FISCAL MARKSMANSHIP IN PAKISTAN: A PROVINCIAL ANALYSIS

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2014

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Registration No. 03/MPhil-ECO/PIDE/2011

A Dissertation Submitted to the Pakistan Institute of Development Economics, Islamabad, in partial fulfillment of the requirements of the Degree of Master of Philosophy in Economics

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Dedicated to My PARENTS

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Acknowledgement

All praises to *ALLAH ALMIGHTY* Whose endless blessings and splendor have filled my life with pleasures and satisfaction. My all Thanks are due to Him for giving me the courage, mental strength and capabilities to complete this research.

I am greatly indebted to my supervisor, *Dr. Anwar Hussain*, whose insightful and patient guidance steered my effort in the right direction. Further, I am much obliged to my respectable teachers *Dr. Muslehuddin*, *Dr. Ather Maqsood* and *Dr. Waseem Shahid Malik* for their teachings. I learnt a lot from them.

Words cannot express how grateful I am to my mother and father for their constant support in my life. Their prayer for me was what sustained me thus far. The moral support and encouragement received from my family has always been an asset for me. I would also like to thank all of my friends.

Finally, to those who indirectly supported me in this thesis and in the completion of my degree, your concern means a lot to me. Thank you very much to all of you.

Sara Jabeen

ABSTRACT

The present study evaluates the forecast accuracy, validity of rational expectation hypothesis and decomposition of forecast errors of the budget/revised budget estimates of federal and provincial governments of Pakistan for the sample period 1987-88 to 2011-12. The data has been taken mainly from various issues of the Annual Budget Statement (ABS). The data is analyzed through techniques of percentage forecast error, Theil inequality coefficient, regression analysis and mean squared prediction error. The mean squared prediction error has been decomposed into systematic and stochastic errors to trace the sources of errors. The results reveal that the forecast efficiency of the federal and provincial governments has not been satisfactory over the sample period; however it has been improved for some of the heads of revenue and expenditures. The decomposition of errors reveals the fact that stochastic variations contribute hugely to forecast errors, leaving a narrow room for improvement and the rational expectation hypothesis also does not hold for federal and provincial government budget forecasting. In the light of analyzed results, the study recommends the better forecasts of key macroeconomic variables, estimates of key parameters such as tax elasticity and stringent fiscal rules to combat forecast errors and enhance forecast efficiency.

CHAPTER 1

INTRODUCTION

1.1 Background and Statement of the Problem

'If a man gives no thought about what is distant, he will find sorrow near at hand'… Confucius

Fiscal policy is the government's policy to direct its economy through fiscal tools i.e. government spending and taxation. Governments make use of fiscal policy to strengthen and sustain a desirable level of growth rate and reduce poverty. The current financial crisis of 2008 convinced the governments to employ fiscal tools to mitigate the vulnerability of crisis and revive the national economies. Before 1930, an adapted and acceptable approach was that of Laissez-fair, but the Great Depression and accompanying stock market crash of 1930's persuaded the policymakers that government has to play its role (Horton and El-Ganainy, 2009). The pivotal role of optimal fiscal policy in the growth process cannot be neglected in general and for developing countries in particular, as fiscal policy is considered a stabilization tool in depressed economies that suffer from high unemployment and output shortages (Ali and Ahmed, 2010; Asher, 1978).

Budgeting is an important component of fiscal policy which plays a vital role in an economy. A budget may rightly be considered as one of the important tool which helps the government to mobilize its resources properly and also takes the government

to the destination, accomplishing its economic objectives (Asher, 1978). Budget is the future plan which requires good forecasting of fiscal tools i.e. forecasts of revenues and expenditures which are the integral part of budget plan. These forecasts are called budget estimates/revised budget estimates and work as a 'fiscal signals' for all rational forecasters, analysts and private agents who make forecasts not only on the basis of past experience but also on budget's released data, as the later shapes the fortune of economy (Davis, 1980).[1] The materialized budget which is out-turn of forecasted budget is a testimony for policymakers to judge their ability of implementing the desired policy initiatives. A good forecast of these fiscal tools is also required for the observance of fiscal discipline under some *super-national fiscal rules* such as *the Stability and Growth Pact* in the 'Economic and Monetary Union' member countries (Cepparulo et.al, 2011).

Economic forecast is an art as much as a science, the better it is, the best it will be (Chow, 2003). The accuracy of budget forecasting is termed as 'Fiscal Marksmanship' i.e. more precisely defined as getting the right target of forecasted budget input (Roy, 1993). Thus fiscal marksmanship measures the accuracy of these budget estimates (fiscal signals) which becomes substaintally accurate if made on the basis of Rational Expectations rather than Adaptive Expectations.[2] The theory of rational expectations show a forward-looking behaviour of the agents who use the present set of perfect information to form their expectations for the future (Morrison, (1986); Muth, (1961)). The study on fiscal marksmanship of United States has concluded that if

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[1] The term 'fiscal signals' is coined by J. M. Davis, 1980 (Fiscal Marksmanship in the United Kingdom, 1951-78) which manifests the budget/revised budget estimates' impact on economy.
[2] The expectations are rational if the forecaster make estimate on the basis of all the past and present information while the adaptive expectations imply that is based solely on past information (Sheffrin, 1996).

estimates of budget are made on the basis of adaptive expectations then the proportion of systematic errors will be greater than stochastic errors (Davis, 1980).

There has always been a noticeable skepticsm about budget estimates/revised budget estimates in annual budget forecasting that usually there turns out a wide margin of inaccuracy in it. The key constraint is the risk and uncertainity involved in budget forecasting which makes this process a 'mugs-game'.[3] The reason is that the budget forecasting is a complicated procedure which has to take into account not only the economic, political and institutional factors but also the very uncertain exogenous factors. Accuracy does not postulate that forecast would be perfect without there being any forecast error, rather some sort of variations are highly likely to occur and are undoubtedly acceptable (Bagdigen, 2005). However, large forecast error has substantial implications for the economy as it usually results in excessive deficit-financing, cutbacks of inevitable public expenditures and debt accumulation (Cepparulo *et.al*, 2011). Therefore forecast errors in case of financial budgeting can have distressing consequences for the economy and this inaccuracy may take the form of either systematic errors or stochastic errors (Zakaria and Ali, 2010). The errors incurred due to the factors which are unanticipated and exogenous to an economy are called stochastic errors like natural disasters. While systematic errors are caused by the factors that can be estimated at the time of budget forecasting and hence are endogenous to the economy and policy-makers (Allan, 1965).

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[3] "*Mugs game"* is a futile activity

The budget-forecasting performance of Pakistan's federal and provincial governments show a wide margin of inaccuracy and the lack of ability to achieve the targets is a manifestation of this fact. This may be termed as failure of Fiscal Marksmanship e.g. if we consider the federal government's budget estimate of Revenue Receipt for fiscal year (FY hereafter) 2000-01, it was estimated as Rs.594.60 billion and was realized to the extent of just Rs.535.09 billion that was an over-estimation to the tune of 11.12%. Similarly for FY 2007-08, the target of the same was set at Rs.1368.14 billion with the realization of Rs.1499.38 billion, showing an under-estimation of -8.75%. These examples show that federal governmnet could not achieve the target of budget estimates in both cases which is obvious failure of fiscal marksmanship (Zakaria and Ali, 2010). This gives an idea of budget- forecasting inefficiency at the federal level and this will be consequently reflected at the provincial level as the later governments base their revenue estimates on reciepts allocated by the federal government as per NFC Award. The incorrect budget estimates of federal government are prone to be translated into forecast errors for the provincial budget estimates of outlays and revenues. Therefore, it is important to investigate that how accurate have the federal and provincial government's budget estimates been in case of Pakistan in the history and has the budgetary forecasts followed the Rational Expectation Hypothesis? Moreover, what happened to the status of budget-forecasting efficiency over the sample period and what has been the status of forecast accuracy? Finally it is considered that what has contributed to the forecast errors in the federal and provincial governments budget?

The present study addresses the accuracy and efficiency of fiscal year's budget forecasting for federal and provincial government over the sample period. The budget formation mechanism is also analyzed. Since the nature of expectations plays an inevitable role in the budget forecasting process and lead to understand the nature of errors thus the study has also checked the validity of Rational Expectation Hypothesis. This research will prove a good help to understand federal as well provincial government budget procedure, extent of accuracy, nature of expectations and the nature of forecast errors in budget forecast of both federal and provincial governments.

1.2 Objectives

Objectives of the present study are to:

1. Assess the status of budget forecast accuracy and efficiency

2. Check the validity of Rational Expectation Hypothesis in budget-forecasting and

3. Decompose and identify the sources of forecast errors at federal and provincial level.

1.3 Hypotheses

It has been hypothesized on the basis of literature for the current study that in case of Pakistan, the federal and provincial:

1. Budget-forecasting is inefficient

2. Budget-forecasts are not based on Rational Expectation Hypothesis and

3. Stochastic errors contribute more than systematic errors to the forecast errors of annual budget.

1.4 Organization of the Study

The study is organized into six chapters. Chapter-1 (Introduction) covers statement, background, objectives and hypotheses of the study. The relevant literature has been reviewed in Chapter-2 and Chapter-3 highlights the budget-making process in Pakistan. Chapter-4 of the study presents Data and Methodology. While Chapter-5 interprets the estimated results and finally chapter-6 concludes the whole study where some key policy implications of this study are also highlighted.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter gives a comprehensive review of empirical and theoretical development in the literature of 'Fiscal Marksmanship'. The evolution of the notion and every aspect of the literature on Fiscal Marksmanship is tried to be investigated and described under a separate heading.

2.2 Importance of Fiscal Marksmanship

The term 'Marksmanship' implies '*the skill in shooting*' where Fiscal marksmanship is defined as 'getting the right target of budget inputs' (Roy, 1993). Thus fiscal marksmanship implies the accuracy of budget forecast which is the core of fiscal policy. The concept of Fiscal Marksmanship has been introduced due to the fact that it ensures economic stability i.e. currency stability, full employment and economic growth (Allan, 1965). Government invests time, money and a lot of effort in the preparation and estimation of Annual Budget (Zakaria & Ali, 2010). The forecast of budget inputs i.e. revenue and expenditure is called budget estimates. These budget estimates act as 'fiscal signals' for private agents and forecasters whose expectations about future depend upon officially released data of annual budget estimates (Cepparulo et al., 2011). Moreover it has a significant impact on public sector's borrowing requirements which, resultantly, affects monetary development (Davis, 1980)**.** Inaccurate budget forecasting can hurdle the government in the implementation of economic policy, for example if government

expenditures are under-estimated or government revenues are over-estimated then it may probably lead to deficit financing with unfavorable economic consequences (Bhattacharya & Kumari, 1988). If these revenues and expenditures are over/under estimated, it reflects the fiscal marksmanship's failure (Zakaria & Ali, 2010). As budgeting is considered one of the major political tools so intentional efforts are made to under-forecast outlays and over-forecast revenues initially so as to act according to the will of people and spend more at the midcourse of year (Bagdigen, 2005).

2.3 Forecast Errors, Their Decomposition and Eradication

The difference between forecast and actual/realized values is called forecast error which is the consequence of fiscal marksmanship's failure (i.e. over and under estimation of budget). This forecast or budget errors indicate the failure in the achievement of set objectives of the governments and lead to non-optimization of resources distorting the implementation of fiscal policy, for example if government expenditures are under-estimated or govt. revenues are over-estimated then it may probably lead to excessive deficit-financing, debt accumulation, cutting-back important public expenditures having unfavorable consequences. Forecast errors arise due to poor judgment of GNP/GDP and price level, over/under estimation of the tax and expenditure elasticity, inaccurate forecasting of public and private enterprises, climate shocks and externalities (Bhattacharya & Kumari, (1988); Cepparulo et al., (2011)). Forecast errors also arise due to the structural characteristics of different government's budgetary framework. The literature decomposes the forecast errors into two major heads i.e. due to endogenous

(systematic variation) and exogenous (random variation) factors. The errors which arise due to wrong forecasting of macroeconomic variables (unemployment, inflation, saving or GDP/GNP) and key parameters (tax or expenditure elasticity) are systematic errors, since these errors are caused by the factors endogenous to economic system and are predictable. If budget is not executed in the compliance with certain revenue leakages or expenditures then it leads to large forecast errors (World Bank, 2005 cited by Cepparulo et al., 2011). The stochastic errors occur due to exogenous factors such as a rise in major imports prices, imposed wars and climate shocks which remain unforeseen by the forecasters. Fiscal marksmanship is more vulnerable to exogenous factors rather than endogenous. The later form of errors can be combated by taking into account the impact of fiscal measures upon macroeconomic variables and by selecting the revenues and expenditures of those areas which can be forecasted more accurately. The errors remain inevitable due to the fact that sufficient steps are not taken to keep actual budget in line with budget estimates and there are also some variables which are not directly in the fiscal control (Allan, (1965); Bhattacharya & Kumari, (1988)). There are three methods to reduce forecast errors; budget should be made more frequently, those areas should be more concentrated and focused whose prediction is easy and hence have greater sensitivity of systematic errors and applying realization function to make forecasted value equal to actual one (Mosley, 1985).

The decomposition of forecast error leads researcher to understand the nature and sources of errors and weak areas of prediction. The empirical studies of different economies present a good picture of their state of fiscal marksmanship and of errors

which distort the implementation of their economic policies. Some empirical studies conclude that proportion of random errors is higher relative to systematic errors, narrowing the space of error correction. The study of US economy shows a unique situation where systematic errors exceed stochastic errors (Morrison, 1986)**.**

2.4 Uncertainty and Fiscal Marksmanship

There has always been a noticeable skepticism about the government's fiscal projections. When the projections of balanced budget get off by wide margin during the decades of 1990s and 2000s, it made the credibility of the *Department of Finance* (Government of Canada) doubtful and provoked the 'inside' and 'outside' of the government to criticize the poor forecasting of budget makers. This sort of unfavorable situation let the *Department of Finance* to undertake two major studies in the year 1994 and 2005 to trace out the main hurdle to a balanced-budget. The studies concluded that risks and uncertainties are the key factors which are too large to allow for a high degree of budget forecast accuracy. Fiscal marksmanship is sensitive to the degree of uncertainty. Uncertainty may take the form of uncertainty of the model's parameters (like assuming that model's structure is known), the uncertainty regarding data e.g. stochastic variation (unexplained) in actual variable or in forecast errors (Woschnagg & Cipan, 2004). The 'stochastic simulation model' has been used to analyze the uncertainty in expenditures and revenues projection. The quantification of uncertainty is a hard task; and exogenous shocks/random variables can be used as proxy to quantify uncertainty in stochastic simulation. The probability distribution is generated for balanced budget and

the probability of surplus budget is estimated with certain assumptions. It has also been concluded in the literature that fiscal and economic forecasting uncertainty gives many possible outcomes for actual budgetary balance as compared to its projected value at forecast time. The government may also forecast future uncertainty on basis of its past experience and it is possible that due to change in forecast's inputs, the current forecast may deviate from the past values. The impact of changing the degree of uncertainty is also considered which provides potential impact of policies in order to reduce uncertainty in budget projections (Robbins *et al.*, 2005). The degree of uncertainty-is-well reflected in the forecasts, made for a long horizon. Data is also held accountable for uncertainty because these are the data problems that have been failed to predict 1990's US recession (Woschnagg & Cipan, 2004).

2.5 Can Economists Forecast Accurately?

'*Can economists forecast accurately*' is a controversial question leading to different conclusions. A comprehensive study over the question has been done. It is proved that by using acceleration principle in developed economies, some economic events can be forecasted which follow some laws or certain pattern. It can be predicted by using econometric models, given the sufficient conditions that to opt for an economic model with constant parameters, estimated by an appropriate method and using data, generated by random data generating process (a repetitive random process). Even unique and non-cyclical events can also be predicted if the factors/variables (better to be qualitative) and their combined effect on the event is analyzed by using sound knowledge

of economics and non-economics (Chow, 2003). This is usually believed that turning points cannot be forecast after the experience of 1990's US recession but a significant number of empirical researches over the concerned issue show that recessions are predictable if the forecasters have high prior probabilities about the occurrence of recessions (Stekler, 1972). This is also argued that these predictions could be avoided if asymmetric cost is associated to forecasting false turns (Schnader and Stekler 1997: cited by Stekler, 2007).

2.6 Efficient and Unbiased Macroeconomic Forecast

An efficient and unbiased macroeconomic forecast plays a vital role in the improvement and implementation of policies. Some studies value the most frequent or six months ahead forecast as more efficient. For an accurate forecast it must be unbiased, efficient and have uncorrelated forecast errors. The violation of these principles pinpoints inaccurate forecast rather than detecting the main reason of the problems, even if the data is taken from three different sources but the average data does not differ substantially from all sources i.e. used in forecasting. The era of 'structural transformation of economy' such as 1970s and 1980s in the US precludes the forecasters to make accurate forecasters (these were, somehow considered to be turning points). Mostly macroeconomic forecasts are not biased but inefficient due to the ad hoc macroeconomic conditions with magnificent inefficiencies that cause inaccurate forecasts (Schuh, 2001). The adjusted average forecasts are used to resolve this issue by incorporating the selected or lagged-errors in the efficiency regression equation as explanatory variables. The

relative Individual forecasts performance can be evaluated by their unbiased and efficient forecasts. Time is the key factor to determine their forecast accuracy. The efficiency of forecasting depends upon the knowledge and skills of forecasters (Chow, 2003)**.** The forecasts tend to be biased when the forecasters do not use the newly available information to avoid large adjustments. This attitude of the forecasters can be characterized as they have to maintain their reputation and credibility (Stekler, 2007).

2.7 Evaluation of Forecast Accuracy

A macroeconomic forecast should be evaluated by its ability to give information about economy's direction to tend, major turning points, size of change and expected duration of that change to persist (Fildes & Stekler, 2002). The forecast evaluation is done in terms of errors (mostly systematic), their magnitude, the forecast's rationality and ability to predict the cyclical ups-down. The forecaster's ability to forecast accurately does not attribute to errors caused by unanticipated events but they hold accountable for the errors that occur due to the use of inaccurate data and models and characteristics of forecasters (Stekler, 2007). It happens for most of the time that forecasters are not able to predict recessions (even could not identify recessions until it occurred) and make systematic errors. The studies witness that growth rates are underestimated in boom and overestimated in recession, which determines the fact that the qualitative measures for forecast can be failed by these turning points (Fildes & Stekler, 2002). The analysis of the forecasting models exhibits that these models focus on accuracy of *ex ante* forecasts. These forecasts incorporate assumptions regarding exogenous variables and all factors required to estimate the model. The effects of model

assumptions and adjustments should be eliminated in order to evaluate the accuracy of these models. The *ex-post* forecasts use realized/actual values of the exogenous variable or eliminate the adjustments made for previous errors or use mechanical rules in the model. Thus it is advised to evaluate the forecasting model that use *ex post* forecasts. The forecasters may not always necessarily maximize their forecast accuracy. There are other factors such as their reputation and credibility which most likely affect their forecasts (Stekler, 2007).

2.8 Role of Judgmental Forecasting in Forecast Accuracy

Judgment plays an important role in the improvement of macroeconomic forecasting performance. Forecasters use judgments by incorporating ad factors in equation (while using statistical or econometric models), in order to adjust the estimates of their models. The effects of this judgmental adjustment are taken into consideration which can result in bias etc., yet there are very few studies which have analyzed the judgmental adjustment in this context because adding ad factors is analogous to combine statistical and judgmental forecasts. Moreover these adjustments are more advantageous when the forecasters use information which has not been adjusted to the models (Stekler, 2007). For many years, the forecasters remain skeptical regarding its role in forecasting accuracy but now its role is widely accepted and a desire to blend it with statistical methods to make accurate forecast has been emerged but some analysts conclude that quantitative methods outshine the performance of judgmental forecasting as judgmental forecasting is being characterized of systematic errors and bias (Hogarth & Spyros, 1981). Forecasters rarely apply forecasting methods in its pure form but prefer to use

qualitative techniques and econometricians employ models with judgmental adjustment forecasting (Fildes & Stekler, 2002). The review of last 25 years forecasting performance shows that two types of data is used in judgmental forecasting i.e. historical/time series data and domain knowledge; an information relevant to forecasting of variable which can influence the forecast accuracy but it is argued that judgmental forecasting should be based more on domain knowledge, particularly where the time series data shows a high degree of variation. The experiment of judgmental forecasting without domain knowledge of time series data portrays that this method leads economists to cognitive traps. Although it is an unrealistic situation but it is good for this method's comparison with statistical forecasting methods and due to the reason that both of methods use same time series data without domain knowledge (Lawrence et al., 2006).

The procedure of combining forecasts from different sources such as statistical methods or judgmental forecasting methods enhance the forecasting accuracy and help to add the information about the variable to be forecasted. The combination of forecast from these two methods is likely valuable in many contexts (Lawrence *et al.*, 2006). It is an acknowledged fact that no forecasting method or model alone can give the best results thus it is better to combine forecasts of all forecasters to improve quality of forecasts (Fildes & Stekler, 2000). The models which incorporate *ex ante* forecasts make judgmental adjustments to their models. The analysis of these models gives mixed results; some models with judgmental adjustments show improvement in forecast quality while other models show that these adjustments make the quality of forecasts worse (Stekler, 2007).

2.9 Rational Expectation Hypothesis

'The rational expectation paradigm may be considered in the same spirit as the maximizing assumption, once the subject of much debate in economics but now considered being fundamental. The Rational Expectations assumption augmented the maximizing assumption by hypothesizing that agent use their information sets efficiently when maximizing' (Sheffrin, 1996). The notion of fiscal marksmanship becomes more important if the budget estimates are made on basis of rational expectation hypothesis (Morrison, 1986). The failure of fiscal marksmanship implies that government is not utilizing all available information efficiently in forecasting its budget estimates or if put it in other words it can be stated as that the government is not following Rational Expectation Hypothesis while forming its revenue/expenditure estimates (Bhattacharya & Kumari, 1988). The concept of rationality is incorporated in the studies to assess the improvement in the forecasts (Stekler, 2007). This helps in understanding the expectation formation in budget forecasting (Zakaria and Ali 2010). There are four types of expectations namely the static, adaptive, rational expectations and perfect foresight. The Chicago's economist Philip Cagon was the first to model expectation in his model of hyperinflation in 1956.

The present research concentrates on adaptive expectation; forming expectation about future on basis of past experience, in which case the forecast error is systematic and rational expectation; forming expectation about future by utilizing all available information (past and present) efficiently. The test of Rational Expectation

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Hypothesis gives mixed results. Most of the findings show that forecasters commit systematic error despite of the fact that the customary tests accept the null of rationality. These finding are not consistent and suggest that Rational Expectation Hypothesis should be rejected. This controversy can be avoided by introducing new tests of rationality. Moreover if the economic structure changes, then the forecasts may be biased, thus it is suggested that forecasts can be rational if the cost of getting more information is afforded (Stekler, 2007).

The study of most of the economies, including the leading and sophisticated one, shows that stochastic errors contribute more than systematic errors to forecast errors (Zakaria & Ali, (2010). Only one of the studies conducted on the US fiscal marksmanship has concluded that systematic errors exceed stochastic errors, leaving enough space to increase accuracy but this also implies that budget estimates are not made on Rational Expectation Hypothesis (Morrison, 1986). A weak rational forecast does not necessarily refer to systematically wrong forecast while a strong rationality of forecasts refers to forecast errors which are uncorrelated with the possible set of information, available at the time of forecast (Woschnagg & Cipan, 2004). There is also some prediction error for which rationality bias is not held accountable e.g. the failure of predicting 1990's US recession which is believed and has been proved to occur due to data problems (Fintzen and Stekler, 1999; cited by Stekler, 2007).

2.10 Summary

Fiscal marksmanship is a mugs-game. There are many factors which are hold accountable for the difference between the projections and out-turn of fiscal inputs. The studies show that if the budget estimates are made on the basis of Rational Expectation rather than Adaptive Expectation then the systematic variation in the forecast errors are avoidable but most of the studies concluded from their decomposition of errors that the proportion of random variation is substantially larger and unavoidable due to the uncertainties and unprecedented circumstances which require a good art of budget forecasting.

2.11 Contribution of the present study

The present study has been conducted to cover the empirical gap of the literature. The marksmanship of the Federal government annual budget has been already taken into account.[4] The contribution of the current study is to update the sample period for the analysis of Federal government and extend this analysis to all Provincial government's annual budget in case of Pakistan.

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[4] See details in Zakaria & Ali (2010).

CHAPTER 3

FEDERAL AND PROVINCIAL BUDGET MAKING IN

PAKISTAN

3.1 Introduction

This chapter explains the budget making process of federal and provincial governments, the legislation regarding the approval of budget/revised budget estimates and the corresponding documentation.

3.2 Annual Budget Statement (ABS)

"Budget is the annual financial statement outlining the expected revenues and expenditures of the government for the coming year. It also reports on the actual expenditures and revenue during the year just ended" (Shams & Ismail, 2005). Federal/Provincial annual budget is presented at the start of financial year that starts on 1st of July and ends at the 30th of June.

ABS is one of the official budget documents which is furnished in the National Assembly of Paksitan. This is forwarded to senate to fulfill the requirements of the Paksitan's Constitution Article 80(1). The ABS portrays the total amount to meet "charged expenditure" as described by the constitution and other "voted expenditure". The ABS includes:

- Receipts: General/Development Revenue Receipts and Current/Development Capital Receipts.

- Expenditures: Current/Development Revenue Expenditure and Current/Development Capital Expenditures.

ABS also contains:

- Demand wise summarized Charged and voted expenditures[5]

- Objective wise classified Budget Estimates (operating expences and allowances etc) (Ahmed & Asif , 2007).

Each of the province has its ABS with the same structure and components of receipts and expenditures but with more segregated details.

3.3 Federal Budget Formation

3.3.1 First Step: Budget Circular Call (BCC)

This is the responsibility of the Ministry of Finance, Islamabad to issue the BCC to all the ministries departments and divisions of the government in the month of October. It tells the procedure how to prepare Budget estimates with a given detailed timeline to complete various stages of Budget within. These ministries, divisions and departments are required to state i) permanent expenditures incurred on current budget ii) projected/expected expenditures on current development projects iii) the proposals for new projects iv) proposals of expenditures on new development projects. The issuance of budget circular call in the provincial governments is same for the formation of budget estimates by their corresponding finance departments. The final budget comes through

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[5] Charged expenditures are compulsory expenditures met from the Federal consolidated fund and Voted expenditures are those expenditures which are voted in the National Assembly in order to incur.

three stages Budget estimates, Revised Budget Estimates and Actual Budget (Shams & Ismail, 2005).

3.3.2 Budget Estimates

All the departments, ministries and divisions prepare the budget estimates seperately for development and current expenditures keeping in view the previous years actual expenditures, current situation and future expectations. These budget estimates are made for the next financial year and are required to be submitted before the month of Feburery. The budget has two main sections i.e.

   i.   Revenue Budget

  ii.   Capital Budget

The revenue budget is incurred on the current or non-development expenditures. The current revenue or revenue receipts i.e. derived through Tax Revenue and Non-Tax Revenue is used to finance running of civil governmnets, defence and repayment of debts etc. If revenue budget is more than enough then it is transferred to capital budget. The Tax Revenue Receipts included direct and indirect taxes, while the Non-Tax Revenue Receipts include Income from Property and Enterprise Receipts, Civil Administration etc. and Miscellaneous Receipts. If the Current Revenue Receipts are far enough for the current expenditures then deficit is met through borrowing. The capital budget is used for the development projects. The capital expenditures are met from reserve funds, revenue surplus and borrowings for general and specific purpose. These budget estimates of the federal nad provincial governmnets are submitted to the finance departments in the month of December/January.

3.3.3 Revised Estimates

The revised estimates are made for the current financial year which include the revised estimates of the provisions for that of authirized expenditure which is anticipated to be incurred before the end of the current financial year in the month of March/April. If the revised estimates of authorised expenditure exceed the authorised grants, this is properly documented that the competent authority has duly authorised the increase and vice versa. The excess is met through

1. Appropriation of existing grants

2. Supplementary grants

3. Appropriation from some other items

The proposals are reviewed after being submitted by the ministries, departments and divisions in order to find out whether the expenditures are new or the fixed. The fixed expenditure includes estableshment, pension, office administration costs and debt servicing. These budget proposals are submitted to the Federal Cabinet for consideration and approval for onward submission to the parliament. The budget proposals are then presented in the National Assembly where it is considered that whether it is according to the needs of public and fiscally sound or not. It requires the Money Bill which if availed, will involve expenditures incurrance from the Federal Consolidated Fund or withdawal from the Federal Public Account. It is not usually presnted to the National Assembly but with the Federal Government's consent.

3.3.4 Annual Development Plan (ADP)

Annual Development Plan includes the development projects for the next financial year. It gives the details of finanacial allocation and targets of these development projects. These development plans are prepared by Planning Commission of Pakistan with the collaboration of Ministry of Finance and provincial governments. These development plans are finally approved by National Economic Council (NEC). The three government bodies involved in this process start the preparation of ADP's in the month of November. The size of the plan is subject to the requirements of economy and planned targets. The plan is handed over to the executing agencies and provincial governments by the Planning Commission of Pakistan while the sector wise development plans are programmed and formulated by the sponsoring agencies for approval by the Planning Commission. The financial allocations are first considered by Priorities Committee in the month of March/April and then by the Annual Plan Coordination Committee in the month of April/May. But prior to determine the size of the plan, it is the resposibility of Ministry of Finance to determine the available resource to undertake these projects, this task is completed with the co-ordination of concerned government agencies like Central Board of Revenue and Provincial Finance Department (particularly). The resourse estimation includes the following principal components;

  i.   Foreign Economic Assistance

 ii.   Public Savings (Surplus of Revenue Receipts)

iii.   Net Capital Receipts (Loan's recoery, Prize Bonds Proceeds and Saving Schemes etc.)

iv. Deficit Financing (Bank Borrowings)

3.3.5 Federal Consolidated Fund and Public Account

"All revenues received by the Federal Government, all loans raised by it and all money received by it in repayment of any loan, form part of the Federal Consolidated Fund and all other money received by or on behalf of the Federal Government or received by or deposied with the Supreme Court or any other court established under the authority of the Federation, are credited to the Public Account of the Federation" (Shams & Ismail, 2005). The custody of both of the Federal Consolidated Fund and Public Account are regulated by Acts of Parliament. All of the provinces have their own *Provincial Consolidated Fund.*

3.3.6 Fiscal Legislation in the National Assembly

Budget is presented to the National Assembly on a day appointed by the leader of the house. No discussion takes place on the very day the annual budget is presented and the only proceeding is made by the Finance Minister i.e. the budget speech on the introduction to Finance Bill. Furthuremore the budget can not be referred to a Standing or to a Select Committee.

The demands for all grants are broken down according to major programms. All demands for grants state the total proposed grant and details of estimate for each item in the grant. Only the government-recommended demands for grants are made. The budget passes through the following stages in the National Assembly;

1. General Discussion

2. Appropriation (particulary in charged expenditure)

3. Voting on demand for grants (other than chaged expenditure)

The speaker decides the days for the above mentioned stages of budget. The General discussion takes at least four days which is held after two days (at least) of budget presentation in the National Assembly. The cut-motion is taken to reduce the amount being demanded for any grants in the following ways:

- Disapproval of policy cut; it entails a cut motion to indicate the particulars of policy and is presented in the form that " *the amount of the demand be reduced to Rupees 1*" and the member doing so is required to suggest an alternative policy.

- Economy cut; it is moved in the form that *"the amount of the demand be reduced by a specified amount"*. This leads to speeches which describe different aspects that can affect the economy.

- Token cut; this motion is taken in the form that *" the amount of the demand be reduced by Rs.100.00"*. this is introduced particularly to show a grievance within the government's responsibility. The discussion on this move is supposed to be confined to that specific grievane.

By rule, any motion must be taken at least two days before the demand is being taken into cosideration. These are conditions under which cut-motions are admitted;

1. It must be related to one demand.

2. It must be related to charged-expenditure on Federal Consolidated Fund.

3. It aims to increase the grant or change the destination of grant.

4. It must not be a biased one.

5. It must be related to one matter in precise terms.

6. It aims to suggest the amendment of any existing law.

7. It must not be related to a matter which is not the main concern of the government.

8. It must not be related to a controversial issue which has to be adjudicated by a court within jurisdiction of Pakistan.

9. It must be discussed in the session in which the decision has been taken.

10. It must not be related to the already considered matter.

The speaker can decide which motion is admissible according to the rule. Each demand for Grant is taken into consideration seperately and all cut-motions regarding to each demand are discussed and voted upon. At the time of sitting termination, the speaker puts forward every important question regarding to the matters of demands for grants.

3.3.7 Fiscal Legislation in Senate

Money bill is only originated in the National Assembly as according to the constitution of Pakistan. According to the Legal Framework Order (LFO) of 2002, a copy of the Money Bill is sent to the Senate while laying the Finance Bill in the National Assembly. The Senate is supposed to make recommendations with reference to ABS and Finance Bill to the National Assembly within seven days after the Money Bill is transmitted to it. These recommendations are put forward to Senate standing Committee on Finance and Revenue. The Committee evaluates these recommendations and submits report to the House and the House submits back the recommendations to the National Assembly after consideration of the report and finalization of recommendations. A schedule of Authorized Expenditure is signed by the the Prime Minister to withdraw

money from the Federal Consolidated Fund in the ABS. This schedule specifies the charged expenditure upon the Federal Consolidated Fund and the extent of expenditure that can be made under a grant or appropriation. The budget estimates of all provinces are presented in the respective Provincial Assembly for the upcoming fiscal year for debate and approval.

3.3.8 Budget Disbursement And Implementation

After the legislative execution and approval of the Budget, the Finance Ministry issues a release letter to all ministries, departments and their corresponding offices of Accountant General of Paksitan Revenue (AGPR or AG i.e. Account General) stating the availibility of Funds. It is the responsibility of the AGPR/AG to inform the District Accounting/Treasury Offices of their funds availibility. The Federal Government issues funds according to their formulae and percentages while the provincial governments release funds to the disrict governments on the 1st of every month. All of the ministries and divisions are required to send a report regarding their expenditures to the Ministry of Finance through their corresponding financial advisors every month. A mid-year review of the budget is conducted i.e. based on reconciled account which helps to design a strategy for Annual Budget implementation for the rest of fiscal year. The Principal Account Officer holds the power to re-allocate expenditures within their departments below a threshold through established procedures while re-allocaton above a threshold is required to be approved by the Ministry of Finance at the time of reconciliation's process in each month. If supplementary grants are required then it will have to be approved by the Parliament at the time of next fiscal year's budget (Ahmed & Asif, 2007).

3.4 Conclusion

The analysis of budget preparation and approval process in Pakistan reveals that the whole process is sophisticated enough to ensure that the budget documents pass through well defined stages. During this time, it is scrutinized in different aspects i.e. by the executing bodies, sponsoring agencies, the executive and the public representataives. The overall procudure is very refined and every possible attempt has been made to ensure that the budget forecast are examined in details to arrive at their best possible accuracy. However, the rules and practise may deviate in reality and if it happens so, there may occur forecast error. These errors may be caused by negligence/ignorance of the fact and may also result from intentional effort. It is therefor important to analyze the accuracy of the outcome of this whole process.

CHAPTER 4

DATA AND METHODOLOGY

4.1 Introduction

This chapter illustrates the analytical background, data and analytical tools used to investigate the aimed research objectives of the study.

4.2 Analytical Background

Forecasting is an act of predicting or estimating the future given the present and past data. In statistics, forecast error is the difference between predicted and realized value. In economics, forecasting is widely used to predict the economic indicators e.g. interest rate GDP and inflation (Hymans, 2008). The prediction of government actual revenue and expenditure is called budget estimates which are subject to great deal of forecasting in order to avoid the unfavorable consequences. If A (t) is the actual/realized value and F(t) is the forecast in time period t then forecast error is defined as the difference between the forecast and actual i.e. E(t)=A(t)-F(t). The forecast error can be negative, positive or zero depending upon whether the budget estimates are under/over or perfectly-estimated. The lesser the forecast error is, the higher will be the accuracy of budget estimates (Bhattacharya and Kumari, 1988). There are four types of accuracy measures; scale dependent (e.g. MAE or MAD), percentage error (e.g. MAPE), relative

error and scale free measures (e.g. MASE). These all approaches are briefly discussed in the following sections with their pros and cons (Hyndman, 2009).

4.2.1 Scale-Dependent

The forecast error E(t) depends upon the scale of the data and accuracy measures that are based on E_t are indeed scale-dependent, therefore this measure is not applicable to compare series with different scales. The two most common scale-dependent measures are Mean Absolute Measure (MAE) $|E_t|$ and Mean Squared Error (MSE) $=(E_t^2)$. Root Mean Squared Error is one of the forecast accuracy measures, based on Mean Square Error as

$$MSE = 1/n \sum (A_t - F_t)^2 \qquad\qquad (4.1)$$

It is not considered to be reliable for the comparison of accuracy across different series (Armstrong & Collopy, 1992). It is advised to use this measure for the comparison of forecasts obtained from same series but across different models. The smaller the value of RMSE, the better will be the quality/acccuracy of forecasting.

$$RMSE = \sqrt{1/n \sum (A_t - F_t)^2} \qquad\qquad (4.2)$$

If there is absolutely perfect fit then RMSE will be zero and vice versa. This measure has one problem that variance of the forecast (i.e. vary error across time) is always subject to non-linearities in the model or large variation in exogenous variables (Jana & Elezabeth, 2004). There cannot be made any furthure robust interpretation of RMSE as it is not the estimate of any model's (forecasting model) parameter (Ray, 1986).

4.2.2 Percentage Errors

The percentage errors are scale-independent and are frequently used to compare forecast accuracy performance of different data sets. The frequently used one is Mean Absolute Percentage Error (MAPE). This measure is a widely used accuracy measure due to its advantage of being scale-independent.

$$MAPE = mean(|E_t|) \tag{4.3}$$

But this measure has a limitation as if the original value is small then it turns out to be assymetric and instable. Moreover it cannot be used for comparison of naive models (random walk) as outliers cause distortions in comparison (Woschnagg & Cipan, 2004). The second problem with this measure is that it penalizes heavily positive errors as compared to negative errors. The 'symmetric MAPE' is advised to use in the M-compututions due to the above mentioned reasons (Makridakis & Hibon, 2000).[6]

$$sMAPE = mean\ 200 \left(\frac{|A_t - F_t|}{(A_t + F_t)} \right) \tag{4.4}$$

Although this measure is not reliable for intermittent data but can be used for measuring the accuracy of annual budget data. In case of intermittent data, the percentage errors can not be used because these types of data may have zero values which will give the percentage error as undefined or infinite (Hyndman, 2006).

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[6] The Makridakis Competitions or M-Competitions is a term used for a series of competitions organized by teams led by forecasting researcher Spyros Makridakis and intended to evaluate and compare the accuracy of different forecasting methods.

4.2.3 Relative Measures

The relative measures are governed by the idea to assess the performance of a forecast relative to a benchmark forecast e.g. if $R_t = E_t / E_t^*$ where R_t is relative measure and E_t^* is a forecast error, that is a benchmark (obtained from a benchmark method). E_t^* is usually obtained from naive methods where the forecast value of the exogenous variable is kept equivalent to the last observed value i.e. $F_t = A_{t-1}$. Theil Inequality Co-efficient, Medain RAE, Geometric MRAE are examples of relative measures (Woschnagg & Cipan, (2004); Hyndman, (2006)). The Relative measures are scale-invariant measures and can be used to evaluate different series.

These three types can be categorized as stand-alone. Stand-alone measures are those which does not require any other reference forecasts to be measured (Woschnagg, E. & Cipan, E., 2004)). The three forecst accuracy measures i.e. Root Mean Squared Error (RMSE), Mean Absolute Error (MAE) and Theil Inequality Co-efficient U are more frequently used by economists/ forecsters to evaluate *ex-post* forecast accuracy as well *ex-ante* forecast accuracy. An *ex-ante* forecast is one in which exogenous variable's guessed or forecast values are used and *ex-post* is one in which exogenous variable's acual values are used. *Ex-post* forecasts are more valued as compared to *ex-ante* forecasts because *ex-ante* forecasts are based on guess values rather than actual values of exogenous variables, in this way one can not separate the errors, occuring due to wrong guess and the ones occuring due to some other factors (Jana & Elizabeth, 2004). The other reason of being not preferring the *ex-ante* forecast is the inclusion of subjective factors in the forecasting (Ray, 1986). Thus it shows the performance of model builders

rather than that of the model being used and examined for the purpose of forecasting (Woschnagg & Cipan, 2004).

4.2.4 Rational Expectation Hypothesis

The rational expectation hypothesis is the most popular model since its incorporation by Robert Lucas (1972,1976) mathematically into macroeconomics. The notion put forward by Jhon Muth in 1960s simply stated that the forecast is rational if the forecaster utilizes the set of information, comprising all present and historical informtion relevant to the variable being forecasted. The rational expectations revolution has significantly enriched mainstream policy research macroeconomics (Taylor, 2000). This rational expectations revolution has led to many different schools of macroeconomic research. The evolution of new classical school, the real business cycle school, the new Keynesian school, the new political macroeconomics school and more recent the new neoclassical synthesis can all be traced to the introduction of rational expectations into macroeconomics in the early 1970s (Goodfriend and King 1997).

4.3 Data Description

The analysis of this study is based on the secondary time series data. The present study takes into consideration the federal as well as the provincial government budgets and the choice of sample period for provincial government's annual budget analysis is subject to the availability of data. The sample period for Federal, Balochistan, Punjab and Sindh is 1987/88-2011/12 while it is 1989/90-2011/12 for province of Khyber

Pukhtunkhwa. The data on Revenue/Capital Receipts and Revenue/Capital Expenditure has been obtained from the ABS. In some provinces, the ABS contained the Actual data while the it was missing for other provinces, which has been obtained from the Budget Wing of the Ministry of Finance, Islamabad and White Papers of respective provincial governments.

4.4 Analytical Tools

The per annum forecast accuracy of the federal and provincial governmnet's annual budget is assessed by the percentage forecast error i.e.

$$E_t = 100 \left({F_t - A_t}/{A_t} \right) \tag{4.5}$$

If F_t is the budget estimates and revised budget estimates and A_t is the actual/realized value of revenues and expenditures then the difference between the budget estimate/revised budget estimate and actual value is the forecast error. Higher the value of forecast error irrespective of the sign, higher is the extent of error and lesser is the accuracy of budget and revised budget estimates. The positive, negative and zero values of forecast error shows the over/under and perfect forecast of the budget and revised budget estimates.

4.4.1 Theil Inequality Co-efficient

Theil (1958) Inequality Co-efficient is the earliest relative measure and considered to be one of the robust measure of forecast accuracy. Theil Inequality co-efficient is the standardized root mean squared error (Bliemel, 1973). Theil (1958) presented this formulation of Inequality coefficient in his book as:

$$U_1 = \frac{\sqrt{\frac{1}{n}\sum\{f(t)-a(t)\}^2}}{\sqrt{\left[\frac{1}{n}\sum\{f(t)\}^2\right]}+\sqrt{\left[\frac{1}{n}\sum\{a(t)\}^2\right]}} \qquad (4.6)$$

Where (a_i, f_i) stands for the predicted and actual changes i.e. $a_t = A_t - A_{t-1}$ and $f_t = F_t - A_{t-1}$. The value of Theil Inequality co-efficient will be greater/lesser than or equal to 1 depending upon whether the direction of change has been forecasted correctly or not. If it is forecasted correctly then $U_1 < 1$, if not then $U_1 > 1$ and if exactly then $U_1 = 1$ showing that no error has been committed while forecasting the direction of change.

The revised measure of Theil Inequality Coefficient is that '*if divide the RMS forecast error by the square root of the mean squared successive differences of the actual values, the result is the following positive squared root of*

$$U^2 = \frac{\sum(F_i-A_i)^2}{\sum A_i^2} \qquad (4.7)$$

Where (F_i, A_i) stands for forecasted and observed/actual change and this is termed as the inequality co-efficient (Theil, 1955). In simplified form:

$$U_2 = \frac{\sqrt{1/n\sum(F_t-A_t)^2}}{\sqrt{1/n\sum A_t^2}} \qquad (4.8)$$

It is immediately noted that $U_2=0$ if and only if all of the forecast are absolutely perfect (*Fi=Ai* for all i); also, *'that $U_2=1$ when the prediction procedure leads to the same RMS error as naïve no-change extrapolation. In other words, by using the inequality coefficient one measures the seriousness of a prediction error by the quadratic loss criterion in such a way that the zero corresponds with perfection and the unit with the loss associated with no-change extrapolation'*. It is manifested that the revised inequality coefficient has no upper bound, which is tantamount to say that it can be considerably worse than by *extrapolating on no-change basis.* First it is directly related to the concept of forecast's failure. Second, the alternative denominator has also the mean square prediction error (that the forecasts depend on the mean square prediction error) and it is not true that the coefficient is uniquely determined by the mean square prediction error which is against the idea of a quadratic loss function (Theil, 1966). The following measure of Theil inequality co-efficient has been extensively used:

$$U_3 = \frac{\sqrt{1/n \sum (F_t - A_t)^2}}{\sqrt{1/n \sum F_t^2} + \sqrt{1/n \sum A_t^2}} \tag{4.9}$$

Where the (F_t, A_t) is not defiend in terms of changes. If $U_3 = 0$ it implies that $A_t = F_t$ for all time period and there is no forecast error while $U_3 = 1$ predicts the worst forecasting performance (Pindyck and Rubinfeld, 1981).[7]

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[7] see details in (Asher, (1978); Bagdigen, (2005); Mosely, (1985); Zakaria and Ali, (2010) Bhattacharya and Kumari, (1988)) .

4.4.2 Decomposition of Errors

The study also aims to decompose the errors to trace out their sources. The mean squared error is mathematically decomposed to get the three components whose sum is equal to 1.

$$1 = \underbrace{\frac{(\bar{F}-\bar{A})^2}{1/n\sum(F_t-A_t)^2} + \frac{(s_F-s_A)^2}{1/n\sum(F_t-A_t)^2}}_{systematic\ variations} + \underbrace{\frac{\{2(1-r)s_F.s_A\}}{1/n\sum(F_t-A_t)^2}}_{Random\ variations} \qquad (4.10)$$

The first part of this equation defines systematic variation and the second part indicates the random/stochastic variation. The systematic variation is broken down into bias and unequal variation. All of the three components of variation are called *inequality proportions* denoted by U_M, U_s and U_C respectively. The first component U_M is

$$U_M = \frac{(\bar{F}-\bar{A})}{1/n\sum(F_t-A_t)^2} \qquad (4.11)$$

U_M measures the proportion of total error deviating from mean change. The second component is U_s:

$$U_S = \frac{s_F-s_A}{1/n\sum(F_t-A_t)^2} \qquad (4.12)$$

Where s_F and s_A are the standard deviations of F and A series, U_s measures the proportion of error which deviates from variance of the change. The third component is U_C:

$$U_C = \frac{\{2(1-r)s_F.s_A\}}{1/n\sum(F_t-A_t)^2} \qquad (4.13)$$

Here r is the correlation co-efficient which measures correlation between F and A series. U_c measures the proportion of error due to stochastic or unanticipated errors (Theil, 1966).

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4.4.3 Testing Rational Expectation Hypothesis

One of the objectives of the present research is to test the Rational Expectation Hypothesis for Budget Forecasting in Pakistan. The necessary and sufficient conditions are supposed to be met in order to hold the Rational Expectation Hypothesis. The necessary condition implies that forecast of a variable should depend on a set of information, containing all the previous and present information regarding the variable (Sheffrin, 1996). To put it differently, the forecasted value should be an unbiased forecaster of the realized one. Thus the budget estimates are rational if the forecasted (F) is an unbiased estimator of actual (A). The REH can be tested by estimating the regression equation:

$$A_t = \gamma_1 + \gamma_2 F_t + \gamma_3 A_{t-1} + \mu_t \tag{4.14}$$

A_t is the actual/realized value while F_t is value forecasted at time t. The budget estimates will be rational if $\gamma_1 = 0$, $\gamma_2 = 1$, but it is not the sufficient condition for rational expectation hypothesis to hold. The necessary condition is that there should not be any correlation between forecast error and forecast value i.e. the correlation co-efficient between forecast error and forecasted value should be zero, i.e. $\rho = 0$ (Muth, 1961) which implies that forecast error is not systematic or the expectations are not formed on the basis of adaptive expectation and this condition holds if $\gamma_3 = 0$ (Bhattacharya & Kumari, (1988); Zakaria & Ali, (2010)). The Durbin Watson test is not valid if the regression model includes lagged-dependent variable as explanatory variable, for which Durbin (1970) advised *h-statistic* i.e.:

$$h = (1 - \frac{d}{2})\sqrt{\frac{n}{1-n\sigma_{\hat{\gamma}}^2}} \tag{4.15}$$

Where n is number of observations, d is the usual DW-statistic and $\sigma_{\hat{\gamma}}^2$ is the estimated variance of the co-efficient of lagged dependent variable (Asteriou and Hall, 2007).

4.4.4 Testing Forecast Efficiency

The last objective of the study is to find out whether budget forecasting efficiency has been improved over the sample period, which is realized by estimating the following equation:

$$E_t = \theta_1 + \theta_2 T_t + \omega_t \tag{4.16}$$

$E_t = \left[\frac{(F_t - A_t)}{A_t}\right] \times 100$ is the percentage forecast error, realized at time t and T is the linear time trend. The forecasting efficiency is considered to be improving if $\theta_2 < 0$ while $\theta_2 > 0$ implies its deterioration over time (Zakaria and Ali, 2010). The co-efficient of determination R^2 shows the proportion of variation of dependent variable, which is being explained by the independent variables of the model. The value of R^2 lies between 0 and one, the closer it is to one the better is the model fit. The Adjusted R-Square shows the percentage of variation of dependent variable explained by only those independent variables that truly affect the dependent variable therefore it penalizes the addition of independent variables that do not belong to the model. The value of Adjusted R-square may be less than or equal to the value of R-square (Asteriou and Hal, 2007).

CHAPTER 5

RESULTS AND DISCUSSION

5.1 Introduction

This chapter interprets the results of estimations of forecast errors, rational expectation hypothesis, forecasting efficiency and decomposition of forecast errors over the sample period for provincial and federal governments.

5.2 Balochistan Budget's Accuracy and Decomposition of Errors

The analysis of the annual budget for the province of Baluchistan covers the time-period running from FY 1987/88 to FY 2011/12. Table 5.1 and 5.2 presents the percentage forecast errors which shows that the BE and RBE of Revenue Receipts are broadly over-estimated for most of the fiscal years, particularly during the period 1996/97-2011/12.[8] The analysis of disaggregated Revenue Receipts show that due to high targets of *Community Service Departments* and *Economic Service Departments* in Non-Taxes, the *Finance Department of Balochistan* failed to maintain its planned estimates thereby resorting to the ex-post increase. Although the provincial Tax Receipts are also over-estimated during this time-period but this is only to the negligible extent. Table 5.1 shows that BE of Capital Receipts are largely under-estimated particularly in the FY of

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[8] BE(budget estimates), RBE(revised budget estimates) & AC(actual budget)

1992-93 which may be attributed to the very low target of *Floating Debt* that comes under the head of Current Capital Receipts. According to the ABS figures, the BE and RBE of Capital Receipts are Rs. 1251 million and Rs. 177462.991 million respectively against the realized value of Rs.184077 million, out of which the *Floating Debt* contributes Rs. 1194.236 million in the BE, Rs. 177405.355 million in the RBE and Rs. 184023.405 million in the realized value for the FY of 1992-93. There is a wide difference in the estimated and actual values which leads to a substantial error. The analysis shows that the Current Capital Receipts are more under-estimated as compared to Development Capital Receipts. The Revenue Expenditure is over-estimated for most of the fiscal years because of the over-estimation partly in Current Revenue Expenditure and Development Revenue Expenditure for BE and RBE. In FY 2006-07 and onwards, there is no figure available for the Development Revenue Expenditures for Baluchistan. The BE of Capital Expenditure is under-estimated for most of the sample years due to Current Capital Expenditure (due to the major head i.e. *Floating Debt*) while RBE follows a mixed trend of over/under estimation during the sample period.

Table 5.1: Errors in Forecasting Baluchistan's Revenue (Rs. Million)

	Revenue Receipts				Capital Receipts		
FY	Actual	%Error (BE)	%Error (RE)	FY	Actual	%Error (BE)	%Error (RE)
1987-88	3,623	8.44	10.51	1987-88	1825	26.84	-10.86
1988-89	3946	14.04	-0.30	1988-89	1606	14.36	11.24
1989-90	4039	-4.05	-1.14	1989-90	3260	-6.24	-5.91
1990-91	4454	-5.99	0.91	1990-91	2795	30.01	46.48
1991-92	8363	8.57	-1.04	1991-92	5784	-51.82	2.69
1992-93	9434	-2.35	0.43	1992-93	185973	-98.49	-3.51
1993-94	10278	-9.61	0.99	1993-94	7974	-42.72	-50.99
1994-95	11684	-8.61	-0.02	1994-95	4789	-19.01	53.97
1995-96	12866	1.95	2.85	1995-96	7425	-33.89	-45.86
1996-97	11572	17.93	18.86	1996-97	8550	-29.46	-34.46
1997-98	11384	40.69	36.80	1997-98	9675	-46.08	-32.38
1998-99	10751	64.88	55.77	1998-99	10799	-1.32	-0.84
1999-00	16043	16.71	22.83	1999-00	11924	-27.12	-41.21
2000-01	18027	38.38	30.44	2000-01	7830	-15.78	-36.72
2001-02	17985	40.40	28.49	2001-02	7475	-6.58	-30.68
2002-03	18470	43.12	31.49	2002-03	15299	-56.44	-62.79
2003-04	18064	36.42	31.16	2003-04	9311	-34.99	-47.79
2004-05	20710	45.27	40.27	2004-05	17549	-46.77	-28.37
2005-06	22992	26.88	40.08	2005-06	9256	21.94	-6.69
2006-07	34397	5.52	24.67	2006-07	17302	25.77	5.78
2007-08	33540	30.68	38.29	2007-08	12437	14.93	-17.52
2008-09	36787	40.07	52.46	2008-09	13048	86.16	49.81
2009-10	42992	37.36	60.92	2009-10	13971	81.76	23.46
2010-11	104179	10.89	12.52	2010-11	14819	88.49	57.75
2011-12	50891	149.66	156.01	2011-12	15987	89.35	105.40

Source: Author's calculations (Data has been taken from various issues of Annual Budget Statement)

Table 5.2: Errors in Forecasting Baluchistan's Expenditures (Rs. Million)

Revenue Expenditure				Capital Expenditure			
FY	Actual	%Error (BE)	%Error (RE)	FY	Actual	%Error (BE)	%Error (RE)
1987-88	3,918	2.92	4.28	1987-88	2,940	-20.66	-4.74
1988-89	4,180	10.42	2.54	1988-89	2,782	-18.28	11.29
1989-90	4,606	4.54	0.10	1989-90	3,611	-29.78	-6.72
1990-91	5,229	1.81	3.77	1990-91	3,889	-34.51	6.10
1991-92	6,792	0.09	0.09	1991-92	8,336	-34.04	0.64
1992-93	8,291	-6.66	-0.81	1992-93	188,301	-97.45	-3.51
1993-94	9,610	-8.66	5.55	1993-94	5,290	17.24	10.69
1994-95	10,000	9.24	2.97	1994-95	7,311	-24.80	3.40
1995-96	11,976	-3.97	0.85	1995-96	8,195	-7.61	0.88
1996-97	11,654	10.90	10.93	1996-97	9,193	2.22	-14.18
1997-98	12,774	11.04	6.07	1997-98	10,192	-11.15	-22.38
1998-99	13,530	14.40	4.72	1998-99	11,191	9.60	-18.38
1999-00	16,581	4.69	5.01	1999-00	12,190	-2.08	-15.74
2000-01	16,497	8.34	10.53	2000-01	16,331	-20.05	-26.94
2001-02	18,909	-2.16	5.23	2001-02	19,255	-32.01	-26.65
2002-03	22,358	-11.25	5.01	2002-03	18,809	-18.10	-29.43
2003-04	25,067	-3.89	-2.48	2003-04	20,610	-33.04	-14.33
2004-05	28,051	1.45	-6.51	2004-05	21,849	-17.71	15.97
2005-06	30,349	14.06	-0.03	2005-06	20,247	-4.15	30.28
2006-07	34,026	10.07	-0.04	2006-07	29,907	-33.78	28.88
2007-08	40,028	3.66	-0.18	2007-08	37,501	-40.56	14.32
2008-09	44,960	5.70	2.55	2008-09	34,567	-1.16	35.56
2009-10	59,731	-11.13	-11.60	2009-10	48,039	-12.00	8.41
2010-11	93,191	-10.46	-20.28	2010-11	66,792	2.03	-1.89
2011-12	90,562	0.00	-5.85	2011-12	34,141	116.74	100.50

Source: Author's calculations (Data has been taken from various issues of Annual Budget Statement)

Table 5.3 depicts all of the three measures of Theil Inequality co-efficient which shows higher values for RBE/AC except for the Capital Expenditure of Baluchistan's annual budget. The changes in these BE are incorporated in the RBE and RBE also covers 7/8 months of the financial year so these are expected to be closer to the actual budget. It can be inferred from the magnitude of the forecast errors in the revised budget estimate that the provincial government commits even more mistakes in revising the BE's. It is generally believed that the governments try to reduce most of errors while revising the BE but if the percentage forecast errors are analyzed in BE and RBE of Revenue Receipts, Capital Receipts and Revenue Expenditure but it has actually happened only rarely.[9] Although the magnitude of errors has been reduced in the RBE but this reduction is not comparable to the increase in error observed in the case of RBE.

Table 5.3: Theil's Inequality Statistic (U) for Balochistan Budget Forecasting

	Theil's U (BE, Actual)			Theil's U (RE, Actual)		
	U_1	U_2	U_3	U_1	U_2	U_3
Revenue Receipts	0.335	0.835	0.603	0.343	0.877	0.638
Capital Receipts	0.716	0.960	0.937	0.860	0.976	0.043
Revenue Expenditure	0.041	0.081	0.210	0.064	0.122	0.304
Capital Expenditure	0.540	0.847	0.899	0.089	0.181	0.078

Source: Author's calculations

Table-5.4 presents the results of Rational Expectation Hypothesis. The co-efficient of γ_1 is significant for BE/AC of Revenue/Capital Receipts, Capital Expenditure

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[9] Table-5.1 & Table-5.2

and RBE/AC of Revenue Receipts/Expenditure. The co-efficient of γ_2 is significant for the BE/AC and RBE/AC of Revenue Receipts/actuals. The co-efficient of γ_3 is significantly different from the hypothetical value of null hypothesis for the BE/AC of Revenue Receipts and RBE/AC of Revenue Receipts/Expenditures. The BE and RBE of Revenue Expenditure and RBE of Capital Receipts are over-estimated by a fixed rate as indicated by $\gamma_1 < 0$. The BE of Revenue/Capital Receipts and RBE of Revenue Receipts and Capital Expenditure are under-estimated by a fixed rate evident by $\gamma_1 > 0$. The BE and RBE (except of Revenue Expenditure) of all heads are over-estimated in the sample period as shown by the $\gamma_2 < 1$. The values of R-Square are quite satisfactory and show a reasonable goodness of fit except for the BE of Capital Receipts and Capital Expenditure. The Durbin-h values are greater than |1.96|, thus suggesting that the errors are not serially correlated. The necessary condition of there being no correlation between the forecast error and BE/RBE is not satisfied. Since none of the condition is fulfilled thus it is concluded that the BE and RBE are not based on the Rational Expectation Hypothesis.

Table 5.4: Testing Rational Expectations of Baluchistan Budget Forecasting

Variables	γ_1	γ_2	γ_3	R^2	Adj. R^2	Durbin h	ρ
(Budget Estimates, Actuals)							
Revenue Receipts	10195.2 (1849.19)*	1.447 (0.11)*	-1.635 (0.16)*	0.912	0.904	5.521	0.760
Capital Receipts	22604.3 (12750.4)*	-0.399 (0.89)	-0.071 (0.22)	0.014	-0.080	3.283	0.785
Revenue Expenditure	-1317.8 (787.3)	1.282 (0.11)*	-0.264 (0.13)	0.990	0.989	3.082	-0.399
Capital Expenditure	20095.2 (11463.4)*	0.481 (0.44)	-0.086 (0.22)	0.054	-0.036	NA	0.268
(Revised Budget Estimates, Actuals)							
Revenue Receipts	10497.7 (1507.5)*	1.412 (0.08)*	-1.671 (0.13)*	0.942	0.936	3.283	0.785
Capital Receipts	29.1 (1411.4)	1.011 (0.03)	0.017 (0.03)	0.978	0.976	3.461	-0.065
Revenue Expenditure	-3159.9 (881.5)*	1.548 (0.15)*	-0.425 (0.15)*	0.989	0.988	4.006	-0.706
Capital Expenditure	636.9 (2368.2)	0.968 (0.04)	-0.058 (0.04)	0.957	0.953	2.082	0.164

Note: values in the parenthesis are the SE

Source: Author's calculations (Data has been taken from various issues of Annual Budget Statement)

Table5.5 explores the forecast efficiency for the province of Baluchistan. It shows that the Revenue/Capital Receipts, Capital Expenditure in the BE and Revenue Receipts, Capital Expenditure in the RBE have been relatively improved over the sample period. While the forecast efficiency of Revenue Expenditure in the BE and the Capital Receipts in the RBE has been deteriorated over the sample period.

Table 5.5: Efficiency of Baluchistan Budget Forecasting

Variables	θ_1	θ_2	DW	R^2	Adj. R^2
(Budget Estimates, Actuals)					
Revenue Receipts	-63.177 (63.61)	8.971 (4.28)*	2.241	0.16	0.12
Capital Receipts	-47.315 (17.89)*	3.525 (1.20)*	0.711	0.272	0.240
Revenue Expenditure	4.626 (3.29)	-0.186 (0.22)	1.282	0.03	-0.01
Capital Expenditure	-37.973 (13.64)*	1.859 (0.92)**	1.472	0.15	0.12
(Revised Estimates, Actuals)					
Revenue Receipts	-68.754 (64.72)	9.599 (4.35)*	1.259	0.17	0.14
Capital Receipts	-22.626 (16.79)	1.433 (1.13)	1.121	0.07	0.03
Revenue Expenditure	6.945 (2.40)*	-0.465 (0.16)*	1.122	0.265	0.233
Capital Expenditure	-15.991 (10.42)	1.482 (0.70)*	0.993	0.16	0.13

Source: Author's calculations

Table-5.6 presents the decomposition of forecast errors. The table reveals the fact that the proportion of errors due to stochastic variation is more than errors due to bias and unequal variation except for the Capital Receipts. The government of Balochistan has utilized the opportunity to reduce random variations in the RBE but it has been failed to achieve this goal in the Capital Receipts/Expenditure. The unequal variations are more than stochastic variations in the BE but have been reduced in the RBE of Capital Receipts however the same has been increased in the RBE of Revenue Expenditure.

Table 5.6: Decomposition of Baluchistan's Forecast Errors

Variables	Budget Estimates			Revised Budget Estimates		
	Bias	Variance	Random	Bias	Variance	Random
Revenue Receipts	0.148	0.213	0.639	0.166	0.210	0.624
Capital Receipts	0.032	0.524	0.445	0.008	0.020	0.971
Revenue Expenditure	0.004	0.209	0.791	0.011	0.555	0.434
Capital Expenditure	0.048	0.239	0.713	0.043	0.003	0.954

Source: Author's calculations

5.3 KP Budget's Accuracy and Decomposition of Errors

Tables 5.7 & 5.8 show the percentage forecast errors of Khyber Pukhtunkhwa (KP) annual budget's Revenue and Expenditure for the sample period 1989/90-2011/12. The Revenue Receipts show an over-estimating trend for BE and RBE. The errors due to over estimation in FY 1997/98-2003/04 are loom large and are mainly resulting from the over-estimation of non-tax revenue particularly from the non-payment of profits of Hydel Power Generation since FY 1991/92-2004/05 which are included in the BE and RBE of non-tax revenue. The tax revenue is under-estimated as share of KP in the federal tax assignments is Rs.59684 million in the BE and is Rs.56099 million in the RBE while the realization is at Rs. 70839 million for the fiscal year 2008/09. The BE and RBE of Capital Receipts are over estimated mainly because of Development Capital Receipts in KP. The Revenue Expenditure shows a mixed trend for BE and over estimation in the RBE for most of the sample years which is mainly due to Current Revenue Expenditure while the under estimation is mainly attributed to Development Revenue Expenditure. The amount of Rs. 1 million is granted by the Federal government for IDP's which is not

included in the BE and RBE of Revenue expenditure causing the under-estimation of Revenue Expenditure for the FY 2008/09. Capital Expenditures are over estimated for most of the sample years in case of both BE and RBE partly due to Current and Development Capital Expenditure but it is largely under-estimated for FY 2011/12 due to expenditures incurred on *Education affairs and Services*, *Repayment of Principal Domestic Debt -Permanent (Loan SBP) and inclusion of Special Federal program PSDP* (white paper KP, 2012/13).

Table 5.7: Errors in Forecasting KP Revenue (Rs. Million)

Revenue Receipts				Capital Receipts			
FY	Actual	%Error (BE)	%Error (RE)	FY	Actual	%Error (BE)	%Error (RE)
1989-90	9,258	18.161	5.513	1989-90	509	-51.366	57.496
1990-91	14,003	-10.42	-15.24	1990-91	75	98.93	-19.37
1991-92	21,018	-33.32	-32.75	1991-92	3,799	-13.38	-9.52
1992-93	14,666	7.79	9.22	1992-93	3,001	20.39	7.01
1993-94	17,093	3.27	4.00	1993-94	2,932	5.57	64.48
1994-95	69,526	-70.14	-69.42	1994-95	3,877	3.70	-27.39
1995-96	22,545	6.28	9.19	1995-96	2,989	2.64	-3.08
1996-97	24,695	9.87	10.95	1996-97	4,554	-36.91	8.49
1997-98	22,237	39.73	33.65	1997-98	5,769	36.94	13.04
1998-99	23,439	44.02	38.12	1998-99	8,143	-9.19	7.63
1999-00	25,756	44.15	47.91	1999-00	6,988	11.45	3.18
2000-01	27,687	55.18	20.38	2000-01	3,957	10.12	2.98
2001-02	27,710	61.20	34.48	2001-02	6,790	-26.30	-1.71
2002-03	31,470	49.90	20.19	2002-03	9,563	-40.54	6.80
2003-04	32,144	61.28	25.76	2003-04	8,873	24.09	12.39
2004-05	40,640	13.86	11.38	2004-05	13,065	11.80	6.12
2005-06	46,243	26.19	5.13	2005-06	22,770	11.25	9.31
2006-07	57,041	18.41	15.96	2006-07	27,512	4.56	1.86
2007-08	68,018	18.47	18.69	2007-08	29,888	28.63	25.62
2008-09	78,010	28.30	23.48	2008-09	36,892	55.15	13.66
2009-10	89,078	27.63	87.35	2009-10	38,564	106.82	14.43
2010-11	99,593	-81.21	66.28	2010-11	63,783	34.79	4.33
2011-12	111,639	80.31	83.99	2011-12	63,693	-74.31	-75.03

Source: Author's calculations (Data has been taken from various issues of Annual Budget Statement)

Table 5.8: Errors in Forecasting KP Expenditure (Rs. Million)

	Revenue Expenditure				Capital Expenditure		
FY	Actual	%Error (BE)	%Error (RE)	FY	Actual	%Error (BE)	%Error (RE)
1989-90	6,200	-3.98	8.14	1989-90	334	-7.49	1.80
1990-91	9,502	11.13	8.21	1990-91	370	-0.66	3.82
1991-92	12,101	5.21	5.26	1991-92	3,244	12.30	6.59
1992-93	15,604	-7.90	-3.14	1992-93	3,897	-8.04	-8.24
1993-94	18,004	-1.94	2.89	1993-94	4,956	-2.12	3.18
1994-95	21,300	-0.99	-0.30	1994-95	4,182	35.94	1.84
1995-96	24,722	-3.08	3.58	1995-96	4,398	5.36	8.25
1996-97	27,700	7.48	-1.61	1996-97	2,454	-49.49	29.17
1997-98	28,914	9.89	0.49	1997-98	5,346	2.80	0.90
1998-99	33,870	3.19	0.81	1998-99	1,844	63.32	3.13
1999-00	37,423	0.32	-0.62	1999-00	2,173	121.66	-7.95
2000-01	40,790	5.33	1.31	2000-01	5,472	2.10	928.32
2001-02	35,987	13.50	2.23	2001-02	31,823	5.12	1.86
2002-03	28,567	47.07	8.46	2002-03	23,432	-4.68	4.45
2003-04	31,003	30.47	4.67	2003-04	22,533	24.33	5.65
2004-05	39,889	-5.74	-10.07	2004-05	28,345	4.62	-3.53
2005-06	46,872	-6.48	-15.83	2005-06	30,564	2.15	4.70
2006-07	55,672	-3.95	-2.62	2006-07	37,345	-5.39	-2.98
2007-08	57,345	2.32	0.96	2007-08	39,837	-4.05	-6.56
2008-09	79,834	-15.70	-5.30	2008-09	43,743	-5.03	-10.84
2009-10	11,872	573.84	818.11	2009-10	81,452	-2.08	-45.82
2010-11	419,822	-69.52	-66.77	2010-11	80,234	7.15	2.62
2011-12	218,819	-31.91	-26.42	2011-12	80,057	-81.25	-81.68

Source: Author's calculations (Data has been taken from various issues of Annual Budget Statement)

The results of KP in table-5.9 postulate that the values of Theil inequality co-efficient are relatively higher for budget estimate/actual as compared to the revised budget estimate/Actual except for the capital expenditure. The reason is the drastic increase in the revised budget estimate of the capital expenditure in FY 2000-01. This outlier is affecting the values of Inequality co-efficient.

Table 5.9: Theil's Inequality Statistic (U) for KP Budget Forecasting

	Theil's U (BE, Actual)			Theil's U (RE, Actual)		
Variables	U_1	U_2	U_3	U_1	U_2	U_3
Revenue Receipts	0.255	0.575	0.749	0.246	0.613	0.921
Capital Receipts	0.269	0.600	0.655	0.217	0.419	0.585
Revenue Expenditure	0.400	0.615	0.832	0.383	0.603	0.869
Capital Expenditure	0.211	0.391	0.531	0.292	0.541	0.755

Source: Author's calculations

Table-5.10 presents the results of Rational Expectation Hypothesis for the province of KP. The co-efficient of γ_1 remains significant for the BE/AC of Revenue Expenditure and RBE of Revenue Receipts/Expenditure. While the co-efficient of γ_2 is significant for all of the heads. However the co-efficient of γ_3 is significant for all of the heads except of the RBE/AC of Revenue Receipts. As indicated by $\gamma_1 > 0$ and $\gamma_1 < 0$, Revenue/Capital Receipts, Capital Expenditure and RBE of Revenue Receipts and Capital Expenditure are under-estimated and BE of Revenue Expenditure and RBE of Capital Receipts are over-estimated by a fixed amount over the sample period. While all of the other heads show an under-estimating trend during the sample period as depicted by the $\gamma_2 > 1$.

The goodness of fit is satisfactory and results of Durbin-h shows that except for the BE/Actuals of Revenue Receipts and capital expenditure and RBE/Actuals of capital expenditure, all others are serially correlated. There also exists a correlation between the budget/revised budget estimates and the forecast error, thus it is concluded that the

Rational Expectation Hypothesis doesn't hold for the budget forecasting of KP annual budget.

Table 5.10: Testing Rational Expectations of KP Budget Forecasting

Variables	γ_1	γ_2	γ_3	R^2	$Adj. R^2$	Durbin h	ρ
(Budget Estimates, Actuals)							
Revenue Receipts	6069.67 (6237.0)	0.174 (0.11)*	0.740 (0.19)*	0.74	0.71	-3.638	0.73
Capital Receipts	255.82 (1235.1)	0.193 (0.05)*	0.925 (0.08)*	0.95	0.95	-1.234	0.64
Revenue Expenditure	-57378.9 (17115)*	3.061 (0.41)*	-0.516 (0.17)*	0.78	0.76	1.297	-0.60
Capital Expenditure	205.68 (2254.5)	0.410 (0.10)*	0.732 (0.10)*	0.93	0.92	-2.19	0.08
(Revised Estimates, Actuals)							
Revenue Receipts	14185.2 (5264.5)*	0.453 (0.12)*	0.095 (0.24)	0.84	0.817	NA	0.91
Capital Receipts	-725.14 (1056.4)	0.338 (0.06)*	0.873 (0.07)*	0.97	0.966	0.131	0.64
Revenue Expenditure	-34631.1 (18513)**	2.388 (0.41)*	-0.405 (0.19)**	0.69	0.65	-1.48	-0.48
Capital Expenditure	985.55 (3060.9)	0.198 (0.13)*	0.917 (0.11)*	0.88	0.87	-2.49	0.15

Note: values in the parenthesis are standard errors

Source: Author's Calculations

Table-5.11 highlights the forecast efficiency of KP annual budget which manifests that only the revised budget estimate of Revenue Receipts has been improved over the sample period.

Table 5.11: Efficiency of KP Budget Forecasting

Variables	θ_1	θ_2	DW	R^2	$Adj. R^2$
(Budget Estimates, Actuals)					
Revenue Receipts	0.01 (16.7)	1.52 (1.22)	1.78	0.07	0.03
Capital Receipts	0.67 (18.52)	0.72 (1.35)	1.89	0.01	-0.03
Revenue Expenditure	-23.69 (52.33)	3.99 (3.82)	2.48	0.05	0.00
Capital Expenditure	17.97 (15.88)	-1.08 (1.16)	1.38	0.04	-0.01
(Revised Estimates, Actuals)					
Revenue Receipts	-20.53 (11.14)*	3.36 (0.82)*	1.49	0.45	0.42
Capital Receipts	17.25 (11.30)	-0.99 (0.82)	1.79	0.07	0.02
Revenue Expenditure	-39.78 (73.80)	5.97 (5.38)	2.38	0.06	0.01
Capital Expenditure	55.93 (86.14)	-1.62 (6.28)	2.08	0.00	-0.04

Note: values in the parenthesis are standard errors

Source: Author's Calculations

Table-5.12 shows the findings of the decomposed-forecast errors for the province of KP. The results show that the proportion of random variation is higher in the Budget estimates of Revenue/Capital Receipts and Capital Expenditure and has decreased in the Revised Budget Estimate of Revenue Receipts/Expenditure only. The errors due to bias are negligible while the errors due to unequal variation are relatively dominant in the BE of Revenue Expenditure and RBE of Revenue Receipts/Expenditure.

Table 5.12: Decomposition of KP Forecast Errors

	Budget Estimates			Revised Budget Estimates		
Variables	**Bias**	**Variance**	**Random**	**Bias**	**Variance**	**Random**
Revenue Receipts	0.045	0.212	0.743	0.165	0.561	0.275
Capital Receipts	0.020	0.108	0.872	0.006	0.024	0.970
Revenue Expenditure	0.035	0.732	0.233	0.030	0.583	0.387
Capital Expenditure	0.030	0.040	0.975	0.015	0.029	0.955

Source: Author's Calculations

5.4 Punjab Budget's Accuracy and Decomposition of Errors

Table 5.13-5.14 shows forecast errors in the budget of Punjab throughout the sample period i.e. 1987/88-2011/12. The forecasting of Revenue Receipt shows a mixed trend of over/under estimation for BE and RBE. The under estimation in FY 1987/88-1995/96 is mainly due to the taxes while over-estimation is solely due to Non-Tax Revenue in the BE and RBE. However the under-estimation is mostly due to the Provincial Non-Tax Revenue in the recent fiscal years e.g. in FY 2009/10 and the over-estimation is the sole consequence of *Federal transfers and straight transfers* and *Provincial Tax Revenue* in the last two fiscal years in the above table. Capital Receipts are under-estimated for most of the fiscal years mainly due to Development Capital Receipts in the BE and RBE, however the FY 1993/94 shows a substantial over-estimation which is the consequence of the Current Capital Receipts. The BE of Capital Receipts is under-estimated due to *General Capital Receipts* as the *Development Capital Receipts (foreign Project Assistance)* is not recorded or may be not realized. The Revenue Expenditure is over-estimated partly due to Current and Development Revenue

Expenditure for BE and RBE for most of the sample years. It is over-estimated as both of the Current and Development Revenue Expenditures are under-forecasted in the recent fiscal years. The BE and RBE of Capital Expenditure are over-estimated due to both the Development and Capital Expenditures e.g. the BE is Rs. 25,819 million and RBE is Rs. 17,834 million while the realized value is Rs. 8,692 million for Current Revenue Expenditures while BE is Rs. 94,949 million, RBE is Rs. 58,767 million against the actual value of Rs. 58,767 million for Development Capital Expenditure in the FY of 2007/08. Thus both of the heads contribute in the forecast error.

Table 5.13: Errors in Forecasting Punjab Revenues (Rs. Million)

Revenue Receipts				Capital Receipts			
FY	Actual	%Error (BE)	%Error (RE)	FY	Actual	%Error (BE)	%Error (RE)
1987-88	25,990	-11.08	-11.73	1987-88	8,023	23.74	-24.40
1988-89	27,008	-13.77	-11.70	1988-89	3,664	-8.99	-11.28
1989-90	30,514	-19.67	-18.87	1989-90	5,903	32.29	0.81
1990-91	35,383	-29.24	-14.69	1990-91	5,021	37.06	-1.90
1991-92	32,611	-21.08	-0.44	1991-92	6,937	5.30	-2.30
1992-93	56,572	-20.90	-23.95	1992-93	10,019	-12.82	-13.18
1993-94	50,854	-4.22	4.56	1993-94	2,048	358.45	385.31
1994-95	60,686	-1.06	-13.57	1994-95	9,000	-25.92	-4.78
1995-96	75,636	-4.71	-0.74	1995-96	3,990	-14.99	16.55
1996-97	84,045	0.02	3.62	1996-97	8,168	-34.86	9.28
1997-98	75,392	9.03	5.48	1997-98	16,237	-15.10	-6.52
1998-99	83,171	7.00	0.07	1998-99	18,245	-17.22	-12.63
1999-00	92,090	1.18	7.04	1999-00	20,193	-32.06	-33.29
2000-01	102,640	11.23	6.54	2000-01	9,357	-18.20	-16.46
2001-02	104,466	15.17	7.49	2001-02	8,268	-9.18	3.83
2002-03	121,269	7.80	6.65	2002-03	17,104	-29.14	-12.68
2003-04	124,109	20.34	25.34	2003-04	20,614	45.67	12.26
2004-05	158,909	13.29	14.09	2004-05	24,829	17.27	1.58
2005-06	188,062	-68.68	-76.60	2005-06	41,159	-13.99	-34.32
2006-07	233,440	11.12	10.48	2006-07	67,186	-23.58	-48.76
2007-08	290,551	11.65	8.62	2007-08	30,766	57.19	103.23
2008-09	340,268	14.59	5.71	2008-09	26,168	39.80	734.00
2009-10	676,312	-37.38	-38.97	2009-10	107,416	-39.53	19.67
2010-11	514,676	10.96	5.83	2010-11	90,400	-35.16	-80.02
2011-12	606,235	8.16	7.04	2011-12	84,617	-36.27	146.30

Source: Author's calculations (data has been taken from various issues of Annual Budget Statement)

Table 5.14: Errors in Forecasting Punjab Expenditure (Rs. Million)

Revenue Expenditure				Capital Expenditure			
FY	Actual	%Error (BE)	%Error (RE)	FY	Actual	%Error (BE)	%Error (RE)
1987-88	23,777	11.02	15.74	1987-88	7,874	16.73	8.76
1988-89	25,397	5.63	7.34	1988-89	4,870	18.28	-3.14
1989-90	22,599	31.09	23.72	1989-90	6,573	-4.48	0.85
1990-91	30,461	4.02	-5.00	1990-91	4,977	16.69	16.32
1991-92	42,674	-16.12	-24.96	1991-92	6,177	-3.06	-0.07
1992-93	48,917	5.84	0.54	1992-93	6,259	9.30	21.16
1993-94	49,164	7.98	6.94	1993-94	6,263	9.64	-0.62
1994-95	61,431	2.95	-14.30	1994-95	6,788	31.08	7.20
1995-96	75,350	-0.77	2.75	1995-96	9,154	6.06	2.19
1996-97	74,872	12.22	7.52	1996-97	8,242	45.19	1.00
1997-98	77,167	14.48	11.57	1997-98	13,023	-14.39	-8.41
1998-99	83,290	15.25	8.91	1998-99	9,266	33.17	14.63
1999-00	99,080	-1.10	5.24	1999-00	12,149	2.91	-10.22
2000-01	101,075	17.77	5.56	2000-01	11,246	17.83	15.98
2001-02	63,954	85.37	61.59	2001-02	8,553	64.80	32.69
2002-03	125,323	4.44	6.65	2002-03	11,341	10.72	16.82
2003-04	134,207	9.63	17.34	2003-04	34,819	-4.38	-1.72
2004-05	156,318	4.51	12.87	2004-05	41,122	18.99	-9.36
2005-06	196,998	-6.94	4.56	2005-06	70,954	-15.72	-18.47
2006-07	258,634	-9.80	4.36	2006-07	139,292	-26.46	-39.73
2007-08	305,448	3.25	1.94	2007-08	67,459	79.02	13.55
2008-09	349,063	-3.15	6.71	2008-09	83,869	13.23	199.30
2009-10	374,766	7.03	6.47	2009-10	85,223	50.16	100.69
2010-11	425,424	14.45	10.25	2010-11	91,095	55.43	1.90
2011-12	536,303	4.78	6.25	2011-12	102,814	43.32	8.83

Source: Author's calculations (data has been taken from various issues of Annual Budget Statement)

The values of Theil Inequality Co-efficient are relatively higher for RBE/AC than BE/AC except for revenue expenditure of Punjab as depicted in the following table-5.15.

Table 5.15: Theil's Inequality Statistic (U) for Punjab Budget Forecasting

	Theil's U (BE, Actual)			Theil's U (RE, Actual)		
	U_1	U_2	U_3	U_1	U_2	U_3
Revenue Receipts	0.126	0.248	0.684	0.131	0.253	0.656
Capital Receipts	0.202	0.354	0.517	0.459	1.266	0.851
Revenue Expenditure	0.048	0.099	0.300	0.041	0.084	0.178
Capital Expenditure	0.182	0.406	0.618	0.316	0.765	0.660

Source: Author's calculations

According to table-5.16, the co-efficient of γ_1 is statistically insignificant for all heads which implies that the null-hypothesis cannot be rejected. The BE (except of the Capital Receipts and Revenue Expenditure) and RBE of all the heads are under estimated by a fixed rate. The co-efficient of γ_2 is also insignificant except for the BE/RBE of capital receipts and RBE/AC of Capital Expenditure. The BE of capital receipts and RBE of revenue expenditure are under estimated while all of the other heads are over estimated for the sample period. The co-efficient of γ_3 is only significant for the RBE/AC of Capital Receipts/Expenditure. The BE of Revenue Receipts/Capital Expenditure and RBE of all heads are under-estimated and BE of capital receipts/revenue expenditure are over estimated by a fixed amount during the sample period. However all of the heads show an under-estimating trend during the sample period. The forecast errors are serially correlated except of the BE of Capital Receipts and the there exists a correlation among

the forecast errors and BE and RBE of all heads which leads to the conclusion that the budget forecasting of Punjab government is not based on the Rational Expectation Hypothesis.

Table 5.16: Testing Rational Expectations of Punjab Budget Forecasting

Variables	γ_1	γ_2	γ_3	R^2	Adj. R^2	Durbin h	ρ
21(Budget Estimates, Actuals)							
Revenue Receipts	8697.99 (187434)	0.892 (0.25)	0.096 (0.27)	0.88	0.87	NA	0.07
Capital Receipts	-4590.29 (3640.6)	1.352 (0.20)*	0.038 (0.04)	0.86	0.85	2.178	-0.58
Revenue expenditure	-1446.32 (5429.4)	0.703 (0.20)	0.309 (0.25)	0.99	0.98	NA	0.41
Capital Expenditure	4039.97 (4273.8)	0.968 (0.19)	-0.327 (0.27)	0.86	0.84	NA	0.65
(Revised Budget Estimates, Actuals)							
Revenue Receipts	7416.67 (19019)	0.853 (0.25)	0.171 (0.27)	0.88	0.87	NA	-0.02
Capital Receipts	5902.37 (5323.6)	0.125 (0.08)*	0.687 (0.17)*	0.62	0.58	-0.92	0.87
Revenue expenditure	197.32 (3084.5)	1.011 (0.11)	-0.099 (0.14)	0.990	0.99	1.18	0.73
Capital Expenditure	5894.19 (5558.8)	0.225 (0.10)*	0.621 (0.17)*	0.76	0.73	0.61	0.77

Note: values in the parenthesis are standard errors

Source: Author's calculations

Table-5.17 shows that the efficiency of budget estimates in Revenue Receipts, Capital Expenditure and the revised budget estimates of Capital Expenditure has been improved over time in sample period.

Table 5.17: Efficiency of Punjab Budget Forecasting

Variables	θ_1	θ_2	DW	R^2	Adj. R^2
(Budget Estimates, Actuals)					
Revenue Receipts	-13.921 (8.27)	0.793 (0.56)**	2.071	0.08	0.04
Capital Receipts	41.09 (32.03)	-2.392 (2.15)	2.247	0.05	0.01
Revenue Expenditure	10.52 (7.81)	-0.120 (0.53)	1.806	0.00	-0.04
Capital Expenditure	4.62 (10.44)	1.104 (0.70)**	2.394	0.10	0.06
(Revised Estimates, Actuals)					
Revenue Receipts	-8.60 (8.54)	0.377 (0.57)	2.284	0.02	-0.02
Capital Receipts	-16.26 (69.45)	4.728 (4.67)	2.003	0.04	0.00
Revenue Expenditure	3.96 (6.15)	0.282 (0.41)	1.851	0.02	-0.02
Capital Expenditure	-8.29 (18.32)	1.777 (1.23)**	1.366	0.08	0.04

Note: values in the parenthesis are standard errors

Source: Author's Calculations

Table-5.18 presents the decomposition of errors for the province of Punjab. It has been realized that the proportion of stochastic variation is higher in the BE and RBE of all heads as compared to the bias and unequal variation.

Table 5.18: Decomposition of Punjab Forecast Errors

	Budget Estimates			Revised Budget Estimates		
	Bias	Variance	Random	Bias	Variance	Random
Revenue Receipts	0.006	0.012	0.988	0.019	0.039	0.940
Capital Receipts	0.044	0.517	0.439	0.039	0.330	0.631
Revenue Expenditure	0.184	0.107	0.709	0.368	0.313	0.319
Capital Expenditure	0.120	0.186	0.694	0.005	0.294	0.701

Source: Author's Calculations

5.5 Sindh Budget's Accuracy and Decomposition of Errors

Tables 5.19 & 5.20 show Revenue and Expenditure for the province of Sindh for sample period 1987/88-2011/2012. The results of percentage forecast errors in Revenue Receipt show an under-estimating trend which is the consequence of the taxes but in recent and some of the early years; it is exclusively due to the non-taxes. while Capital Receipts are also largely over-estimated for most of the fiscal years partly due to Current and Development Capital Receipts in the decade of 90's, particularly in FY 1995/96 where the Realized Current Capital Receipt is Rs. 56 million against the BE and RBE i.e. Rs. 1,035 million and Rs. 1,035 million while the BE and RBE are Rs. 4,294 million and Rs. 4,422 which have been realized as Rs. 834 million for Development Capital Receipts. The FY 2001/02 also shows a huge over-estimation in the Capital Receipts for the province of Sindh. As per the ABS facts and figures, the BE and RBE are Rs. 3,263 million and Rs. 3,063 of Current Capital Receipts which turns out into Rs. 384 million while BE and RBE of Development Capital Receipts are Rs. 1,875 million and Rs. 1,448 million which turns out into Rs. 304 million. The analysis shows that both of the heads

are contributing to the large forecast errors. Revenue Expenditure shows that BE and RBE are over-estimated for most of the fiscal years partly due to Current and Development Revenue Expenditures e.g. the FY of 1990/91 manifests that the Revenue Expenditures are over-estimated mainly due to the Development Revenue expenditures i.e. *Education, Industries and Mineral Resources* etc. but the FY 2004/05 experiences an over-estimation which occurs due to both Current and Development Revenue Expenditure. The Capital Expenditures show the under-estimating trend for BE and RBE i.e. majorly shared by Current Capital Expenditure but the FY 1989/90's huge under-estimation is equally due to Current and Development Capital Expenditure as it is proved by the over-estimation, particularly of the FY 1996/97 as depicted by the figures e.g. the BE and RBE are Rs. 2,271 million and Rs. 5,089 million which turns out into Rs. 2,968 million for Current Capital Expenditure while the BE and RBE are Rs. 6,511 million and Rs. 3,048 million which is realized into Rs. 3,037 million for Development Capital Expenditures, it shows that both of the heads cause error in the forecast.

Table 5.19: Errors in Forecasting Sindh Revenues (Rs. Million)

Revenue Receipts				Capital Receipts			
FY	Actual	%Error (BE)	%Error (RE)	FY	Actual	%Error (BE)	%Error (RE)
1987-88	8,614	-12.44	3.26	1987-88	3,410	-37.69	-1.65
1988-89	8,783	30.01	38.62	1988-89	3,227	-71.63	-63.21
1989-90	11,419	7.06	-0.50	1989-90	5,580	-32.62	-39.10
1990-91	12,382	-7.22	-14.80	1990-91	7,969	-52.11	-43.99
1991-92	18,851	-0.70	2.52	1991-92	8,607	-49.51	-45.98
1992-93	23,429	-11.05	-7.72	1992-93	3,162	68.00	5.72
1993-94	25,179	-9.70	1.41	1993-94	6,139	16.39	4.75
1994-95	32,295	-10.88	-7.73	1994-95	1,590	248.51	294.21
1995-96	39,265	-13.27	0.47	1995-96	891	498.31	512.64
1996-97	41,372	1.39	-0.85	1996-97	2,040	259.61	211.23
1997-98	37,661	6.85	3.68	1997-98	2,512	195.51	269.62
1998-99	37,451	18.81	8.12	1998-99	3,852	108.26	217.35
1999-00	54,513	-15.30	2.50	1999-00	4,583	108.85	74.95
2000-01	56,080	18.83	15.52	2000-01	6,026	-7.02	-29.36
2001-02	114,499	-39.37	-37.01	2001-02	689	645.88	554.85
2002-03	87,740	-3.24	-3.98	2002-03	7,202	-28.53	-43.61
2003-04	85,869	5.88	-0.36	2003-04	6,594	-26.92	47.20
2004-05	105,208	-4.30	-2.50	2004-05	9,977	-15.14	-70.29
2005-06	113,065	-0.10	12.29	2005-06	7,969	19.80	32.79
2006-07	200,188	-26.26	-26.85	2006-07	14,414	14.98	26.27
2007-08	214,544	-17.69	-17.57	2007-08	21,464	-31.84	-48.46
2008-09	242,614	-14.34	-11.99	2008-09	29,042	-28.18	-9.52
2009-10	305,353	-20.20	-23.93	2009-10	21,641	23.52	96.31
2010-11	277,768	22.49	18.47	2010-11	14,116	118.83	52.42
2011-12	317,921	23.30	31.83	2011-12	12,546	275.90	212.69

Source: Author's calculations (data has been taken from various issues of Annual Budget Statement)

Table 5.20: Errors in Forecasting Sind Expenditure (Rs. Million)

Revenue Expenditure				Capital Expenditure			
FY	Actual	%Error (BE)	%Error (RE)	FY	Actual	%Error (BE)	%Error (RE)
1987-88	11,102	-12.29	-5.46	1987-88	5,663	-52.68	-9.72
1988-89	11,792	1.84	7.66	1988-89	6,953	-54.86	-37.51
1989-90	11,515	16.72	18.95	1989-90	8,616	-60.57	-56.98
1990-91	11,397	41.07	28.99	1990-91	5,300	-30.04	-29.39
1991-92	20,789	-7.37	-0.78	1991-92	6,256	-29.88	-18.49
1992-93	22,700	-5.87	-0.54	1992-93	4,793	14.34	10.71
1993-94	26,564	-4.70	2.86	1993-94	4,943	1.54	22.24
1994-95	33,430	-8.36	-9.64	1994-95	7,390	-21.68	-64.60
1995-96	37,906	-5.69	1.02	1995-96	7,015	2.74	39.74
1996-97	39,620	6.33	-3.62	1996-97	6,005	46.25	35.51
1997-98	39,107	6.07	12.04	1997-98	7,544	-22.74	-17.60
1998-99	39,931	19.75	14.44	1998-99	8,808	-27.41	4.77
1999-00	53,693	-5.22	9.85	1999-00	8,830	-13.17	-21.71
2000-01	61,752	11.92	10.33	2000-01	10,615	-13.89	-15.46
2001-02	66,563	9.77	17.61	2001-02	12,916	-15.69	-15.20
2002-03	69,070	24.89	27.44	2002-03	11,239	-15.65	14.76
2003-04	108,010	-15.65	-11.36	2003-04	11,372	40.12	43.03
2004-05	80,868	33.08	36.26	2004-05	16,768	50.75	80.88
2005-06	109,185	10.87	21.24	2005-06	46,191	-13.49	-9.47
2006-07	133,044	7.66	7.97	2006-07	45,025	28.89	22.60
2007-08	144,527	19.31	19.90	2007-08	62,239	-32.27	-21.08
2008-09	189,156	2.81	5.82	2008-09	52,538	-2.96	19.50
2009-10	204,332	17.33	12.02	2009-10	71,931	-10.28	-24.54
2010-11	267,208	8.32	10.37	2010-11	69,875	61.32	17.58
2011-12	330,082	-7.69	41.01	2011-12	16,945	4.97	218.96

Source: Author's calculations (data has been taken from various issues of Annual Budget Statement)

Although the difference is negligible for Revenue Receipts, Capital Receipts and Revenue Expenditure but the values of Theil Inequality Co-efficient are relatively higher for revised budget estimate/Actuals than budget estimate/Actuals as shown in table-5.21.

Table 5.21: Theil's Inequality Statistic (U) for Sind Budget Forecasting

Variables	Theil's U (BE, Actual)			Theil's U (RE, Actual)		
	U_1	U_2	U_3	U_1	U_2	U_3
Revenue Receipts	0.104	0.208	0.578	0.114	0.230	0.591
Capital Receipts	0.334	0.793	0.703	0.313	0.752	0.702
Revenue Expenditure	0.058	0.119	0.428	0.115	0.255	0.442
Capital Expenditure	0.131	0.275	0.634	0.436	1.362	0.704

Source: Author's calculations

Table-5.22 shows the results of Rational Expectation Hypothesis for the province of Sindh. The co-efficient of γ_1 is not statistically significant for any of the heads. The co-efficient of γ_2 is significant for the BE and RBE of all heads except of the BE of Revenue Expenditure. The co-efficient of γ_3 is significantly different from the hypothesized value except of the BE of Revenue/Capital Expenditure for all heads. The BE and RBE of all heads are under-estimated while the BE of Revenue Expenditures is over-estimated by a fixed rate as indicated by the $\gamma_1 < 0$ and RBE of Revenue Receipts and Capital Expenditures are under-estimated by a fixed rate i.e. shown by $\gamma_1 > 0$. The BE and RBE of all heads are over-estimated in the sample period as shown by the $\gamma_2 < 1$. Since none of the condition is fulfilled thus it is concluded that the BE and RBE are not based on the Rational Expectation Hypothesis.

Table 5.22: Testing Rational Expectations of Sindh Budget Forecasting

Variables	γ_1	γ_2	γ_3	R^2	$Adj.\,R^2$	Durbin h	ρ
(Budget Estimates, Actuals)							
Revenue Receipts	7420.80 (7459.4)	0.311 (0.22)*	0.719 (0.26)*	0.94	0.93	NA	0.27
Capital Receipts	1745.37 (1351.6)	0.019 (0.12)*	0.804 (0.18)*	0.68	0.65	1.48	0.74
Revenue expenditure	-2539.17 (3950.3)	0.648 (0.21)	0.399 (0.27)	0.98	0.98	NA	0.28
Capital Expenditure	1890.82 (2608.2)	0.592 (0.16)*	0.386 (0.25)	0.913	0.905	NA	0.52
(Revised Budget Estimates, Actuals)							
Revenue Receipts	7088.89 (7459.6)	0.253 (0.18)*	0.783 (0.22)*	0.94	0.93	NA	0.32
Capital Receipts	1750.65 (1327.6)	0.034 (0.14)*	0.782 (0.21)*	0.68	0.65	NA	0.75
Revenue expenditure	2610.99 (4121.2)	0.413 (0.12)*	0.580 (0.19)*	0.98	0.98	-8.17	0.86
Capital Expenditure	1971.06 (2251.8)	0.151 (0.031)*	0.865 (0.10)*	0.93	0.93	-2.76	0.95

Note: values in the parenthesis are standard errors

Source: Author's Calculations

Table-5.23 shows the findings of forecast efficiency over the sample period. It has found that the efficiency of BE in Capital Expenditure and the RBE in Revenue/Capital Expenditure has been relatively improved over time in Sindh.

Table 5.23: Efficiency of Sindh Budget Forecasting

Variables	θ_1	θ_2	DW	R^2	Adj. R^2
(Budget Estimates, Actuals)					
Revenue Receipts	-1.14 (7.04)	-0.132 (0.47)	1.929	0.00	-0.04
Capital Receipts	59.57 (75.20)	2.252 (5.06)	1.487	0.01	-0.04
Revenue Expenditure	2.47 (5.95)	0.317 (0.40)	2.159	0.027	-0.02
Capital Expenditure	-37.28 (11.54)*	2.356 (0.78)*	1.835	0.27	0.26
(Revised Budget Estimates, Actuals)					
Revenue Receipts	3.09 (7.04)	-0.291 (0.47)	1.753	0.02	-0.03
Capital Receipts	71.95 (72.42)	1.289 (4.87)	1.472	0.00	-0.04
Revenue Expenditure	1.72 (5.21)	0.712 (0.35)**	2.027	0.15	0.12
Capital Expenditure	-38.96 (20.29)**	3.58 (1.36)*	1.514	0.23	0.20

Note: values in the parenthesis are standard errors

Source: Author's Calculations

Table-5.24 shows the decomposition of forecast errors for the province of Sind. The results show that the errors are largely subject to the stochastic variation in the BE of all heads, the unequal variations are increased in the RBE of Revenue/Capital Expenditure while the proportion of errors due to bias seems to be negligible in the BE and RBE of all heads.

Table 5.24: Decomposition of Sindh Forecast Errors

Variables	Budget Estimates			Revised Budget Estimates		
	Bias	Variance	Random	Bias	Variance	Random
Revenue Receipts	0.018	0.018	0.963	0.006	0.031	0.963
Capital Receipts	0.043	0.162	0.795	0.062	0.210	0.729
Revenue Expenditure	0.111	0.039	0.850	0.160	0.564	0.276
Capital Expenditure	0.004	0.110	0.886	0.040	0.745	0.215

Source: Author's Calculations

5.6 Federal Budget's Accuracy and Decomposition of Errors

Table-5.25 and table-5.26 shows the revenue and expenditure of Federal Government for the sample period 1987/88-2011/12. On the revenue side, revenue receipts show over estimation for budget estimate while it shows a mixed trend for revised budget estimate; however the capital receipts are under-estimated for most of the fiscal years. The analysis reveals that Revenue Receipts are considerably over-estimated in the decade of 1990s which implies that the Federal Board of Revenue had been given high targets of revenue collection but it was not able to collect it due to shortfalls in income tax, import and excise duties' revenues. This situation took place due to the unfavorable conditions in the industrial sector and the changes in the composition of imports toward no duty or lower duty imports. On expenditure side, the revenue expenditures are considerably under-estimated in budget estimate and over-estimated in revised budget estimate. The capital expenditure shows a mixed trend for both budget estimate and revised budget estimate.

Table 5.25: Errors in Forecasting Federal Revenues (Rs. Million)

	Revenue Receipts				Capital Receipts		
FY	Actual	%Error (BE)	%Error (RE)	FY	Actual	%Error (BE)	%Error (RE)
1987-88	119,600	-0.57	1.37	1987-88	642,440	-8.99	-5.41
1988-89	143,080	2.14	0.30	1988-89	729,860	-11.58	-0.74
1989-90	163,530	-2.51	-1.49	1989-90	811,620	-5.90	-0.64
1990-91	170,340	8.79	8.18	1990-91	914,170	6.18	-6.75
1991-92	216,590	6.46	2.90	1991-92	864,440	-16.61	-12.29
1992-93	242,620	7.58	2.98	1992-93	947,000	5.94	0.94
1993-94	273,240	5.65	6.92	1993-94	1,071,510	1.29	2.98
1994-95	321,320	12.71	0.95	1994-95	1,171,120	-3.45	-0.98
1995-96	370,510	3.26	3.08	1995-96	1,371,440	-6.95	-3.26
1996-97	384,260	18.17	1.16	1996-97	1,505,840	-1.19	-1.01
1997-98	433,640	6.08	3.58	1997-98	1,653,070	3.51	2.08
1998-99	464,370	11.65	8.07	1998-99	1,888,770	1.63	2.47
1999-00	531,300	5.58	-2.24	1999-00	2,136,140	-14.57	0.18
2000-01	535,090	11.12	4.27	2000-01	2,572,580	-8.05	-1.97
2001-02	619,070	4.00	2.22	2001-02	2,733,450	4.38	1.16
2002-03	720,700	-6.36	-2.65	2002-03	2,304,840	2.36	-1.40
2003-04	794,130	-8.28	-4.17	2003-04	2,071,160	-5.54	-1.59
2004-05	900,040	-11.52	-2.75	2004-05	3,115,290	-26.33	-1.08
2005-06	1,076,630	-13.86	-5.01	2005-06	3,228,640	3.03	-1.06
2006-07	1,297,960	-16.58	-6.47	2006-07	3,764,300	-17.62	-0.93
2007-08	1,499,380	-8.75	-6.70	2007-08	3,897,150	-4.66	-0.92
2008-09	1,850,901	-39.98	-12.27	2008-09	5,603,310	-6.64	-1.23
2009-10	2,078,165	-3.41	-1.26	2009-10	6,505,988	-0.34	0.23
2010-11	2,291,895	5.20	-2.44	2010-11	8,795,328	-19.05	-0.34
2011-12	2,559,335	6.75	-0.88	2011-12	10099747	-4.49	-8.34

Source: Author's calculations (data has been taken from various issues of Annual Budget Statement)

Table 5.26: Errors in Forecasting Federal Revenues (Rs. Million)

Revenue Expenditure				Capital Expenditure			
FY	Actual	%Error (BE)	%Error (RE)	FY	Actual	%Error (BE)	%Error (RE)
1987-88	147540	-8.75	-0.89	1987-88	51150	12.26	6.06
1988-89	163090	-0.02	-2.21	1988-89	47030	-10.91	2.04
1989-90	165240	0.52	5.31	1989-90	57180	4.69	1.05
1990-91	189280	-2.01	-2.77	1990-91	70860	-22.30	-15.52
1991-92	211690	-3.87	0.64	1991-92	114400	-20.79	-11.19
1992-93	248540	-5.70	0.31	1992-93	86140	9.21	-2.29
1993-94	268030	1.65	6.72	1993-94	96300	-7.66	3.22
1994-95	315710	0.14	0.48	1994-95	106050	2.14	0.74
1995-96	382670	-4.76	-0.79	1995-96	124200	-7.30	-10.89
1996-97	414450	1.20	0.27	1996-97	135380	2.36	-0.58
1997-98	466500	2.24	0.80	1997-98	125900	0.56	3.20
1998-99	529030	-2.47	-6.58	1998-99	156980	2.50	-4.64
1999-00	604370	-8.35	-3.19	1999-00	137070	10.54	10.70
2000-01	612680	-1.41	-1.79	2000-01	95380	-5.31	0.79
2001-02	694450	-4.59	0.47	2001-02	254280	-31.78	1.94
2002-03	705840	-8.29	0.47	2002-03	155410	-21.85	-2.19
2003-04	769700	-8.47	0.45	2003-04	122990	0.21	1.92
2004-05	833820	-5.71	0.43	2004-05	150650	-18.93	-1.08
2005-06	1068500	-10.05	0.35	2005-06	123010	7.76	0.92
2006-07	1230280	-9.29	0.32	2006-07	131110	5.12	-0.60
2007-08	1767560	-23.42	0.23	2007-08	148590	4.56	0.36
2008-09	2079513	-15.36	-1.29	2008-09	197251	4.57	-0.52
2009-10	2416643	-10.36	-3.43	2009-10	245734	4.66	-0.98
2010-11	2534633	-8.87	-1.42	2010-11	205214	-8.54	-12.51
2011-12	2859175	-9.46	2.26	2011-12	259185	-4.87	-18.97

Source: Author's calculations (Data has been taken from various issues of Annual Budget Statement)

Table-5.27 presents the values of Theil inequality co-efficient for Federal government which are relatively higher for budget estimate/Actuals than revised budget

estimate/Actuals. It is only the Federal government which draws a satisfactory picture as it corrects the forecast errors in the revised budget estimate by utilizing this opportunity.

Table 5.27: Theil's Inequality Statistic (U) for Federal Budget Forecasting

	Theil's U (BE, Actual)			Theil's U (RE, Actual)		
Variables	U_1	U_2	U_3	U_1	U_2	U_3
Revenue Receipts	0.081	0.158	0.518	0.027	0.053	0.187
Capital Receipts	0.059	0.114	0.362	0.024	0.046	0.122
Revenue Expenditure	0.063	0.120	0.211	0.011	0.021	0.080
Capital Expenditure	0.072	0.140	0.298	0.043	0.085	0.111

Source: Annual Budget Statement

Author's calculations

Table-5.28 shows that the co-efficient of γ_1 is significant for the BE of Revenue Expenditure and RBE of Capital Receipts only. The positive values of intercept show that the BE of Revenue Receipts and Capital Expenditure is under-estimated by a fixed rate and the rest of the heads are over-estimated as indicated by the negative values of the intercept for the sample period. The co-efficient of γ_2 is significantly different from the hypothesized value for the BE of Revenue Receipts/Expenditure and RBE of Capital Receipts only. The BE of Revenue Expenditure is under-estimated and the BE and RBE of all other heads is over-estimated for the sample period. The co-efficient of γ_3 is statistically significant for the BE of Revenue Receipts/Expenditure and RBE of Capital Receipts only which reveals that the hypothesized value holds true for rest of the heads. Their errors are correlated and there is a relation between the forecast errors and BE/RBE of all heads. The results highlight the fact that the Rational Expectation Hypothesis does not hold true for Federal government.

Table 5.28: Testing Rational Expectations of Federal Budget Forecasting

Variables	γ_1	γ_2	γ_3	R^2	Adj. R^2	Durbin h	ρ
(Budget Estimates, Actuals)							
Revenue Receipts	5658.76 (8941.4)	-0.277 (0.05)*	1.433 (0.05)*	0.99	0.99	-0.38	-0.03
Capital Receipts	-65684.6 (117602)	0.940 (0.23)	0.170 (0.26)	0.98	0.98	NA	-0.520
Revenue expenditure	-46814.4 (21264)*	1.600 (0.27)*	-0.457 (0.27)**	0.99	0.99	NA	-0.85
Capital Expenditure	-5824.16 (7375.8)	0.999 0.06	0.076 (0.06)	0.95	0.95	1.37	-0.02
(Revised Budget Estimates, Actuals)							
Revenue Receipts	-5300.2 (16255)	0.466 (0.41)	0.629 (0.45)	0.99	0.99	NA	-0.56
Capital Receipts	-96030.6 (39119)*	0.872 (0.05)*	0.205 (0.06)*	0.99	0.99	1.17	-0.56
Revenue expenditure	-75.62 (7736.1)	0.931 0.05	0.084 (0.06)	0.99	0.99	1.95	-0.14
Capital Expenditure	-5824.16 (7375.9)	0.999 (0.06)	0.076 (0.06)	0.96	0.96	2.78	-0.23

Note: values in the parenthesis are standard errors

Source: Author's calculations

Table-5.29 indicates that the budget forecast efficiency of Federal Government has improved neither in budget estimates nor in revised budget estimates over the sample period.

Table 5.29: Efficiency of Federal Budget Forecasting

Variables	θ_1	θ_2	DW	R^2	Adj. R^2
(Budget Estimates, Actuals)					
Revenue Receipts	9.93 (4.54)*	-0.754 (0.31)	1.229	0.21	0.18
Capital Receipts	-2.82 (3.56)	-0.195 (0.24)	2.547	0.03	-0.01
Revenue Expenditure	0.89 (1.89)	-0.517 (0.13)	1.358	0.42	0.39
Capital Expenditure	-4.65 (4.97)*	0.083 (0.33)	1.755	0.00	-0.04
(Revised Budget Estimates, Actuals)					
Revenue Receipts	5.09 (1.61)	-0.399 (0.11)	1.595	0.37	0.35
Capital Receipts	-2.40 (1.43)**	0.061 (0.09)	1.443	0.02	-0.03
Revenue Expenditure	0.40 (1.09)	-0.046 (0.07)	1.936	0.02	-0.03
Capital Expenditure	0.19 (2.84)	-0.165 (0.19)	1.189	0.03	-0.01

Note: values in the parenthesis are standard errors

Source: Author's calculations

Table-5.30 presents the decomposition of errors for Federal Government. It has been realized that the proportion of stochastic variation is higher in the BE (except of Revenue Expenditure) and RBE for all heads as compared to the bias and unequal variation. However the unequal variations are slightly higher in the BE of Revenue Expenditure and RBE of Capital Receipts.

Table 5.30: Decomposition of Federal Forecast Errors

Variables	Budget Estimates			Revised Budget Estimates		
	Bias	Variance	Random	Bias	Variance	Random
Revenue Receipts	0.041	0.023	0.937	0.125	0.281	0.594
Capital Receipts	0.205	0.242	0.553	0.091	0.324	0.584
Revenue Expenditure	0.325	0.503	0.172	0.026	0.023	0.951
Capital Expenditure	0.089	0.035	0.876	0.091	0.062	0.846

Source: Author's calculations

These findings are parallel to the earlier studies regarding fiscal marksmanship. The study on the fiscal marksmanship of federal government of Pakistan, conducted by Zakaria & Ali (2010) also concluded that the forecast efficiency of federal government is not satisfactory, hence the budget/revised budget estimates are not rational and the proportion of stochastic variation is significantly higher than systematic and unequal variation. The study conducted by Bhattacharya Kumari (1988) on the performance of central government of India also concluded the same results. All of the relevant studies draw the same conclusion except the study on the fiscal marksmanship of US by Morrison (1986) which concluded that the proportion of systematic variation is more than stochastic variation.

CHAPTER 6

CONCLUSION AND POLICY RECOMMENDATIONS

6.1 Introduction

This chapter concludes the study and gives some policy suggestions on the basis of analyzed facts and figures.

6.2 Major Findings of the Study

The present study was aimed to analyze the extent of accuracy and decomposition of forecast errors in order to sort out the proportion of errors due to bias, stochastic and unequal variations in the budget forecasting of federal and provincial governments. The first objective of the study is to verify the extent of accuracy for federal and provincial budget forecasting and to evaluate the change in the efficiency of budget forecasting over the sample period. The federal and provincial budget forecasting accuracy has not been satisfactory over the sample period. The results show that the Revenue Receipts are broadly over-estimated except for the Sindh annual budget while Capital Receipts are largely under estimated except in the case of KP and Sindh annual budgets. The Revenue Expenditures are over estimated in all cases except the federal budget and Capital Expenditures are under estimated for all cases other than that of KP's and Punjab's annual budget. However the Finance Departments of the corresponding governments have tackled the forecast inaccuracy and inefficiency in some of the heads. Although the

overall budget forecast efficiency has not been improved significantly but the forecasts in few heads has been made more efficient at federal and provincial level over the sample period. Thus the first hypothesis of the study that budget forecasting is not up to the mark holds true. The second objective of the study is to verify the validity of Rational Expectation Hypothesis. The analysis shows that the budget forecasts are based on the Rational Expectation Hypothesis in Pakistan neither at federal nor at the provincial level. Hence the second hypothesis that the budget estimates/revised budget estimates are not rational also holds. The third objective of the study is to decompose the forecast error and identify the nature of errors. The decomposition practice shows that the proportion of stochastic variations is more than systematic variation and unequal variations are relatively higher than bias. Although the systematic variations are not substantial but still there is a room for improvement. In short, the third hypothesis of the study is also holding in principle.

6.3 Conclusion

It can be concluded that the key issue with the budget-actual data (*ex post* data) is the ignorance of the fact that an annual budget is made in different phases; the planning stage (where the budget estimates of Revenue and Expenditures are prepared) and the implementation stage (when taxes are collected and expenditures are incurred). The *ex-post* data is largely different from the *ex-ante* data due to the appropriation and re-appropriation of the budget while revising the budget. The fact is that the *ex-ante* plans are formulated very ambitiously or over ambitiously due to political factors and

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government myopia. This unrealistic approach in formulating the *ex-ante* budget estimates leads to under/over estimation of fiscal variables and consequently to *ex-post* errors.

The systematic variations are due to the miscalculation or misjudgment of major economic variables (e.g. inflation, national income, investment and saving) and incorrect estimation of the parameters such as tax and consumption elasticity which have a significant influence over the budgeting while the stochastic variations are caused by the unprecedented circumstances such as climatic shocks (e.g. floods, earthquakes) and unwanted operations against terrorism etc. Pakistan has lost Rs. 8264.4 billion ($102.5bn) to compensate for direct and indirect cost of war on terror during the last thirteen years (Economic Survey 2013-14) and it has started to decline only recently starting from the FY 2011-12.

Overall budget estimates of revenues and expenditures contribute more to forecast error than the revised budget estimate although the errors in revised budget estimates are also substantial for some of the fiscal years in the sample. This reflects that the federal and provincial governments make errors while formulating the budget but in most of the instances, they utilize the opportunity to reduce the error at the time of revising the budget. The structural drawbacks such as fiscal deficit, inflation, faulty projections of revenue/outlays and fiscal indiscipline are showing the habit persistence. Over estimating FBR revenues and under estimation of subsidies and interest repayment on debts is very much a common practice. Indirect taxes are over estimated as compared to the direct

taxes while there is no tax culture in Pakistan and the tax base is also not being widened over the years. As a result of this, the tax revenue is more or less stagnant. The budget estimates of the provincial governments are quite dependent on the revenue released from the federal assignments as per the *National Finance Commission Award,* thus the inaccuracy of the federal government's revenues estimates translates into the forecast errors of provincial governments. The Current expenditure comprises approximately 80% of the total expenditure limiting the development expenditures to the remaining 20% of the total outlay. This inflexibility or in other words the mandatory nature of the current expenditure largely contributes to the forecast errors of federal and provincial budgets by restricting the choices available to the policymakers for improving the forecast efficiency.

6.4 Recommendations

On the basis of above discussion and in view of the fact that the forecast errors of large magnitude have unfavorable consequences for the economy, it is recommended that in case of Pakistan

- Better Forecasts of basic macro variables, such as national income, price level, etc., and estimates of key parameters such as tax and expenditure elasticity should be made.
- More stringent fiscal rules like FRDL act are required to be implemented to combat the forecast errors.

6.5 Limitation of the Study

The limitation of the present study is that it could not undertake the uncertainty which is the key source of stochastic variation.

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