Alberto and Roberto Perotti, (1995). The Political Economy of Budget Deficits, *IMF* Staff Papers (March)., 1-32.

Asher, M. G. (1978). Accuracy of Budgetary Forecasts of central Government, 1967-68 to 1975- 76, *Economic and Political Weekly*, 13(8)

Auld, DAL (1970). Fiscal Marksmanship in Canada, *The Canadian Journal of Economics*.

Bhattacharya, BB and Kumari A, (1988).Budget Forecasts of Central Government Revenue and Expenditure: A Test of Rational Expectation, *Economic and Political Weekly*, 27(9)

Cassidy, Glenn, Mark. S. Kamlet, and Daniel S. Nagin, (1989). An Empirical Examination of Bias in Revenue Forecasts by State Governments. *International Journal of Forecasting*, 5, 321-331.

Chakraborty, Lekha & Sinha, Darshy, (2018). *Has Fiscal Rule changed the Fiscal Marksmanship of Union Government?, Working Papers 18/234,* National Institute of Public Finance and Policy.

Chakrabarty, T K and Varghese, W. (1982). *The Government of India's Budget Estimation: An Analysis of the Error Component*s, Reserve Bank of India, Occasional Papers.

Chakraborty, Lekha & Chakraborty, Pinaki & Shrestha, Ruzel, (2019). *Budget Credibility of Subnational Governments: Analyzing the Fiscal Forecasting Errors of 28 States in India,* Working Papers 19/280*, National Institute of Public Finance and Policy.*

Davis, J M, (1980). *Fiscal Marksmanship in the United Kingdom, 1951-1978*, The Manchester School.

End, N. (2021). *The Tectonics of Debt, Expectations, and Fiscal Policy—A Dissertation on Fiscal Credibility*. Economics and Finance. Aix-Marseille Université, English.

K, Nithin and Roy, Rathin (2015). Finance Commission of India's Assessment: A Political Economy Contention between Expectations and Outcomes, *Applied Economics*, 48(2), 73-88.

Khan, T., A. Hussain & Z. Khan Malik, (2018). Fiscal Marksmanship in Pakistan: With Special Focus on Province Khyber Pakhtunkhwa, *Pakistan Journal of Economic Studies*, 1(1), 21-43

Morrison, Rodney J, (1986). *Fiscal Marksmanship in the United States: 1950-1983*, The Manchester School.

Pina, A lvaro M. & Venes, Nuno M., (2011).. The political economy of EDP fiscal forecasts: An empirical assessment, *European Journal of Political Economy*, Elsevier, 27(3), 534-546, September.

Paul, S and Rangarajan C, (1974). *Short-Term Investment Forecasting*, Macmillan India

Pattnaik, R K, (1990).. Fiscal Marksmanship in India, *Reserve Bank of India,* Occasional Paper, 11(3)

Stephan, Andreas and Bru ck, Tilman, (2005). Do Eurozone Countries Cheat with their Budget Deficit Forecasts?, *The Postgraduate Research Programme working paper series,* No. 2005,5.

Theil, H. (1958). *Economic Forecasts and Policy*. Amsterdam: North Holland.

Zakaria. M and S. Ali, 2010, Fiscal Marksmanship in Pakistan *The Lahore Journal of Economics*, 15(2 (Winter 2010), 113-133