Forman Journal of Economic Studies
Vol. 12, 2016 (January–December) pp. 41-56

Accuracy of Revenue Forecast: Analysis of Pakistan's Federal Revenue Receipts

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Abstract

The government budget plays an important role in determining economic growth of a country. The accurate determination of budget estimate for revenue and expenditure is the key for successful implementation of budget plan. Any significant variation in determination of either of these budget estimates from the accurate budget estimates can have far reaching economic implications. The revenue receipts are one of the most significant parts of the overall resource envelope of a country. Therefore, there is a need to analyze accuracy of budgetary forecast for revenue receipts. This study conducts an exercise on accuracy of Pakistan's Federal Revenue receipts budgetary forecasts. The study identify that there is a significant difference between the budget estimates of Federal Revenue receipts and actual revenue receipts. This difference also holds for different components of revenue receipts. Further analysis is done for pre and post 1990s reforms. The revenue forecasting has not improved during post reforms period due to a number of reasons. The reforms did not have revenue forecasting as one of the objectives, secondly the estimates rely heavily on the accuracy of macroeconomic forecasts and the buoyancy measures. These are not up to the mark. With this analysis, policy recommendations for increasing the certainty in fiscal instruments are drawn.

Keywords: Revenue Forecast**,** Budgets, Macroeconomic Forecast

JEL classification: E62, H20, H68

1. Introduction

The effective management of resources, physical, financial or natural, is the key for success and prosperous life of an individual as well as nations of the world. Governments prepare plans so as to materialize their short and long term goals needed for the peace and prosperity of the country. The plans are implemented through the effective use of human, natural and financial resources available to the country. The expenditures, either for development purposes or for

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current need, depend upon the resource envelope of the country. The resource envelop of a country consists of two major components namely internal resources and external resources. The availability of total internal resources depends upon tax and non-tax measures.

For any government of a country, accuracy of tax revenue forecasting is important for materializing its projected programs. Otherwise the degree of deviation from accurate forecasting would eventually cause government to lose its esteem among the public. In Pakistan, historically there is a short fall in actual revenue receipts against the projected revenue receipts. The short fall in revenue receipts causes cuts mainly in capital expenditure/development expenditure which is vital for the future growth of the country

The budget preparation is annual feature and is being practiced by each country of the world. The first and the most important step towards budget preparation is the determination of resource envelop available to the country. Serious efforts are made to determine the appropriate level of revenue receipts which constitute major portion of internal resources. The annual budget in Pakistan is also prepared on the principles being followed by most of the countries of the world. The targets for government receipts are determined and the expenditures are made accordingly. The following table one below contains the Federal Government Targets for total revenue receipts for the last four years. The targets lay down for revenue receipts did not materialized for most of the period. The revenue targets are missed by more than 2.5% on average as against the laid down target. The revenue target missing clearly indicates that either the targets are not accurate or the tax collection machinery is inefficient. The accuracy of revenue receipts of Federal Government is important because any short fall in federal revenue receipts would have two important effects: one it will jeopardize government's development plan and secondly the provincial governments would have lesser resource at their disposal because more than 80% of provincial resources depend upon the transfers made by the Federal Government.

Table 1: Federal Government Total Revenue as % of GDP

Years	Target	Achievement
2010-11	15.1	12.3
2011-12	15.5	12.8
2012-13	15.9	13.3
2013-14	14.9	14.5

Source: Pakistan Economic Survey various issues.

In Pakistan, revenue forecasts are not based on macro-econometric models rather framework based projections are made. The forecasts are made by applying the revenue elasticity on projected economic growth, the new tax measures and administrative measures to improve efficiency of tax machinery. So one of the reasons could be low tax elasticity (mostly less than one, except for few taxes) for Pakistan. Even if there is significant movement in the tax base there will be low yield for that tax. Secondly in order to make a macro-variable based projection the FBR may need to estimate a macro-econometric model incorporating all relevant macro-variables such as inflation, projected growth in bases, external shocks etc. Such model by FBR is not publically available.

If we see different government policy documents, such as the Budget Strategy Papers, the measures taken by federal government are:

1. Enhance the tax basis by levying tax on a number of sectors,
2. Increasing the existing rates,
3. Introducing new taxes etc.

These measures are projected to raise the revenue, whereas no discussion on how existing basis would yield less or more revenues is provided. Further the approximation of these measures towards revenue increase is purely subjective. The resulting outcome thus may have many errors in forecast. However since there is no breakup of how much each of the measures would yield and there is no subsequent evaluation of each of the reforms envisaged in policy hence the process is not improved.

In this backdrop the objective of the study is first to investigate the accuracy of total federal revenue receipts and of its subcomponents. This will help in determining the source for inaccuracy of total revenue receipts. Second objective is to see if there is any change in accuracy of federal revenue receipts after the economic reforms of 1990's or not.

The paper is structured as follows: the review of literature is discussed in section-II, discussion on different components of revenue receipts in section-III, estimation and results are discussed in section-IV and in the last section we will present the conclusion and recommendations.

2. Review of Literature

Revenue forecasting involves the use of analytical method to project the amount of financial resources available in the future. The ability to correctly plan future resources is critical to sidestep budgetary shortfalls. For the public sector, even small errors in planed revenue can lead to serious budgeting problems for

the expenditures such as ending in unwanted surplus or deficits. Thus, revenue forecasting is crucial both for the federal and lower tier governments. The issue of not being able to forecast may depend on a number of distinct parameters which vary across methodologies and countries. This section presents brief review of literature on the revenue forecasting methods and outcomes based on different countries including Pakistan.

Jalles et al., (2015) have evaluated the fiscal forecast performance of 29 sample countries categorized as developed, emerging and developing countries. The authors concluded that there is biasness towards positive balance, inefficiency and lack of accuracy in the budget balance forecasts. This over projection to an extent is attributable to wrong GDP and inflation forecasts and non-inclusion of international linkages. This is also established by Croushore and Simon, (2016). Who further stated that structural budget forecast error is significantly related to the forecast error in the unemployment forecasts? There is general the over prediction increases in recessionary periods and is pessimistic in better conditions. Croushore and Simon, (2016) have evaluated the fiscal forecast errors covariates and influence of these on the monetary policy for USA. They found fiscal forecast errors have lead to an exogenous effect on the federal funds rate for USA.

Leal et al., (2007) reviewed the fiscal forecasting methods in European Union. Authors states that fiscal forecasting methods have evolved in the context of accountability of democratic governments in lieu of public fund utilization. Rule based fiscal policy mechanisms such as Maastricht Treaty and Stability and Growth Pact (SGP) of European Union has further increased the interest in fiscal forecasts. Any expected deviation from fiscal targets will automatically trigger procedures such as Excessive Deficit Procedures (EDP). It is emphasized that systematic biases lead to unrealistic and politically motivated fiscal estimates, thus establishing a need for non-political independent fiscal forecasts. Practically fiscal forecasts are complex as it needs to be aligned with other macroeconomic forecasts. Further authors assert that these forecast methods should also incorporate budgetary contexts.

Afonso and Jorge, (2012) examined the budget balance ratio forecasts variation for the Portuguese economy official and European Commission vintage forecasts. They concluded that due to the automatic stabilization effect and imperfect tax indexation the forecasts differed. Further there was significant effect of investment variation and non significant effect of unemployment on the fiscal

forecasts. Countries with rule based fiscal policies perform better in fiscal forecasting.

Jalles, (2015) evaluated the information lead correction in the fiscal forecasts in a multi country analysis. They took the sample of G7 countries over the period of 1993-2012. The author found out that the fiscal forecasts are not adjusted for both domestic and external information thus refuting the full information rational expectation hypothesis. Thus there is information rigidity in the system of fiscal forecasts. Further Frankel and Jesse, (2016) compared the official and private fiscal forecasts for the Euro Area for the period of 1999-2007. The authors conclude that the government forecasts are generally over-optimistic then the private forecasts in a systematic way.

Feenberg et al., (1988) has evaluated the revenue forecasting position of states, after revenue shortfall crises considering that either states are rational in forecasting revenue or not?. Revenue forecast methods differed from states to state. Some states rarely used econometrics models and mostly use informal method such as the "judgmental approach" as the econometrical method led them to disappointing results. Authors conclude that due to uncertainty in certain economic fundamentals like employment, national income and population or the political environment etc. and additional uncertainty for an unanticipated tax shock in future makes it difficult to predict the correct revenue figures.

Jena, (2006) explored the issues which arise for the local/state governments due to inaccurate revenue forecasting by the central government and the local/state governments in India for the period 1993-2003. The authors conclude that there are wide variations in the central revenue forecasting and the actual outcomes thus making it a case of poor fiscal marksmanship. The reasons behind the poor forecasting were mainly that the revenue targets are set rather than taking into account any proper model incorporating all the fundamentals of the economy. Hence the outcomes change as the economic conditions change. This shortfall then leads to poor resource allocation and inefficient budgetary practices on the expenditure side. Further since it also put pressure on the state governments to resort to various methods of costly borrowings.

The report "Forecasting Accuracy of the ACT Budget Estimates" by Department of Treasury Australia elaborates the forecasting process and needs. The forecast errors need to be in an acceptable range and may require revision of the statistical models and process being used for those estimate outcomes which are out of that bound. The report highlighted that forecasts need to be evaluated for better policy and planning outcomes. Further in the report Australian Capital

Territory (ACT)'s forecasting performance of its revenue is done. The report identifies that in the ACT region revenue forecasts are comparable with other Australian states. Due to economic factors these estimates have been consistently overestimated.

Foster and James, (2000) have reviewed the federal budget and its process from the policy perspective for USA. The focus of their analysis is the accuracy of the budgetary forecasts. They have identified this to be a complex process, where certain rules have to be followed, goals are over ambitious to achieve and sometime conflicting with rules and above all the personalities and political considerations are important. The authors state that the complexities in the system have evolved overtime as there is a peculiar interest in budget in the context of public debate in US. Often the estimates based on a statistical process are difficult to explain as compared to an arithmetic one. Forecasts which are not credible don't carry the desired political benefits along with them. To conclude the authors commented that rules alone cannot bring the desired discipline or the outcomes but the political will is also needed with that.

Bagdigen, (2002) have evaluated the revenue forecasting in Turkey during the period 1981-2000.Inaccuracy of forecasts on either the downward bias or upward bias have possible public choice repercussions. Public may feel that they are overtaxed if the revenue forecasts are significantly less than the actual realization and vice versa may feel the government being extravagant. The authors conclude that Turkish revenue forecasts are significantly underestimating the true tax potential every year. This helps them in dealing with budget balances but may create resentment in public for governments being ineffective in resource mobilization mix.

Lekha and Darshy, (2008) have evaluated the rational expectations theory in the context of forecasting of budgetary process (including Revenue and Expenditures) for India for the period of 1990-91 to 2003-04. Authors have used Theil's inequality Coefficient (U) and decomposed the errors in biasedness, unequal variation and random components. The authors conclude that revenue and expenditure forecast processes are not based on rational expectations. The errors in revenue forecasting are higher than expenditure forecasting. Further the efficiency of forecast has not improved over time also.

Zakria and Shujat, (2010) have estimated the fiscal marksman in Pakistan. Authors have evaluated the forecasting efficiency of central government budget estimates and revised estimates for the period of 1987-88 to 2007-08 using the Theil's inequality coefficient. The authors conclude that the errors in fiscal

forecasts are mainly due to the exogenous (random) factors. Similar to Lekha and Darshy, (2008); Zakria and Shujat, (2010) also conclude that the fiscal forecasts are not based on rational expectation hypothesis and the inefficiency is not declining overtime.

To summarize broadly the importance of the fiscal forecasts especially on the revenue side can be understood both from the public choice models and fiscal sustainability. The choice of models used and different political considerations have a different outcome. In the developed economies it is a regular feature to evaluate the fiscal marksman ship and improve the processes. However the system is still complex and may end up in a downward bias for revenue estimates. In the developing countries however it is not yet an established exercise. It may be anecdotally referred to but no serious consideration is given in developing a proper frame work for evaluation and improvement.

3. Composition/Structure of Federal Receipts.

The total federal receipts consist of revenue receipts and capital receipts. The revenue receipts are important because federal and provincial (via NFC formula based transfers) governments largely depend upon these receipts. It is noticed that any adverse change in the collection of these receipts severely affects the government's efforts to run the affairs of her jurisdiction. The revenue receipts are also important for the federal government because as per FRDLL-2005, the federal government should have revenue surplus from 2008 and this surplus is required to meet the development needs of the federal government. These two prominent aspects of revenue receipts induced us to; further, explore the various aspects of federal revenue receipts. The revenue receipts have two broad categories tax receipts and non-tax receipts. The tax receipts comprise of direct taxes and indirect taxes. The major components of direct & indirect taxes are income tax, capital value tax, workers welfare tax, customs, sales tax, federal excise, petroleum levy etc. The nature of these receipts indicates that the next year targets should be predicted on a well-defined process/method or an economic model.

The capital receipts of federal government comprise of recoveries of advances/investments, proceeds of borrowing, money received in payment of loans, net receipts from transactions under deposits and remittances heads and proceeds of saving schemes. As the nature of these receipts indicates that they do not require any technique/model for determination of next year target. The targets for capital receipts are largely pre-determined because, in case of recovery of loan, the target would be the amount expected to be paid against the loan for that

year. We will focus on revenue receipts here because its accuracy is directly related to the fiscal policy measures taken by the federal as well as by the provincial governments. Further, more, the revenue receipts require forecasting procedure to set targets for the coming year whereas for capital receipts the targets for the next year are based on pre-determined values. The following table contains details of total internal receipts of the federal government.

Table 2: Federal Internal Receipts-Budget estimates (Million Rupees)

Description of Components	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**
Total Revenue Receipts (gross)	2007207	2410994	2732150	3236827	3419996
Total Capital Receipts (net)	190513	325384	395652	477779	493226
Total Internal Receipts	2197720	2736378	3127802	3714606	3913222
% Share in total internal Receipts					
• Capital Receipts	8.67	11.89	12.65	12.86	12.60
• Revenue Receipts	91.33	88.11	87.35	87.14	87.40

Source: Annual Budget Statement (various issues).

The above table two indicates that importance of revenue receipts, as its share in total internal receipts is around 90% for last five years.

3.1. Trends in Federal Revenue Receipts

The following table three contains share of budget estimates pertaining to various components of revenue receipts in total federal revenue receipts for the last five years.

Table 3: Percentage Shares in respective budget estimates

	Budget Estimates	**Budget Estimates**	**Budget Estimates**	**Budget Estimates**	**Budget Estimates**
Description	2009-10	2010-11	2011-12	2012-13	2013-14
A. Tax Revenue in Gross receipts	74.41	73.78	75.92	77.42	75.97
Direct Taxes in tax revenue	37.87	36.98	35.85	37.23	37.55
Indirect taxes in tax revenue	62.13	63.02	64.15	62.77	62.45
Custom in indirect tax	17.48	16.13	15.51	15.75	17.20
Sales Tax in indirect tax	53.82	60.20	62.88	68.50	64.94
Fed Excise in indirect tax	16.47	13.70	12.45	7.95	10.28
Other Taxes(ICT) in indirect tax	0.16	0.15	0.14	0.16	0.18
Airport Tax in indirect tax	0.01	0.01	0.01	0.00	0.00
Petroleum Levy in indirect tax	12.07	9.81	9.02	7.64	7.40
B. Non-Tax Revenue in Gross receipt	25.59	26.22	24.08	22.58	24.03

Source: Various issues of: (i) Federal Budget in Brief (ii) Explanatory Memorandum on Federal Receipts.

The Table 3 indicates that more than 76% of total federal receipts are originating from tax revenues where the share of non-tax revenue in total federal receipts is around 24%. Indirect taxes constitute major proportion of tax revenue and its share is more than 63% for the last five years. The high proportion of indirect taxes indicates that: tax base for direct taxes of the country is low, tax collection machinery is in-efficient or existence of discriminatory rules & regulations. The sub-components analysis of indirect taxes indicates that major contributor of this category is sales tax and its share in indirect taxes has increased over the time. During 2013-14 the share of sales tax in indirect taxes is 65%. The high share of sales tax in tax collection implies that the nature of tax system is regressive rather than being progressive.

3.2. Revenue Forecasting

As per Accounting Policies and Procedures Manual, Government of Pakistan, the revenue forecasting is defined as "Forecasts of revenue are to be prepared on a cash basis that is, based on what can reasonably be expected to be paid and collected in the financial year. This will be calculated from prior year collection figures, adjusted for changes in revenue collection policy. The forecasts will be provided in gross amounts (e.g. revenues will not be shown net of any related costs). This is also consistent with the related accounting policy for the recognition of revenues". The above stated revenue forecasting procedure is very simple and does not base on any forecasting model/procedure/technique which usually takes into account all economic agents likely to play key role in the determination of revenue for the coming year. As we will see in the coming paragraphs that the budget estimates of revenue receipts are either overestimated or under estimated as compared to the actual receipts, for most of the period of the study, and the probable reason for over or under estimation is due to non-adoption of proper model/procedure to determine the revenue forecasts.

The FBR (Federal Board Of Revenue) is the major tax collecting authority of the country and is collecting about 90% of tax revenue, has its own procedure/method for setting the revenue targets for the coming year (or next year). The procedure/method adopted by FBR to set the next year revenue target is not available in the documented form. However, the discussions with the officials of FBR reveal the following combination of procedure/method adopted by FBR to set the revenue targets for the coming year:

- Buoyancy based revenue forecasts: Government Ministries (such as Finance, Planning etc.) prepare the Macroeconomic Growth Frame work

for the next year identifying the sectoral growth rates. Based on Buoyancy measures for respective taxes revenue forecasts for each tax is calculated.

- Reforms based revenue forecasts: Based on tax reforms for respective taxes each year, revenue projections are made.
- Administrative Efficiency measures based revenue forecasts: Based on certain administrative reforms of the FBR itself certain revenue projections are made for the overall taxes.
- SRO based revenue shortfall estimates: Based on the SROs[2] revenue reduction is estimated and deducted from the above revenue forecasts.

In this paper we have analyzed the efficiency of the above system of revenue forecast. Since these forecasts are not based on documented statement of FBR, so, the exact time line of this method utilization is not known.

4. Analysis and Results.

The study is based on secondary data being published in various issues of Pakistan Economic Survey. The data on total tax revenue receipts and on its various components has been taken for the period from 1970 to 2014. The data on each component of tax revenue receipts consists of budget estimates and actual estimates. The objectives of the study are achieved by simple calculation of percentage change, share in total and other simple calculating methods. The formula used to measure the forecast error is as follows:

$$\text{Forecasted Error } = \left\{\frac{(\text{Actual or the Budget outcomes}) - (\text{Forecasted budget estimates})}{(\text{Actual or the Budget outcomes})}\right\}$$

The following are the results based on the above formula application.

Table 4: Revenue Forecast Errors

Description	Composition of Percentage error	
	Over-estimated as % of total period	Under-estimated as % of total period
Federal Total Revenues	57.78	42.22
Federal total Taxes	68.89	31.11
Federal Direct Taxes	55.56	44.44
Federal Indirect Taxes	73.33	26.67
Sales Tax	66.67	33.33
Custom Duties	55.56	44.44
Federal Excise	73.33	26.67
Surcharge	60.00	40.00
Federal Non-Tax Revenues	64.44	35.56

[2] Under the Statutory Regulatory Order (SRO) certain sectors of the economy are given preferential treatment as compared to other sectors in the respective tax base.

The above table indicates that the forecasts remained over-estimated for the major proportion of the study period. The over-estimated proportion across different categories varied from 55.56% to 73.33%.The over-estimation is more prominent for federal indirect tax which is recorded at 73.33%. The federal indirect tax comprises of sales tax, custom, federal excise and surcharges. The table also indicates that the constituent of indirect tax has also registered a high rate of over-estimation. The break-up of percentage error, at different levels of accuracy in terms of absolute value, is given in the Table-5.

The figures enable us to see the behavior of forecasts at various percentage levels for the entire period. The acceptable level of accuracy i.e. forecast is said to be accurate, is measured when the percentage of error is less than or equal to one which implies that the forecasted values of revenue are very close to the realized revenues. The table indicates that the highest level of accuracy is recorded for federal excise where 11.11% of the total period, actual revenues were close to the predicted revenues by a margin of less than or equal to one. The high level of accuracy in this head of revenue is because this tax is mostly collected from the products such as beverage, cement, natural gas, POL-products etc. and the level of production pertaining to these products is well known which enables the forecaster to predict the value in a more precise way or to use simple method/calculation to arrive the predicted value.

Table 5: Levels of Revenue Forecast Error

Description	**Proportion of Percentage error in total at various level (in absolute term)**			
	≤ 1%	> 1% But ≤ 5%	> 5% and above	Standard Deviation
Federal Total Revenues	8.89	37.78	53.33	11.04
Federal total Taxes	6.67	26.67	66.66	10.79
Federal Direct Taxes	6.67	31.11	62.22	29.14
Federal Indirect Taxes	8.89	35.55	55.56	10.88
Sales Tax	4.44	20.00	75.56	30.66
Custom	8.89	35.35	55.56	12.21
Fed Excise	11.11	17.78	71.11	12.93
Surcharge	9.52	14.28	76.20	32.79
Federal Non-Tax Revenues	4.44	20.00	75.56	23.26

The lowest level of accuracy is noticed for sales tax and the indirect taxes with a proportion of4.44% of the percentage errors for the study period. The corresponding standard deviations for these two head of revenues are also high

which implies that the method/technique used to make forecast are not appropriate because of large standard deviation. It is worth to note that Federal excise and Sales taxes are collected at the final level of the production but the accuracy of the sales tax is low as compared to the federal excise. The low accuracy of sales tax is probably due the fact that this tax is levied on large number of products and the tax authorities are unable to take into account the expected level of final production of each product. The Federal excise duty, in the other hand, is imposed on limited numbers of products and the tax authority has access to the expected level of production of these products.

The highest level of accuracy, within the range of greater than one percent but less than or equal than 5% is noticed for the federal indirect taxes which is 35.55% of the study period. The federal indirect taxes mainly consist of sales tax, federal excise and custom and we have discussed in the preceding paragraph that how the federal excise, sales tax and custom have high level of revenue forecasts. The highest level of level of inaccuracy i.e. the level of accuracy greater than 5%, is also noticed for the sales tax which is 75.56% with the corresponding highest level of standard deviation of 30.66 and the reasons for high level of inaccuracy, (corresponding to the lowest low level of accuracy), are already sated in the preceding paragraphs.

The accuracy level of greater than 5% and above maybe termed, in fact, as the level of inaccuracy because the percentage error at different time period of the study varies from 5% to more than 100%. A look at the table indicates that the percentage error of more than 5% is noticed for all heads of revenues and its proportion in the period of study varies from 53.33% to 76.20%. The high proportion of percentage error in total Revenues indicates that the method/technique/model used to make revenue forecast are inaccurate and as a result the government's macro-economic policies remained under financial stressed.

4.1. The Pre and Post Reform Analysis

During 1990's the government of Pakistan started to take various measures to revive the economy of the country and improve the fiscal position. Some of the important measures taken were to reform the overall tax system, especially the FBR (Federal Board of revenue), the tax collecting authority of the country. Overall the objectives of these reforms are as follows:

i. Broadening the Tax base

ii. Rationalizing Tax rates

iii. Simplify procedures and strengthening tax administration

We have divided our accuracy analysis in two components i.e. pre and post reforms analysis. The following table contains accuracy and over-estimation for pre and post reform period for total tax revenue and its different components as shown in Table 6. This table contains the comparison of forecast error for total tax receipts and its components. The figures in parenthesis are proportion of the number in period of study total sub-period respectively. A look at the number of times the accurate forecast were made, irrespective of their sign i.e. whether the forecast error is less than or equal to zero, reveals that it is just in between 2 to 5 times for the over-all period of study and 1 to 4 times for pre and post reform period respectively. A comparative analysis of pre and post reform in terms of the accurate forecast as percentage of period of study indicates that there is a marginal increase in accuracy during post reform period for total revenue, total tax revenue, direct tax, indirect tax, sales tax and custom duties, whereas, there is declined in accuracy for federal excise and surcharges. The accuracy of federal non-tax revenue is almost the same when compared to the pre reformed period.

Table 6: Forecast Error for Pre and Post Reform Period

	Number of times Accurate			**No. of time over-estimated**		
Description	**Overall period**	**Pre-reform**	**Post-reform**	**Overall period**	**Pre-reform**	**Post-reform**
Federal Total Revenues	4 (8.89)	1 (5.0)	3 (12.0)	26 (57.78)	10 (50.0)	16 (64.0)
Federal total Taxes	3 (6.67)	1 (5.0)	2 (8.0)	31 (68.89)	11 (55.0)	20 (80.0)
Federal Direct Taxes	3 (6.67)	1 (5.0)	2 (8.0)	25(55.56)	9 (45.0)	16 (64.0)
Federal Indirect Taxes	4 (8.89)	0 (0.0)	4 (16.0)	33 (73.33)	12 (60.0)	21 (84.0)
Sales Tax	2 (4.44)	0 (0.0)	2 (8.0)	30 (66.67)	8 (40.0)	22 (88.0)
Custom Duties	4 (8.89)	1 (5.0)	3 (12.0)	25 (55.56)	9 (45.0)	16 (64.0)
Federal Excise	5 (11.11)	4 (20.0)	1 (4.0)	33 (73.33)	16 (80.0)	17 (68.0)
Surcharge	4 (8.89)	3 (17.65)	1 (4.0)	24 (53.33)	9 (52.94)	15 (60.0)
Federal Non-Tax Revenues	2 (4.44)	2 (10.0)	0 (0.0)	29 (644.4)	14 (70.0)	15 (60.0)

Note: For Surcharges we have 42-observations because for the years 1970-72 we have missing observations. In each cell figure in parenthesis is percentage and other is count.

We have reported the over-estimation of forecast error as it is not only prominent as compared to the under-estimation but has, also, serious effects on

federal as well on provincial governments towards development their programs and debt management. The proportion of over-estimation for different components federal tax revenue remained in between 52% to 67%.

While comparing the pre and post reform periods: it is noticed that during the post reform period there is marked increase in number of times when over-estimation is made in almost all components of tax revenues. The over-estimation during the pre-reform period remained in between 40% to 65% while the proportion of over-estimation during post reform period witness an increase ranging from 56% to 80%. The over-estimation in sales tax is almost double in post reform as compared to the pre reform period (increased from 40% to 80%) and it may be due to over reliance to this mode of tax collection because now a day the sales tax constitutes more than 75% of indirect taxes.

The increase in over-estimation in revenue forecast for the post reform period may be attributed, besides other economic factors; to over estimation in the projection of GDP growth for the next year (target GDP growth is over estimated). The GDP growth plays a significant role in setting the target of federal revenue receipts for the next year by FBR. As an example the following table may highlight the over estimation made for GDP growth during the period from 2005-06 to 2013-14.

Table 7: GDP Growth Targets and Actual Realizations

Year	GDP Growth Rate- Target at Constant Factor Cost (Real)	GDP Growth Rate- Actual at Constant Factor Cost	Gap % of Actual
2005-06	7	5.8	-20.67
2006-07	7	6.8	-2.94
2007-08	7.2	3.7	-94.60
2008-09	5.5	1.7	-223.53
2009-10	3.3	2.6	-26.92
2010-11	4.5	3.7	-21.62
2011-12	5.5	3.8	-44.74
2012-13	4.3	3.68	-16.85
2013-14	4.4	4.05	-8.641

Source: Various Economic Surveys

The Table 7 indicates that the growth rate of GDP was over-estimated for the last nine years and the level of error is as high as -223.55% of the target set for

the year 2008-09. Considering the major portion of the Federal Revenue forecasts are based on these Macroeconomic projections, and if these are not near the mark, then the revenue collection would also be compromised.

5. Conclusion and Recommendations

The accuracy of revenue forecasts is measured through the forecast error which is the ratio of the difference of actual value of revenue receipt to budget estimate of revenue receipt to the actual revenue receipts. The negative sign of the forecasted error indicates that the estimates were greater than the actual outcome in other words the estimates were over estimated. The positive sign of the forecasted error indicates that the revenues were under estimated. A forecasted value (ignoring sign) greater than zero but less than or equal to one may be called as an accurate forecast. The analysis of revenue accuracy pertaining to the different heads of revenue accounts of Federal Government, for the period 1970 to 2014, was examined and it is found that all revenue accounts have large forecast error which indicates that the predicted values of the revenue significantly differs from the actual values of the revenue accounts. The accurate forecast was made just in between 2 to 5 times for the entire period of study and for all revenue accounts. The over-estimation was more dominating as compared to the under-estimation. The analysis of pre and post reform period indicates that during the post reform period there was a slight increase in number of accurate forecast as compared to the pre-reform period. It is also noticed that in post reform period there was more over-estimation as compare to the pre-period. The over-estimation during post reform period may correspond beside other reasons to over-estimation of GDP growth rate which has a significant role in determination of revenue target. The persistent forecast error during the period of study indicates that targets are not set on the basis of econometric model/CGE type models.

The revenue authorities should pay more attention to adopt better quantitative methods, for determination of revenue receipts, which takes into account the vital role of all economic agents and international linkages that shape sound macro-economic forecasts. Broadly speaking methods such as judgment methods, spreadsheet analysis, accounting models, simple regression models, time series methods and structural macroeconometric models, or some combination of these can be used. Besides these quantitative measures budgetary processes and assumptions such as FRDLL etc may also be considered in the determination of accurate revenue receipts.

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