

**Does Fiscal Policy Matter?  
Evidence for Pakistan**

**Ph.D. Dissertation  
For partial fulfilment of the degree of  
Doctor of Philosophy in Economics**

**Submitted to  
Pakistan Institute of Development Economics  
Islamabad, Pakistan.**

**By**

**Mahmood Khalid  
PhD/52-2002**

**Supervisor:  
Dr. Eatzaz Ahmed**

**Co-Supervisor:  
Dr. Rehanna Siddiqui**

August, 2014



**Department of Economics  
Pakistan Institute of Development  
Economics, Islamabad**

**In the Name of Allah, the Most Merciful and Most Beneficent**



*Dedicated to my father Ch. Karam Din (late)*

## Acknowledgment

I express my profound thanks to Almighty Allah, who granted me courage, determination and potential to undertake and accomplish this piece of applied research work. As a matter of fact, it was also not possible for me to perform this difficult task without the blessings and help of Muhammad (PBUH) and His Progeny (A.S). So I am indebted to them (A.S) from the core of my heart.

It is hard to overstate my gratitude to my Ph D supervisors, Dr. Eatzaz Ahmed (Dean Social Sciences, Quaid-i-Azam University, Islamabad) and Dr. Rehanna Siddiqui (Joint Director, PIDE, Islamabad). Without their inspirational guidance, their enthusiasm, their encouragements, their thought provoking criticisms, I could never finish my doctoral work. For me, they are not only my teachers, but also lifetime mentors and advisors. I, once again, express my heartfelt gratitude for them and pray for their health and services for the nation as well as for the noble profession.

I owe my deepest gratitude to my colleagues and superiors at Pakistan Institute of Development Economics, Dr. Ejaz Ghani, Dr. Muhammad Ali Qasim, Dr. Fazal Hussain, Dr. Usman Mustafa, Dr. Hassan Muhammad Mohsin, Ayaz Ahmed and all other staff of PIDE whose advices/suggestions and encouragement on critical moments helped me move along.

I thank my seniors, fellow students and friends at PIDE and elsewhere; Dr. Wasim Shahid Malik, Dr. Akthar Hussain Shah, Dr. Ahsan ul Haq Satti, Dr. Ghulam Saghir, Dr. Syed Nisar Hussain Hamdani, Oxy, Urfee, Dr. Zahid Asghar, Dr. Abdul Jalil, Agha Dr. Tashfeen, and all others whom I can not name here due to space limitation for their encouragements, thought provoking discussions, help and support.

I want to express my appreciation to my parents and family for their love, understanding, patience, endless support, and never failing faith in me. Finally, I am indebted to my caring wife, my lovely daughter Mahreen Fatima, son Muhammad Ali, nephews Sikandar Masood, Shahab Saqib, Mohsin Masood, Muhammad Mahir and Danish Masood for their love which remained an inspiration throughout.

Mahmood Khalid  
Department of Economics,  
PIDE, Islamabad,  
Pakistan.

## Table of Contents

Chapter No	Title	Page No
	List of Acronyms used	x
	Abstract	xi
	Summary	xii
1	Introduction	1
2	Literature Review	9
2.1	Introduction	9
2.1	Fiscal Stance	12
2.3	Fiscal Policy Effectiveness	14
2.3.1	Fiscal Policy Effects on Aggregate Economic Activity	17
2.3.2	Fiscal Policy Effects on Components of Aggregate Economic Activity	22
2.4	Fiscal Policy Effects: Theoretical Model	26
2.5	Selected Empirical Studies on Effectiveness of Fiscal Policy	33
2.6	Literature Review and Research Gaps for Pakistan	42
3	Fiscal Policy in Pakistan: Institutions, Instruments and Outcomes	47
3.1	Institutions dealing with Fiscal Policy in Pakistan	48
3.2	History of Fiscal Management in Pakistan	49
3.2.1	Resource Mobilization in Pakistan	50
3.2.2	Resource Allocations	65
3.2.3	Resource Gap	70
3.3	Fiscal Instruments and Economy of Pakistan	72
3.4	Conclusion	77
4	Methodology and Data	79
4.1	Approaches to Identification	81
4.2	Structural Vector Autoregressive Approach for Fiscal policy Effectiveness Analysis	83
4.3	Methodology	84
4.3.1	Structural Vector Auto Regressive Estimation Method	84
4.3.2	Elasticity Estimation	88
4.4	Elasticities	91
4.5	Data and Estimation of Revenue Elasticities	93
4.6	Data and Estimation Methodology for Fiscal Policy Effectiveness	99
4.7	Conclusion	104
	Appendix	106
5	Fiscal Policy Effects on Aggregate Macroeconomic Indicators in Pakistan	111
5.1	Case 1: Net Tax Revenues	108
5.2	Case 2: Tax Revenues (Net of Interest Payment only, Net of Subsidies)	125

	only and Total Taxes)	
5.3	Case 3: Government Expenditures (Defense and Non-Defense Spending, Interest Payment Spending and Non-Interest Payment Spending, Defense and Interest Payment Spending and Non-Defense-Non-Interest Payment Spending)	130
5.4	Case 4: Revenues (Direct taxes and Indirect Taxes)	139
5.5	Conclusion	143
	Appendix	146
6	Fiscal Policy Effects on Disaggregate Macroeconomic Indicators in Pakistan	154
6.1	Private Consumption	155
6.2	Private Investment	157
6.3	Exports and Imports	159
6.4	Conclusion	163
7	Conclusion and Policy Implications	165
	References	169

<b>Table No</b>	<b>Table Description</b>	<b>Page No</b>
3.1	Tax Structure by Legislation for Pakistan	50
3.2	Consolidated Tax Revenues as a percentage of GDP	52
3.3	Cross Country Comparison: Tax to GDP Ratios	52
3.4	Level and Composition of Tax Revenue in Developing Countries (as % of GDP)	55
3.5	Correlation Matrix for Indirect Taxes in Rs. Million (1959-2010)	60
3.6	Elasticity and Buoyancy of Major taxes	63
3.7	Budget Deficit and Tax Evasion as a Percent of GDP	64
3.8	Aggregate Tax Incidence (% of income)	65
3.9	Cross Country Comparison: Fiscal Expenditure Indicators (2007)	66
3.10	Correlation Matrix between Macroeconomic and Fiscal Variables (1959-2010)	73
4.1	Tax Elasticities (1971-2010)	98
4.2	Weighted Tax Elasticities (Average of 1971-2010)	101
4.3	Variable Description and Source	103
4.4	Variables used for Elasticity estimation and their Description	106
4.5	Results of Unit Root Tests	107
4.6	Tax to Tax Base Elasticity Regressions	108
4.7	Tax Base to Income Elasticities Regressions	109
4.8	More Results of Unit Root Test	110
5.1	Contemporaneous Coefficients for Case 1	114
5.2	Fiscal Forecasts and Actuals (Billion rupees)	116
5.3	Response to Tax Shocks (Sub-Case1 ; $\beta_{tg} = 0$ ( $a_2=0$ ), i.e. taxes are ordered first	119
5.4	Response to Government Shock (Sub-Case1 ; $b_2=0$ to estimate $a_2$ , i.e. government expenditures are ordered first	122
5.5	Response to Tax Shocks (Sub-Case2 ; $\beta_{gt} = 0$ $b_2=0$ to estimate $a_2$ , i.e. Government Expenditures are ordered first	146
5.6	Response to Government Expenditure Shock (Sub-Case1 ; $a_2=0$ to estimate $b_2$ , i.e. taxes are ordered first	146

<b>Figure No</b>	<b>Figure Description</b>	<b>Page No</b>
3.1	Total Taxes (TTR) and Non-Tax Revenues (TNTR)- 1959-2008	51
3.2	Tax Structure of Pakistan (1959-2008)	56
3.3	Tax Composition- Indirect Taxes	59
3.4	Tax Composition- Direct Taxes	62
3.5	Expenditure Composition Consolidated	69
3.6	Fiscal Resource Gap (1959-2008)	71
3.7	Primary Deficits (1959-2008)	72
3.8	Cyclicality of GDP and Fiscal Instruments	73
3.9	Real Per Capita Private Consumption Expenditures and Fiscal Instruments	74
3.10	Real Per Capita Private Investment Expenditures and Fiscal Instruments	75
3.11	Real Per Capita Net Exports and Fiscal Instruments	76
4.1	Weighted Tax Elasticities (1971-2008)	110
5.1	Real Tax and Net Tax Revenues (1960-2009)	115
5.2	Response to Tax Shock: Case 1-Sub-Case 1; $\beta_{tg} = 0$ (a2=0 to estimate b2), i.e. taxes are ordered first	120
5.3	Response to Government Expenditures Shock: Case 1-Sub-Case 2; $\beta_{gt} = 0$ (b2=0 to estimate a2), i.e. Government Expenditures are ordered first	124
5.4	Response to a Tax Shock: Case 2-Sub-Case 1; $\beta_{tg} = 0$ (a2=0 to estimate b2), i.e. Taxes are ordered first	126
5.5	Response to Government Expenditures Shock: Case 2-Sub-Case 2; $\beta_{gt} = 0$ (b2=0 to estimate a2), i.e. Government Expenditures are ordered first	129
5.6	Response to Government Expenditures Shock-Defense Expenditures: Sub- Case 2; $\beta_{gt} = 0$ (Taking b2 and b5=0 to estimate a2 and a3), i.e. Government Expenditures are ordered first	132
5.7	Response to Government Expenditures Shock: Sub-Case 2; $\beta_{gt} = 0$ (Taking b2 and b5=0 to estimate a2 and a3), i.e. Government Expenditures are ordered first	135
5.8	Response to Government Expenditures Shock: Sub-Case 2; $\beta_{gt} = 0$ (Taking b2 and b5=0 to estimate a2 and a3), i.e. Government Expenditures are ordered first	137
5.9	Response to Tax Shock: Sub-Case 1; $\beta_{tg} = 0$ ( Taking a3 and b3 = 0 to estimate b5 and b6), i.e. Taxes are ordered first	140
5.10	Response to Tax Shock: Case 1-Sub-Case 2; $\beta_{gt} = 0$ (b2=0 to estimate a2), i.e. Government Expenditures are ordered first	147
5.11	Response to Government Expenditure Shock: Case 1-Sub-Case 1; $\beta_{tg} = 0$ (a2=0 to estimate b2), i.e. Taxes are ordered first	148
5.12	Response to Tax Shock: Case 1-Sub-Case 2; $\beta_{gt} = 0$ (b2=0 to estimate a2), i.e. Government Expenditures are ordered first	149
5.13	Response to Tax Shock: Case 2-Sub-Case 2; $\beta_{gt} = 0$ (b2=0 to estimate a2),	150



	i.e. Government Expenditures are ordered first	
5.14	Response to Government Expenditures Shock: Case 2-Sub-Case 1; $\beta_{tg} = 0$ (a2=0 to estimate b2), i.e. Taxes are ordered first	151
5.15	Response to Tax Shock: Sub-Case 1; $\beta_{tg} = 0$ ( Taking a2 and a3= 0 to estimate b2 and b5), i.e. Taxes are ordered first	152
6.1	Private Consumption Impulse Response to Fiscal Shock	156
6.2	Private Investment Impulse Response to Fiscal Shock	157
6.3	Total Exports Impulse Response to Fiscal Shock	159
6.4	Total Imports Impulse Response to Fiscal Shock	162

### **List of Acronyms used**

RBC Real Business Cycle

VAR: Vector Auto Regressive

MPC: Marginal Propensity to Consume

SVAR: Structural Vector Auto Regressive

SGP: Stability and Growth Pact

EDP: Excessive Debt Procedures

EFC: Expansionary Fiscal Contraction

NFC: National Finance Commission

MOF: Ministry of Finance

ADP: Annual Development Program

FBR: Federal Board of Revenue

NEC: National Economic Council

ECNEC: Executive Committee of the National Economic Council

PSDP: Public Sector Development Program

IMF: International Monetary Fund

VAT: Value Added Taxes

WTO: World Trade Organization

FP: Fiscal Policy

MP: Monetary Policy

GMM: Generalised Method of Moments

OLS: Ordinary Least Square

PAM: Partial Adjustment Method

CD: Custom Duty

ST: Sales Tax

FED: Federal Excise Duty

PP: Philips Perron test

AIC: Akaike Information Criteria

ADF: Augmented Dickey Fuller test

LM: Langrange Multiplier test

VECM: Vector Error Correction Method

SBC: Shcwarz Bayesian Criteria

## **Abstract**

The role of fiscal policy in affecting economic activity has been on the theoretical and applied research agenda for both academicians and policy makers since the evolution of macroeconomics. This thesis attempts to identify the fiscal policy effectiveness with respect to different budgetary components towards aggregate economic activity and its components using the data from 1960-2010. We employ the structural VAR estimation method to identify the impact of fiscal policy instruments on the aggregate and disaggregated economy for Pakistan. Government expenditures as a policy instrument appear to be more effective as compared to taxes. Three possible reasons for such an outcome appears; low tax base, less elastic taxes and ratchet up effect on government expenditures. Private investment is supplemented with government expenditures; hence increase in development is inevitable for increasing the pace of economic growth. Finally aggregate indicators of policy intervention variables; here the Fiscal policy, such as budget deficit and the outcome variable, here the economic activity (such as the GDP) may give a picture which is different from what is happening at the disaggregate level for both the intervention and outcome variables. Hence fiscal policy conduct may incorporate the disaggregated level of instrumentation and outcome variables should also be seen in component wise effects.

## Summary

The role of fiscal policy in affecting economic activity has been on the theoretical and applied research agenda for both academicians and policy makers since the evolution of macroeconomics. Fiscal Policy can affect an economy dynamically; this impact could differ across economies depending on the structure of the economies. In the context of developing economies, such as Pakistan, where active fiscal policy or a non-Ricardian fiscal policy is practiced, large seigniorage revenues exist and ratchet-up effects of expenditures are found, it thus becomes crucial to ascertain the fiscal policy effectiveness. This thesis attempts to identify the fiscal policy effectiveness with respect to different budgetary components towards aggregate economic activity and its components using the data from 1960-2010.

The estimation is divided in two parts; in the first step, we have estimated the elasticities for the revenue and expenditure aggregates and sub-aggregates. These elasticities are required to be used to calculate the structural VAR. In second step, we employ the structural VAR estimation method to identify the impact of fiscal policy instruments on the aggregate and disaggregated economy for Pakistan.

Standard Cholesky decomposition which sets the upper triangle in the relation matrix of the structural shocks to the reduced form VAR shocks is without a theory and may have serious issues especially if the reduced form residuals are strongly correlated. Further the ordering may also cause a difference in the innovation accounting (impulse responses and variance decomposition). To avoid it for estimation we are using the Blanchard and Roberto (2002) approach which is an extension of Sim (1986) and Bernanke (1986) proposed structural VAR.

We have identified the parameters and then the impulse responses and variance decomposition is done to comment on the transmission mechanism. Following the approach used

by Blanchard and Roberto (2002), we have used both the Deterministic trend and Stochastic trends in reduced form VAR estimation and also a cointegrating relationship approach (VECM) to compare the results.

In Pakistan's case, it is evident that fiscal policy has been playing a major role in providing policy options for the government throughout her history of economic management. There seems to be regime switching among the components, across fiscal instruments and across level of the governments. For that we have estimated elasticities of fiscal indicators at disaggregated level on revenue side for both the federal and provincial governments.

The novel procedure developed by Blanchard and Roberto (2002) uses the institutional information such as the elasticity of different fiscal instruments e.g. taxes and the decision orders to identify the transmission channel for fiscal policy instruments. We have used the same approach where affects of different fiscal policy instruments on the aggregate and the disaggregated economy for Pakistan. It was observed that government expenditures at the aggregate level affect the economy in line with the theory, i.e. it affects the economic activity positively, whereas the tax variable shock affects economic activity opposite to the theory. This may be due to the fact that the tax elasticities are very low and government expenditures also behave in a ratchet up manner, as also pointed out by other authors. Hence, when revenues increase the government expenditures also increase instead of paying off the debt, which may lead to a positive impact on the economic activity.

We estimated separately, the fiscal policy effectiveness for fiscal policy instrument sub-components i.e. defense and interest payment expenditures. In our analysis it turns out that defense expenditures have positive impact on economic growth while interest payments negatively affects it which is comparable to a number of studies (please see chapter five for

detailed results). Similarly, disaggregated analysis for the tax revenue variable by splitting it in the broad categories of direct taxes and indirect taxes was also performed. From that analysis it appears that direct taxes affect economic activity negatively while indirect taxes ambiguously affect economic activity positively. This is mainly due to weak tax elasticity (as earlier mentioned around 0.43 only) and because of the corresponding ratchet up effect in government expenditures which further exacerbate the situation.

Finally the fiscal policy effectiveness for the components of GDP was estimated. It was observed that private consumption is crowded out with increased government expenditures, a result consistent with the neoclassical school of thought, whereas it increases with an increase in taxes. Similarly private investment is crowded in with total government expenditures a case now consistent with the Keynesian school of thought and negatively affected with taxes. For the external sector, firstly for per capita exports; these decline with increased government expenditures while for imports; these increase with increased level of government expenditures thus suggesting the theoretical case of twin deficit phenomenon to hold for Pakistan.

To conclude Government expenditures as a policy instrument appear to be more effective as compared to taxes. Three possible reasons for such an outcome appears; low tax base, less elastic taxes and ratchet up effect on government expenditures. Hence there is a need to reform our taxation system. Private investment is supplemented with government expenditures; hence increase in development is inevitable for increasing the pace of economic growth. Finally aggregate indicators of policy intervention variables; here the Fiscal policy, such as budget deficit and the outcome variable, here the economic activity (such as the GDP) may give a picture which is different from what is happening at the disaggregate level for both the intervention and outcome variables. Hence fiscal policy conduct may incorporate the

disaggregated level of instrumentation and outcome variables should also be seen in component wise effects.

From the above analysis it emerges that the Political Economy of Fiscal Policy seems (not modeled here, but needs to be evaluated by some future study) to be more significant as compared to the economic rationale of policy actions, implying that institutions such as Fiscal Responsibility and Debt Limitation Law (FRDLL-2005) needs to be strengthened. Transparency of objectives for Fiscal policy conduct is required; implying an identification and ex-post evaluation of policy goals/outcomes both for the shortrun and the longrun. Finally aggregate indicators of intervention variable, here the Fiscal policy; such as budget deficit and the outcome variable, here the economic activity (such as the GDP) may give a picture which is different from what is happening at the disaggregate level for both the intervention and outcome variables.

# Chapter 1

## Introduction

The role of fiscal policy in affecting economic activity has been on the theoretical and applied research agenda for both academicians and policy makers since the evolution of macroeconomics. Now modern macroeconomics literature emphasizes both the shortrun and longrun objectives of fiscal policy as being fundamental (Romer, 2007). In the shortrun it can be used to counter output cyclicalities and/or reduce volatility in macro variables, which is descriptively similar to as of role of the shortrun monetary policy. Further, in longrun also fiscal policy can affect both the demand and supply sides of the economy. But in most traditional analyses it is assumed that fiscal policy would adjust to ensure that the inter-temporal budget constraint is satisfied, while monetary policy is free to adjust its instruments ('Ricardian Regime' according to Sargent, 1982) such as stock of money supply or nominal interest rate (Walsh, 2003).

The debt financing methods, expenditure and tax powers of fiscal authorities have been seen to affect both the supply and demand sides of the economy. As noted by Baxter and King (1993), the initial Real Business Cycle models had only the supply side effects of the fiscal policy; where these were transmitted through the wealth effect and labor-leisure choices of the household only. Recently, the New-Keynesian type models with micro-foundations and sticky prices argue that fiscal policy management could also be accorded for stabilization through the supply side (Linnemann and Schabert, 2003). The demand side effects of fiscal policy could also be found but with more imperfections such as 'Rule of Thumb' consumers or those with liquidity constraints, which lead to exclusion of Ricardian equivalence (Gali *et al.* 2005). But all that depends on the structure of the economy, as Blanchard and Roberto (2002) stated:



*“The evidence from large-scale econometric models has been largely dismissed on the grounds that, because of their Keynesian structure, these models assume rather than document a positive effect of positive fiscal expansion on output”.*

Blanchard and Roberto (2002) also noted that there is persistent effect of government spending on private consumption, which is consistent with the Keynesian models but opposite to the neoclassical paradigm. Further, the new literature on the theory of ‘expansionary fiscal contraction’ asserts that reduction in provision of those public goods which are in the utility function of households ( by virtue of reduction in government expenditures) leads to increased spending by households to meet that gap and have, an increase in aggregate demand.

Interestingly, with little empirical knowledge about the systematic effects of different fiscal policy instruments on different macroeconomic variables (Perotti, 2001), there is now a renewed emphasize on fiscal policy as a staunch instrument for managing the demand side of economy (De Castro and Hernandez, 2007). In order to gauge the effects of shocks in fiscal policy on the economy or its responsiveness to various macro variables (i.e. the automatic stabilizers property of fiscal instruments), one has to see the stance of the fiscal policy by composition of budget both by the share of components and their classifications. Normally, macroeconomics ‘fiscal stance’ is assessed by looking at the consolidated scale of public deficit. But the dynamic effects of the shocks in government spending, taxes and the consolidated budget deficit (thereby implying the composition of inter-temporal budget constraint) can be altogether different in magnitude and lags in implementation.

On the other hand, government expenditures can be of permanent and transitory nature. Both have different direct multiplier (Keynesian) effects on aggregate demand and its components, which are mainly consumption and investment. For instance increased government

expenditures can lead to increased aggregate demand directly in a standard IS-LM framework, by activating the idle production factors in the economy and creating more employment and output growth. Moreover, in recessionary phases, when economy is in a liquidity trap (e.g., Japan), where private investment demand becomes inelastic, fiscal policy can provide the necessary stimulus to the economy for coming out of that trap.<sup>1,2</sup> Further, in developing economies, government expenditures also play a complimentary role for private investment. On the contrary recent evidence from global economic crises, where discretionary fiscal policy was adopted due to weakened monetary policy transmission channels (Furceri and Annabelle, 2010) mainly due to dysfunctional financial markets, thus a passive monetary policy and high levels of uncertainty made it difficult to assess the effectiveness of fiscal policy through looking at simple fiscal multipliers only.

On the financing side of government expenditures options such as tax or inflation-seignorage (money printing) financing have altogether different implications, whereas creating a debt to finance the government expenditures have yet another set of dynamic effects on macroeconomic variables. In case of money printing (fiscal dominance) there are changes in price levels and controlling them by monetary policy alone could be miss-targeted. If the increased government expenditures are financed by issuing bonds through banking system then it could lead to crowding out of private investment if interest rate rises in the loanable funds market. On the other hand, in the presence of a loose monetary policy (implying a passive fiscal policy) the interest rate would decrease and output increase. So, domestic debt-raising cost

---

<sup>1</sup> One of the more recent examples could be the fiscal stimulus in financial crises in the USA and the Euro-zone.

<sup>2</sup> However in case of a real business cycle model, with Ricardian consumers there could be a negative impact of government expenditures on consumption. On the other hand there is also a growing literature that identifies the presence of rule-of-thumb consumers in the economy, these consumers are non-Ricardian and base their decisions on their current wages. In this case the effects increased government expenditures would be positive on consumption and output. Similarly, monetary policy becomes ineffective in real business cycle supply-side theories, but fiscal policy is effective through the investment demand and labor supply (with taxes being distortionary).

would decline, as it is done through increase in money supply, the home currency would depreciate and there could be indirect impact on the foreign debt servicing of the country (Leeper, 1990, 1991).

The fiscal policy stance through adopting a specific tax structure can affect supply side of the economy also by affecting the household labor supply decisions or the firm's business financing decisions, etc. Direct and indirect tax levels have different transmission mechanisms to affect economic agents' decision making. For instance changes in taxes and, hence, disposable incomes of household would lead to an effect on the consumption, investment, labor supply and saving decisions of the agents.

Deficit levels, financing patterns and financing sources also have different implications for macroeconomic variables. Domestic versus external borrowing, multilateral versus unilateral borrowings, banking versus non-banking borrowing and short-term versus long-term borrowing all have different dynamic effects on the economy. There have been a number of studies exploring these issues. For example, Barro (1989) explored whether bonds are net wealth or not, where Ricardian equivalence can hold or may be challenged, depending on the types of consumers, policy environments such as imperfect loans market, timing of taxes and uncertainty of incomes etc.

Fiscal policy is considered to have dynamic transmission mechanism, as it carries longer policy lags for different macro variables as compared to monetary policy. The private agents form anticipations about the policy (here fiscal policy); hence it is not entirely unexpected (Blanchard and Roberto, 2002). Further, with interaction to different monetary policy stances, while considering solvency constraint, fiscal policy has different impacts on key macro variables. Theoretically monetary policy can respond to inflation and fiscal policy could focus on output

and distribution. However, monetary policy stabilization policies have often fallen short of the intended results as these are inflation biased policies due to targeting of potential output growth rate above the natural rate,<sup>3</sup> especially in developing economies where private sector lacks the capacity to keep output at the potential level and provide for all welfare maximizing goods through market mechanism.<sup>4</sup> Further, new evidence shows that fiscal stance can also impact prices in an economy (e.g., see Leeper, 1991, and Woodford, 2001).

### **Motivation for the Study**

Fiscal Policy can affect an economy dynamically; this impact could differ across economies depending on the structure of the economies. It can have direct or indirect effects on the levels and growth rates of demand side and supply side variables such as output, prices, exchange rate, interest rate, balance of payment, debt, consumption, investment, labor supply and the future fiscal policy variables.

Fiscal policy is considered to be the most active tool for macroeconomic stabilization and growth achievements, especially in a developing economy context. This is also evident by the activeness of fiscal policy vis-à-vis monetary policy (Nahyun, 2010). Further, the political economy context of fiscal policy, war escalations across border, natural disasters and governance issues of conduct of fiscal policy, all have been affecting the magnitudes of its instruments and its sustainability. With experiments in the levels of governments and functions, the outcomes of fiscal interventions are difficult to measure across the tiers of the government in the countries where reforms are taking place.

Therefore, in the context of developing economies, such as Pakistan, where active fiscal policy or a non-Ricardian policy is practiced, large seigniorage revenues exist and ratchet-up

---

<sup>3</sup> The natural output can be taken to be equal to potential output.

<sup>4</sup> As also seen by some empirical studies; private investments are complementary to the government durable spending (see Richard et al., 2002, Shahid and Naved, 2010 and Tariq, 2003).

effects of expenditures are found (Khalid et.al. 2007), it becomes crucial to ascertain the fiscal policy effectiveness in Pakistan. This thesis attempts to identify the fiscal policy effectiveness with respect to different budgetary components towards aggregate economic activity and its components.

Most of the studies reviewed have used either the cumulative variable of fiscal deficit as an indicator for fiscal policy (whereas choice of fiscal instruments can have a different impact on macro variables e.g. see Furceri and Annabelle (2010)) or have not adjusted the fiscal variables for their automatic responses towards the economic activity, hence the results may be dubious for the impact and effectiveness of Fiscal policy for developing countries like Pakistan.

Our study here employs the novel Structural Vector Auto Regressive (SVAR) method of estimation (as noted by Cogan *et al.* 2009, that model assumptions and estimation techniques can lead to varying results) by taking two levels of disaggregation, first by looking at the impact of government expenditures and taxes as instruments of fiscal policy instead of fiscal deficit, and then looking at the second level of disaggregation of taxes and expenditures. Further the use of institutional information of fiscal policy settings, the automatic response of a fiscal shock is also incorporated.

In analyzing the fiscal policy variables we have also considered atypical fiscal disaggregated indicators such as interest versus non-interest, defence and interest combined versus non-defence non-interest expenditures and direct taxes versus indirect taxes for evaluating the fiscal policy effectiveness as each of these may have a different multiplier. For the case of fiscal shocks almost none of the studies has empirically tested the relationship of disaggregated fiscal policy instruments at this level with the aggregate and disaggregate macroeconomic variables in the context of Pakistan. By considering different fiscal policy variables a number of

policy lessons can be derived which can be helpful in designing an effective fiscal policy mechanism.

## **Objectives**

Targeting of different instruments can have different impact on the macroeconomic performance both in terms of long term growth and sustainability of public finances (e.g. see Furceri and Annabelle, 2010). By considering different fiscal policy variables a number of policy lessons can be derived which can be helpful in designing an effective fiscal policy mechanism. The study aims to extend positive literature on the following aspects for Pakistan using the data from 1960-2010:

1. Present a historical review of the fiscal policy instruments and institutions in Pakistan
2. Estimate revenue elasticities for different revenue variables and their components and the disaggregation by the levels of the governments (Federal and Provincial)
3. Empirically examine the fiscal policy effectiveness in Pakistan for aggregate and disaggregated macroeconomic variables:
  - a. By considering different fiscal policy instruments/budgetary components such as revenues and expenditures, and their sub-components and
  - b. By using different policy stance identification schemes to contrast the results of the estimations.

## **Organization of the Study**

In this study chapter 2 explores the existing literature on the topic and also presents the theoretical model. Chapter 3 gives the different developments over time for the inclusion of fiscal policy as a stanch option for achieving different welfare objectives in Pakistan. Here both the historical, institutional and empirical portion is covered. Pakistan specific descriptive

analysis is also done to ascertain the fiscal instruments, their policy context, time, magnitude, sustainability, source of financing and different other assignments roles by the levels of government. Chapter 4 gives the estimation methodology and data issues for the examining the fiscal policy effectiveness in Pakistan and the elasticity parameters of different revenue side fiscal instruments to be used in the next chapters. Chapter 5 and 6 consist of estimation results and discussion for fiscal policy effectiveness towards aggregate and disaggregated economy of Pakistan. In the end conclusion and policy recommendations are presented in chapter 7. References to studies used in this thesis are provided at the end.<sup>5</sup>

---

<sup>5</sup> Instead of providing appendices at the end of the thesis, relevant appendix is provided at the end of the each chapter.

## Chapter 2

### Literature Review

#### 2.1 Introduction

Textbook aggregate-demand models suggest simple and straightforward relationships between government budget allocations and economic activities; e.g. a cut in the government budget deficit would depress private spending and output in the economy. Though such models heavily influence the design of stabilization policies, their micro foundations are unclear and their sharp predictions are not always consistent with realities. In many countries large cuts in government spending carried out as part of stabilization programs have led to expansions rather than contractions in economic activities.<sup>6</sup> While most economists would agree that an exogenous increase in money supply will lead to some increase in price level, but it is difficult to ascertain the sign of the responses of say private consumption or private investment to an exogenous shock to government spending or to a tax cut.

There has been considerable literature available on assessing the impact of monetary policy on the economy or the coordination problem between monetary and fiscal policies. But only recently small, but growing literature has come up applying standard time-series analyses to the dynamic impact assessment of fiscal policy instruments on the major macro-economic variables.

The predominant Keynesian view of the effects of fiscal policy that was embedded in the large scale macro econometric models of the 1970s and 1980s has now come under severe criticism because of the built-in Keynesian structure in these models; they assume rather than

---

<sup>6</sup> The Literature refers to this situation as expansionary fiscal contractions [See e.g. Giavazzi and Pagano (1990), Bergman and Michael (2010), Barry and Michael (1995) and Guajardo *et al.*, (2011)].



document a positive effect of fiscal expansion on output (Blanchard and Roberto, 2002). Theoretically, in the neoclassical approach that has developed in the last twenty years; government spending can have drastically different effects than those obtained in Keynesian models, particularly on private consumption. The need for empirical investigation to elucidate the issues in these debates spurred a large body of new research, which can be largely grouped in the following three categories. The first category of research focused on specific episodes; fiscal consolidations or the study of the macroeconomic impact of large reductions in the budget deficit.<sup>7</sup>

The second line of research analyzed the stabilizing capability of the fiscal policy variables, i.e., to what extent the tax and transfer system provides insurance against idiosyncratic regional shocks and how well it stabilizes macroeconomic fluctuations in the aggregate economy.<sup>8</sup> Finally, in the third category, the dynamic effects of discretionary fiscal policy on macroeconomic variables - a typical issue in the large macro econometric models of the 1960s and 1970s - was recently revived within the framework of Vector Autoregression models in the seminal work of Blanchard and Roberto (2002). On the other hand, dynamic stochastic general equilibrium (DSGE) models are also presented in this regard, which use the new Keynesian assumptions i.e., nominal rigidities to suggest a rationale for fiscal policies that promote stabilization (Afonso and Peter, 2008).

As in most modern macro-economic models, the extent of fiscal crowding out in response to a government debt shock depends critically on 1) the degree to which consumers are assumed to count government bonds as net wealth, 2) the relationship assumed between aggregate consumption and disposable income, and 3) the assumed sensitivity of aggregate consumption to

---

<sup>7</sup> See, for example, Bertola and Drazen (1993).

<sup>8</sup> This category includes papers on fiscal federalism and the provisions of insurance by the tax and transfer system, e.g., see Asdrubali *et al.* (1996).

changes in interest rate. If consumers are connected to all future generations by operative intergenerational transfers, increases in government debt will not crowd out private investment because consumers will change their saving rate today to prepare for tax liabilities in the future. This phenomenon is referred to as the Ricardian equivalence hypothesis because taxes today (that is, tax financing of government spending) are equivalent to taxes in the future (that is, deficit financing of government spending). But this does not always hold because of two reasons. First, since a significant fraction of consumers cannot borrow against their future labor income, their expenditure is effectively constrained by their current disposable income. Second, consumers who are constrained by wealth rather than disposable income are assumed not to internalize the tax burden that will be passed on to future generations. Thus wealth-constrained consumers are assumed to incompletely adjust their saving rates in response to higher future tax liabilities because they realize that future generations will partly share the tax burden associated with the higher levels of government debt (Barro, 1989).

In view of these micro-foundations of fiscal policy the present chapter has been organized to discuss theoretical and empirical aspects of fiscal shock dynamics, which are in the third strand of research outlined above. This chapter will briefly explain the stance of a fiscal policy shock, and then elaborate on the theory on fiscal policy effectiveness from various dimensions such as explaining the difference in a tax shock and an expenditure shock and the discussion on the impact of fiscal policy shocks on the aggregate and disaggregated macro variables. In the end some empirical literature will be discussed both globally and with reference to Pakistan which identifies existing gaps and extensions to be provided in this thesis.

## 2.2 Fiscal Stance

Interpreting the fiscal policy shocks arising from the tax/revenue changes and the government spending changes becomes important while gauging the impact of fiscal policies. Government spending is typically budgeted in advance for the whole fiscal year; hence one could argue that the fiscal shocks identified are not really unanticipated. However, the yearly budget is often mostly considered as a political document (e.g. developing countries like Pakistan), whose figures typically bear little relation to the actual expenditure eventually disbursed, and which is discounted by the private sector as such.

In addition, even if the total expenditure for the year were fixed and reliable, actual cash disbursements can vary unpredictably on a quarterly basis for a variety of reasons. Strictly speaking, the fiscal policy shock only for the last quarter of the fiscal year would be somewhat accurately predictable under these circumstances. More importantly, there are shocks to budgeted expenditure all through the year, due to mid-year legislation and executive decisions. Under this interpretation, we can consider that the decision lags in fiscal policymaking help identify the shocks and implementation lags contribute to making them predictable. Thus, the validity of the identification procedure outlined here is a matter of degree. It depends on how long and predictable are the decision lags relative to the implementation lags, and on how important is the yearly budget relative to quarterly policymaking. On the revenue side there are different forms of tax adjustments: lump-sum taxation, distortionary taxes,<sup>9</sup> deficit financed tax cut, etc., all of which can have altogether different implications.

---

<sup>9</sup> In the presence of tax distortions it is also relatively easy to generate negative effect of government purchases of goods on private investment, even with persistent spending shocks (Alesina *et al.* 2002).

In general there is a consensus that macroeconomic policies have been found to be highly procyclical.<sup>10</sup> It has been observed that when economies are contracting, the budgetary authorities are also inclined to put a cut on badly needed expenditures at that time, or the central banks tend to increase interest rates as they are pursuing an anti-inflationary policy. Such a fiscal stance increases stress on the economy as a whole.

The procyclical policies are not only limited to stress periods in most of the developing countries; rather they present a ratchet up effect also (e.g. see Khalid *et al.* 2008). This phenomenon was also found for Latin American countries, where it was observed by Gavin and Roberto (1997) that fiscal policy is expansionary in good times and contractionary in bad times. Talvi and Végh (2000), Lane (2003) and Braun (2001) using different methodologies noted that procyclical fiscal policies can be generalized for all the developing countries as the countercyclical policies are for the developed countries. Although Gupta *et al.* (2005) found empirical support for procyclical government spending in developing countries, but they differ in the extent and the composition of response.

There are major competing theories for these differences in fiscal response across developed and developing countries. For example, Gavin and Roberto (1997) and others argue that in developing countries it is the credit constraints that prevent governments from obtaining credit in economic crises. So they have to repay even what they borrowed earlier in bad times too, which will result in contraction of certain fiscal components.<sup>11</sup> There are theories about the voracity effect<sup>12</sup> also in which due to competition for a pooled fund the increase in government expenditures may be more than the temporary gains in funds transfer (in the form of taxation)

---

<sup>10</sup> Therefore such macroeconomic policies may be considered as adding fuel to the fire in case of booms or busts.

<sup>11</sup> For a contrast please see Reinhart *et al.* (2003) for an analysis of borrowing across cycles.

<sup>12</sup> This refers to the collective action problem where due to strong blocks and the absence of strong institutions increase in the share of government expenditures is more than the increase in resource pie.

(Tornell and Lane, 1999). Following such political business cycles also the opportunist policy makers would run smaller primary surpluses in good times (Talvi and Végh, 2000). Further, Riascos and Végh (2003) have also shown that in case of developing countries, incomplete markets can explain procyclical fiscal policy as a result of Ramsey type problem (neo-classical growth model with endogenous savings) without imposing any additional frictions.

### **2.3 Fiscal Policy Effectiveness**

The role of fiscal policy is central to macroeconomic growth and stability. Due to applications of different fiscal responsibilities pacts across countries,<sup>13</sup> the monitoring and forecasting of fiscal positions is also very much essential. While the stock effects of fiscal policy are captured by a huge volume of both theoretical and empirical research, the dynamic impact is relatively less explored. Moreover, the effectiveness of the revenue components and expenditures components as fiscal policy instruments is also scarce.

Alesina *et al.* (2002) noted that the size of the impact for the fiscal policy instrument suggests that there may be nothing special in the behavior of investment during the periods of large fiscal adjustments. The fiscal stabilizations that have led to an increase in growth consist mainly of spending cuts, particularly in government wages and transfers, while those associated with a downturn in the economy are characterized by tax increases. So, exactly what types of wealth effects occur in response to shock in fiscal policy is difficult to determine. For instance, fiscal policy can affect human wealth by impacting the size of the future disposable income at given interest rates. If a fiscal consolidation reduces nominal interest rates, the value of assets denominated in nominal terms increases as there is a negative relationship with interest rates and the prices of assets; because bad times (recessions) are normally associated with high levels of

---

<sup>13</sup> Such as Stability and Growth Pact of 1997 in European Union and Fiscal Responsibility and Debt Limitation Law of 2005 in Pakistan.

public debt. This is a potentially important source of asymmetry between normal and difficult times (normal vs. recessions) . Similar considerations apply to a fall in the real interest rates.

Both government expenditure and taxes affect GDP. Since the two are presumably not independent, to estimate the effects of any one of them on GDP, it is necessary to include the other (Blanchard and Roberto, 2002). According to Barro (1981), a temporary tax cut, holding government spending constant, will lead to a permanent increase in the ratio of government debt to GDP, due to higher public borrowing accompanied by a pickup in economic activity in the near term. Private consumption and savings rise with the fall in taxes and increase in disposable income. An increase in the fiscal deficit leads to upward pressure on interest rates and exchange rate (domestic currency in terms of foreign currency) initially, leading to some crowding out of investment and net exports. Since the increase in public dissaving is not fully offset by a rise in private saving, the current account deficit tends to widen and greater reliance on foreign saving leads to an increase in net external debt. In the longrun, private consumption and disposable income are lower, reflecting the higher taxes required to finance higher interest payments on a higher public debt.

The longrun levels of investment, capital stock and output decline slightly in association with the higher level of debt because the steady-state real interest rate in the individual country models is assumed to be tied down by, say, a Taylor-rule type monetary rule. Meanwhile, net exports rise in the steady state—in association with a permanent decline in the real competitiveness index—to finance the higher interest payments to foreigners resulting from higher external debt.

On the other hand, Barro (1981) also estimated the effects of a permanent increase in the ratio of government spending to GDP on macroeconomic variables, by holding tax rates

constant, say for five years and subsequently adjusting the basic tax rate to stabilize the ratio of public debt to GDP at a level that is higher than in the baseline case. This shock leads to increases in output, interest rates and exchange rate in the short term. Higher interest rates and an appreciated currency tend to lower investment and net exports in the near term, and the fall in national (private plus public) saving tends to worsen the current account balance and increase the level of net foreign liabilities. In the longrun, private consumption and disposable income are again lower because of higher taxes (required to bridge the deficits created in the previous periods). However, in the longrun there is a decline in disposable income (due to higher taxes) in the full model simulations with world real interest rate being endogenous and determined by equilibrating world savings and investment.

Further, the effects of fiscal policy on macro variables when differences in real interest rates of an economy depend on the level of government debt, are different (i.e. considering a model in an open economy context with perfect capital mobility). The increase in income levels are somewhat larger in case of the government expenditure shock, as compared to the effect of a tax shock. The former shock induces a larger crowding out effect on private consumption to accommodate for the higher public consumption. But, as is the case for the temporary tax cut, the real interest rate converges back to the world rate of interest as output, investment and the capital stock return to their baseline levels. Meanwhile, on the external side, a steady-state real depreciation is again required to boost net exports and finance the larger stock of net external debt. This is why in the major industrial countries, shortrun government spending multipliers tend to be significantly greater than the tax multipliers (Barro, 1981).

The role of expectations in gauging the impact of fiscal policy interventions is profound. If deficit reduces due to the decrease in the government spending then the private consumption

will increase while the output will at worst remain unchanged and may rise if current output depends negatively on the expected future taxes. If the tax increases with no change in expected government spending, output will fall and consumption will at best remain unchanged and may fall if a government spending cut had been expected (Bertola and Drazen, 1993). The expectations view of the fiscal policy indicates among other things that a neoclassical model may generate observable implications that look quite Keynesian. In a no money closed economy with fixed output situation, an increase in government spending that induces the expectation of a future spending cut, will cause interest rates to rise. If work effort were endogenous, increase in the government spending would imply expansion in output as consumers attempt to increase their current incomes by increasing work hours (Bertola and Drazen, 1993).

### **2.3.1 Fiscal Policy Effects on Aggregate Economic Activity**

Fiscal policy may have greater impact on the aggregate output when it provides those goods and services that the private sector cannot provide for by itself (Boskin, 1988). Further, this could also happen if fiscal policy acts to redistribute the resources among individuals having different opportunities or for the same individuals between different times in their own life spans or among different generations. Broadly speaking, there are two strands of theories put forth explain the effects of changes in government expenditure on the aggregate economy. One is the Keynesian tradition; following the tradition IS-LM Philips curve model (Linnemann and Andreas, 2003), which considers the transmission of increased government expenditure to consumption basing on the assumption of sticky prices. It states that increased government expenditures represents an exogenous change in aggregate demand, thereby motivating firms to sell more and in the process produce more employment and have a multiplier impact on consumption.



On the other hand, there is fully flexible price setting behavior of optimizing agents modeled through real dynamic general equilibrium models (e.g. see Baxter and King, 1993). The transmission channel for this type of neoclassical general equilibrium settings works through the labor supply decisions of household based on negative wealth effects. In this setting increased government expenditure is financed by taxes, which creates a negative wealth effect on labor supply. Therefore to maintain their incomes, the workers have to work more, thereby increasing employment and output. Consequently the result of such type of setting is different from those which follow the Keynesian type of models that work through aggregate demand. Here because of optimal response of household labor supply the impact on consumption is reverse of that found in Keynesian models (Linnemann and Andreas, 2003).

There is another approach towards this dynamic model setting behavior, which is called the New Keynesian Economics as noted by Hairault and Portier (1993), Clarida *et al.* (1999), Goodfriend and King (1997), McCallum and Nelson (1999), etc. This is also dubbed as New Neoclassical Synthesis. In this type of setting, with price stickiness, nominal variables also become important and hence the interaction of monetary policy with the fiscal policy plays a major role in affecting the macro variables.

So the Keynesian way of looking at the government expenditure change is purely an aggregate demand shock and then the supply side follows, whereas the neo-classical school proposes that with changes in government expenditure it will be the negative wealth effect which will lead to passive adjustment by the demand side. In the New-Keynesian school it is the synthesis of the two and hence the role of monetary policy also becomes important to either accommodate the supply side shock to the demand change or not.

In this way with increase in government expenditures two types of effects emerge. First, if government expenditures are financed through increased taxes, there will be a negative wealth effect on the labor supply and hence household will provide more labor services. So there will be a supply shock to the economy and output will rise. Second, there will be incomplete crowding out of the consumption and hence the aggregate demand will also increase. The change in price level will depend on the relative effects of the two (Linnemann and Andreas, 2003).

The role of monetary policy here becomes important through its effect on interest rates. With economic activity expansion, the real interest rates will increase, which can affect consumption/leisure plans of the household. So, if the monetary policy regime controls interest rate then the impact of fiscal policy will be more significant as compared to a case when monetary policy is not effectively controlling the interest rates. One could argue that differences in the government spending multipliers, both over time and across countries, might be caused by differences in the behavior of the monetary authorities (proposed as active-passive fiscal/monetary regimes by Leeper, 1991).

Just as the output elasticity of taxes is a crucial parameter in estimating the effects of taxes on GDP (more specifically in case of Structural Vector Auto Regressive Systems-SVARs), so is the price elasticity of government spending crucial in estimating the effects of government spending on prices.<sup>14</sup> Increase in the public wages and/or employment put upward pressure on private sector wages, which is consistent with competitive or unionized labor-market models. Also, indirectly workers in the private sector may react to tax hikes or more generous transfers by decreasing the labor supply, asking for higher pretax real wages as described by Alesina *et al.* (2002).

---

<sup>14</sup> See Blanchard and Roberto (2002) for an early application of this methodology.

## **The effects of Government Spending**

The longrun effects of public policies are evaluated at the economy's steady state values, where following types of effects are observed: Government influences net resources available to the society along the resource constraint. For example, basic government purchases financed by lump-sum taxation exert only resource cost; this type of purchase simply transfers resources in the economy without altering equilibrium prices. Government investment, on the other hand, involves a resource benefit as well as a direct resource cost (in terms of transformation of private goods to publicly provided goods in an economy), since a larger stock of publicly provided capital makes private factors more productive (Baxter and King, 1993).

The impact response of change in government spending on aggregate economic activity is positive and significant in most of the studies. For example in the USA there is a positive response estimated by Blanchard and Roberto (2002), where the size of the impact response is between 0.3 and 0.4 percent of GDP.<sup>15</sup> The effect varies over time, sometimes elongated and sometimes not. For example, again, in case of USA it was estimated that after the initial rise GDP starts declining and after about 4 quarters it rises again (Perotti, 1999). Increases in government spending has economic effect which is consistent with a large variety of economic theories, including Keynesian, neo-Keynesian, real business cycle theories or models with increasing returns, as all of these theories predict an expansion with multiplier larger than one, i.e. output increases more than one-to-one when compared to the standard Real Business Cycle model by Fatas and Ilian (2001). Additionally, Baxter and King (1993) in their general equilibrium analysis of fiscal policy found that permanent changes in government purchases are

---

<sup>15</sup> Here the impulse response of Government spending and taxes are multiplied by their respective average shares in GDP to obtain impulse responses in terms of shares of GDP. Further the actual response of government spending on impact is usually slightly different from 1, because of the feedback from output and price changes to fiscal shocks.

associated with larger output effects than those that arise due to temporary changes in purchases; contrary to the findings of Barro (1981).

The effect of a fiscal intervention on aggregate demand components like consumption, investment and net exports may be described differently on the basis of model assumptions; e.g. the behavior of the consumers (such as planning over a long horizon or rule of thumb consumers), whether the intervention is permanent or temporary, is it anticipated or not, does the consumer discount the future tax liabilities (due in his/her life time or those of his/her offspring), the monetary policy regimes and functioning of capital markets.

In many instances empirically it is reported that fiscal contraction has actually proved to be expansionary. For this transmission, in literature, both channels of consumption and investment are identified. It is argued that when government reduces its spending, consumers tend to provide for those goods which were earlier provided by the government. On the other hand, when government investment decreases it is observed that mostly in developed economies, private sector starts investing in those left-over sectors which the government is no more targeting. Hence, fiscal contraction actually leads to an output expansion.<sup>16</sup>

### **The Effects of Taxation**

Expansionary fiscal policy could also be identified through a tax cut, but the effect of this tax cut could be different if it is financed through the cut in government expenditures or through increase in debt burden or a mix of the two (Mountford and Harald, 2009).

There is strong evidence that there is a negative effect of taxation on GDP (Perotti, 1999). But it depends on the tax to output elasticities that determines what will be the effect of the seasonally adjusted tax shock on output. At the same time, as also estimated by Blanchard and

---

<sup>16</sup> This phenomenon has been reported by Giavazzi and Pagano (1990), Bertola and Drazen (1993), Alesina and Perotti (1995), and Alesina (1997). The same is also identified by Drazen (2001) for developed countries and by Gupta *et al.* (2005) for developing economies.

Roberto (2002), this effect could be on higher side as compared to the estimates of others e.g. Perotti (1999), whereas both estimated effects for the same 19 OECD countries included in their sample. Similarly Baxter and King (1993) found that permanent changes in the government purchases have important effects on macroeconomic activity when these are financed by lump-sum taxation. The associated multiplier are likely to be greater than one in the longrun and if labor supply is highly elastic then a shortrun multiplier is also possible to be greater than one.

These effects are transmitted through the changes in prices. For example according to Perotti (1999) the net tax shocks have positive impact on the nominal interest rate in three countries (USA, Canada and Australia) all presented around 0.2 percentage points in elasticity terms, and essentially no impact in West Germany and the U.K. Broadly speaking the nominal interest rate response is positive in the shortrun and negative or zero in the longer run. This could be explained by two reasons; first joint tightening by fiscal and monetary authorities,<sup>17</sup> secondly due to reverse causation i.e. when interest income increases, tax revenues from non-labor income also increases (Perotti, 1999). Further, there is also an evidence of stronger negative effects of net taxes on prices in the shortrun (Perotti, 1999).

### **2.3.2 Fiscal Policy Effects on Components of Aggregate Economic Activity**

#### **Fiscal Policy Effects on Consumption**

In almost all the studies reviewed, the behavior of private consumption largely mimics that of GDP in response to change in fiscal variables. However, in the presence of automatic fiscal stabilizers such as income tax and cyclical government current expenditures the response of household's consumption expenditure to shock in the economic activity/income is different as compared to a situation where these are not present (Cohen and Glenn, 2000). Blanchard and

---

<sup>17</sup> This explanation might be consistent with the fall in the nominal interest rate in response to a positive government spending shock.

Roberto (2002) found that private consumption is consistently crowded out by taxation and crowded in by government spending. The latter result is difficult to reconcile with neoclassical models of Real Business Cycle, regardless of persistence of spending shock but it is consistent with Keynesian model. In the empirical estimations, expansion in output is always accompanied by an increase in consumption. Although a Real Business Cycle model can produce an expansion in output following an increase in government expenditure as in Baxter and King (1993), consumption always decreases in response to an expansion in the government spending because of the obvious negative wealth effect (Fatas and Ilian, 2001).

In the context of Ricardian equivalence debate there are many studies which consider finite lifetimes of agents and liquidity constraints which make government debt net wealth for the households. Therefore in these models an increase in the government spending may increase consumption. In any case, the most suitable reason for the presence of effect of fiscal shock on consumption is the non-separability of the private and public consumption (Perotti, 1999).

### **Fiscal Policy Effects on Investment**

There is mixed literature on the effectiveness of fiscal policy in stimulating economic activity through changes in private investment. For example, increase in government expenditures in a New Keynesian setting will lead to raise the real interest rate, therefore investment expenditures will decline (Linnemann and Andreas, 2003). This can lead to decrease in aggregate demand and output especially if the real interest rate increases sharply. It is also observed in other empirical literature that the main transmission channel in boosting the economic activity is through the private investment for any fiscal policy action (Emanuele *et al.* 2007).

The private investment response to fiscal policy is typically more irregular as compared to the response in other macro variables; hence summarizing their shapes is more difficult. In empirical estimates Fatas and Ilian (2001) have found that the response of investment to increase in government expenditure is ambiguous. In most of the cases the response is not significant and the point estimates differ across different investment components. Although some of the components of investment namely, residential, respond positively but the response is small and not significant. Moreover some of the investment falls in response to the increase in the government expenditure. However, in general the response of investment is smaller than the response of the consumption. Blanchard and Roberto (2002) found that private investment is consistently crowded out by both government spending and to a lesser degree by taxation; which implies a strong negative effect of a balanced budget fiscal expansion on private investment. This result is consistent with neoclassical model but inconsistent with standard Keynesian approach. According to the authors an increase in government spending may increase or decrease investment depending on the relative strength of increase in output and the increase in interest rate; but in either case increases in spending and taxes have opposite effects on investment.

Alesina *et al.* (2002) have shown that increase in public spending increases labor costs and reduce profits. As a result investment declines as well. The magnitude of these effects is substantial. A one percentage point increase in the ratio of primary spending to GDP leads to a decrease in the investment as a share of GDP by 0.15 percentage points on impact and a cumulative fall of 0.74 percentage points after five years. The effect is particularly strong when the spending increases the government wage bill.

There are many empirical studies analyzing the effect of taxes on the cost of capital, using either aggregate or firm-level data (see Alesina *et al.* 2002 for a good review on these

studies). Further, cost of capital has been found to be significantly related to investment but elasticity tends to be small. All of these studies are country specific. Using the Tobin-q type model of investment equation that links investment to present and expected future profits on panel data for eighteen OECD countries over the period 1960-1996, Alesina *et al.* (2002) showed that increase in taxes reduce profits and investment, but the magnitudes of the effects on the revenue side are smaller than those on the expenditure side. Labor taxes have the largest negative impact on profits and investments. So the available literature on the impact of fiscal policy on investment is rich and varied.

### **Fiscal Policy Effects on Net Exports**

Typically the impact of fiscal policy (say rise in government expenditure) in an open economy context will depend on where the government spending is going. If it is used to buy domestically produced goods only, it can have an impact on the fiscal multiplier of domestic consumption which may become quasi neutral. Consumption may be crowded out, but due to domestic demand increase the affect would be mitigated (Ganelli, 2000). Traditionally the effect of fiscal policy on net exports is analyzed in Mundell-Fleming framework (Mundell, 1968 and Fleming, 1962), in which expansionary fiscal policy (say a tax cut) leads to increase in aggregate demand, assuming that the increased income due to this shock is not fully absorbed by the increase in private savings, thus putting upwards pressure on the real interest rates in the economy and leading to foreign capital inflows. With the increased foreign inflows, the exchange rate appreciates and leads to reduction in net exports. This is contrary to what the Ricardian theory (Barro, 1974, 1989) proposes that the private saving will absorb the fiscal shock and it will only be the temporary government spending shocks that can lead to increased demand for imports as the domestic economy cannot absorb the shock (Rosensweig and Ellis, 1993)



## 2.4 Fiscal Policy Effects: Theoretical Model

The model presented here is akin to the model presented by Perotti (1999) and Barro(1989) wherein they develop a standard macro-economic model depicting the effects of both revenue and expenditure shocks on output and its components. The model presented here is also empirically tested by estimating the effectiveness of aggregate and various sub components of fiscal policy instruments in the government expenditures and revenues stream on GDP and its components in chapter 5 and 6.

The model is based on the following key assumptions which are fairly standard in all macroeconomic model:

- i. Taxes are distortionary.<sup>18</sup>
- ii. The policy makers effectively discount future more than the households/private sector.<sup>19</sup>
- iii. Economy can be divided in individuals by their levels of access to financial markets (credit constraint); i.e. there is a segment of society which is without the possibility of smoothing their consumption by effectively savings and dissavings through the credit market.<sup>20</sup>
- iv. Government expenditures have positive effect on output.<sup>21</sup>
- v. There are no supply side effects of government interventions; i.e., supplies of labor and other factors of production are inelastic.

---

<sup>18</sup> Although it can be argued that distortions may not occur in case of an equivalent tax (i.e. replacing the distortionary tax with a non-distortionary tax such as income tax, keeping the revenue target intact. But here for simplicity we are assuming taxes to be distortionary.

<sup>19</sup> This will result in a non-tax smoothing position for initial periods.

<sup>20</sup> They are also referred to as the rule of thumb consumers (e.g. see Gali *et al.*, 2005). This can further be extended by relaxing the extreme position and assuming that their access to the financial market is more costly as compared to others such as, larger borrowers, because they have to borrow at a higher than market rate of interest due to their low credit worthiness, small credit demand and lack of collaterals.

<sup>21</sup> This assumption is highly debatable now-a-day, especially with the emergence of expansionary fiscal contraction literature such as empirical evidence provided by Gavin and Perotti (1997).

- vi. Government expenditures are exogenously given; i.e. they do not follow a particular reaction function.<sup>22</sup>

In order to capture the effects of an anticipated fiscal policy through intertemporal budget constraint of government by wealth affects enjoyed by those individual's in society who have access to credit markets, we consider a simple model in which consumer lives for three discrete periods. Although models of life time horizons in decision making such as overlapping generations model are also used in literature, but for simplicity we have taken just three discrete time periods 0, 1 and 2 faced by individuals while making consumption decisions.

Theoretically, with the prior knowledge about government's intertemporal budget constraint,<sup>23</sup> the individual's consumption function in period 0 and 1 will depend on information in time period 1. Individual's have a standard quadratic utility function, with their intertemporal decisions based only on consumption and savings (as already mentioned, the labor supply is inelastic, hence work-leisure choice is not considered in the model). The fraction of population which has access to the credit markets for making financial decision is  $1 - \gamma$ . Further, the rate of interest at which they can borrow or lend is at par with average market rate. The rest of the population fraction  $\gamma$  is credit constrained by either non-access or by being charged a higher interest rate than the market average.

Following the standard consumer theory of consumption smoothing, and assuming for simplicity that both; the rate of time preferences and interest rate are equal to zero for unconstrained individuals in the economy, the change in consumption between periods 0 and 1 will be half of the change in the present discounted value of their after tax income.

---

<sup>22</sup> This issue is further empirically tested by Khalid *et al.*, 2007, where a Fiscal Reaction function for Pakistan is estimated.

<sup>23</sup> As each action of fiscal policy maker will have a consequence on the behavior of fiscal policy in 2<sup>nd</sup> and/or terminal period.

$$\Delta C_1^{un} = \frac{1-\gamma}{2} \left[ \left( Y_1 - Y_{1/0} \right) + \left( Y_{2/1} - Y_{2/0} \right) \right] + \varepsilon_1 \quad (2.1)$$

Here in the above equation, superscript ‘un’ refers to those households of economy who have unrestricted and unconstrained access to the financial markets, whereas later on the superscript ‘r’ will be used for constrained individuals of the society. Here  $Y_i$  refers to disposable income in the  $i$ th period (where  $i$  can be 1 or 2) and  $Y_{i/j}$  represents the expected disposable income in period  $i$  whose expectations are formed in period  $j$  (here  $i=1,2$  and  $j=0,1,2$ ). The variable at the end  $\varepsilon_1$  represents all other factors due to which the consumption can change such as transitional consumptions or shocks to preferences in period 1.<sup>24</sup>

On the other hand, since the constrained individuals can neither borrow nor lend at the market rate of interest or they are restricted from availing the facility, they consume all of their disposable income in each period (this simplicity is also used by Perotti (1999), Hayashi (1982) and Campbell and Mankiw (1989) and (1990)). The equation depicting the change in consumption between periods 0 and 1, now for the constrained individuals can be written as follows:

$$\Delta C_1^r = \gamma \Delta Y_1 \quad (2.2)$$

Now we can aggregate both the specific equations for the change in aggregate consumption (equation 2.1 and 2.2) to represent the overall consumption change, but before that we need to define the process of disposable income over the same time period so that once integrated the effects of fiscal policy shocks can be obtained. A general form of disposable income could be written as:

$$Y_t = \bar{Y} + \alpha X_t + \beta G_t - T_t - \omega T_t^2 + \varphi_t^Y, \quad \beta > 0; \quad \omega > 0 \quad (2.3)$$

---

<sup>24</sup> We assume that  $\varepsilon_t$  is i.i.d.

Here  $X_t$  is a row vector covering all variables affecting the aggregate disposable income in the economy in period  $t$  except for the government expenditures and taxes.  $G_t$  represents the government expenditures in period  $t$  and  $T_t$  represents the taxes in period  $t$ .  $\omega T_t^2$  represents the exponential form of taxes affecting the disposal income. The square term of taxes (rather than tax rates; also used by Sargent (1987)), captures the effect of distortion and it does not lead to any compromise on the standard results.  $\varphi_t^Y$  represents the innovation in the income level  $Y_t$  in period  $t$ .

Let  $\phi_t^X$  identify the innovation in variable  $X_t$  on the basis of information available in period  $t-1$ , i.e.

$$\phi_t^X = X_t - E(X_t | I_{t-1}) \quad (2.4)$$

This means we can define  $X_t$  as described by the following law of motion:

$$X_t = \bar{X} + X_{t-1}\rho + \phi_t^X \quad (2.5)$$

For simplicity again here we are assuming  $X_t$  to be a scalar and we focus on just the fiscal policy variables. Going back to equation 2.3, in general  $T_t$  represents the total taxes on individuals and  $G_t$  are the total government expenditures. Finally as in the earlier equations here the error term  $\varphi_t^Y$  refers to a stochastic disturbance term.

From equation 2.3 it is a straightforward result that increase in taxes leads to a parallel fall in disposable income, meaning that only the present discounted value of the taxes matter for an unconstrained (*un*) individual and not the timing as they can always smooth their consumption by accessing the financial markets as here taxes are assumed to be non-distortionary. Secondly the term  $\omega T_t^2$  in equation 2.3 captures the distortionary effects of taxes on pre-tax incomes of the

individuals (Perotti, 1999). As we have noted earlier that there are no investments and labor supply is inelastic in this model.

Now if we look at the equation 2.3 from government expenditures side, it is apparent that there is positive impact of government expenditures on the disposable incomes of the households through the aggregate demand channel. Government expenditure is by assumption being taken as exogenous and can be written as:

$$G_t = \bar{G} + \pi_0 G_{t-1} + \varepsilon_t^G \quad (2.6)$$

and

$$T_1 - E_{1/0} T_1 = \varepsilon_1^T$$

We can now write the government budget constraint which, assuming the given exogenous path of government expenditures, can be written in terms of expected taxes to satisfy the intertemporal budget solvency. i.e.

$$\sum_{i=t+1}^2 T_{i/t} = \sum_{i=t+1}^2 G_{i/t} + D_t; \quad t = 0,1 \text{ and } D_2 = 0 \quad (2.7)$$

Here  $D_t$  is the debt stock of the government in period  $t$ . Further the government expenditures  $G$  here can be bifurcated into those belonging to sub categories which are defence and non-defence spending, interest payment expenditures versus non-interest payment expenditures, etc. From equation 2.6 and 2.7 the linkage between the current policy shock and future adjustments can be traced straightforwardly. However, in case of certain fiscal policy rules such as that adopted in Pakistan (fiscal responsibility and debt limitation law (FRDLL), 2005) further changes can be made accordingly.

Now in order to solve the above described model we need to solve for the changes in the aggregate consumption of period one i.e.,  $\Delta C_1$  as a function of tax and government expenditure shocks ( $\varepsilon_t^T$  and  $\varepsilon_t^G$ ). This is achieved by using the equation 2.1 which has terms

$Y_1 - Y_{\%0}$  and  $Y_{\%1} - Y_{\%0}$  which can be further solved using equation 2.3. So from equation 2.3 we

can derive the following:

$$Y_1 - Y_{\%0} = \bar{Y} + \alpha X_1 + \beta G_1 - T_1 - \omega T_1^2 + \phi_1^Y - \{\bar{Y} + E_{\%0}(X_1)\alpha + \beta E_{\%0}(G_1) - E_{\%0}(T_1) - \omega E_{\%0}(T_1^2)\} \quad (2.8)$$

and

$$Y_1 - Y_{\%0} = X_1\alpha - E_{\%0}(X_1)\alpha + \beta G_1 - \beta E_{\%0}(G_1) - T_1 + E_{\%0}(T_1) - \omega T_1^2 + \omega E_{\%0}(T_1^2) + \phi_1^Y \quad (A)$$

Further using equation 2.5 we can have:

$$E_{\%0}(X_1) = \bar{X} + X_0\rho \quad (B)$$

Similarly from 2.6

$$E_{\%0}(G_1) = \bar{G} + \pi_0 G_0 \quad (C)$$

and

$$E_{\%0}T_1 = T_1 - \varepsilon_1^T \quad (D)$$

Now substituting from equation (B), (C) and (D) in (2.8), yields:

$$Y_1 - Y_{\%0} = \alpha\phi_1^X + \beta\varepsilon_1^G - \varepsilon_1^T - \omega\{T_1^2 - E_{\%0}(T_1^2)\} + \phi_1^Y \quad (E)$$

Here the term  $\omega\{T_1^2 - E_{\%0}(T_1^2)\}$  can be linearized using the Taylor series expansion of  $T_1^2$

around  $T_{\%0}$ :

$$\begin{aligned} \{T_1^2 - E_{\%0}(T_1^2)\} &= 2T_1T_{\%0} - 2E_{\%0}T_1T_{\%0} \\ &= 2T_{\%0}\{T_1 - E_{\%0}T_1\} \\ &= 2T_{\%0}\varepsilon_1^T \end{aligned}$$

By substituting this result back in equation (E) we obtain:

$$Y_1 - Y_{\%0} = \alpha\phi_1^X + \beta\varepsilon_1^G - \{1 + 2\omega T_{\%0}\}\varepsilon_1^T + \phi_1^Y \quad (2.9)$$

The similar result can be derived for the second part of the equation (2.1) i.e.  $Y_{2/1} - Y_{2/0}$  as follows:

$$Y_{2/1} - Y_{2/0} = \alpha \rho \phi_1^X + \beta(G_{2/1} - G_{2/0}) - (T_{2/1} - T_{2/0}) - \omega\{E_{2/1}(T_2^2) - E_{2/0}(T_1^2)\} \quad (2.10)$$

Now we can use equations (2.9) and (2.10) and get:

$$\Delta C_1^{un} = \sigma_1^{un} \varepsilon_1^G + \sigma_2^{un} \varepsilon_1^T + \mu_1^{un} \quad (2.11)$$

Where

$$\sigma_1^{un} = (1 - \gamma) \frac{(1 + \pi_0)}{2} \{\beta - (1 + 2\omega T_{2/0})\}$$

$$\sigma_2^{un} = (1 - \gamma) \omega \{T_{2/0} - T_{1/0}\} > 0$$

&

$$\mu_1^{un} = (1 - \gamma) \frac{1}{2} \{\alpha(1 + \rho)\phi_1^X + \phi_1^Y\} + (1 - \gamma) \varepsilon_1$$

So the terms  $\sigma_1^{un}$  and  $\sigma_2^{un}$  here explains the impact of fiscal policy shocks emanating from expected taxes on the household consumption for unconstrained individuals. Whereas we earlier defined that for the constrained households consumption is based upon their disposable incomes only (due to absence of borrowing or lending possibilities). So we can bifurcate the total change into expected and unexpected changes in their disposable incomes and solve them by using equation 2.3 as we did for the above case. The final result is:

$$\Delta C_1^r = \sigma_1^r \varepsilon_1^G + \sigma_2^r \varepsilon_1^T + \mu_1^r + \gamma (Y_{1/0} - Y_0) \quad (2.12)$$

where

$$\sigma_1^r = \gamma \beta > 0$$

$$\sigma_2^r = -\{1 + 2\omega T_{1/0}\} < 0$$

$$\mu_1^r = \gamma(\alpha \phi_1^X + \phi_1^Y)$$

Here the last term is the unexpected change only and rest of the equation is deterministic in nature.

Since there will be no wealth affects of the expected policy changes, expenditure shocks, with taxation being assumed to be constant, will have a positive impact on the economy. Similarly, it will be the opposite in the taxation case, although it was not the case with the unconstrained households.

Finally, if we add these changes in consumption for the unconstrained and constrained household's equations (2.11) and (2.12) simultaneously, we get the aggregate change in consumption in economy. It describes the possible effects of expenditure and taxation policy actions depending on the share of population having access to the financials markets ( $\gamma$ ). This could be written as:

$$\Delta C_1 = \sigma_1 \varepsilon_1^G + \sigma_2 \varepsilon_1^T + \gamma (Y_{1/0} - Y_0) + \mu_1 \quad (2.13)$$

Where;

$$\sigma_1 = \sigma_1^{un} + \sigma_1^r$$

$$\sigma_2 = \sigma_2^{un} + \sigma_2^r$$

$$\mu_1 = \mu_1^{un} + \mu_1^r$$

Here  $\sigma_1$  and  $\sigma_2$  captures the total impact of government expenditures and taxation shocks respectively.

## 2.5 Selected Empirical Studies on Effectiveness of Fiscal Policy

Despite extensive theoretical and empirical research on the issue of fiscal policy affecting both the macroeconomic aggregates and disaggregated macro variables (e.g. Hoepfner F., 2003; Heppke-Falk *et al.* 2006; Perotti, 2004; Rezk *et al.* 2006; Castro, 2003; Sinha, 1998; Calus *et al.* 2006 and Fatas and Mihov, 1998), yet inconclusiveness in terms of impact and duration of the



impact exists in the literature (e.g. see Perotti, 2001). But still researchers such as Romero de Avila and Strauch (2007), Bose et al. (2003), Odedokun (2001), Kneller et al. (1999), Tanzi and Zee (1997), Mendoza et al. (1997) and Barro and Sala-i-martin (1995) have used fiscal policy variables in their estimation equations and have found significant contribution of these while explaining the dynamics of their focused macro variables over time. Different theoretical models and model assumptions offer altogether different results in terms of sign, impact and magnitude of the fiscal instrumentation (de Castro and Pablo, 2007). The empirical results based on these assumptions of models also provide the same heterogeneity; e.g. Hoepfner F. (2003), Heppke-Falk *et al.* (2006), Calus *et al.* (2006) and Castro (2003) are of the view that fiscal expansion through government expenditure shock affects GDP growth positively and taxes negatively whereas there are few ( Jafri *et al.* 2006; Balassa, 1988; Samudram *et al.* 1996 and Iqbal and Zahid, 1998), who found that there is a negative relationship in budget deficits and economic growth in the longrun.

So from the empirical front there are no generalized results either. Specifically the recent research which used either large structural macroeconomic models or opposite-VAR analysis identify positive short-term economic activity multipliers as a result of increase in government expenditures and/or tax reductions, but the resulting impact and the time frame of impact is quite dispersed (de Castro and Pablo, 2007). Further in some instances even negative fiscal multipliers in some OECD countries is also observed (Perotti, 2004). As explained earlier in the introductory chapter (about the non-Keynesian impact of fiscal policy, or the term referred to as expansionary fiscal consolidation), empirically, as a result of fiscal consolidation favorable impacts on output has been documented in some developed economies (see Giavazzi and Pagano, 1990; European Commission, 2003; Perotti, 1999).

However Boskin (1988) noted that based on empirical literature it can be concluded that fiscal policy does matter both in the shortrun for output stabilization purpose and in the longrun for capital accumulation purpose. But the results of these fiscal operations may not have impacts as large as postulated by the simple Keynesian multipliers based on the MPC or those having no impact at all represented by the Ricardian School of thought.

Ganelli (2000), noted that the Obstfeld and Rogof( 1995, 1996) paradigm for analysis called ‘The New Open Economy Macroeconomics’ is flexible enough to be used for impacts of monetary shocks but lacks the analytical ability for incorporating the role played by the useful-government spending (as opposed to waste-government expenditures). He considers both the Private and Public consumption as perfect substitute (through non-separability) and analyzed the effects of both domestic and foreign financing based expansion on shortrun and longrun multipliers. Further the author asserts that if there is a home bias (spending on domestic goods only) in government spending then cost of government spending on domestic consumption is offset by the positive simulation of domestic demand, therefore making the net impact on domestic consumption as zero.

Blanchard and Roberto (2002) in their classical article explored the dynamic effects of the aggregate fiscal policy indicators; government expenditures and tax revenues and the disaggregated defence versus non-defence spending on the overall economic activity and its components.<sup>25</sup> They used structural vector auto regressive (SVAR) approach instead of large scale macro-econometric models (due to their inbuilt Keynesian structure) to identify the transmission mechanism of the effects of fiscal policy by using quarterly data of US economy and its components. They relied on institutional information to achieve identification (following

---

<sup>25</sup> Their work is further extended by considering other fiscal disaggregated indicators impact on economy, such as interest vs. non-interest, both defence and interest combined vs. non-defence and interest payment on the expenditure side and direct taxes and indirect taxes on the revenue side in the present thesis.

Bernanke and Mihov, 1998) in the SVAR framework as this identification scheme is more suited for fiscal policy impact assessments. There were two main reasons for such approach to use; as output stabilization is rarely the objective of fiscal policy reaction function, hence in a system with output variable used, it becomes exogenous and secondly due to implementation lags, fiscal policy discretion is very limited. Thus they obtained the automatic response (elasticities) from outside the system through institutional information and by using that, recovered the affects of pure fiscal policy shocks on output and its components. They found positive effects of government expenditures on the economic activity and consumption and negative effects of taxes; a standard Keynesian result. Whereas for the private investment both government expenditures and taxes effecting it negatively, a result which is consistent with the standard neoclassical models with distortionary taxes. These results and methodology used are further referred to in chapter five where fiscal policy effectiveness is estimated for Pakistan.

Linnemann and Andreas (2003) observed that because of differences in methodologies the results of fiscal interventions may be different. Those studies which followed the traditional Keynesian structures for their modeling have shown multiplier effects of fiscal stimulus whereas those adopting neoclassical model settings with fully flexible prices and optimizing household decisions regarding their labor supply, have presented the reverse of that. Further he identifies that the recent “New-Keynesian” model setting incorporates both the optimizing general equilibrium and shortrun nominal sticky price setting behaviors. They have used this approach with price stickiness inbuilt in it to observe the cyclical effects of fiscal policy. Since here the nominal variables are important so the authors have chosen two types of monetary policy regimes; a “cash-in-advance” type model of Calvo(1983) and Staggered price setting (Yun ,1996). They have found that due to stickiness of prices, role of monetary policy is profound.

Through numerical estimation (calibration) the authors have found fiscal policy effect (through aggregate demand shock) to have positive effect on output, inflation and real wages if the central bank is not strongly responding to output changes. Although for consumption it shows a negative wealth effect and hence it decreases (neo-classical foundations).

Two types of simulations were used by Perotti (1999) for the Canadian bloc to explore the effects of (1) a permanent increase in government debt that is a result of a temporary tax cut, holding constant the level of real government spending, and (2) a permanent increase in real government spending, holding tax rates constant temporarily before raising them to subsequently stabilize the ratio of government debt to GDP. In both shocks, tax rates are adjusted after the fifth year to raise the debt-to-GDP ratio to a level that is 10 percentage points higher than in the baseline. In each case, the current reduction in public saving (that is, deficit financing) and its consequences for future tax burdens have important macroeconomic effects as private agents are unable, or fail, to fully internalize the implications of the government's intertemporal budget constraint. When consumers "excessively discount" future tax liabilities or are "excessively sensitive" to current disposable income, changes in fiscal policy can have relatively large effects on the real economy, reflecting significant departures from Ricardian equivalence.

Using VAR techniques with few prior restrictions for relationship among fiscal policy, exchange rate and trade adjustment Rosensweig and Ellis (1993) found that for US economy the trade deficits of 1980s represent the traditional Mundell-Felming framework, where the budget deficits are related to the Trade deficits rather than mere temporary changes in government purchases.

Giuliodori and Beetsma (2005) and Beetsma *et al.* (2006) have analyzed the impact of domestic fiscal shocks on exports in the EU countries. They found insignificant impact of such

policy actions. Whereas Corsetti and Muller (2006) identified for US, Canada, the United Kingdom and Australia, that issue of twin deficits are more present in the closed economy case.

Polito and Mike (2007) proposed a measure of fiscal stance based on the forecast of debt to GDP ratio, which is compared to be more or less than a specified benchmark over a specific time horizon for US, UK and Germany. They used a forward looking VAR based approach to allow time variation in the interest rate, inflation and growth rate as compared to other studies where it is kept constant over the time horizon. They concluded that the stance had improved in the 1990s but in the recent years it has been deteriorating and if the same pattern is carried out it will lead to un-sustainability of public finances.

De Castro and Pablo (2007) presented the case study of Spain to evaluate the impact of fiscal policy in the context of fiscal consolidation as a result of Stability and Growth Pact (SGP) and Maastricht Treaty in 2005, regarding the Excessive Debt Procedures (EDP) adopted by European Union. They note that there are divergences in the estimation methodologies and outcomes even for the same country. Notably the structural macro models used or the simple VARs both show positive short term fiscal multipliers originating from expenditure increase or tax cuts. Whereas they conclude by using the seminal SVAR methodology developed by Blanchard and Roberto (2002) that fiscal policy both from the expenditure side or the taxation side can lead to short term positive response in terms of generating economic activity but at the cost of higher inflation and debt. Further they argued that using the taxation as an instrument to curtail the budget deficits may lead to even higher budget deficits in future. Finally they argue that the VAR based estimation are only better for short term forecasting rather than long term impact evaluation, and the magnitude of impact may vary according to the size of the fiscal variables and state of the economy.

On the other hand for developing countries especially and those which have government investment portfolios including investment in public sector organizations, should add the balance sheets of these public sector organizations in the total fiscal operations and indicators such as budget deficit. As Dullien (2005) estimated the fiscal stance for China using government consumption, government expenditure, the state-owned-enterprises' investments and tax revenue and found that with this new method, fiscal policy has been found to be strongly counter cyclical over the last two decades.

Another important issue of individual versus consolidated government's stance was dealt with by Goyal et al. (2004) for Indian economy. By differentiating the finances for Central Government and other sub national government, combining them and incorporating the structural breaks in the longrun relationships they found that individual governments may have unsustainable public finance but at the combined level these are sustainable. The main reason is found to be the definition of sub-national government revenues, which are under estimated due to the presence of large central government fiscal transfers.

Budget deficit shows the combined effect of changes in revenues and expenditures. Afonso and Peter (2008) have used the cyclically adjusted budget components i.e. revenues, expenditures and budget balances to uncover their transmission channel towards affecting the output. They used a SVAR approach with shortrun and longrun restrictions and concluded that due to reduction in taxes during the recessions without matching adjustment in expenditures and a ratcheting-up effect for expenditures in booms the budget deficit exists for EU countries such as France, Germany, Portugal and Spain. Further they commented that even though there is a

rule base fiscal policy, such as SGP, but still procyclical fiscal policies are present and further worsen the macroeconomic instabilities.<sup>26</sup>

Further if we look into more recent papers which uses the DSGE method of estimation like Furceri and Annabelle (2010) and Roger and In't Veld (2009), then the results are not very different except for the possibility of a more comprehensive analysis which can be done through this method. For example in case of the former authors, developed a DSGE model to analyze the tradeoff between impacts of an expansionary fiscal policy on economic activity and government bond premium increases for the Euro area. As it can lead to a crowding out of public investment and consumption and may lead to unsustainable debt levels. They found that fiscal policy appears to be a successful policy option in case of shortrun demand boosting even though there are crowding out of interest sensitive demand components due to increase in government's bond spreads. Further they found that different fiscal instruments may have different impacts on key macro variables; such as they found largest shortrun impact on GDP of an increase in public investment, public consumption is also positively related to economic activity. On the other hand they found subsidies/transfers to liquidity constrained households have less impact on economic activity and in general they found that tax reductions have less effect in supporting demand activities than a spending increase.

Another interesting paper by Cogan *et al.* (2009) also presents the application of the recent DSGE modeling on estimating the New-Keynesian Government Spending Multipliers for the US economy. They have used the Smets-Wouters Macro model to represent their New-Keynesian model characteristics. They found that the government expenditure multipliers in case of a permanent increase in government expenditures are much less in the New-Keynesian model

---

<sup>26</sup> Still the authors argue that if there are structural reforms which can raise potential growth and thus have an impact on the long-term sustainability of government budget balances then there could be grounds for short term deviations from the budget balance rules.

settings as compared to the traditional Keynesian ones. Further they found evidence that these multipliers are less than one as private consumption and investment is crowded out. This identifies another paradigm in estimating the impact of fiscal policy shocks that these may not only vary because of the instruments used rather the assumptions of the model also matters.

In the same line of estimation Muscatelli and Patrizio (2005) also presented the results in a New Keynesian but more elaborate model settings. They bridged the theoretical and empirical literature gap in the New Keynesian model setting with identifying and incorporating the interaction of monetary policy rules with fiscal policy. Their main objective was to test the hypothesis of the validity of role for fiscal policy in stabilization of macro-economic variables for US and Euro Zone. They found the role of fiscal policy to be complementary to monetary policy under certain assumptions such as in those models where the consumers have finite horizons. They also found that fiscal interventions are significant in terms of achieving the desired objectives but clearly the magnitudes of these were not like those propagated by early 1960's Keynesian ones.

Mountford and Harald (2009) in their seminal paper analyzed the effects of fiscal policy shocks using a novel approach of estimating a Vector Auto Regressive Scheme (VAR) for estimation but without any identifying restrictions of contemporaneous reaction of some of the variables to be set equal to zero (like those of Blanchard and Roberto, 2002), or to use additional information to identify the shocks such as timing of wars etc. Further their methodology also employs the announcement effects embedded in fiscal policy responses and to distinguish between the business cycle and monetary policy reactions of different fiscal variables. They concluded using the quarterly data for US from 1955-2000 that in order to stimulate the economy



a deficit financed tax cut and a fiscal expansion through government spending in the longrun can have more gains as compared to short-term gains.

In a classic review article Hemming *et al.* (2002) concluded that the theoretical literature on the effectiveness of fiscal policy spans from the simple Keynesian Models to those of closed and open economy IS-LM type models, demand side models (incorporating rational expectations), Ricardian Equivalence type models, Interest rate premiums and their impacts with issues of credibility (as being faced by most of the Euro region and US now), uncertainty and finally the supply side models (including the new-classical and New-Keynesian type models).

While reviewing the fiscal multipliers calculated by a number of authors using one of the theoretical distinctions described above; the authors states that the possibility of small and/or large fiscal multipliers exists based on a number of assumptions holding for a particular country. Further contrary to many other studies the authors found literature evidence of little direct crowding out or crowding out through the interest rates, and exchange rates. The same was the case for finding a partial or insignificant Ricardian equivalence. Hence they propose that the fiscal response to a down-turn will vary from country to country, episode by episode and in certain cases it may be the contraction and in others it may be expansion.

## **2.6 Literature Review and Research Gaps for Pakistan**

As noted earlier that the effectiveness of fiscal policy has been studied in different contexts and methods across the globe. The same is the case of Pakistan, where the predominant view of fiscal policy effectiveness, research has been to use the fiscal deficit as an indicator of fiscal stance and run a battery of estimation methods on a variety of economic variables to gauge the effectiveness and comment about policy issues related to them. E.g. Shabbir and Mahmood (1992), Khilji and Mahmood (1997) and Iqbal (1994, 1995) and Iqbal and G.M (1998) have

broadly claimed that fiscal deficit is one of the key variables which affects the economic growth in Pakistan. Whereas contrary to that Haq(2003) concluded that fiscal deficits do not have a significant impact on key economic variables such as investment, inflation and GDP growth. But overall there are few studies who have specifically focused on the effectiveness of Fiscal policy as a research question in Pakistan (we surmise) e.g. Ahmad and Qauym (2008), Haque and Peter (1991) and more recently Javed and Umaima(2010), Ali and Naveed (2010) and ours Khalid *et al.* (2007).

For Pakistan Khalid *et al.* (2007) found evidence of fiscal policy in Pakistan being endogenous over the period 1965 to 2006. They found only pro-cyclical response of fiscal policy to the business cycle fluctuations. Also the pro-cyclical response is seen more in the periods of boom. On the other hand, they could not identify transmission mechanism of fiscal policy with the help of model they have estimated. They also find the evidence of contemporaneous response of policy to state of the economy but the policy is not forward-looking at all. Considering this weakness of the model we have extended the estimation here in the present thesis by incorporating an SVAR method.

Ali and Naveed (2010) studied the effectiveness of Fiscal policy measured by Fiscal deficit on the economic growth. They used Auto Regressive Distributed Lag (ARDL) approach to identify the transmission channel of fiscal policy in Pakistan. They found evidence supporting the “Expansionary Fiscal Contraction” hypothesis for Pakistan as the fiscal deficit had a negative longrun affect on economic growth. Whereas for shortrun dynamics by using Error Correction Method (ECM) they found out that there is a positive impact on economic growth. Further they identified that inflation rate, consumption and investment channels are not crucial in transmitting the fiscal stimulus towards the economy. One of their important results is that the government

investment has a strong and positive impact on private investment and private consumption. In terms of expenditure disaggregation they found out that a shock to government consumption expenditures has a negative impact on the economic growth.

For the case of fiscal shocks and external sector linkages, almost none of the studies have empirically tested the relationship of disaggregated fiscal policy instruments in the context of external account variables in Pakistan. There are however studies which have explored the concept of twin deficits by applying varied methods and data. Such as Hakro (2009), Aqeel and Nishat (2000), Kazimi (1992), Zaidi (1995), Burney and Yasmeen (1989) and Burney and Akhtar (1992). More recently Javid *et al.* (2010) have empirically tested the relationship between the fiscal deficit as an indicator of fiscal policy and current account while adding other macro variable as control variables. The study covers the period from 1960-2009 and an SVAR methodology (Cholesky decomposition method) is used. Exogenous fiscal shocks through budget deficits are identified by adding real output as a variable used for controlling the business cycle response of variables included in the system. The authors conclude that with an expansionary fiscal shock the private savings increase and investment fall which leads to improvement in the current account balance and exchange rate depreciates which is quite opposite to the economic theory (Mundell-Fleming Model), where current account worsening and initial exchange rate appreciation is proposed and follows more of the Ricardian approach to explaining the issue at hand.

Javed and Umaima (2010) have presented a dynamic analysis to test the hypothesis of expansionary fiscal policy affecting the macro variables for the period of 1970-2010. They have used Blanchard and Roberto (2002) approach of using an unrestricted VAR but used Cholesky decomposition for generating the impulse responses for an SVAR. The study has documented

dynamic relationship of six variables i.e. Government Spending per Capita, GDP per Capita, Consumption per Capita, Debt to GDP ratio, Long term Interest rate and Real Exchange Rate. The study found a negative relationship in government spending and output and consumption, a result consistent with neo-classical models. They observed that interest rates increase and real exchange rates appreciates with a shock in government spending. Finally in their results they also support the Ricardian behavior in policy variables of taxes and debt.

Rehman and Zeeshan (2011) have evaluated the case of Expansionary Fiscal Contraction (EFC) for Pakistan. The authors state that the case of EFC seems more logical in the developed economies as they have good financial system, market mechanism and higher literacy rates, all of which develops the forward looking behavior of the masses. They have use the Cointegration method and error correction method of estimation for checking the longrun relation and shortrun dynamics for Pakistan's case using the data from 1960-2007. They conclude that EFC does not hold for Pakistan in the shortrun; however it exists in the longrun. Hence with increased government expenditures it is estimated that the private consumption expenditures will be crowded out (and vice versa for Net tax shocks).

Summarizing we can say that in this short review of empirical and theoretical literature we have explored the role, effectiveness and persistence in terms of impact for different fiscal policy instruments in various developed developing countries.

Few of the weakness of the existing studies are as follows:

- i. Most of the studies mentioned above have used either the cumulative variable of fiscal deficit as an indicator for fiscal policy
- ii. Studies have not adjusted the fiscal variables for their automatic responses towards the economic activity

- iii. The results may be dubious for the impact and effectiveness of Fiscal policy for Pakistan as these are not adjusted for business cycle shocks (automatic response).

Based on these limitations of the existing study our study has the following features:

- i. It employs the novel Structural Vector Auto Regressive (SVAR) method of estimation.
- ii. As noted by Cogan *et al.* 2009, that model assumptions and estimation techniques can lead to varying results, so we have taken the following levels of disaggregation:
  - a. First by looking at the impact of government expenditures and taxes as instruments of fiscal policy instead of fiscal deficit
  - b. In the second step looking at the second level of disaggregation of taxes into direct taxes and indirect taxes
  - c. Thirdly for expenditures used the conventional disaggregation of defense versus non-defense and interest payment versus non-Interest payment expenditures.
  - d. Fourth, this study analyzes the impact of fiscal policy instruments on both the aggregate and disaggregated level of economy for Pakistan.
  - e. Finally the use of institutional information of fiscal policy settings, the automatic response of a fiscal shock is also incorporated.

## Chapter 3

### **Fiscal Policy in Pakistan: Institutions, Instruments and Outcomes**

Through Fiscal policy, being the core tool of policy interventions, on one side government generate resources through administration of a tax-system, user charges and pricing of public goods provided through institutions and on the other side redistribute these resources for socially desirable goods. This resource creation and its consequent diversion help in achieving certain economic and social goals assigned to the government by the public (through the public choice model setting).<sup>27</sup> The fiscal policy does not work in isolation; it has strong linkages with other macroeconomic policies and shocks affecting the economy. Therefore, the role of fiscal policy is inevitably vulnerable to influences from other economic policies, fiscal discipline itself and general economic health of the country (Ahmad, 1998). In the context of developing economies, such as Pakistan, where active fiscal policy or a non-Ricardian policy is practiced, large seigniorage revenues exist and ratchet-up effects of expenditures are found (Khalid et.al. 2007), fiscal policy is considered as an active policy tool.

This chapter focuses on the conduct of fiscal policy in Pakistan and its consequences for long-term economic growth and short-term stabilization. As the outcomes of fiscal policy actions depend on instruments behind them, hence it becomes important to explore the institutional and political economy aspects of fiscal policy conduct in Pakistan. Further, by looking at the fiscal variables, which are of focus for the fiscal authorities, markets and international financial institutions, it will also shed some

---

<sup>27</sup> Although in a political economy setup of fiscal policy, some of the economic and social goals thus targeted may represent only few voters' preference and not of the whole society.

light on the debate for fiscal indicators ranging from short-term (liquidity concerns) to long-term (inter-temporal solvency) conditions.

### **3.1 Institutions dealing with Fiscal Policy in Pakistan**

Pakistan is a federalist structure country. Besides its own budget making, federal government also allocates funds for provinces/federating units through National Finance Commission (NFC) awards.<sup>28</sup> Provinces also generate and utilize their own resources for their respective budgets. However, major part of provincial budget revenues consist of funds provided by the federal government, as most of taxes in the country are imposed and collected by the federal government which later go into divisible pool and are then shared by the provinces. NFC has been empowered to develop a formula for the sharing of these resources. However, distribution of the amount to the provinces has always remained a debatable topic.

In Pakistan the fiscal policy is coordinated both from resource and expenditure sides by different institutions and legislative rules. Ministry of Finance (MOF) is the core ministry which coordinates both and presents the expenditures and revenue estimates in the form of a budget document every in every June of the following fiscal year (July 1<sup>st</sup> to – June 30<sup>th</sup> next year). Figures pertaining to the recurring expenditures of the business of the government and debt servicing (current expenditures) are put up by MOF in consultation with other departments of the government. Whereas the development expenditures are prepared according to the annual development program (ADP) developed with consultation of Planning Commission of Pakistan.<sup>29</sup> Major revenue heads

---

<sup>28</sup> Mainly based on the population size of each province.

<sup>29</sup> The same procedure is adopted at the provincial level for their budget making.

at the federal level is dealt with the Federal Board of Revenue (FBR), whereas the provincial revenue departments deal with provincial revenues.

In Pakistan the overall planning machinery is headed by the National Economic Council (NEC); which reviews the overall economic situation in Pakistan and formulates plans with respect to the financial, commercial and economic policies for the overall economic development of the country. Below NEC there is Executive Committee of the National Economic Council (ECNEC), which sanctions the Public Sector Development Program (PSDP) schemes (affecting the level and sectoral composition of public investment in various sectors). Further, it also oversees the implementation of the decisions taken by the NEC. However, the role of Planning Commission as an overarching institution developing both the longrun (through vision documents, Ten year perspective plans and Five year plans) and shortrun (annual plans) policy guidelines for macro-management of the country's economic policies is significant. In the 1960s the 'golden period of development and growth', Planning Commission was actively involved in designing its policy horizon through the second and third five year plans.

### **3.2 History of Fiscal Management in Pakistan**

Fiscal policy is considered to be the most active tool for macroeconomic stabilization and growth achievements, especially in a developing economy context. This is also evident by the activeness of fiscal policy vis-à-vis monetary policy (Nahyun, 2010). Further, the political economy context of fiscal policy, war escalations across border, natural disasters and governance issues of conduct of fiscal policy, all have been affecting the magnitudes of its instruments and its sustainability. With experiments in the levels of governments and functions, the outcomes of fiscal interventions are difficult to



measure across the tiers of the government.<sup>30</sup> The following discussion will focus on the aspects of resource mobilization, expenditures and deficit management and debt sustainability for Pakistan in a historical perspective.

### 3.2.1 Resource Mobilization in Pakistan

In Pakistan resource mobilization takes place through two channels: Revenue Receipts and Capital Receipts. Revenue receipts both for the federal and provincial government includes both the tax and non tax revenues. The main taxes are broadly differentiated in direct and indirect taxes (with sometimes the surcharges also included in the indirect taxes).

By the 1973 constitution of Pakistan the following are the tax structures defined for the tiers of the governments:

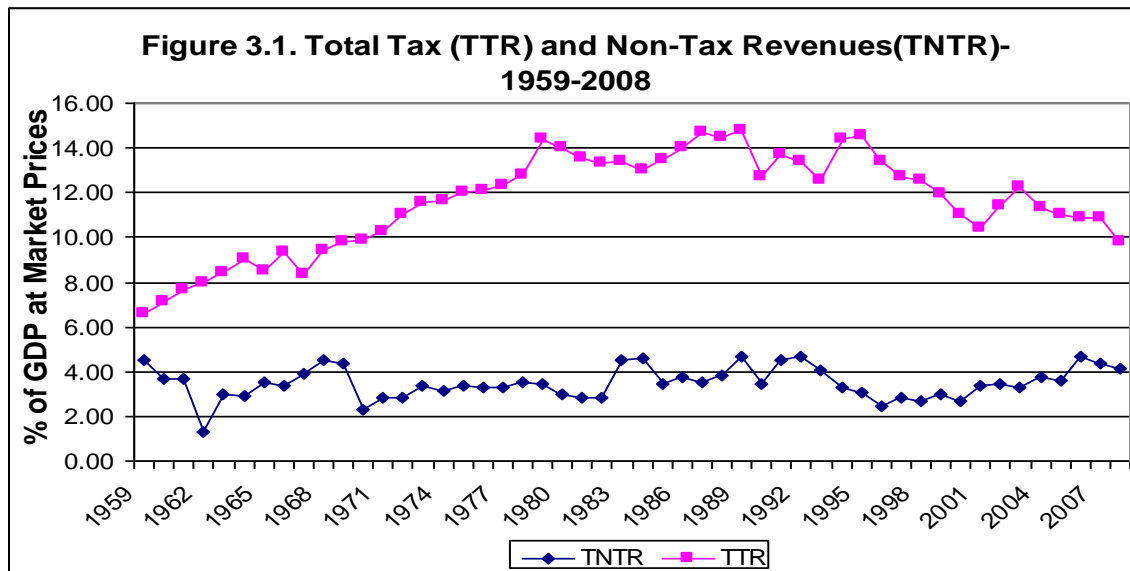
<b>Level of the Government</b>	<b>Direct Taxes</b>	<b>Indirect Taxes</b>
<b>Federal Government</b>	Income Tax Corporation Tax Wealth Tax Property Taxes	Sales Tax Excise Duty Import Duty Export Duty Gas and Petroleum Surchage Foreign Travel Tax
<b>Provincial Government</b>	Land Revenue Urban Immovable Property Tax Tax on Transfer of Property Agriculture-Income Tax Capital Gains tax Tax on Professions, trades and callings	Stamp Duty Motor Vehicle Tax Entertainment Tax Excise duty Cotton fee Electricity Duty

source: Zaidi, 2005

<sup>30</sup> E.g. Basic Democracies of Ayub Khan (1960s), Local Bodies of Zia (1980s) and lately Local Governments by Musharraf (2000s), all of them were tried in military governments and turned down in the democratic governments following them.

The capital receipts include external borrowing and internal non-bank borrowing (unfunded debt, public debt) and revenue account (containing the revenues of the government) and public sector profits (Ahmed and Rashid, 1984).<sup>31</sup>

Overall the tax collection has been very low for resource mobilization in Pakistan from the very beginning. The tax revenue to GNP (at factor cost) ratio was just 4.7 percent, whereas the non-tax revenue ratio was 1.6 percent in the beginning. Although it had improved to 5.8 and 2.8 percent respectively for 1957-58 but as a level it was still very low (Ahmed and Rashid, 1984). This showed the weak capacity of revenue collecting bodies and non-willingness to pay taxes (tax avoidance and tax evasion) by the people. As can be seen from Figure 3.1, the tax to GDP ratio was very low in the late 1950s:



On the positive note the difference between the total tax revenue (TTR) and non-tax revenue (TNTR) has been increasing, but in the later years again the two are getting close. The highest tax to GDP ratio was observed as 14.76 in 1989. The situation shows a

<sup>31</sup> Whereas the provincial capital receipts include only loans and grants from federal government and permanent and floating debt.

dismal picture; even in the 1970s the tax to GDP ratio was on average 16 percent in comparable seventeen middle income countries and 16.3 percent in 24 developing countries (Ahmed and Rashid, 1984). Overall, the variation in the tax revenue is much greater than in the non-tax revenue (standard deviation 2.18 and 0.71 respectively). In the later periods the tax to GDP ratio has been falling despite substantial reform (post 1990s) taking place at the main revenue collecting authority (FBR), with use of information technology and major tax reforms.

The same picture emerges from table 3.2 below, where we see that relatively the decade of the 1980s was better than the rest both in terms of average value and consistency. The striking feature of the above table is that the tax to GDP ratio is constantly declining since the 1980s. This shows that the tax system is non-elastic and non-buoyant.

<b>Periods</b>	<b>Average</b>	<b>Maximum</b>	<b>Minimum</b>	<b>Standard Deviation</b>
1959-69	8.39	9.79	6.60	1.00
1970-79	11.80	14.41	9.85	1.29
1980-89	13.88	14.76	13.04	0.61
1990-99	13.19	14.56	11.94	0.86
2000-10	10.99	12.26	9.79	0.68

Source: Authors calculation, Economic Survey Various Issues

If we compare the same position across other economies then position is very dismal for Pakistan. It is observed from table 3.3 that Pakistan has been in the lower tax to GDP bracket among other comparable countries.

<b>Country name</b>	<b>Country Classification By The World Bank</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
Singapore	High Income: Non-OECD	12.20%	12.60%	13.90%	14.60%
Australia	High Income: OECD	23.70%	23.50%	23.10%	-

Austria	High Income: OECD	20.20%	19.80%	20.20%	20.10%
France	High Income: OECD	22.30%	22.40%	21.80%	-
Germany	High Income: OECD	11.10%	11.30%	11.80%	-
Netherlands, The	High Income: OECD	22.60%	23.20%	23.60%	-
New Zealand	High Income: OECD	31.30%	33.20%	31.70%	-
United Kingdom	High Income: OECD	27.30%	28.10%	27.70%	28.60%
United States	High Income: OECD	11.40%	12.10%	12.20%	10.30%
Brazil	Upper Middle Income	3.30%	15.40%	16.30%	16.40%
Maldives	Lower Middle Income	18.00%	19.90%	21.50%	21.00%
<b>Pakistan</b>	<b>Lower Middle Income</b>	<b>9.60%</b>	<b>9.40%</b>	<b>9.80%</b>	<b>9.80%</b>
Sri Lanka	Lower Middle Income	13.70%	14.60%	14.20%	-
India	Lower Middle Income	10.20%	11.50%	12.40%	12.90%
Bangladesh	Lower income	8.20%	8.20%	8.00%	8.80%
Nepal	Lower income	9.20%	8.80%	9.80%	10.40%

Source: The World Bank; <http://databank.worldbank.org/ddp/home.do?Step=3andid=4>

The above table reveals that Pakistan had been the lowest after Bangladesh (Brazil seems an outlier for 2005) for the tax to GDP ratio in sampled countries for the given years. Both the OECD and Non-OECD countries have shown a good tax to GDP ratio, which is evidence of their better tax management and less tax evasion. But Pakistan is showing even a smaller tax to GDP ratio in the case of the comparable group countries; i.e. the lower middle income countries. For example, Maldives has a healthy tax to GDP ratio which was 18% in 2005 and it increased to 21% in 2010. These economies have also grown at a steady pace as well; hence in the level form the tax revenue increase may be even much higher. Sri Lanka and India also have shown the same trend (India increasing from 10.20% to 12.90% and Sri Lanka from 13.70% to 14.20%), even Nepal has a tax to GDP ratio of 10.40% in the year 2010. This shows that due to less elastic and buoyant tax structure in Pakistan the growth in fiscal revenues collected through taxes have been low.

## **Tax Structure in Pakistan**

From the very beginning Pakistan's tax structure presented a regressive nature. The share of indirect taxes (and surcharges) has been more than share of direct taxes in the consolidated (federal and provincial) revenue resources. Since the early times Pakistan's fiscal economy has been dependent on indirect taxes for mobilization of resources, which clearly increases excess burden on the economy as indirect taxes creates distortion in the resource allocation. It is also reported by Ahmed and Rashid (1984) that in 1949-50 share of direct taxes were just 25 percent of the consolidated revenues, which was 33 percent in 1959-60 and it fell to just 14-17 percent in the 1970s. However, in the later periods efforts were made to cover for this deficiency. As noted by Fatima and Qazi (2001), the emphasis of fiscal policy in 1990s was to increase the direct taxes share in tax revenue, which eventually did increase a bit, but the overall tax to GDP ratio could not be increased.

Due to complex laws, primitive mechanisms for tax collections and high degree of discretion with the tax collecting authorities; less revenues and an impression of corruption and inefficiency for the tax collection authorities has emerged. Further, the tax base for almost all the taxes are narrow due to the wide ranging exemptions,<sup>32</sup> concessions and the presence of a black economy (Zaidi, 2005). The political economy angle of tax reforms reveals that vested interest groups at the helm of affairs and strong lobbies have been able to manage the tax-free ride at the cost of high deficits and others bearing the burden of higher indirect taxes. As Pasha (1995) noted, the lack of

---

<sup>32</sup> Still agricultural sector, which contributes upto 21 percent of the GDP in 2010 and even more in earlier periods, is exempted from agricultural income tax. Further, there are 0-rated industries/sectors such as textile industry, which enjoys a tax holiday for quite some time now and lastly the packaged and unpackaged food items such as tea, pulses, vegetable oil, etc. are also tax-exempt. Although the reformed GST which was floated in 2011 was suppose to include these items also, but it was not implemented.

commitment by those making the policies, state capture by vested interest groups and wrong strategy of implementation of reforms have been the main reasons for such low fiscal resource mobilization in Pakistan.

The table 3.4 shows a comparison of Pakistan's tax structure vis-à-vis developing countries. One thing which is striking is that the tax to GDP ratio of Pakistan among other comparable countries has been low. Further the main difference in these economies and Pakistan is that reliance on indirect taxes in Pakistan is far more than either those which are the lower bound of the developing countries or upper.

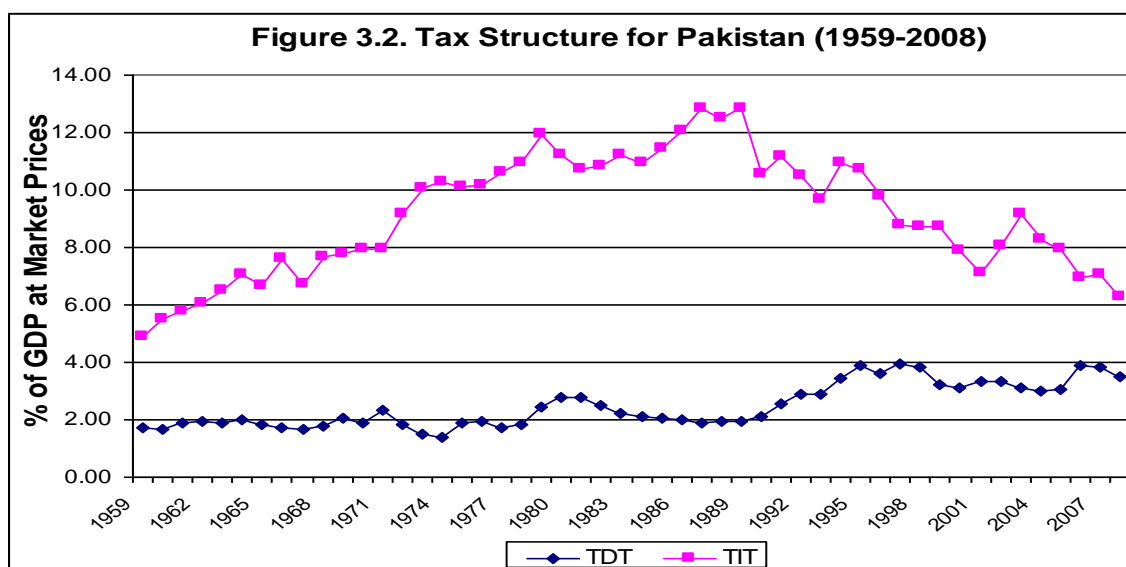
Tax Type	Developing Countries			Pakistan		
	With per Capita Income of Less than \$360	With per Capita Income of \$360 to \$750	All	1989-90	1992-93	2008-09*
<b>Direct Taxes</b>	3.91	6.84	7.26	1.83	2.71	3.50
Income Tax	3.27	5.53	5.11	1.75	2.58	3.27
Wealth and Property Tax	0.24	0.31	0.45	0.08	0.13	0.03
Social Security Taxes	0.21	0.79	1.3	-	-	-
Others	0.19	0.21	0.4	-	-	0.14
<b>Indirect Taxes (Domestic)</b>	4.55	4.74	5.21	4.81	4.33	6.29
Sales, Turnover, VAT	2.44	2.3	2.46	2.17	1.74	0.91
Excises	1.55	1.95	2.07	2.64	2.59	3.50
Others	0.46	0.49	0.68	-	-	-
<b>Indirect Taxes (Foreign)</b>	5.3	7.58	5.13	5.68	4.52	1.15
Import Duties	4.05	6.7	4.32	5.11	4.46	-
Export Duties	1.09	0.64	0.62	0.57	0.06	-
Others	0.16	0.22	0.2	-	-	-
<b>Others</b>	0.26	0.41	0.45	0.51	0.7	-
<b>Total Taxes</b>	14.02	19.66	18.05	12.83	12.26	9.79

Source: Pasha, Hafiz and M. Asif Iqbal, 'Taxation Reforms in Pakistan', Pakistan Journal of Applied Economics, vol.10, nos.1 and 2, 1994, pp: 50, \* Author's calculation

As we can see from table 3.4 above that direct tax collection as a percentage of GDP has been lower in Pakistan for all the reference years. The same situation prevails for the indirect taxes collected both from domestic and foreign tax base. Especially in

1990s the resource mobilization by taxing the imports has been higher in other developing countries as compared to Pakistan. The indirect tax collection has improved and this increase is more as compared to the reduction in taxes collection from trade base due to reforms.

If we look at the composition of tax revenue, then it becomes evident that reliance on indirect taxes for generating revenues has been predominant. In figure 3.2 it is observable that the total direct taxes (TDT) as a percentage of GDP had been very low from the very beginning and their growth as compared to total indirect taxes (TIT) have also be sluggish. Further there had been low correlation (-0.05) between the two series for the sample period (1959-2010). That shows that they have not been augmenting each other and do not represent any coordination at the policy making level also.



From the figure it is evident that Pakistan has been relying on indirect taxes. As the indirect tax to GDP ratio has been higher than that of direct taxes to GDP ratio. On average, indirect taxes were highest in the decade of 1980s, whereas the direct taxes have been the highest in the later years. In the earlier decades indirect taxes were less (with a

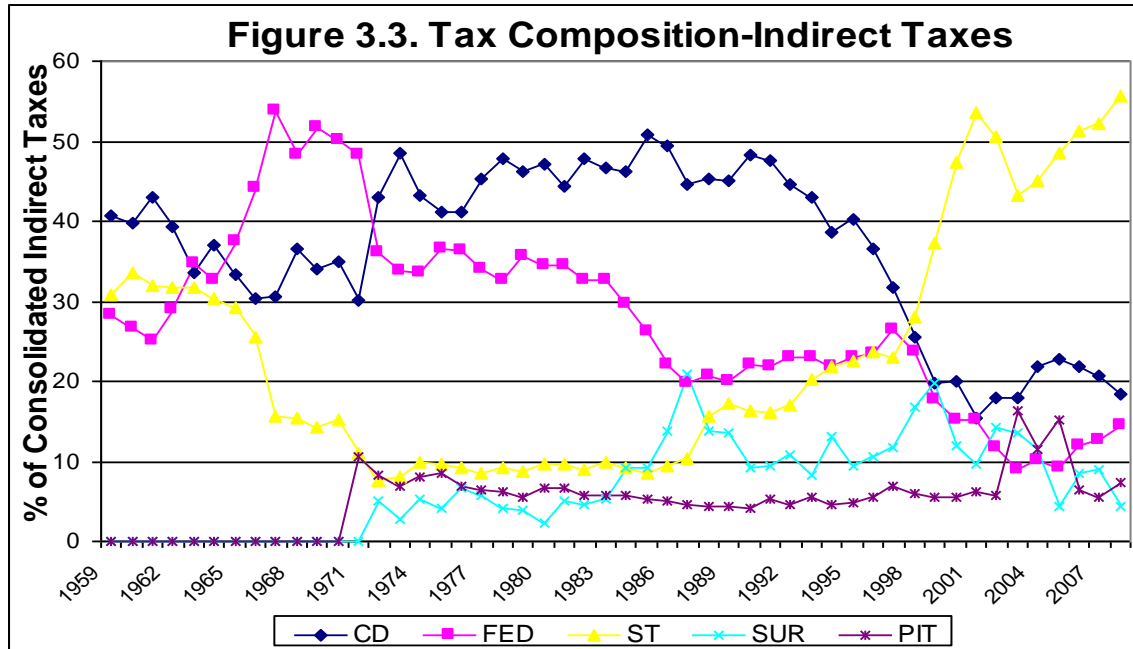
minimum value of 4.90 percent of GDP in 1959) and it increased till 1980s (with the highest value as 12.84 percent of GDP in 1987), which then started to decline and in the period of 2000-10 on average it was around 7.64 percent of the GDP. For the direct taxes, there had been a gradual increase. It was around 1.83 percent of GDP in the 1960s and it went up to 3.35 percent on average in the period 2000-2010. Although the share of indirect taxes had been on the higher side than direct taxes but they have also been more volatile all across the sample period. As a whole, the decade of 1990s had been most volatile as compared to the earlier and later decades.

### **Tax Compositions: Indirect Taxes**

If we look at the composition of taxes, it is evident that there had been major reliance on few taxes at certain times rather than the whole tax system. From figure 3.3 we see that in most of periods, right from the beginning, major tax revenue sources were custom duties. This had been practiced to support the import substitution policies and generate resources with more convenience. With high tariffs and import substituting industrial developments it had contributed to early economic growth of the country (Zaidi, 2005). On average for the period 1959-69 it had been contributing 36.17 percent of the total revenues collected through taxes. But it declined in late 1950s, and again started to increase from 1970s. It increased upto 49 percent of total indirect tax collection in 1973. Overall it had higher values in the 1970s, 1980s and 1990s. They were higher than any other source of revenue in the three decades of reference (42.13, 46.71 and 37.58 percent of total indirect taxes). Although it had started to decrease in nineties, but still its value was much higher than any other tax. It touched its lowest value in 2001, when it was around 15 percent of the total indirect taxes. On the other hand, federal



excise duty was increasing in the initial phases and went as high as 54 percent in 1967, and thereafter it was declining. On average it remained a steady 38 percent of the total indirect taxes in the first two decades of reference i.e. 1959-69 and 1970-79. Thereafter it was 27.26 percent in 1980-89 and 22.63 percent in 1990-99 periods. Whereas it had the lowest value in 2005 when it was just 9 percent in 2005 and on average it had been just 12 percent for the last reference period i.e. 2000-10. We see a major shift in the tax regimes, where over time moving from custom duties and federal excise duties, the main revenue generating source had been sales tax now. Although the value of sales tax were also higher in the initial phase but it went down from a higher value of 34 percent in 1960 to just 7.5 percent in 1972. Overall the time period of 1970s had the lowest value of sales tax on average (9.67 percent). Then in late 1980s the value started to pick up, this is the time when federal customs duty started to decrease, and federal excise duties were already falling. This is also the time when the structural adjustment program with the help of donor agencies was implemented, and in the taxation side one of the requirements was to shift from reliance on import duties to domestic consumption, to be used as a base to provide more revenues. In this period sales tax net was broadened and more imported and domestically produced goods were brought under the tax base (Zaidi, 2005).



Even in the current time there is pressure from IMF and World Bank to impose the new and modified Sales tax system, which will be based on a pure VAT format. Earlier the sales tax was a General Sales tax (GST) in a VAT mode just at the final stage of the product. But still due to lack of proper documentation of transactions at smaller retail and wholesale stage, it is difficult to administer full fledged VAT.

Surcharges were almost not present before the 1970s. These started to gradually rise after its inception as the coverage was expanded and rates were increased. These went as high as 20 percent in 1987 and 1999. After the peak in late 1990s these were again falling in the later periods as a percentage of total indirect taxes. The position for provincial indirect tax collection as a proportion of total indirect tax collection had been very low, because major tax assignments were kept by the federal government and then the resources were transferred back to the provinces through the NFCs.<sup>33</sup>

<sup>33</sup> National Finance Commission (NFC) is a body established through constitution of Pakistan and sets up the criteria to distribute the resources among provinces through a formula, based mainly on population, e.g. in 7<sup>th</sup> NFC award (most recent) 82% of weight is given to population.

Overall the tax system has shown a volatile picture and major regime change across the sample period has taken place. The changes in share of these taxes in total indirect tax collection show the shift of focus from one tax to other. If we look at the following table 3.5, then it is evident that for the whole sample (1959-2010) customs duty and federal excise duty are not correlated with each other. Whereas the customs duty is highly negatively related to the sales tax; meaning that sales tax has been gradually replacing the reduction in collection of customs duty (reduced due to the tariff reduction agreed with WTO enactment). Further, custom duties are also showing a negative relationship with provincial indirect tax collection and surcharges, but the strength of correlation is very low. The same situation is present for the federal excise duty and the rest of taxes. The correlation coefficient is low; i.e. -0.63, -0.28 and -0.54 for sales tax, provincial indirect taxes and surcharges. However among them it appears the reduction of federal excise duty could mainly be attributed with increase in sales tax and surcharges (especially surcharges are considered theoretically also to deter consumption of certain products as the federal excise duty is supposed to do the same).

**Table 3.5. Correlation Matrix for Indirect Taxes in Rs. Million (1959-2010)<sup>34</sup>**

	<b>Custom Duties</b>	<b>Federal Excise Duties</b>	<b>Sales Tax</b>	<b>Provincial Indirect Taxes</b>	<b>Surcharges</b>
<b>Custom Duties</b>	1.00	0.35	-0.85	-0.42	-0.31
<b>Federal Excise Duties</b>	0.35	1.00	-0.63	-0.28	-0.54
<b>Sales Tax</b>	-0.85	-0.63	1.00	0.35	0.26
<b>Provincial Indirect Taxes</b>	-0.42	-0.28	0.35	1.00	-0.20
<b>Surcharges</b>	-0.31	-0.54	0.26	-0.20	1.00

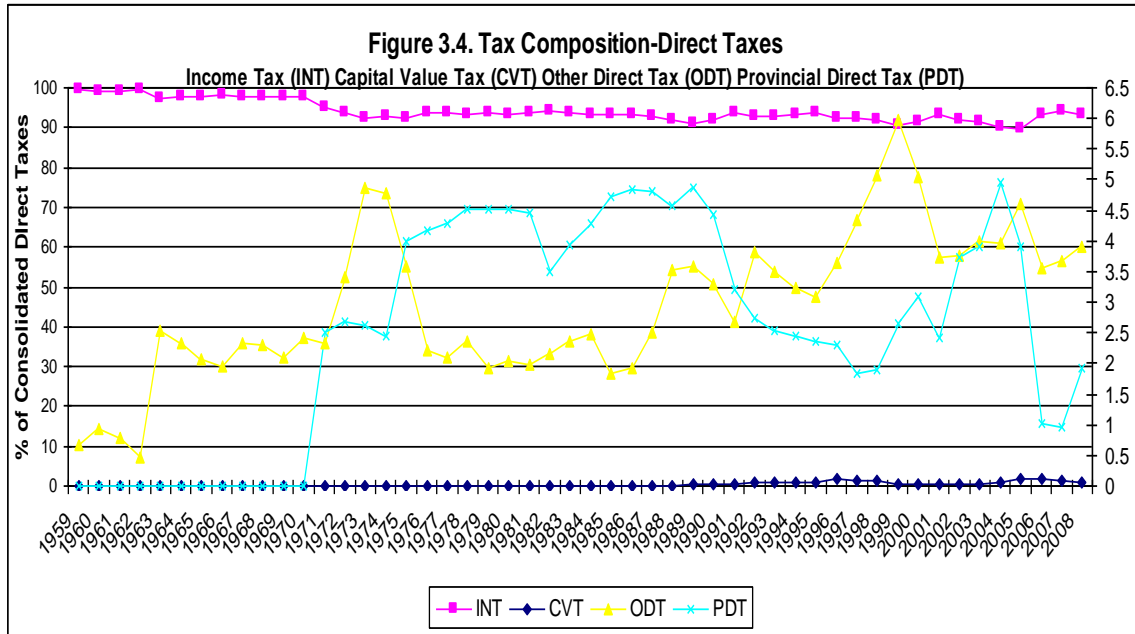
<sup>34</sup> For surcharges and provincial indirect taxes the correlations are for the period 1972-2010

## **Tax Composition: Direct Taxes**

The contribution of direct taxes in the total tax revenues has been significantly less than that of indirect taxes, due to the difficulty in tax administration. However over time the share of direct taxes is increasing, as shown in the figure 3.2, it is close to 4 percent of the GDP in 2000s. Figure 3.4 shows that major reliance in the direct taxes had been from the very beginning on the incomes earned by individuals and corporate business. It had been almost 100 percent in the early 1960s, but it reduced afterwards. It has never been less than 90 percent of total direct tax collections. On the other hand, other direct taxes and provincial direct taxes have been very volatile over the sample period (1959-2010). Capital value taxes are a recent phenomenon and contribute thinly to direct taxes. Other direct taxes have been the highest in 1999, when these touched figure of 6 percent of the total direct taxes and provincial direct taxes have been the highest in 2004 when these touched five percent of total direct taxes value. The striking feature is the volatility of these other direct taxes and provincial direct taxes although their share is minuscule.<sup>35</sup> This shows the weak capacity of the tax administration and volatile tax bases.

---

<sup>35</sup> As noted in the above paragraph that the highest value was six percent and five percent for the other direct taxes and Provincial direct taxes, whereas their respective standard deviations are 1.2 and 1.8 respectively, which are relatively higher for such low valued variables.



### Tax Elasticity, Buoyancy, Tax Evasion and Tax Incidence in Pakistan

Tax elasticity and buoyancy measures reveal the revenue generating capacities of the tax system with respect to changes in economic activity at macro level.<sup>36</sup> Table 3.6 shows that both direct taxes and indirect taxes had been less elastic and less buoyant in Pakistan. If we look at the customs duty then it is apparent that it has an elasticity coefficient less than one, hence with one percent change in custom duty base there is less than one percent change in the customs duty collection. Whereas the buoyancy measure shows that it is greater than one, hence only with change in implementation mechanism and tax structure change, more revenue could be generated. Federal excise duty had been very dismal in this regard, as both the elasticity and buoyancy measures have been less than one. On the other hand sales tax elasticity and buoyancy coefficients are more than one, hence these show more progressivism, as it is a value added tax. Its elasticity has

<sup>36</sup> Tax Elasticity measures the percentage changes in tax revenues due to percentage change in income of the country without the changes in the tax rate or other structures, whereas the buoyancy measures the total responsiveness of the tax revenues with change in income level of the country and other tax rate and structure changes.

shown a coefficient value of more than one in all time periods, with the highest value in the longrun (1.50). The same is the case with income tax (as described earlier, the major contributor in direct taxes), as its value for elasticity is close to one for the first and second period and in the longrun as noted by Bilquees (2004). Except for the period of 1981-82 to 1989-90 it has shown to be both elastic and a buoyant tax. Finally, if we look at the total taxes elasticity then we see that for the period of 1972-73 to 1980-81 it has shown to be both elastic and buoyant, but other than that it has been a less elastic and less buoyant tax overall. Especially if we see the longrun elasticity and buoyancy measures as estimated by Bilquees (2004), it is evident that elasticity coefficient is just 0.88 and buoyancy coefficient is 0.92. This is one of the main reasons for low tax to GDP ratios as compared to other developing countries. Besides corruption and poor administration, the tax system of Pakistan is least efficient to capture the possible additional resources which could have been generated due to economic growths in different periods.

**Table 3.6. Elasticity and Buoyancy of Major taxes**

Federal Taxes		Periods			Shortrun*	Longrun*
		1972-73 to 1989-90	1972-73 to 1980-81	1981-82 to 1989-90	1974- 2003	1974- 2003
<b>Customs</b>	Elasticity	0.69	0.94	0.70	-0.20	0.43
<b>Duty</b>	Buoyancy	1.06	1.18	1.07	-0.06	-1.19
<b>Excise</b>	Elasticity	0.66	0.92	0.53	0.06	0.44
<b>Duty</b>	Buoyancy	0.89	1.15	0.53	0.48	0.48
<b>Sales Tax</b>	Elasticity	1.01	1.08	1.45	0.38	1.50
	Buoyancy	1.26	1.26	1.71	0.42	1.41
<b>Income</b>	Elasticity	0.95	1.38	0.29	0.31	1.21
<b>Tax</b>	Buoyancy	1.10	1.35	0.64	0.40	1.23
<b>Total</b>	Elasticity	0.80	1.06	0.80	0.33	0.88
<b>Taxes</b>	Buoyancy	1.07	1.21	0.98	0.44	0.92

Source: Applied Economics Research Centre (AERC), Resource Mobilization by Federal Government in Pakistan, Research Report No.91, 1992, pp.67, \* Bilquees Faiz (2004)

One of the reasons accounted for such dismal tax collection is the presence of large underground economy, which evades taxes. Khalid (2002) has found the size of

under ground economy to be 16.93 % of the recorded GDP over the sample period of 1974 to 1998. In another study Kemal (2007) noted that tax evasion is estimated to be present in all the years of reference i.e. 1976-2005 and it was as high as 7.3 percent of GDP in 1996. If we look at table 3.7 then it becomes evident that if the government is able to curb some of the tax evasion (taken from Kemal, 2007) and transform the underground economy into a formal one then most of the budget deficit problem can be resolved.

**Table 3.7. Budget Deficit and Tax Evasion as a Percent of GDP**

Years	Budget Deficit	Tax Evasion	Years	Budget Deficit	Tax Evasion
1976	9.6	2.6	1991	8.8	3.5
1977	8.6	2.6	1992	7.5	4.5
1978	7.9	3	1993	8.1	4.6
1979	8.9	3.7	1994	5.9	5.5
1980	6.3	4.3	1995	5.6	6
1981	5.3	4.1	1996	6.5	7.3
1982	5.3	5.1	1997	6.4	7.2
1983	7.1	4.3	1998	7.7	7.5
1984	6	4.8	1999	6.1	5.4
1985	7.8	3.9	2000	5.4	5.7
1986	8.1	4.6	2001	4.3	6.3
1987	8.2	5.5	2002	4.3	6.8
1988	8.5	4.6	2003	3.7	7.1
1989	7.4	4.6	2004	2.4	6.3
1990	6.5	4	2005	3.3	5.8

Source: Kemal (2007)

Further, the tax system as a whole represents a regressive structure, which means that the objective of affecting consumption decisions and income re-distribution has not been incorporated while setting up the tax structure in Pakistan. Table no 3.8 shows that not only the total taxes paid as a percentage of household income has reduced over time, but it has become more regressive. In the earlier periods of sample the lower income groups were paying almost the same level of taxes as a percentage of their incomes as were paid by the higher income groups, except for the highest income group. Alarminglly,

over time the position has worsened, the lower and highest income bracket tax collection has reduced significantly. Earlier these were around 8 percent of the household income for the lower income bracket and 11 percent of the household income in 1980s and these reduced to just 6 percent for the lower income bracket and for higher income brackets it reduced to near 5 percent only in 2000s. This is in line with the above discussion, where it was noted that the taxes are inelastic and less buoyant. Further, there is high tax evasion and above all due to major reliance on indirect taxes, higher income brackets are protected from being charged at a higher effective tax rate than those applicable on lower income brackets.

**Table 3.8. Aggregate Tax Incidence (% of income)\***

<b>House hold Income Groups</b>	<b>1987- 88</b>	<b>1988- 89</b>	<b>1989- 90</b>	<b>1990- 91</b>	<b>1999- 00</b>	<b>2000- 01</b>	<b>2001- 02</b>	<b>2002- 03</b>	<b>2003- 04</b>
I	7.24	8.1	8.54	7.61	6.53	6.39	6.16	6.32	6.16
II	7.9	8.55	8.82	8.19	7.61	7.47	7.22	7.46	7.29
III	8.1	8.6	8.92	8.17	7.43	7.3	7.07	7.33	7.17
IV	8.06	8.58	8.8	8.13	5.07	5	4.86	5.06	4.98
V	8.06	8.49	8.65	8.09	4.68	4.63	4.52	4.76	4.69
VI	8.1	8.5	8.66	8.1	-	-	-	-	-
VII	7.84	8.21	8.32	7.78	-	-	-	-	-
VIII	8.02	8.32	8.37	7.87	-	-	-	-	-
IX	7.62	7.93	8.01	7.58	-	-	-	-	-
X	8.52	8.87	8.93	8.49	-	-	-	-	-
XI	7.57	7.97	8.09	7.49	-	-	-	-	-
XII	10.99	11.19	10.62	10.64	-	-	-	-	-

Source: Khalid (2010),\*The Earlier Household Income and Expenditure Surveys had twelve income groups, which were reduced to five in the later surveys

### **3.2.2 Resource Allocations**

Resource allocation at individual and firm level can in general be influenced by fiscal incentives (or disincentives) and balancing between the development and non-development expenditures (Ahmed and Rashid, 1984). Contrary to the poor resource



mobilization situation in Pakistan, expenditures have been on the higher side. Like other developing economies government has always played a major role in providing goods and services in the economy of Pakistan. With different macroeconomic policies adopted in various development eras, the main role has always been assigned to fiscal policy and within that it has been expenditure side mostly.

If we look at table no 3.9, it is clear that the size of government as measured by total expenditures as a percentage of GDP is not small all across the globe. But the issue is of composition, i.e. how and where the expenditures are allocated. Of course considering the inter-temporal nature of government budget constraint, the current levels of expenditures also reflects the policies adopted in past. So, if we look at the table it appears that except for Singapore (13.17% of GDP) all high income countries in the sample have a high level of government expenditures as a percentage of GDP. On the other hand, the lower-middle- income countries have a mixed trend as it has few countries such as Pakistan (16.32% of GDP) and India (16.01% of GDP) which have low levels of public expenditures and there are others such as Maldives (48.56% of GDP) and Sri Lanka (20.05% of GDP) which have high levels of government expenditures. The Lower income countries have low levels of expenditures due to limited availability of resources and/or requirement to adopt fiscal austerity measures by donor countries.

<b>Country Name</b>	<b>Country Classification By World bank</b>	<b>Expense (% of GDP)</b>	<b>Interest payments (% of expense)</b>	<b>Interest payments (% of revenue)</b>	<b>Subsidies and other transfers (% of expense)</b>
<b>Singapore</b>	High Income: Non-OECD	13.17	0.17	0.10	0.32
<b>Austria</b>	High Income: OECD	38.78	7.04	7.22	70.33
<b>Australia</b>	High Income: OECD	23.62	3.74	3.48	69.72
<b>France</b>	High Income: OECD	44.40	5.63	5.93	62.38

<b>Germany</b>	High Income: OECD	29.02	5.90	5.96	81.62
<b>Netherlands</b>	High Income: OECD	40.28	4.49	4.43	79.19
<b>New Zealand</b>	High Income: OECD	32.93	3.86	3.42	37.63
<b>United Kingdom</b>	High Income: OECD	40.00	5.44	5.77	53.28
<b>United States</b>	High Income: OECD	21.80	10.41	11.55	60.92
<b>Brazil</b>	Upper Middle Income	24.84	16.75	17.51	51.73
<b>Maldives</b>	Lower Middle Income	48.56	3.57	3.11	2.57
<b>Pakistan</b>	Lower Middle Income	16.32	26.39	29.17	30.67
<b>Sri Lanka</b>	Lower Middle Income	20.05	25.46	30.70	23.41
<b>India</b>	Lower Middle Income Countries	16.01	22.09	24.07	53.86
<b>Bangladesh</b>	Lower income	10.08	21.73	20.70	29.32
<b>Nepal</b>	Lower income	15.06*	7.00*	6.03	-

source: The World Bank; <http://databank.worldbank.org/>, \* figures pertain to Year 2005

It is evident that Pakistan is clearly not among the high government expenditures league,<sup>37</sup> as others are, but if we go further in the composition of these expenditures then the situation seems even worse. In the sampled countries above we saw that the countries that have low expenditure to GDP ratio except for lower income and lower middle income countries also have small interest payments and subsidies. Further the countries that have high levels of expenditures as a proportion of GDP; resources are allocated more towards providing subsidies (or are welfare oriented). Whereas in the case of lower and lower middle income countries, not only the overall expenditures as a proportion of GDP are high but also these high expenditures are used to repay for the high cost debt which these economies have borrowed or to provide for high level of subsidies. In case of Pakistan almost 57 percent of the expenditures are on the interest payment and subsidies,

<sup>37</sup> One of the reasons could be that like other developing countries where most of the state owned assets are not privatized, many government operations are running through the public sector organizations, such as Pakistan International Airlines, Railway, Water and Power Sector Development Authority (WAPDA), Pakistan Steel, etc. So if balance sheets of the public sector organization are also included, the total size of the government will increase further. The data for these public sector organizations are not available, hence not included in the present study.

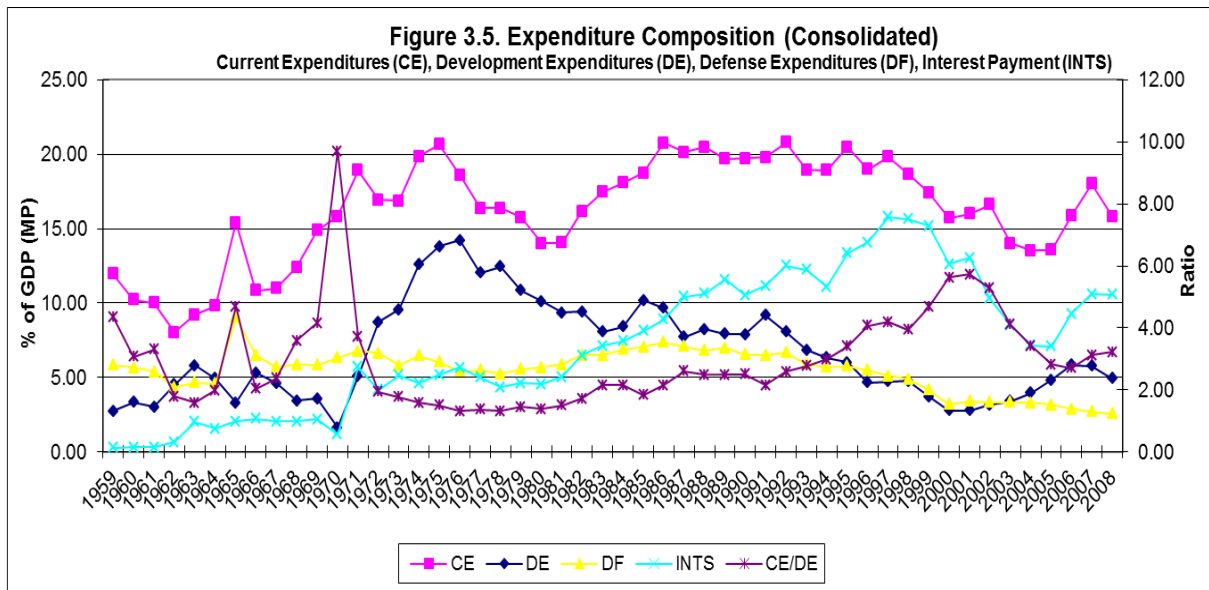
therefore leaving little room for other service delivery functions and developmental activities. Besides, Pakistan among the lower middle and lower income countries pays the highest level of interest payments.

In sample period (1959-2010) for this study total expenditure<sup>38</sup> as a percentage of GDP has been increasing. From figure 3.5 it is evident that growth in current expenditures has been more than that in development expenditures. In the early periods current expenditures were around 11 percent of GDP and development around 4 percent of GDP, so it was roughly a 3:1 ratio. This ratio improved till the mid 1970s. However, in the mid 1970s both expenditures started to fall as percentages of GDP but the fall in development expenditures was greater. In the start of the decade of 1980s current expenditures again started to increase but development expenditures could not increase and kept falling. In the 1970s current expenditures were around 18 percent of the GDP whereas the development expenditures increased upto 10 percent of GDP on average. This was the time when development and current expenditures as a percentage of the GDP were the jointly highest. Development expenditures touched 14 percent of GDP and current expenditures were around 21 percent of GDP. Also in the same decade the ratio of current expenditures to development expenditures were the highest, when it was almost 10:1. In the subsequent decades current expenditures could not be curtailed as compared to the development expenditures, which kept falling. In 1980s current expenditure were around 18 percent of the GDP on average and development expenditures reduced to 9 percent on average. The ratio of current expenditures to development expenditures on average improved to 2:1 in 1980s.

---

<sup>38</sup> Current expenditures include current subsidies and development expenditures includes development subsidies.

However, in the 1990s again the current expenditures increased on average (19.35 % of GDP), whereas the development expenditures (6.22% of GDP) kept reducing. This led to further deterioration in the ratio of current to development expenditures, when it stood at 3.33: 1. In the last period of sample (2000-2010), the position further worsened, as the ratio of current to development expenditure stood on average at 4:1, and it touched its highest value at 5.72:1 in 2001. However, in the same period the current expenditures as a proportion of GDP also fell (15.45 % of GDP on average) and development expenditure kept falling and reached the value of just 4.16 % of GDP on average, which was lowest after the decade of 1960s, and it also touched the lowest value of just below 3 percent of GDP in 2006.



As a whole in the early periods of our sample (1960s) just one head, defence expenditure had the largest share in the current expenditures, it stood at 5.77% of GDP on average in 1960s. It kept its high share in the current expenditure allocations (5.98% of the GDP in 1970s); although its share was declining as now interest payment was also taking its place in the current expenditures. Its size increased from a mere 0.68 percent of GDP to 2.19

percent on average in the 1970s. In the next decade both defence expenditure as a percentage of GDP (6.67%) and interest payment as a percentage of GDP (3.86%) increased, leading to further contraction in development expenditures. In 1990s defence expenditures reduced by a fraction (5.68%) but interest payments increased to almost double (6.31%). Both combined now accounted for almost 62% of the total current expenditures.

In the last decade of reference although the absolute size of expenditures was increasing but as a ratio of GDP reduced considerably. The defence expenditure fell to 3.10% of GDP on average<sup>39</sup> and interest payment as a percentage of GDP fell to 4.76% of GDP, resulting in decline of total current expenditures as a whole, although the absolute size increased. Overall the ratio of these two expenditures as a proportion of current expenditure also fell to around 51% in the later periods. So in the earlier periods defence expenditures were the main driver for high current expenditures, which in the later periods of our sample, was joined by interest payments. But as a whole the size of the government has been reduced over time by substantial amount as a percentage of GDP.<sup>40</sup>

### **3.2.3 Resource Gap**

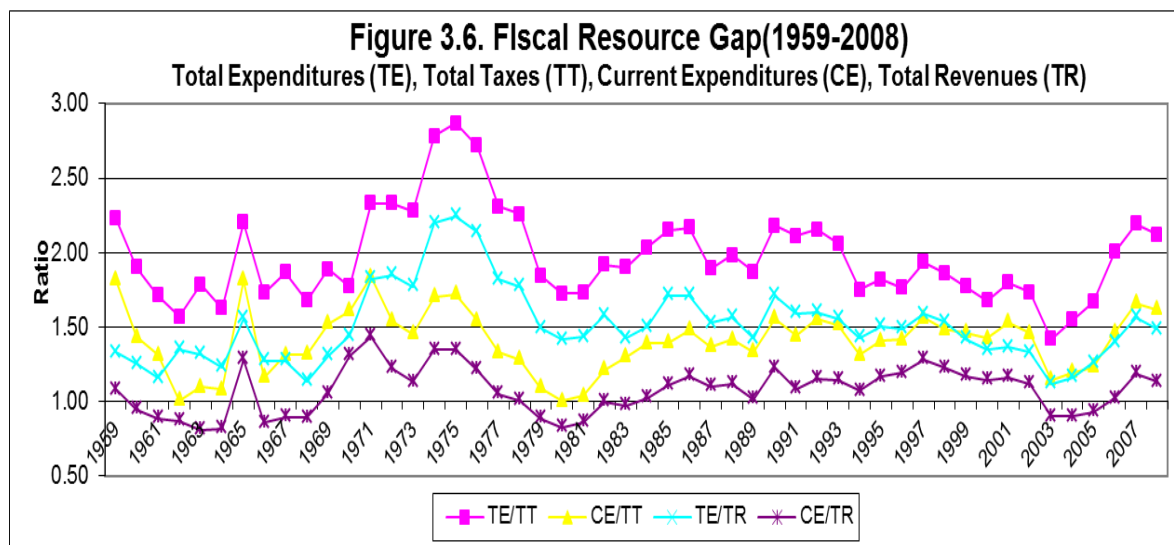
If we look at the picture of resource gap then it becomes evident that Pakistan has never posted a budget surplus. From figure 3.6 we can see that consolidated expenditures have been almost double the tax revenues for the sample period. It went as high as 2.87 times of tax revenues in 1975. Further, even the current expenditures were not fully met from the consolidated tax revenues for the sample period except for 1962 and 1980. It

---

<sup>39</sup> One of the reasons is that pensions and other benefits accruing to retired soldiers were shifted in the current expenditure head of civilian government. The second reason is the rebasing of GDP in 2000.

<sup>40</sup> Although increased in terms of absolute size.

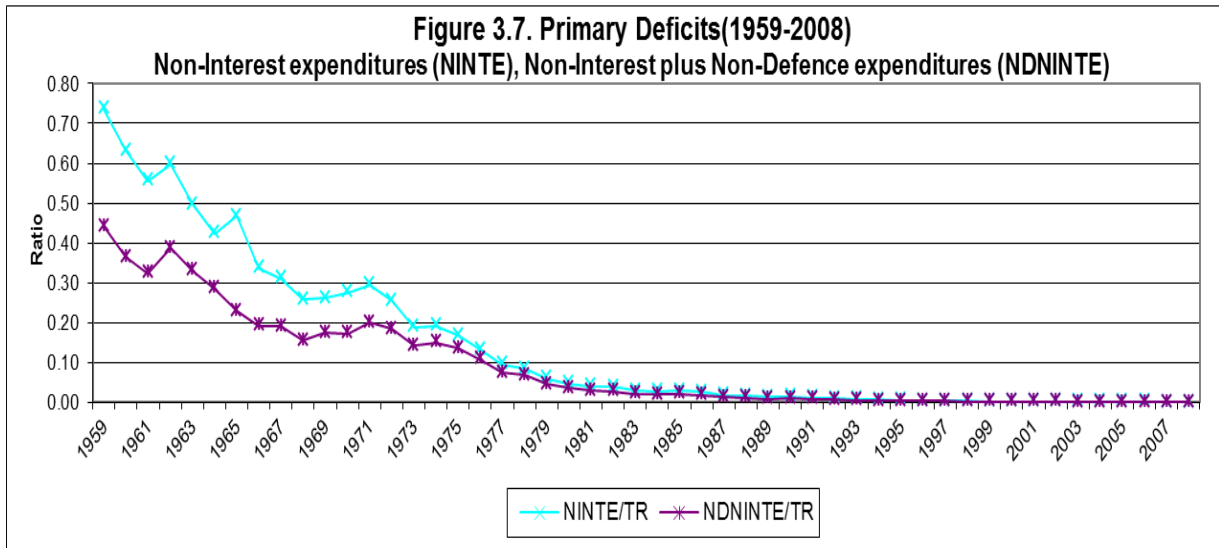
went as high as 1.81 times tax revenues in 1965.<sup>41</sup> Both the total expenditures and current expenditures have also shown a volatile picture over the sample period. Now if we look at the total revenue position, then it is somewhat better. But this reliance on non-tax revenues which mainly comprises of the public sector profits and privatization receipts may not be sustainable over the longrun.



In Figure 3.7 the primary deficits (non-interest expenditures/total revenue and non-interest plus non-defence expenditures/ total revenues) are explored over time. If we look at the early periods of our sample then it is evident that interest payments as a proportion of the total revenues were very small, but it has grown so much that in periods after the 1990s majority of our expenditures financed by revenues are appearing as interest expenditures only. Hence over time Pakistan is just able to finance interest payments from its revenue resources, which are also the total revenues not just the tax revenues. Further, if we take the defence expenditures away from the total expenditures along with the interest payments then it is evident that in earlier periods defence was the only major head of expenditure, but over time interest payments have become the single largest

<sup>41</sup> Pakistan engaged in war with India in 1965.

expenditure head for fiscal expenses in Pakistan. Alarming in the later periods now these two heads take away all the revenue resources, thus leaving nothing from the revenue resources to be spent on public service delivery. Thus it becomes a major concern to evaluate the impact of fiscal interventions on the economy so that future desirable and optimal policies could be drawn.

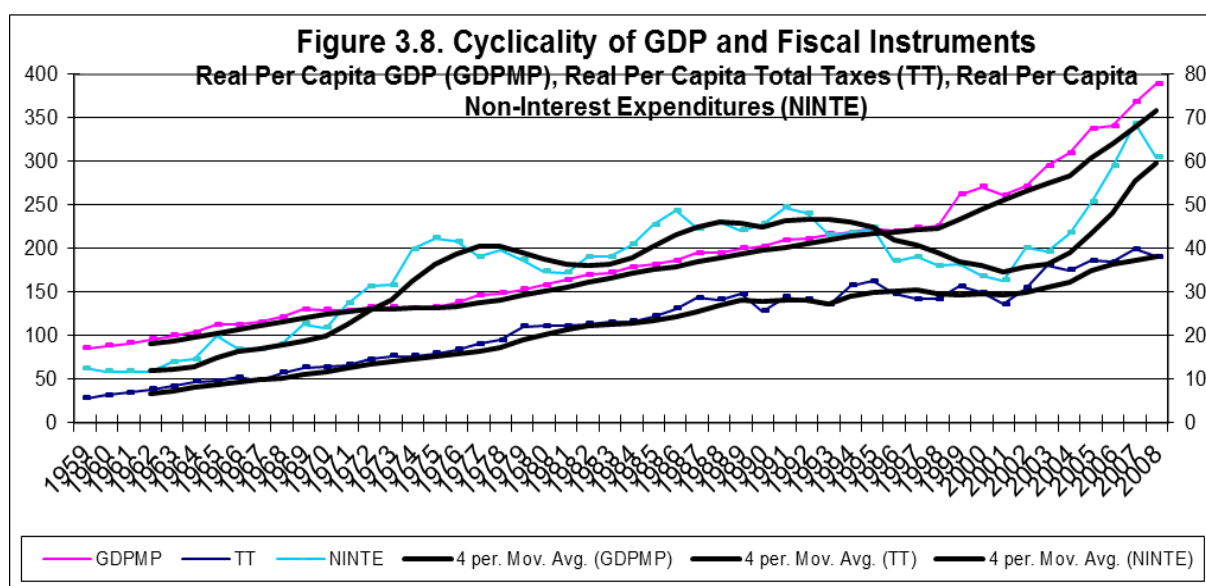


### 3.3 Fiscal Instruments and the Economy of Pakistan

Given the dynamic changes in the fiscal instruments in Pakistan over the sample period, it would be pertinent to explore their relationship with the aggregate economy and with its components. This is done by exploring the simple graphic relationship and growth rate calculations for the decades of our sample period in this chapter. Next chapters has more detailed and technical discussion on the impact of fiscal variables with reference to aggregate and dis-aggregated macroeconomic variables, however basic analysis is presented here.

From figure 3.8 it is apparent on the basis of taking four years moving averages, that there was a rough cycle starting in the early 1970s and going upto the late 1990s for the aggregate economy in our sample period (1959-2010) and then another cycle starting

from the late 1990s till 2010. Now if we compare these cycles with other fiscal variable series then acyclical total tax and non-interest expenditure variables are found in the first cycle whereas in the second cycle the same seems to be procyclical. Another study, Hussain (2004), has identified that total taxes cause total expenditures for federal government.<sup>42</sup> So, both of them may be independently behaving, yet in the same direction, or one (which we expect to be expenditures) may lead and other follows.



**Table 3.10. Correlation Matrix between Macroeconomic and Fiscal Variables (1959-2010)**

	NX	PCE	PI	GDPMP	TNTR	TT	TE	NINTE	NDNINTE
NX	1.00	-	-	-	-	-	-	-	-
PCE	-0.50	1.00	-	-	-	-	-	-	-
PI	-0.50	0.95	1.00	-	-	-	-	-	-
GDPMP	-0.45	0.99	0.96	1.00	-	-	-	-	-
TNTR	-0.57	0.92	0.92	0.92	1.00	-	-	-	-
TT	-0.38	0.92	0.84	0.94	0.85	1.00	-	-	-
TE	-0.49	0.86	0.77	0.87	0.84	0.94	1.00	-	-
NINTE	-0.57	0.77	0.68	0.78	0.80	0.86	0.97	1.00	-
NDNINTE	-0.63	0.79	0.70	0.78	0.81	0.83	0.95	0.99	1.00

NX: Net Exports, PCE: Private Consumption Expenditures, PI: Private Investment, GDPMP: GDP at Market Prices, TNTR: Total Non-Tax Revenue, TT: Total Taxes, TE: Total Expenditures, NINTE: Non-Interest Total Expenditures, NDNINTE: Non-Defense, Non-Interest Total Expenditures

(Note: All variables are taken to be Real Per Capita Variables)

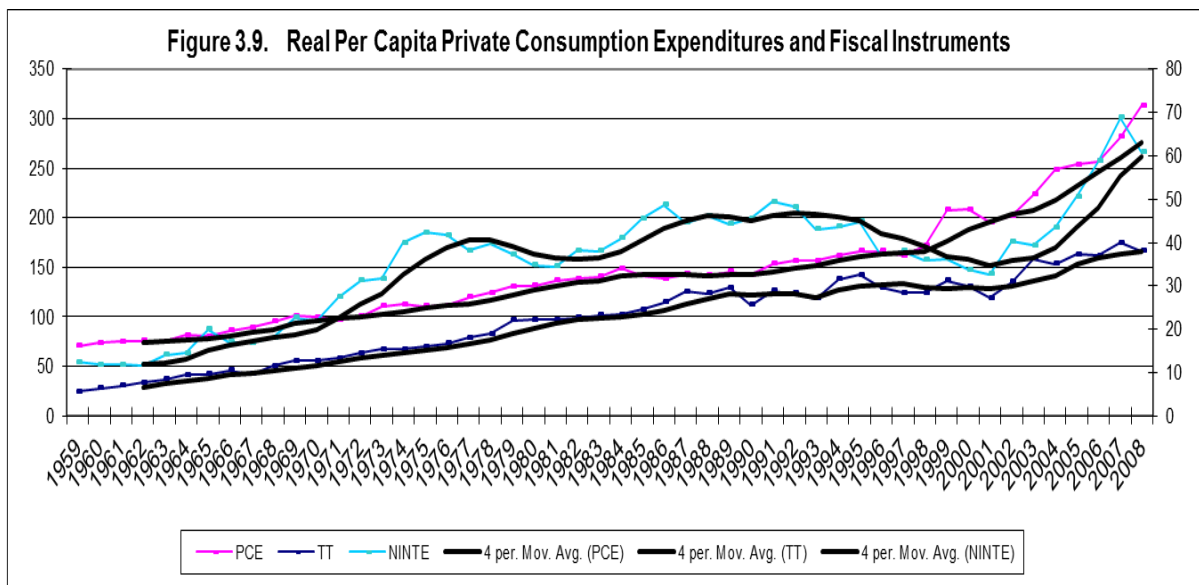
<sup>42</sup> As discussed earlier major chunk of expenditures and taxes are dealt with by federal government in Pakistan



However if we look at the whole sample, as reported in table 3.10, with correlations for the whole sample period, then the aggregate economy seems to be highly correlated in the same direction for all the fiscal policy variables, although taxes and other non-tax revenues have strong correlations as compared to expenditure indicators. Specifically non-interest and non-interest-non defense expenditures have relatively smaller correlation coefficients (0.78 for both).

### Fiscal Policy Instruments and Private Consumption in Pakistan

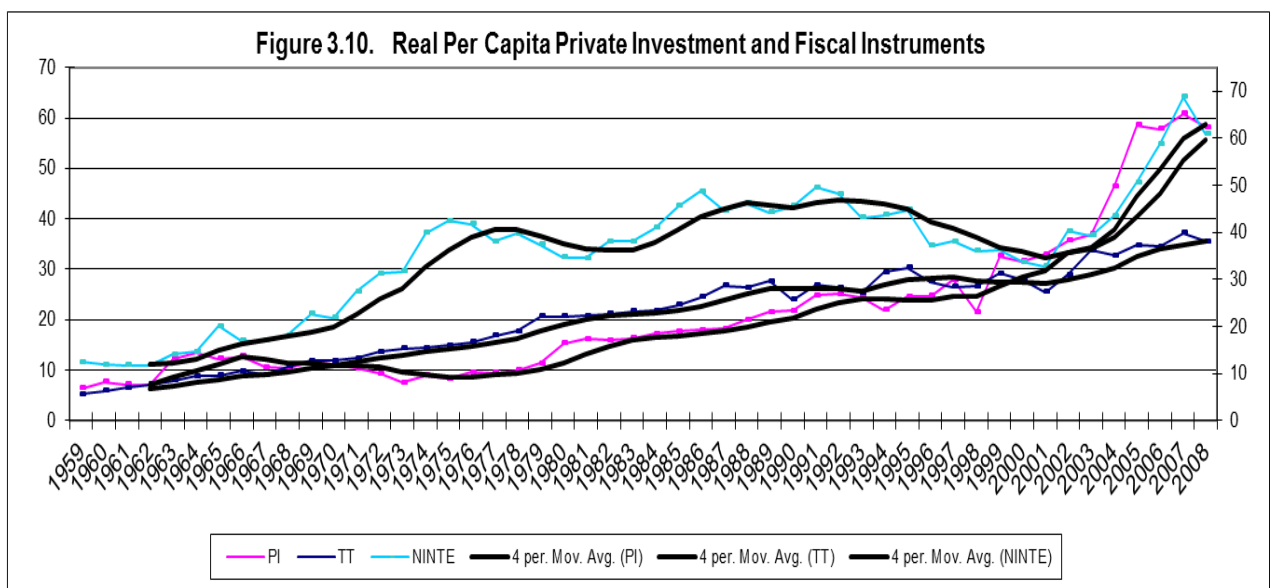
Figure 3.9 reveals that total taxes closely follow the private consumption expenditure cycles. This may be because of greater share of indirect taxes in the total taxes. Except for the later periods (after year 2000) in which although total taxes follow the cycle but its growth does not match with the growth of private consumption expenditures. That's why in the correlation table 3.10 still high positive correlation between the total taxes and per capita real consumption expenditures is reported for the whole sample (1959-2010) under consideration (0.92).



On the other hand, non-interest total government expenditure presents acyclical behavior for the whole sample period. However in the last period for the private consumption expenditure it showed the typical cyclical behavior. The same situation appears in the correlation matrix, where the value of correlation coefficient relative to revenue variables is less (0.77). The same situation holds if we see total expenditures and non-interest-non defense expenditures, there correlation coefficients with private consumption expenditures were 0.86 and 0.79 respectively.

### Fiscal Policy Instruments and Private Investment in Pakistan

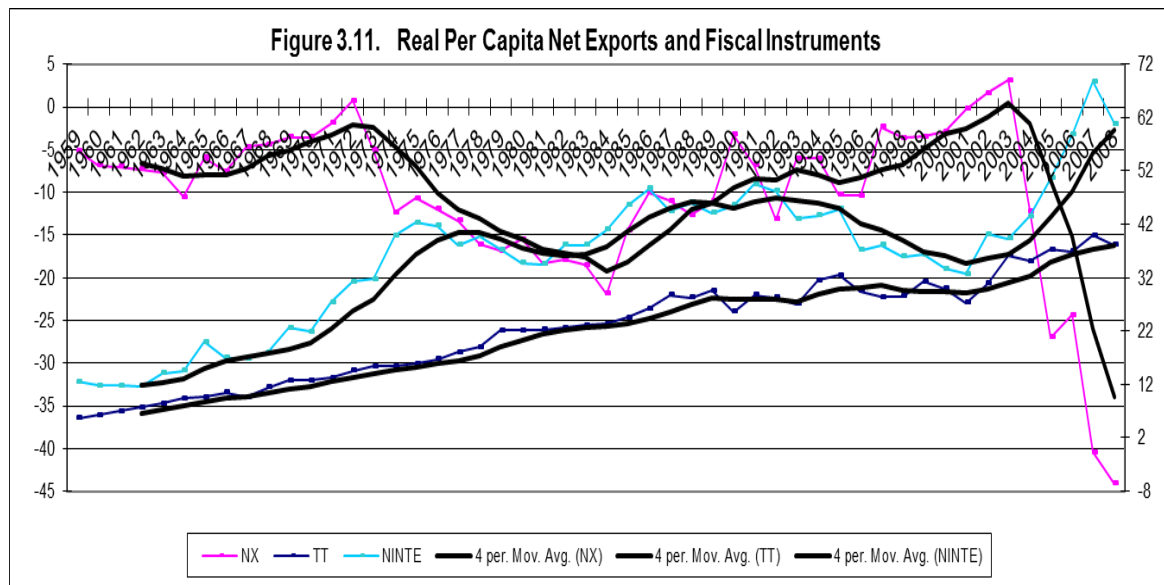
For real per capita private investment, the movement of total taxes seems to be acyclical upto the late 1990s, although for GDP and private consumption the trend has been opposite. Since the taxes comprise of mainly indirect taxes, which are predominantly consumption taxes, so the relationship is opposite in direction. The situation is explained further if we see the correlation between total taxes and private investment (0.84) which is lower than the high positive correlation (0.92) of non-tax revenues.



On the other hand, non-interest expenditure shows also an acyclical movement. This observation is further strengthened if we look at the very low correlation coefficient between non-interest expenditure and private investment (0.68). The same situation holds for total expenditures and non-interest-non defense expenditures. This shows the tendency of fiscal policy to be non-complimentary to the private investment expenditures.

### Fiscal Policy Instruments and Net Exports in Pakistan

Pakistan has rarely achieved positive trade balance (except for 1972 and 2003), and represents a pretty regressive picture. However, if we compare the total taxes to the movement in net exports then it is observed that total taxes seem to be invariant to the net exports in the sample period (1959-2010). Although Net exports are negatively correlated i.e., for both the non-tax and tax revenues, but correlation coefficients are low (-0.38 and -0.57). Hence nothing can be inferred from the graphical and correlation exercise about the pro or anti-cyclical movements of revenue variables with the net exports.



Similarly, expenditure side is also least correlated with the net exports. Graphically no pattern of cyclical co-movements is observed and this argument is

substantiated by correlation coefficients. All the three indicators used for expenditures i.e. total expenditures, non-interest expenditures and non-interest and non-defense expenditures have negative but low correlation with the net exports (-0.49, -0.57 and -0.63). So, here we see that both taxes and expenditures seem to be uncorrelated with net exports, and if we use the composite measure of budget deficit, it may give us different and misleading results.

### **3.4 Conclusion**

In this chapter we have tried to cover the relevance and historical perspective of fiscal policy in Pakistan for the sample period 1959-2010. Besides looking at the dynamics of taxes, expenditures and budget deficits, some graphical symmetry are also explored. The analysis is descriptive and sheds some light on the trends. Aggregate and disaggregated fiscal policy variables are analyzed. Contrary to the general belief about the size of the government, Pakistan is not among the “Large government” countries. Its share of expenditures in the total GDP is not very high. However the overall revenue and taxes in particular are very low. In fact amongst the lowest in the world. This puts the Fiscal policy conduct in a suboptimal position. Because on the expenditure side also, although the overall size of the government is small but due to consistent increase in the interest payments and debt servicing the available resources are shrinking. This in turn leads to excessive cuts in the development expenditures. On the other side, our tax system is also not very elastic and/or buoyant. On top of it the overall tax incidence shows that the tax system is not progressive.

Fiscal policy over the years has structurally changed. It becomes evident that fiscal policy has been playing a major role in providing policy options for the government

in the sample period. However, merely looking at the composite values for checking the relationship may be misleading, as each component of taxes and expenditures has its own dynamics. There also seems to be regime switching among these components and across fiscal instruments. At the end observations of simple graphs and correlation tables provides us some idea about how the fiscal instruments behave, but it needs more rigorous econometric analysis to identify the exact stance, effectiveness of fiscal instruments towards the aggregate economy and its components from expenditure side, which is covered in the following chapters.

## Chapter 4

### Methodology and Data

World over governments are moving towards ‘Fiscal Profligacy’<sup>43</sup> (Afonso and Peter, 2008) even though there are institutional constraints over the governments to be fiscally sustainable. The focus is not only on the resulting macro variable of budget deficit rather the composition of budget adjustments pertaining to sustainability of public finance is considered always with its impact on the economic growth.

These developments in the compositions are not merely based on economic but political rationality as well, in which certain decisions are taken as strategic ones (Alesina and Perotti, 1995). Targeting of different instruments can have different impact on the macroeconomic performance both in terms of long term growth and sustainability of public finances (e.g. see Furceri and Annabelle, 2010), especially in case of combinations of active/passive fiscal policy (FP) and or passive/active monetary policy (MP). Different fiscal instruments can be statistically and historically identified on both the government spending and taxation side for Pakistan (some of them were also presented in chapter 3). As noted above in the introductory chapter (page 10) and literature review (section 2.5, page 40), most of the macroeconomic models have embedded the cyclical fluctuations around some steady-state trend growth path in their analysis such as Dynamic Stochastic General Equilibrium (DSGE) models with nominal rigidities (Afonso and Peter, 2008). The same can be extended to include the fiscal policy. Since it involves use of certain parameters which are not available currently for Pakistan hence it is not used here.

---

<sup>43</sup> Merriam-Webster Dictionary; Wildly extravagant. Here it refers to governments spending more than what is required, both in terms of scope and size. E.g. focusing/spending in too many areas.

On the other hand counterpart to a DSGE model is to use the VAR based models. However there is a large body of literature which shows a common trend of showing a positive effect of fiscal change to macro outputs such as consumption. In this type of analysis due to the presence of endogeneity and issues specific to fiscal policy operations, it becomes difficult to get reliable estimates (see Perotti, 2004 for details).

Specifically while administering the fiscal operations, the changes in the fiscal stance come as a result of long and politically manipulated process, hence private agents are not surprised. This may result in even not affecting the fiscal variables itself in the first instance (what Lippi and Reichlin (1994) referred to as shocks being non-fundamental). Secondly with the presence of automatic response from budgetary components (although the response may vary for each country and budget component) these problems are further exacerbated (Afonso and Peter, 2008). In the end since the fiscal shock may have a different originating base (such as direct taxes or indirect taxes, through expenses or transfers etc), hence each of these may have a different short term and long term impact.<sup>44</sup>

This problem of endogeneity is addressed by Blanchard and Roberto (2002); in their seminal paper they have used a Structural VAR that employs out of model institutional information, such as the elasticity of budgetary components and other timing issues of the precedence in fiscal policy making decisions. Once the cycles are identified through the use of tax and expenditure elasticities the discretionary shocks in fiscal variables are just the shifts in them.

---

<sup>44</sup> There is no definition of a standard fiscal shock; each trade off between say tax or spending adjustment may be debated in the legislative council (national assembly in case of Pakistan) for approval.

In this chapter we have provided the basic framework through which the effectiveness of fiscal policy will be estimated. The estimation is divided in two parts; in the first step we have estimated the elasticities for the revenue and expenditure aggregates and sub-aggregates. These elasticities are required to be used to calculate the structural VAR in next chapter. In second step we employ the structural VAR estimation method to identify the impact of fiscal policy instruments on the aggregate and disaggregated economy for Pakistan.

This chapter is organized as follows: first the approaches to identification of fiscal shocks are described, and then structural VAR methodology is explained. After that method of estimating the parameter requirements i.e. the elasticity estimation methodology is explained and finally data and data issues are described.

#### **4.1 Approaches to identification**

The first point is looking at the methods for identification of fiscal shocks used for the description of fiscal policy effectiveness. The empirical evaluation of the effects of fiscal policy is normally conducted using vector auto regression (VAR) framework. Some of the earlier work on fiscal policy has often relied on the cyclically-adjusted primary deficit as a measure of fiscal policy stance. Although the adjusted deficit does deliver information about current policy, it is inappropriate in dynamic macro econometric analysis because none of the competing theories implies that spending increases and tax cuts have the same effect on the economy. A small but growing literature has recently applied VAR methods for the analysis of fiscal policy; I briefly review four different approaches to the identification of fiscal policy shocks that have been used in the literature available on that:



i) In this group presented by Christiano, Eichenbaum and Evans (1999); fiscal policy shocks are identified by tracing the effects of a dummy variable capturing the fiscal episodes like: for US the Korean War military buildups, the Vietnam War build up or the Regan Fiscal expansion or the recent gulf war expenditures. For Pakistan it could be the earthquake of 2005, the most recent floods in 2010 or going back; the war in 1965. The advantages and disadvantages of this approach are well known. If these episodes were truly exogenous and unanticipated and one is only interested in estimating their effects, there is no need to impose other potentially controversial assumptions: all that is needed is a reduced form regression. But what if these events are anticipated and secondly other substantial fiscal shocks of different type or sign might have occurred around the same time, thus polluting the identification of the fiscal shocks.

ii) The second approach consists of identifying the fiscal shocks by sign restrictions on the impulse responses to fiscal policy (Mountford and Harald, 2009). For instance revenue shocks are identified by imposing tax revenue response to increase while the government spending response does not change, and that all responses such that both tax revenues and GDP increase would identify a business cycle shock.

An important advantage of this approach is that it is well suited to handle anticipated fiscal shocks: the estimated effect on, say, private consumption at time 0 could be the response to a revenue shock that occurs later. On the other hand, by identifying revenue shocks via the condition that tax revenues and output do not co vary positively in response to the shock, the approach rules out by assumption a whole set of “non-Keynesian” output responses to fiscal shocks.<sup>45</sup> A second cost of this approach is

---

<sup>45</sup> For some empirical evidence on non-Keynesian effects of fiscal policy, see Alesina et al., (2002)

also related to its benefits; while it can better handle anticipated fiscal policy, it cannot pin down at what point of time the fiscal shock has occurred.

(iii) Third approach essentially relies on ordering to identify the fiscal shocks. In the former, government spending is ordered first: in the latter, fiscal shocks from revenues are ordered last. It is by analogy to monetary shocks in some recent monetary policy VAR contributions. A discussion of this approach will be implicit in the discussion of the next one.

(iv) The fourth approach, developed by Blanchard and Roberto (2002), is akin to a structural VAR estimation. Identification is achieved by exploiting decision lags in fiscal policy, and institutional information about the elasticity of fiscal variables such as taxes and spending to economic activity. The present thesis mainly relies on this fourth approach, while extending it to the components of taxes and spending for Pakistan.

#### **4.2 Structural Vector Autoregressive Approach for Fiscal Policy Effectiveness Analysis**

Structural VAR approach has been used to assess the effects of monetary policy in a number of studies (see in particular Bernanke and Ilian, 1998). A similar approach could be well suited for studying the impact of fiscal policy for two reasons (Blanchard and Roberto, 2002). First in distinction to monetary policy, fiscal variables change for many reasons out of which output stabilization is rarely major, put in other words, there are exogenous with respect to output, fiscal shocks. Secondly again in contrast to a monetary policy action, decision process and implementation lags in fiscal policy conduct imply that at high enough frequency- say within a quarter- there is small or no

discretionary response of fiscal policy to unexpected contemporaneous movements in the activity.

This is even valid for low frequency property values such as bi-annual or annual in certain countries. For instance, in Pakistan, due to very low tax elasticity there is almost no response from the revenue side while expenditures are also exogenous to the state of the economy (this issue is also taken up in the another study by Khalid *et al.* (2007) where a fiscal reaction function is estimated for Pakistan). So with enough out of the system information (institutional information) about the tax and transfer systems, we can construct estimates of automatic effects of unexpected movements in activity in fiscal variables, and by implication, obtain estimates of fiscal policy shocks which can be termed as discretionary. Having identified these shocks we can then trace their dynamic effects on GDP and its components and other variables of interest.

### **4.3 Methodology**

#### **4.3.1 Structural Vector Auto Regressive Estimation method**

We use the Structural VAR (SVAR) approach here to identify structural balances and impacts of various fiscal policy instruments following methodology used by Blanchard and Roberto (2002), which filters the cyclical response of the Fiscal policy to economic conditions. This can be explained as follows:

The SVAR approach starts from the reduced form specification:

$$X_t = A(L)X_{t-1} + U_t \quad (4.1)$$

Where vector of endogenous variables  $X_t$  in our case includes the log per capita real government spending on goods and services ( $g_t$ ), log real per capita taxes ( $t_t$ ) and log per capita real output ( $x_t$ ).

The reduced form residuals ( $U_t$ ) of the  $x_t$ ,  $g_t$  and  $t_t$  in equations i.e.,  $u_t^x$ ,  $u_t^g$  and  $u_t^t$ , can be thought of as linear combinations of three components. First component is the automatic response of taxes and government spending to innovations in output; for instance, for given tax rates, taxes increase automatically when output increases. Second, the systematic discretionary response of policy makers to innovations in the other endogenous variables; for instance, reductions in tax rates implemented systematically in response to recessions. Third, random discretionary shocks to fiscal policies; these are the structural fiscal shocks, which unlike the reduced form residuals are uncorrelated with all other structural shocks. These shocks, i.e. the values of the elasticities of government revenues and transfers will be used for identification scheme.<sup>46</sup> This is also the component of major focus while estimating impulse responses to fiscal policy shocks.

These relations can be written as follows which will be later used to identify the structural values in the typical VAR:

$$u_t^t = \alpha_{tx} u_t^x + \beta_{tg} e_t^g + e_t^t \quad (4.2)$$

$$u_t^g = \alpha_{gx} u_t^x + \beta_{gt} e_t^t + e_t^g \quad (4.3)$$

$$u_t^x = \alpha_{xt} u_t^t + \alpha_{xg} u_t^g + e_t^x \quad (4.4)$$

Where the coefficients  $\alpha_{jk}$  captures the first two components of shocks and  $e_t^g$ ,  $e_t^t$  and  $e_t^x$  are considered as the structural shocks among which the fiscal shocks i.e. the government expenditure and net taxes ( $e_t^g$ ,  $e_t^t$ ). Further these are considered to be uncorrelated i.e.  $\text{cov}(e_t^g, e_t^t) = 0$ . However on the other side  $e_t^g$  and  $e_t^t$  are correlated with the reduced form residuals, hence they cannot be obtained by an OLS estimation of 4.2

---

<sup>46</sup> Since in Pakistan there is no explicit transfer system such as unemployment insurance or medical payments so just elasticity with respect to taxes will be used.

and 4.3 directly. So we need to use some exogenous information to estimate the parameters in these equations.

To do that we can construct cyclically (with the institutional information about the elasticities of fiscal variables) adjusted fiscal shocks as:

$$u_t^{t,CA} = u_t^t - \alpha_{tx} u_t^x = \beta_{tg} e_t^g + e_t^t \quad (4.5)$$

$$u_t^{g,CA} = u_t^g - \alpha_{gx} u_t^x = \beta_{gt} e_t^t + e_t^g \quad (4.6)$$

Which are linear combinations of the two structural fiscal policy shocks and adjusted for the elasticities.<sup>47</sup> However there is no standard practice both theoretical or empirical, on how to identify the two structural shocks  $e_t^t$  and  $e_t^g$  on the r.h.s of 4.5 and 4.6 (Afonso and Peter, 2008). Therefore we try both orthogonalizations: firstly; we assume  $\beta_{tg} = 0$  and estimate  $\beta_{gt}$ ; in the second, we assume  $\beta_{gt} = 0$  and estimate  $\beta_{tg}$ . As it turns out in all cases the correlation between the two cyclically adjusted fiscal shocks is very low, hence their ordering does not matter but for reporting purpose both are given in results.

Now since the two estimated structural shocks are orthogonal to the other structural shock of the economy, hence they can be used as instruments in the remaining equation (equation 4.4). We can estimate the GDP equation;  $u_t^x = \alpha_{xt} u_t^t + \alpha_{xg} u_t^g + e_t^x$  by using  $u_t^{t,CA}$  and  $u_t^{g,CA}$  as instruments for  $u_t^t$  and  $u_t^g$  respectively.<sup>48</sup> Once the structural shocks are identified, the impulse responses are constructed using the average weighted tax elasticities over the relevant sample periods.

---

<sup>47</sup> Here CA in superscript stands for ‘cyclically adjusted’.

<sup>48</sup> We have used GMM technique to estimate the coefficients of equation 4.4.

In order to estimate the elasticities of government purchases and net taxes in relation to the economic activity ( $\alpha_{tx}$  and  $\alpha_{gx}$ ) we need institutional information which provides us information on the features of these variables. These, i.e. the taxes and expenditure elasticities are reported in the next sections with details of estimation methodology. Initially it will be for individual taxes and expenditure items but here we need to use an aggregate measure of tax elasticities and expenditures as explained above. In case of government expenditures there are no such explicit expenditures which could be related to the state of the economy (e.g. there are no explicit social security or health insurance schemes run by the government). Hence the elasticity of government purchases to economic activity is taken to be zero i.e.  $\alpha_{gx}=0$  {this assumption is also used by a number of other studies such as Blanchard and Roberto (2002), Castro and Pablo (2007) and Afonso and Peter (2008)}.

Now for the aggregate tax elasticity ( $\alpha_{tx}$ ) estimation we can define total taxes to be  $T = \sum_i T_i$ , and the relevant tax base to be  $B_i$ , then we can define the aggregate tax elasticities with respect to economic activity as:

$$\alpha_{tx} = \sum_i \eta_{T_i, B_i} \eta_{B_i, X_i} \frac{T_i}{T} \quad (4.7)$$

Here  $T_i$  refers to  $i$ th tax,  $\eta_{T_i, B_i}$  refers to elasticity of  $i$ th type of tax to its relevant base and  $\eta_{B_i, X_i}$  refers to elasticity of  $i$ th tax base to total economic activity.<sup>49</sup>

---

<sup>49</sup> Details about the methodology and tax bases used are provided in the next sections.

### **4.3.2 Elasticity Estimation**

High elasticity and/or buoyancy of taxes are pivotal for a healthy public financial system. But in developing countries the taxation structure both from the tax rates and administration side are suboptimal and inefficient. Tax to GDP ratios is low which indicates either the high levels of tax erosion (under-ground economy) or low growth in the system. Major taxes have a very low elasticity due to inherent weaknesses in the economic structures as majority of the people remains out of the tax net due to low average income levels and non-formal nature of most of the economic activities. Nevertheless, an equally important factor has been the provision of massive tax incentives and exemptions to the industrial sector over longer periods of time in most of the developing countries (Mohsin, 2004). As a result, the level of budget deficits and borrowing becomes unsustainable over time (same has been the case for Pakistan as narrated in Chapter three).

The estimates of tax elasticity are essential element for assessing revenue productivity of a tax system, budget making, fiscal projections and long term plans of development in developing countries. The response of tax revenues to changes in income has often been singled out as a vital ingredient in considering a criterion for a tax system. This response is measured by the concepts of elasticity and buoyancy. The elasticity measures the automatic response of revenues to income changes i.e. revenue changes excluding the effects of discretionary policy changes. High tax elasticity is always desirable as it allows growth in public expenditures. Higher elasticity means that growing development expenditures will be financed by automatic increase in the tax revenues due to high economic growth without raising tax rates. The target of increased revenue can be

met with the growth in the base only. However the major tax revenue sources may have a low elasticity in developing countries, the case where governments must introduce discretionary changes to accrue additional funds. Thus, tax revenue growth may be caused by higher buoyancy.<sup>50</sup>

Although the measurement of tax elasticity has been a debated issue in the public finance literature, the Prest (1962) method is considered to be the most appropriate to clean the historic tax data series to measure the ‘built in flexibility’. To exclude the effects of discretionary policy changes on revenues four methods have been generally used.<sup>51</sup>

1. Proportional Adjustment Method (by Prest (1962))
2. Constant rate structure
3. Divisia Index Method and
4. Econometric method

In the constant rate structure, a simulated tax revenue series is generated on the basis of an effective tax rate for the base year. The estimates of the tax base for later years provide accurate estimates on the condition that both tax and its base are most accurately and narrowly defined in the base year. But it is evident that this method cannot be defined to the broad tax categories such as excise and customs duty, but it can be more appropriately used for individual products within these categories. The data requirements for this technique are very large; that is why this method is rarely used. But it is relevant when ever a consideration is being given to revamp the tax structure substantially.

---

<sup>50</sup> See Mansfield (1972) for details.

<sup>51</sup> For detailed discussion, see Sen Pronab (2002)



The Divisia Index and Econometric methods are least demanding in detailed data requirements. The actual tax series and relevant base at an aggregate level is enough to use them; that is why researchers use them for panel data estimation for cross country comparison. The problem with most of the country estimation is that the aggregate tax to which this methodology is applied comprises of a non-constant set of items. The developing countries particularly will experience, significant change in the base if long time-series is used for estimation. Moreover Econometric method which relied mainly on the use of dummy variables cannot be used if frequent changes in the tax structure are experienced, since more and more dummy variables in the equation reduce the degrees of freedom and even changes the specification of true model.

According to Sen Pronab (2002); the Proportional Adjustment method lies in between the two extremes in terms of data requirements. It does not require disaggregated data on tax rates and base as used in the constant rate structure but the data pertaining to budget estimates of taxes and discretionary changes is a prerequisite for estimation purpose. If these data are available, this method provides the estimates better than those obtained from above discussed methodologies (Sen Proonab, 2002). The data on tax estimates and discretionary measures is available for some of the countries but the reliability of budget estimates of the effects of discretionary changes and tax estimates are also in question. Our study intends to measure the elasticity estimates for the federal direct taxes and the indirect taxes; sales tax, customs duty, excise duty and surcharge and provincial direct and Indirect taxes aggregates, which will then be used as parameters in SVAR estimation.

#### **4.4 Elasticities**

We have used data for the period of 1960-2010. However for estimating the elasticities the data is used from 1971-2010. The reason for limiting the analysis to this period is availability of estimated changes in revenues due to discretionary changes in tax structure. Another limitation of study is that such data are not available for provincial taxes or non-tax revenues.

The data on estimated revenue impact of discretionary changes in the tax variables were personally obtained (earlier it was used to be published as an exploratory memorandum with the federal budget publications set, but later discontinued) from the Federal Board of Revenue. For direct taxes these data on disaggregated level were not available; hence the elasticity for each of the subhead of direct taxes could not be estimated. But availability of these data regarding indirect taxes made estimation of elasticity possible at a disaggregated level. Further, for provincial revenues this sort of data (estimates of revenue impact for discretionary changes) was not available; hence their buoyancy estimates were used in the analysis. Details of the revenue variables and their respective base from national accounts is described in table 4.6 in appendix.

While estimating the elasticity by applying the method of Proportional Adjustment Method (PAM) developed by Prest (1962) and Mansfield (1972), each tax variable is cleaned for the discretionary changes starting from base year (which in our case is 1971). This is a standard method and widely applied for estimating the tax elasticities across countries. The data cleaning process can be described in the following manner following Sen Pronab (2002);

Let :

$AT_i$  = the adjusted or cleaned tax yield in year i

$T_i$  = the actual tax yield in year i

$D_i$  = budget estimate of yield arising out of discretionary tax changes in year i

In the base year '0', i.e. the year whose tax structure is to be used as the basis for adjusting series, the adjusted tax yield is supposed to be equal to the actual:

$$AT_0 = T_0 \quad (4.8)$$

For the following year it can be written as :

$$AT_1 = T_1 - D_1 \quad (4.9)$$

Since  $AT_0$  is equal to  $T_0$  by equation (4.8), no further adjustment is needed in the base year. In every subsequent year, however, the non-discretionary component of tax receipts has to be adjusted in the following manner:

$$AT_j = (T_j - D_j) \frac{AT_{j-1}}{T_{j-1}} \quad \forall j = 2, \dots, n \quad (4.10)$$

Through sequential substitution it can be shown that equation (4.10) can be rewritten as:

$$AT_j = AT_1 \cdot \prod_{i=2}^j \frac{(T_i - D_i)}{T_{i-1}} \quad \forall j = 2, \dots, n \quad (4.11)$$

Which provides us data set for each tax revenue, adjusted for discretionary changes taking place each year from the base year.

Further the tax to income elasticity can be broken into elasticity of tax to tax base and elasticity of tax base to GDP components:

i.e.

$$\alpha_i = \alpha_{i,b} * \alpha_{b,y} \quad (4.12)$$

Where

$\alpha_{i,b}$  = ith tax revenue elasticity with respect to relevant tax base

$\alpha_{b,y}$  = ith tax base elasticity with respect to total income

The tax elasticity with respect to its base is determined on the basis of the tax structure. It can be progressive if elasticity value is more than one, regressive if less than one and proportional if equal to one. If the taxes are by definition proportional, such as an indirect tax (here in the case of Pakistan custom duty (CD) and general sales tax (ST)), then the elasticity should be one. But since the tax bases are proxy bases and the tax implementation is also weak with many taxable commodities in the tax base being exempted from tax.<sup>52</sup> Hence the elasticity coefficient needs to be estimated and may turn out to be very low. Further, income taxes, at least theoretically, should be progressive for a good tax structure but in case of developing countries where the tax system has many caveats, exemptions and proxy bases, it may turn out differently. Even for per unit flat taxes such as Federal Excise duty (FED) in case of Pakistan, the elasticity value will turn out to be much less than one. The value of the base improves over time due to inflation but since the tax is specific and not changed over time hence it may look like a regressive system.<sup>53</sup>

#### **4.5 Data and Estimation of Revenue Elasticities**

Now in the first step all the revenue series were cleaned for the discretionary changes using PAM as explained above. In the next step each cleaned tax variable is regressed upon a proxy tax base using appropriate econometric methodology. Similarly

---

<sup>52</sup> E.g. in case of Pakistan's ST, clothes and apparel are exempt from ST, meat and dairy products are also exempt, educational services are not charged with taxes although it is legally due on the user of these.

<sup>53</sup> The cyclically-adjusted fiscal position is also affected by ad-hoc factors which are not directly referable to the economic cycle, which includes one time revenues such as broadening of taxable base, e.g. in case of Pakistan withholding taxes (on the assumption of post realization) are applied on various billing instruments such as TV license, utility bills, car/financial assets purchase, or others as also noted by Girouard and Christophe (2005) such as creative accounting, classification errors and asset prices cycles.

the tax base is regressed on the national income to obtain the tax base elasticity with respect to national income.

The appropriate tax base for federal direct taxes is non-agricultural GDP, as agricultural income tax is a provincial matter.<sup>54</sup> For each indirect tax the base is taken to be a proxy base, further alternative bases were also tried to find reasonable elasticity estimates. For sales tax, the base of private consumption expenditures and imports were taken. Custom duty was considered to have both the imports and total exported goods, but since most of the exports get a tax rebate hence only imports were kept to be the base for customs duty. In case of federal excise duty the base was taken to be the total value added of the manufacturing sector in the economy. Although the total manufacturing sector has many such items which are not under the excise tax regime, but since the value addition was only available proxy at the aggregate level hence it was used. In case of surcharges, instead of considering it a tax without base and directly linking it with the total income, we took base to be the value addition in the gas and electricity distribution sector and transport and communication sector, as mainly the surcharge has been collected on fossil fuels only and these two sectors consume most of the fossil fuels such as gas and petroleum products. Lastly for provincial direct taxes the proxy base is taken to be national GDP at market prices and for indirect taxes again private consumption expenditures with imports are taken.

The basic elasticity equation for each revenue and expenditure item will be:

$$\log X_t^i = a_0 + a_1 \log Y_t^i + \varepsilon_t^i \quad (4.13)$$

---

<sup>54</sup> Provincial governments also procure a very negligible amount in this head despite the fact that agricultural sector contributes a significant portion in the national income (around 20% in 2009 for base adjusted data)

Here  $X_t^i$  represent the respective tax or expenditure and in the second stage tax base for that particular tax.  $Y_t^i$  represents the variable which is used to calculate elasticity with, i.e. in the first case it is respective tax base and in second case it is national income. Before estimating equations we have tested the time-series properties of the variables to be used. For testing the stationarity of the variables Augmented Dickey Fuller (ADF) and Philips Perron (PP)<sup>55</sup> test is applied on log of all variables. The results are reported in the appendix of this chapter.

Before applying the formal battery of tests, each variable in log term was inspected through graph and running a regression on constant and time trend then accordingly these were also included in the tests for unit roots. From the results it appears that there are mixed results. As expected theoretically most of the tax variables are integrated of order one, but there respective bases are not integrated at the same level. Further due to the possibility of presence of structural breaks in the tax variables the PP test is also giving different results.

So in order to obtain consistent estimates of the elasticities the regressions are in first difference form rather than in level form, i.e. instead of estimating equation of type 4.13, we use the following equation:

$$D \log X_t^i = a_0 + a_1 D \log Y_t^i + \mu_t^i \quad (4.14)$$

---

<sup>55</sup> In performing unit root tests, however, care must be taken if structural breaks are suspected in the data series. The Augmented Dickey Fuller test is biased towards *non-rejection* of unit roots when structural breaks are incorporated in the data. In such cases, Philips Perron test can be performed to check for unit roots in the presence of a structural change (Indraratna, 1991).

However here it needs to be noted that the coefficients ( $a_1$ ) referred to in this type of equation as elasticities, is approximately same as in an equation in level form.<sup>56</sup> Although the new regression equation has a low R-square and adjusted R-square but individual significance and overall significance of the model exists. Further most of the model's equations showed a problem of serial correlation (checked by using the Langrange Multiplier test (LM) test using one and two lags respectively), which was corrected by including lags of dependent variables or by using AR(1) or MA(1) process in the regressions.

In the next step the elasticities of tax base with respect to total income is derived in a similar manner as the tax to tax-base elasticities are derived. We used equation 11 to derive the elasticities. However in the case of tax base to total income elasticity econometric problem of simultaneity was anticipated and corrected accordingly. As the tax base variables (Private Consumption Expenditures (PCE), Imports (M), Total Trade (TRD), Non Agriculture GDP at market prices (NAGDPMP), Value added of manufacturing and services (VAMS), Value Added of Electricity and Gas Distribution (VAEGD) and Value added of Transport and Communication Services (VATCS)) are simultaneously determined with total income (here GDPMP), hence running a regression with endogenous right hand side variables does not provide consistent results.<sup>57</sup> This problem was solved by using the 2SLS method.

---

<sup>56</sup> Girouard and Christophe (2005) found the Statistical errors of the regression, measured by rootmean square error (RMSE), mean absolute error (MAE) and mean absolute percentage error (MAPE), were of similar overall magnitude in the two models i.e. with and without differencing for a stationary series.

<sup>57</sup> The bias in the base to income elasticities regression equation arises from the simultaneous determination of the dependent and the exogenous variables. For example, in a simple consumption function of the form  $C_t = a + bY_t + ut$ , the variables  $Y_t$  and  $C_t$  are simultaneously dependent on each other as  $Y_t = C_t + I_t + G_t + (X - M)$ . OLS estimator is not consistent in this case as the endogenous variables on the r.h.s. are correlated with the error term.

For example if we take the proxy base of sales tax to be the private consumption expenditures and imports (PCE+M) then tax base to total income elasticity can be found by estimating the following equation:

$$D\log(PCM + M)_t = a_0 + a_1 D\log GDPMP_t + \mu_t^i \quad (4.15)$$

Here  $a_1$  is the elasticity of sales tax base with respect to total income. But due to the simultaneity problem we cannot use this regression equation. So in the first step we have to replace the right hand side variable of  $GDPMP_t$  with such an instrument which has no correlation with  $\mu_t^i$  and is highly correlated with endogenous variable  $GDPMP_t$ .

For this we have run the following regression:

FLGDPMP =	0.24 +	0.10 LGGCE +	0.88 LGDPMP(-1) +	0.56 MA(1)
t-test Prob values	0.0011	0.0504	0.0	0.0002
R2 =	1.00	adjR2 =	1.00	
Sum of Squared residual =	0.01	F-test value =	17918.10	
Prob of having no Serial correlation at one lag (LM-test) = 0.23				

Here FLGDPMP stands for fitted value of LGDPMP (log of GDP at Market Prices) and LGGCE is the log of general government consumption expenditures. As the new variable FLGDPMP has the characteristics of high correlation with the original variable LGDPMP and has no correlation with the error term of original equation 4.14. Now instead of using the original values of LGDPMP, FLGDPMP was used in equations for obtaining the tax base to income elasticities. The procedure is same as used for the tax to base elasticity i.e. using the difference equations instead of level to obtain robust results.

Table 4.1. display the tax to tax base elasticity and tax base with reference to total income elasticities.



<b>Table 4.1. Tax Elasticities (1971-2010)</b>			
	<b>Tax to Base</b>	<b>Tax Base to Total Income</b>	<b>Tax to Total Income</b>
	$\alpha_{i,b}$	$\alpha_{b,y}$	$\alpha_i = \alpha_{i,b} * \alpha_{b,y}$
FDT	1.15	0.77	0.88
CD(with Imports only)	0.84	0.77	0.65
CD(with total trade)	0.90	0.49	0.44
FED	0.77	0.24	0.18
ST	0.27	1.20	0.32
SUR	0.87	0.42	0.36
PDT*	0.92	1.00	0.92
PIT**	0.84	0.75	0.63

\* Since the provincial government can levy agricultural income tax, hence their base was taken to be the total income

\*\* Trade taxes are administered by Federal Government only

From the above table it is evident that Pakistan's tax structure is fairly regressive for almost all types of taxes. This view is further strengthened if we look at the low tax to GDP ratio, (around 9% for 2010; Economic Survey of Pakistan, 2012). Our results are broadly similar to those obtained by Mohsin (2004) which used the sample period 1980-2002 and those of Bilquees (2004) which used the period 1974-2004. However estimation methodology for each study is different. For instance in Mohsin (2004), the tax to base and then base to total income elasticity decomposition is not done; the data used is limited; and finally the time-series problem of unit root is neither investigated nor taken care off. In Bilquees (2004), the data range is somewhat different; a different method (Divisia Index) has been used, which has its own shortcomings; and in decomposing the tax base to total income elasticity the issue of simultaneity is not taken care off. As we need these elasticities to estimate the fiscal policy effectiveness in Pakistan using an SVAR, hence we have re-estimated them.

As commented earlier that the tax system in Pakistan is poised with weak structure and implementation mechanism (existence of large underground economy and corruption), therefore we find very low revenue elasticities. All of the taxes have less

than unity value except for federal direct taxes in case of tax to tax base elasticities, so the system is quite regressive and is unable to take care of sudden shocks either towards improvement or degradation. The situation is worse in case of tax to total income elasticities, where all taxes have less than unity elasticity values. Although both the federal and provincial direct taxes are some what better with elasticity estimates close to one (0.88 and 0.92 respectively), all other taxes show a very dismal picture. The federal excise duty shows just a value 0.18, which is due to the fact that most of the excise taxes are on per unit basis, hence with the advent of inflation although the value increases but since the volume does not increase by the same proportion hence the resulting revenue generated is less.<sup>58</sup>

#### **4.6 Data and Estimation Methodology for Fiscal Policy Effectiveness**

As explained earlier that for estimation we are using the Structural VAR methodology to recover the parameter estimates for analysis of fiscal policy effectiveness in Pakistan. Normally the primitive VAR (actual VAR) is not estimated because it contains contemporaneous variables. Hence the reduced form of VAR is estimated. But if we want to recover the actual VAR for parameter estimates from the reduced form VAR then we have an identification problem as the number of parameters estimated are more in the reduced form estimation, especially in the form of the interaction terms of earlier uncorrelated errors, which are now correlated. Although they do not have auto correlation and have a 0 mean and a constant variance. So to recover the primitive VAR one has to apply the identification restrictions which match the number of knowns to the un-

---

<sup>58</sup> Since our study requirements were to have the elasticity parameters hence we did not calculate the buoyancy estimates. However other authors like Bilquees (2004) and Mohsin (2004) have estimated both the longrun elasticity estimates and the tax buoyancies which are quite high. This results in higher one-off revenues but is not sustainable for longrun.

knowns. It had been a practice to use the standard Cholesky decomposition which sets the upper triangle in the relation matrix of the structural shocks to the reduced form VAR shocks. But that is without a theory and may have serious issues especially if the reduced form residuals are strongly correlated. Further the ordering may also cause a difference in the innovation accounting (impulse responses and variance decomposition). So Sims (1986) and Bernanke (1986) proposed to use the structural VAR approach where the economic theory is used to identify the restrictions. Here we are using the Blanchard and Roberto (2002) approach which is an extension of that.

Once the parameters are identified then the impulse responses and variance decomposition is also done to comment on the transmission mechanism. However still there are issues in such estimations; it is strongly argued that the VAR should not be run in first difference to take away the stochastic trend as it also takes away the essential information, namely the error correction (Enders, 2004). So if there is a problem of Stationarity and there is cointegration in the variables then there should be a cointegrating relationship imposition, i.e. to estimate VAR in an un-restricted form and use the error correction mechanism to look at the innovation accounting or to use the VAR in levels with appropriate lags if the parameters are not important and just the innovation accounting is required (Enders, 2004). However following the approach used by Blanchard and Roberto (2002) we will use both the Deterministic trend and Stochastic trends in reduced form VAR estimation and also a cointegrating relationship approach (VECM) to compare the results.

We first calculated three sub categories of aggregate tax elasticities i.e. federal government indirect tax elasticity, federal government direct tax elasticity and the total

provincial government's tax elasticity. However among each of these categories respective bases were used to calculate elasticities such as elasticity of general sales tax or federal excise duty etc. Then these sub categories were aggregated on the basis of their respective weights in total tax revenues using equation 4.7. Table 4.2 show the weighted tax elasticities calculated from elasticities estimated in the last section and will be used in the respective fiscal effectiveness analysis afterwards.

Federal Indirect Tax Elasticity (FITE)	0.42
Federal Direct Tax Elasticity (FDTE)	0.88
Federal Total Tax Elasticity (FTTE)	0.52
Provincial Total Tax Elasticity (PTTE)	0.66
Consolidated Total Indirect Tax Elasticity (TITE)	0.43
Consolidated Total Direct Tax Elasticity (TDTE)	0.88
Consolidated Total Tax Elasticity (TTE)	0.53

So for the first case the Consolidated Total Tax Elasticity (TTE) value of 0.53 will be used as the parameter value of  $\alpha_{tx}$ . The value is very low representing peculiar characteristics of tax structure in Pakistan. The low tax effort, large tax gap and huge tax credits have resulted in a tax to GDP ratio which is abysmally very low. Since the values of  $\alpha_{tx}$  would vary over time due to the variations in ratio  $\frac{T_i}{T}$ , it can create issues regarding the time variation of VAR (Blanchard and Roberto, 2002). To avoid such problem average of the sample period (1971-2010<sup>59</sup>) is taken.

In the next step we evaluate the variables for their time-series properties (Others have been evaluated in the earlier section where elasticities were estimated). The results for Unit root test for the per capita real government expenditures on consumption and

<sup>59</sup> The data for calculating the tax elasticities is 1971-2010 instead of 1960-2009 as in order to calculate elasticities through Prest (1962) method we need revenue estimates of new tax measures and that data could only be retrieved for 1971-2010 from FBR (Federal Board of Revenue).

investment, per capita real GDP (at year 2000 base prices) and per capita real net taxes are provided in appendix.<sup>60</sup> On the basis of these results, we decided to use the linear trend and take<sup>61</sup> the first difference to account for both the possibilities of deterministic trend and stochastic trend in the VAR estimations. After recovering the structural parameters of the primitive VAR we have used the innovation accounting method by estimating the impulse responses using the structural factorization used in recovering these estimates. However one thing should be noted here that there is considerable variation in the weighted elasticity of different tax variables over the sample period 1971-2010 (Graph of weighted tax elasticities is given in appendix). We have used the average over the sample elasticity to be used both in the structural factorization as well as innovation accounting which is in line with other authors who used such estimation technique (see for example Blanchard and Roberto (2002), Afonso and Peter (2008) and Castro and Pablo (2007)). By using these average estimates the impulse responses provide average dynamic responses of fiscal shocks (Blanchard and Roberto, 2002)

Now as explained earlier that our objective is to determine the impact of various fiscal shocks on the total economic activity (GDP) and its components. For this purpose we have used a number of definitions for the revenue side and expenditure side variables. The data used is annual for the period of 1960-2009 (2010 is excluded from analysis as it contained the estimated values of the variables and prior to 1960 data definitions are different). Further all the variables are transformed in log-natural real per capita form,

---

<sup>60</sup> Here net taxes means taking interest payments and gross subsidies out from the consolidated total tax revenues, however estimations are also reported without netting the tax variable and other breakups of taxes.

<sup>61</sup> For residual generation for VAR with deterministic trend we have taken the linear trend instead of a quadratic trend with different lags of the endogenous variables as the Akaike and Shwartz criteria values in terms of model improvement did not increase with other formations and the adjusted R square was quite high for this selection.

where the base for conversion is taken to be 2000 prices. The GDP deflator is used to deflate the revenue side variables and other expenditure side variables as it allows us to show the impulse response in relation to GDP (Blanchard and Roberto, 2002). The following table describes the variables used and their source:

**Table 4.3. Variable Description and Source**

Variable	Classification	Abbr	Description	Source
Revenue	Total Tax Revenue	TT	Total Consolidated Tax Revenues	Federal Board of Revenue (FBR) annual report 2010 and chapter on Public Finance in Economic Survey of Pakistan Various Issues
	Net Taxes1	T	Total Consolidated Tax Revenues minus the transfers (subsidies plus interest payments)	Chapter on Public Finance in Pakistan Economic Survey Various Issues for consolidated subsidies and interest payments
	Net Taxes2	TS	Total Consolidated Tax Revenues minus the transfers (interest payments)	
	Net Taxes1	TB	Total Consolidated Tax Revenues minus the transfers (subsidies)	
	Direct Taxes	DT	Total Consolidated Direct Tax Revenues	
	Indirect Taxes	IT	Total Consolidated Indirect Tax Revenues	
Expenditure	Government Expenditures	G	Consolidated expenditures on government consumption and investment (both by the government and public sector enterprises)	Chapter on National Accounts in Economic Survey of Pakistan Various Issues
	Defense Expenditures	DG	Federal Government Defense Expenditures	Chapter on Public Finance in Pakistan Economic Survey Various Issues
	Non-Defense Expenditures	NDG	Total (Development and Current <sup>62</sup> ) Government's Expenditures minus Federal Defense Expenditures	Chapter on Public Finance in Pakistan Economic Survey

<sup>62</sup> For the defense versus non defense government expenditures the total government expenditures are not those reported in the national income accounts rather the consolidated government expenditures (both

---

				Various Issues, State Bank of Pakistan Annual Reports for Development Expenditures of the Governments
	Interest Expenditures	IG	Consolidated Government's Interest Payments	Chapter on Public Finance in Pakistan Economic Survey Various Issues
	Non-Interest Expenditures	NIG	Total (Development and Current) Government's Expenditures minus Consolidated Government's Interest Payments	
	Defense and Interest Expenditures	IDG	Federal Government Defense Expenditures plus Consolidated Government's Interest Payments	
	Non-Defense Non-Interest Expenditures	NIDG	Total (Development and Current) Government's Expenditures minus Federal Government Defense Expenditures minus Consolidated Government's Interest Payments	
Macro Economy	GDP at Market Prices	X	GDP at Market Prices	
	Private Consumption	PC	Private Consumption	
	Private Investment	I	Private Fixed Capital Formation Plus Changes in Inventories	Chapter on National Accounts in Economic Survey of Pakistan Various Issues
	Exports	XP	Total Exports (FOB)	
	Imports	MP	Total Imports (CIF)	
	GDP Deflator	GDP DEF	Price Indices with base prices of 2000	
	Population	POP	Total Population	UNDP Projections for Pakistan (as no Population census is carried after 1998)

---

Notes: All Variables are taken in Million Rs or in Counts where applicable

## 4.7 Conclusion

In this chapter methodology for estimation and the data used for it are presented. Estimation of revenue elasticities is also done. The revenue variables were bifurcated in tax and non-tax revenues and elasticities are estimated by the widely used Prest (1962) method. These elasticities are used to calculate the weighted aggregate elasticities based

---

federal and provincial governments) are taken, as the defense expenditures are taken from these accounts and same are used for interest payment versus non-interest payments.

on the weight of each revenue variable in the total revenues. These weighted elasticities will be used as structural values used as parameters for identification in analyzing the fiscal policy effectiveness in the next chapters.



## Appendix

**Table 4.4. Variables used for Elasticity estimation and their Description**

Variable Name	Description	Source	Base for
<b>National Accounts Variables</b>			
PCE	Private Consumption Expenditures at Current Factor Cost (Adjusted for base revision in 1999-2000)	Economic Survey Various Issues	PIT
GGCE	General Government Consumption Expenditures at Current Factor Cost (Adjusted for base revision in 1999-2000)	Economic Survey Various Issues	
X	Exports	Economic Survey Various Issues	
M	Imports	Economic Survey Various Issues	CD
TRD	Total Trade (i.e. Sum of Imports and Exports)	Economic Survey Various Issues	CD
GDPMP	GDP at Market Prices at Current Factor Costs (Adjusted for base revision in 1999-2000)	Economic Survey Various Issues	PDT
VAAG	Total Value Addition in GDP of Agricultural Sector at Current Factor Cost	Economic Survey Various Issues	
NAGDMP	Total Non-Agricultural GDP at Current Factor Cost	Economic Survey Various Issues	FDT
VAMS	Total Value Addition in GDP of Manufacturing Sector at Current Factor Cost	Economic Survey Various Issues	FED
VAEGD	Total Value Addition in GDP of Electricity and Gas Distribution Sector at Current Factor Cost	Economic Survey Various Issues	
VATCS	Total Value Addition in GDP of Transport and Communication Sector at Current Factor Cost	Economic Survey Various Issues	
SB	Surcharge Base (i.e. Sum of VAEGD and VATCS)	Economic Survey Various Issues	SUR
PCE+M		Economic Survey Various Issues	ST
FLGDMP P	Fitted Log of GDPMP		Tax Base to Income
<b>Revenue Variables</b>			
FDT	Federal Total Direct Taxes (i.e. sum of Income Tax, Wealth Tax, Capital Value Tax, Workers Welfare Taxes, Foreign Travel Tax and Other Federal Direct Taxes)	Federal Board of Revenue annual reports and various issue of Economic Survey for Foreign Travel Tax	
CD	Customs Duty	Federal Board of Revenue annual reports	
FED	Federal Excise Duty	Federal Board of Revenue annual reports	
ST	Sales tax on domestic and Imported products	Federal Board of Revenue annual reports	
SUR	Surcharges (mainly on oil and gases)	Federal Board of Revenue annual reports	
PDT	Provincial Direct Taxes	Economic Survey Various Issues	
PIT	Provincial Indirect Taxes	Economic Survey Various Issues	

**Table 4.5. Results of Unit Root Tests**

Variable Name	Graph	Regression on constant and trend	ADF Tests				PP test
			none	with intercept	with intercept and trend	first difference with intercept and trend	Level
LFDTCCL	IT	IT	NUT*	UT	NUT*(I*T*)	NUT*(I*)	UT(I*T*)
LCDCL	IT	IT	NUT*	NUT*(I*)	UT(I*)	NUT*(I*)	UT(I*)
LFEDCL	IT	IT	NUT*	NUT*(I*)	UT(I*)	NUT*(I*T*)	UT(I**)
LSTCL	IT	IT	NUT*	UT	UT(I*)	NUT*(I*)	UT(I*)
LSUR	IT	IT	UT	UT(I*)	UT(I*)	NUT**(I*T*)	UT(I*)
LPDT	IT	IT	NUT*	UT(I*)	UT(I*T*)	NUT*(I*)	UT(I*)
LPIT	IT	IT	NUT*	UT	NUT*(I*T*)	NUT*(I*T**)	NUT*(I*T*)
LPCE	IT	IT	NUT*	UT(I*)	UT(I*T*)	NUT*(I*T**)	UT(I*T*)
LGGCE	IT	IT	NUT*	UT(I**)	UT(I*T*)	UT(I*)	UT(I*T*)
LX	IT	IT	NUT*	UT(I*)	UT(I*T*)	NUT*(I*)	UT(I*T*)
LM	IT	IT	NUT*	UT(I*)	UT(I*T*)	NUT*(I*)	UT(I*T*)
LTRD	IT	IT	NUT*	UT(I*)	NUT**(I*T*)	NUT*(I*T*)	NUT*(I*T*)
LGDPMP	IT	IT	NUT*	UT(I*)	UT(I*T*)	NUT*(I*T*)	NUT*(I*T*)
LVAAG	IT	IT	NUT*	UT(I*)	NUT**(I*T*)	NUT*(I*)	UT(I*T*)
LNAGDMP	IT	IT	NUT*	NUT**(I*)	NUT*(I*T*)	NUT*(I*T*)	UT(I*T**)
LVAMS	IT	IT	NUT*	UT(I*)	NUT**(I*T*)	NUT*(I*)	NUT*(I*T*)
CPI	IT	IT	NUT*	UT(I*)	NUT*(I*T*)	NUT*(I*)	UT(I*T**)
LVAEGD	IT	IT	NUT*	UT(I*)	UT	NUT*(I*T*)	UT
LVATCS	IT	IT	NUT*	UT*(I*)	NUT*(I*T*)	NUT*(I*)	UT(I*T*)
LSB	IT	IT	NUT*	UT(I*)	UT	NUT*(I*T*)	UT
LFDT	IT	IT	NUT*	UT	NUT*(I*T*)	NUT*(I*)	UT(I*T**)
LCD	IT	IT	NUT*	NUT*(I*)	UT(I*)	NUT*(I*T*)	NUT*(I*)
LFED	IT	IT	NUT*	UT(I*)	NUT*(I*T*)	NUT*(I*)	UT(I*)
LST	IT	IT	NUT*	UT	NUT*(I*T*)	NUT*(I*T**)	NUT*(I*T*)
I	Intercept						
T	Trend						
UT	Unit Root						
NUT	No Unit Root						
*	significant at 5 percent						
**	Significant at 10 percent						
for ADF	MacKinnon (1996) one-sided p-values.						
for PP	MacKinnon (1996) one-sided p-values.						

**Table 4.6. Tax to Tax Base Elasticity Regressions**

Tax/Base Variable	DLFDTCL	Prob	DLCDCL	Prob	DLCDCL	Prob	DLFEDCL	Prob	DLSTCL	Prob	DLSUR	Prob	DLPDT	Prob	DLPIT	Prob
Constant	-0.01	0.68	-0.02	0.13	-0.02	0.15	-0.03	0.23	0.01	0.67						
DLPCE															1.12	0.00
DLM			0.84	0.00												
DLTRD					0.90	0.00										
DLGDPMP													0.82	0.03		
DLNAGDMP	-0.25	0.58														
DLNAGDMP(-1)	1.40	0.00														
DLVAMS							0.77	0.01								
DLSB											1.11	0.03				
AR(1)					0.29	0.09	0.34	0.05								
DLPDT(-1)													0.11	0.52		
DLPIT(-1)															-0.34	0.05
D(LPCE+LM)									0.27	0.08						
D(LSUR(-1))											-0.28	0.11				
R2	0.25		0.56		0.61		0.29		0.08		0.08		0.00		0.13	
adjR2	0.20		0.55		0.59		0.25		0.06		0.05		-0.03		0.10	
Sum of Squared residual	0.08		0.09		0.08		0.04		0.22		1.14		0.49		0.59	
F	5.48		45.11		26.20		6.80		3.17							
Serial correlation at one lag	0.80		0.21		0.21		0.36		0.33		0.82		1.00		0.77	
Serial correlation at two lag			0.35		0.41											

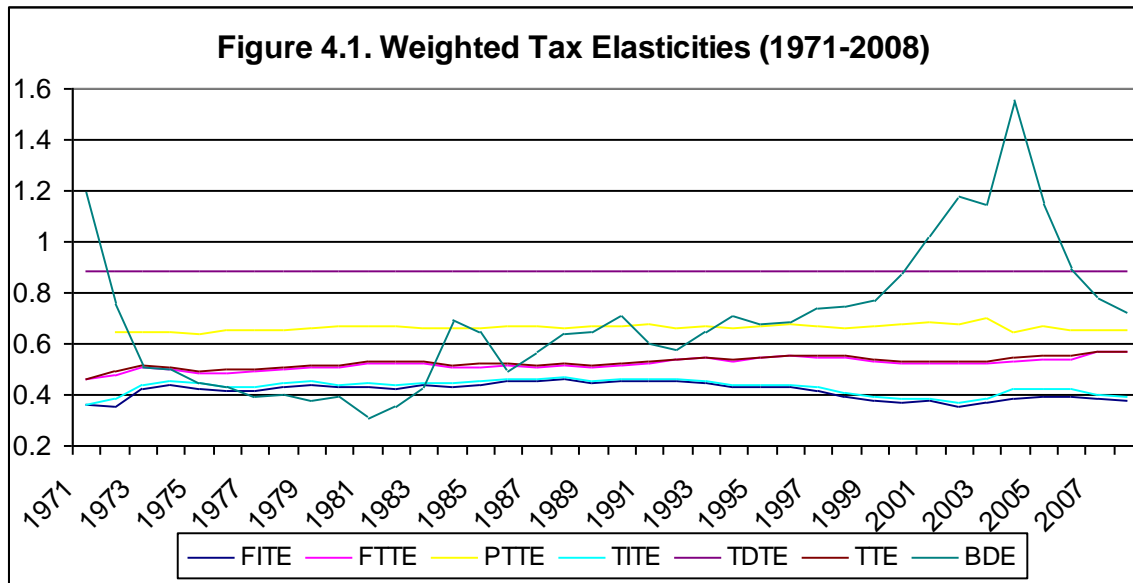
**Table 4.7. Tax Base to Income Elasticities Regressions**

Base/Expenditures Variable	DLPCE	Prob	DLM	Prob	DLTRD	Prob	LGDPMP	Prob	DLNAGDMP	Prob	DLVAMS	Prob	DLSB	Prob	D(LPCE+LM)	Prob
Constant	0.01	0.11	0.03	0.29	0.04	0.08	0.24	0.00	0.02	0.04	0.05	0.00	0.04	0.01	0.06	0.07
LGGCE							0.10	0.05								
MA(1)	-0.51	0.01					0.56	0.00	-0.56	0.01						
LGDPMP(-1)							0.88	0.00								
D(FLGDPMP1)	0.72	0.00	0.77	0.07	0.60	0.01			0.68	0.00	0.24	0.11	0.40	0.02	1.20	0.03
D(FLGDPMP1(-1))	0.03	0.84			-0.10	0.64			0.09	0.37			0.02	0.91		
R2	0.38		0.09		0.19		1.00		0.46		0.07		0.17		0.13	
adjR2	0.32		0.06		0.14		1.00		0.40		0.05		0.12		0.11	
Sum of Squared residual	0.01		0.14		0.04		0.01		0.01		0.02		0.02		0.23	
F	6.26		3.39		3.72		17918.10		8.67		2.76		3.21		5.13	
Serial correlation one lag	0.92		0.29		0.80		0.23		1.00		0.14		0.41		0.18	

**Table 4.8. More Results of Unit Root Test**

Variable Name	Graph	Regression on constant and trend	ADF Tests				PP test		
			none	with intercept	with intercept and trend	None	none	with intercept	with intercept and trend
PCRGR	IT	IT	UT	UT(I*)	UT(I*)	NUT*	UT	UT(I*)	UT(I*)
PCRGRDP	IT	IT	UT	UT	NUT**(I*T*)	NUT*	UT	UT	UT(I**)
PCRNT	IT	IT	NUT*	UT	NUT*(I*T*)	NUT*	NUT*	UT	UT(I*T*)

I Intercept  
 T Trend  
 UT Unit Root  
 NUT No Unit Root  
 \* significant at 5 percent  
 \*\* Significant at 10 percent  
 for ADF MacKinnon (1996) one-sided p-values.  
 for PP MacKinnon (1996) one-sided p-values.  
 Here PCRGR, PCRGRDP and PCRNT means Per Capita Real Government Expenditures, GDP and Net of transfer taxes



## Chapter 5

### Fiscal Policy Effects on Aggregate Macroeconomic Indicators in

#### Pakistan

Strong economic growth and buoyant public finances are the two main axioms of an efficient fiscal policy. Considering the importance of fiscal policy in affecting the whole economy both from demand and supply sides, it becomes imperative to evaluate the possible impact of various resource allocations and revenue generation mechanisms and instruments adopted by a government while considering her welfare maximization objectives. As also shown in literature review that empirically most of the studies present a short term positive impact of government expenditure and negative effect of tax increase on the consumption while ignoring the dynamics of them (Afonso and Peter, 2008). We will use the Structural Vector Auto Regressive (SVAR) approach developed by Blanchard and Roberto (2002) and explained in the previous chapter.

In this chapter we have used different definitions of the fiscal variables to identify the dynamic effects of shocks in these variables on macroeconomic variables. These are noted as different cases to highlight possible policy implications when seen in isolation. Further, for the first estimation case only the results for the stochastic trend included VAR and with applying longrun cointegrating relationship between revenues and expenditures for budget balance is produced here as there is no significant difference in the results otherwise.

#### 5.1 Case 1: Net Tax Revenues

Here we have taken the revenue variable to be net taxes i.e. total consolidated tax revenues minus the total transfers (consolidated subsidies and interest payments). For

expenditure side the variable is purchase of consumption and investment goods and services by the consolidated government (federal and provincial combined). The macro economy is represented by GDP, however in the subsequent analysis components of the GDP are also analyzed. As noted earlier, all the data are transformed into real-per-capita-natural logarithms.

As discussed above we have estimated our results both for the deterministic trend, a stochastic trend and with a cointegrating relation (based on balanced budget theory assumption). So in the first case of deterministic trend initially after estimating a three variable  $(T_t, G_t, X_t)$  unrestricted VAR of equation 4.1 type with order of net taxes, government expenditures and GDP with linear trend,<sup>63</sup> appropriate lags<sup>64</sup> and after removal of autocorrelation<sup>65</sup> in the system residuals of reduced form VAR were generated.

Further it is important to note here that as we have to take, in the first case  $\beta_{tg} = 0$  so that we could estimate  $\beta_{gt}$  i.e. the tax decisions come first and for the second case we assume  $\beta_{gt} = 0$  and we estimate  $\beta_{tg}$  i.e. government expenditure decisions come first.<sup>66</sup>

These residuals can be written in the form of equations 4.2-4.4 for the case where tax decisions come first as follows:

---

<sup>63</sup> We preferred linear trend over a quadratic trend as there was decrease in tests value based on model information criteria such as AIC (Akaike Information Criteria) or SBC (Schwarz Bayesian Criteria), further there was a decline in over all Adjusted R-Square in each single equation of the reduced form VAR as well.

<sup>64</sup> A range of model information criteria such as AIC, SB, HQ (Hannan-Quin), FPE (Final Prediction Error) and LR (sequential modified LR test statistic, each tested at 5% level of significance) tests were used to select appropriate levels of lags.

<sup>65</sup> Null Hypothesis of no serial correlation of order h were tested for one, two, three and upto four lags where required by using the Serial Correlation Langrange Multiplier (LM) test.

<sup>66</sup> As noted by the pioneer (Blanchard and Roberto, 2002) of this novel estimation approach that "...there is no convincing way to identify these coefficients..."

$$u_t^t = 0.53u_t^x + e_t^t \quad (5.1)$$

$$u_t^g = \beta_{gt} e_t^t + e_t^g \quad (5.2)$$

$$u_t^x = \alpha_{xt} u_t^t + \alpha_{xg} u_t^g + e_t^x \quad (5.3)$$

Here we have taken  $\alpha_{gx} = 0$  as described earlier i.e. the elasticity of government purchases to economic activity is taken to be zero. Now for the estimates of

$\alpha_{xt}$  and  $\alpha_{xg}$  we will use instruments derived from equation 4.5 and 4.6 as follows:

$$u_t^{t,CA} = u_t^t - 0.53u_t^x \quad (5.4)$$

$$u_t^{g,CA} = u_t^g \quad (5.5)$$

We have used GMM (Generalized Methods of Moments) technique to estimate these coefficients  $\alpha_{xt}$  and  $\alpha_{xg}$ . Clearly the values of these coefficients depend on the instruments used. Once these parameters are recovered, now we have the set of restrictions required for obtaining the estimates of left over parameters. This is done with the help of structural VAR estimation, where for structural factorization in the optimization control we have taken the number of iterations to be maximum 500000 with convergence level set to be .00000001 and the starting values were taken from standard normal distribution. Similarly it is also done for the second sub-case where we assume  $\beta_{gt} = 0$  and we estimate  $\beta_{tg}$  i.e. government expenditure being decided first and tax decisions come later.

Now we come to the second scheme of identifying these coefficients, where instead of taking a deterministic trend as an exogenous variable in the VAR system we have taken the first difference of all the variables included in the system and excluded the



trend from the system and called it a stochastic trend model. Rest of all the steps carried out were the same to obtain the parameter estimates.

The following table 5.1 gives the parameter estimates and their significance level for both the Deterministic Trend and Stochastic Trend estimation schemes described above.

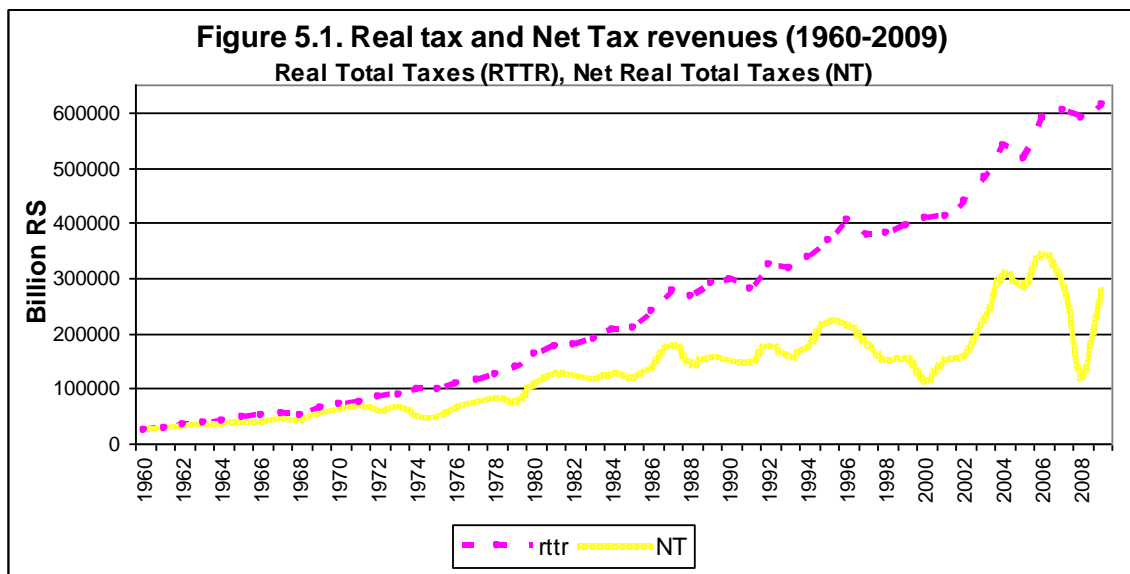
<b>Table 5.1. Contemporaneous Coefficients for Case 1</b>				
	$\beta_{tg}$	$\beta_{gt}$	$\alpha_{xt}$	$\alpha_{xg}$
<b>Deterministic Trend</b>				
Coefficients	-0.188348	-0.052100	0.033372	0.020641
P-Values	0.1874	0.7153	0.0000	0.0892
<b>Stochastic Trend</b>				
Coefficients	-0.262499	-0.063787	0.033080	0.042352
P-Values	0.0690	0.6585	0.0000	0.0576

Notes:  
Sample Period 1960-2009  
 $\beta_{tg}$  = effect of g on t within a year assuming  $\beta_{gt}=0$ ; i.e. when government expenditures are ordered first  
 $\beta_{gt}$  = effect of t on g within a year assuming  $\beta_{tg}=0$ ; i.e. when taxes are ordered first  
 $\alpha_{xt}$  = effect of t on x within a year  
 $\alpha_{xg}$  = effect of g on x within a year  
In unrestricted VAR single lag was selected using criteria explained above and no-auto correlation was found using the LM test  
In Structural VAR estimation convergence was achieved in 58 iterations for sub-case 1 and 90 in second sub-case

From the above table it appears that there is not much difference in the estimates of contemporaneous coefficients in case of both specifications except for the coefficient  $\beta_{tg}$  i.e. effect of g on t within a year assuming  $\beta_{gt}=0$ ; i.e. when government expenditures are ordered first. The coefficient is still same in sign i.e. negative but becomes significant and increased in value in case of Stochastic Trend specification.

Now if we look at the signs of these parameters then for  $\alpha_{xg}$  (i.e. effect of g on x within a year) it is positive, in line with the theory and is significant. But the magnitude of the

parameter is quite small and that's quite surprising.<sup>67</sup> On the other hand tax shocks ( $\alpha_{xt}$ ) also seem to affect the GDP positively and significantly although the coefficient is quite small. This is not surprising as the tax to GDP elasticity is very low and the government expenditures tend to behave in a ratchet up fashion, i.e. as the tax revenues grow the government instead of paying back some of its debt tend to spend more, so this could in effect lead to a positive growth in the economy. Secondly since we are using the net taxes (net of total transfer payments including interest payments and subsidies), which as compared to total taxes behave quite differently especially in the later years<sup>68</sup> and also differs a lot in magnitude as seen in figure 5.1:



The difference in magnitude and signs of  $\alpha_{xt}$  and  $\alpha_{xg}$  shows the importance of considering the causing factors of changes in budget deficit; as each instrument of fiscal policy has a different impact on the state of the economy. Especially in case of Pakistan

<sup>67</sup> This may indicate the poor planning and high proportions of budgets going on non-productive expenses.

<sup>68</sup> In the latter periods the total transfer payments (subsidies plus interest payments) have increased many folds

like other less developed countries both instruments have altogether different implications and cannot be considered as an alternative to each other.

Lastly all other parameters in equation 5.1 and 5.2 are insignificant except for the tax response to government expenditures when government expenditures are ordered first. It is negative and significant in this case, which is a non-trivial result. This would also mean that there will not be much difference in the impulse (dynamic) responses when we evaluate them. One of the reason could be the budgeting method used in Pakistan, where first the expenditures are set, then all possibilities of donor and external financing is considered and then the left over of unmet expenditures are set to be the revenue targets. Further as this type of revenue targets are ad-hoc, it has been a practice that they are under achieved, while on the other hand the expenditures are always under estimated and they tend to be higher when financial year closes on June 30<sup>th</sup> of each year. This evidence can also be seen from table 5.2 as well:

	<b>Budget Estimates</b>		<b>Actual</b>	
	<b>FY09</b>	<b>FY10</b>	<b>FY09</b>	<b>FY10</b>
Total revenue	1809	2155	1851	2078
Tax revenue	1308	1564	1331	1473
Non-tax revenue	501	592	520	605
Total expenditure	2391	2877	2531	3007
Current expenditure	1876	2104	2042	2386
Development and net lending	516	774	487	653
Fiscal balance	-582	-722	-680	-929
Total financing	582	722	680	929
External financing	165	312	150	189
Domestic financing	417	390	531	740
Non-bank financing	243	246	225	436
Bank financing	149	144	306	304
Privatization proceeds	25	19	0	0

Source: Economic Survey of Pakistan FY09 and FY10.

The figures in table 5.2 show that the expenditures (more specifically the current expenditures) tend to be under estimated while the revenues are over estimated. The revenue over estimations leads to a higher expenditures setting which does not reduce once revenue target loss is realized, as the revenues accrue mostly in the last quarter of the fiscal year whereas the expenditures tend to start from the first quarter. Hence it may appear that with increase in expenditures the revenues tend to fall. Secondly again since we have netted the taxes with the total subsidies and interest payments hence the results are like that, but as we move further we have also done estimations without netting these and there the results are quite in line with the theory.

### **Dynamic Effects of a Tax Shocks**

The results in figure 5.2 and table 5.3 show the impulse responses of one standard deviation shock to the tax variable under the structural factorization both for the Deterministic Trend (DT) and Stochastic Trend (ST) specifications and a cointegrating relationship model under the sub-case one where taxes are ordered first followed by sub-case two where government expenditures are ordered first.

It is apparent from the impulse response graphs that with shock in tax variable, the GDP variable shows a positive increase of around .03 but is insignificant (Range value of .003), from there it increases to a positive value of .06 by the second and third year and then starts to decline. However except for the first year of impact the next values are highly significant. As explained earlier, in the case of positive contemporaneous effects of a tax shock, that it may be due to the ratchet up effect of the increase in government expenditures responding to the increase in taxes and abysmally low value of the tax elasticity and thus overall low tax system efficiency. This is also observable from

the tax shock effect on the government consumption expenditures; in the first year it posted a decline and then it gradually increases upto the third year and then starts to fall slowly. It does not reach back to its normal value even beyond ten years of impact. Whereas correspondingly the GDP variable fall is sharp and has a tendency to move back to its normal pre-shock position. Here the tax variable itself also has a tendency to fall sharply after the initial shock and after the 10<sup>th</sup> year of shock the impact is almost zero. If we look at the peaks then we see that for GDP it's the second year, for government expenditures it's the third year of impact and for tax variable itself after the first year of shock it keeps on declining.

Now for the second scheme of estimation under the name ST (Stochastic Trend Model) the pattern is almost the same in the initial periods with same significance levels, however from third year onwards the values are different. This may be due to the fact that here the variables are in Natural Log Difference form, hence represents more or less elasticities of the impact, hence the initial values and signs are the same but values differ. So for the GDP variable the shock truncates suddenly from the second years and goes into negative but have very small value and then stays at 0 for the next years. Here the peak value is again in the second period (.03). However for the government expenditures now the peak is also in the second year and then it falls to a negative but low value (-.01) in the third and then stays close to 0 for next years.

Finally in the case of third scheme of estimation under the condition of a longrun budget balance (used as a cointegrating relationship), the signs are the same except for the magnitudes. Here in this case the increase in GDP variable is much lower in the initial impact year and at the peak (.008 and .015 as compared to around .03 and .06 in DT). But

the peak years are the same in second year. Additionally the value of the GDP tends to stabilize at a new value of around .012 rather than coming back to 0. This is attributable to a corresponding increase in G upto the third year and then stabilizing at a value around .07 for the next years. This may also be attributable to an increase of tax variable responding to a shock of its own (typically less than one, meaning a non-fundamental shock) which stabilizes around a value of .08 after the fourth year of impact.

**Table 5.3. Response to Tax Shocks (Sub-Case1 ;  $\beta_{ig} = 0$  (a2=0), i.e. taxes are ordered first**

	Year 1	Year 2	Year 3	Year 4	Year 5	Peak (Year)
<b>DT</b>						
<b>GDP</b>	0.032878 (0.00300)	0.058874 (0.68425)	0.058661 (0.70680)	0.051546 (0.61069)	0.043456 (0.53276)	0.058874 (2)
<b>G</b>	-0.0521 (0.14286)	0.129652 (0.67957)	0.161686 (0.69373)	0.150453 (0.64436)	0.129205 (0.60229)	0.161686 (3)
<b>T</b>	1.017425 (0.00159)	0.428276 (0.77500)	0.221207 (0.58303)	0.139806 (0.50819)	0.101362 (0.47659)	1.017425 (1)
<b>ST</b>						
<b>GDP</b>	0.030921 (0.00622)	0.031412 (0.71313)	-0.00429 (0.36109)	0.001612 (0.02749)	-0.00025 (0.01812)	0.031412 (2)
<b>G</b>	-0.06379 (0.14434)	0.156908 (0.70129)	-0.01305 (1.22633)	0.004318 (0.77703)	-0.00019 (0.25371)	0.156908 (2)
<b>T</b>	1.016388 (0.00330)	-0.33889 (0.80647)	0.088422 (1.67939)	-0.01944 (1.32868)	0.003595 (0.62475)	1.016388 (1)
<b>With a Cointegrating Relationship</b>						
<b>GDP</b>	0.008248	0.015380	0.014111	0.012761	0.012406	0.015380 (2)
<b>G</b>	0.000410	0.044623	0.071260	0.073901	0.073787	0.074455 (10)
<b>T</b>	0.224169	0.131276	0.089940	0.084905	0.083569	0.224169 (1)

Note: the Peak Values are taken from a sample of first Ten years only. The Significance of Impulse responses are generated from analytic asymptotic method which takes the null hypothesis of 0 in a range of One Standard Deviation innovation +- 2 Standard Errors. The Value in Parenthesis ( ) are the one sided range

Now if we look at the results of the second sub-case where the taxes are ordered second and government expenditures are ordered first i.e.  $\beta_{gt} = 0$  (b2=0 to estimate a2) then the results do not differ much for the first two schemes of estimation i.e. DT and ST.<sup>69</sup>

<sup>69</sup> Results of estimation of impulse response with figures are provided in the annexure

### Figure 5.2. Response to Tax Shock

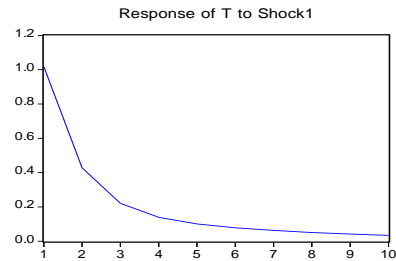
Case 1-Sub-Case 1;  $\beta_{tg} = 0$  ( $a_2=0$  to estimate  $b_2$ ), i.e. taxes are ordered first

DT

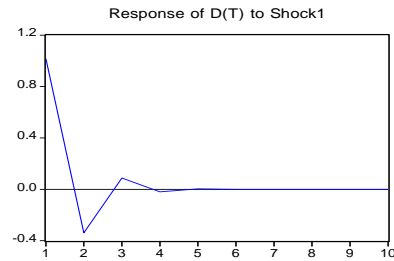
ST

With a Cointegrating Relationship

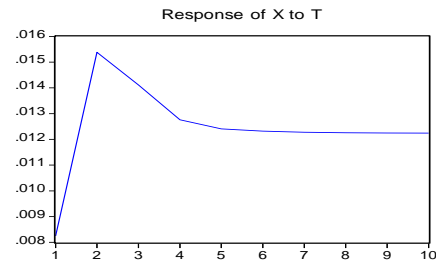
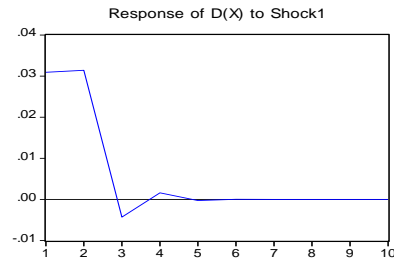
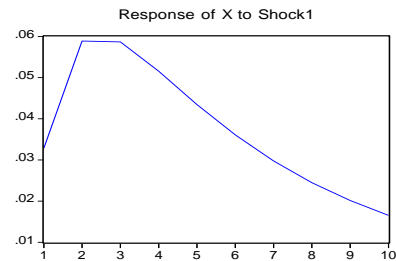
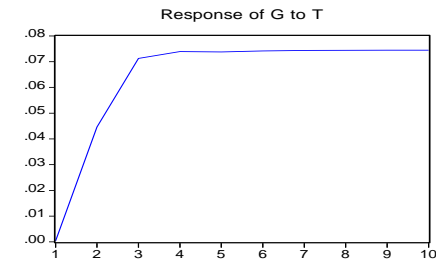
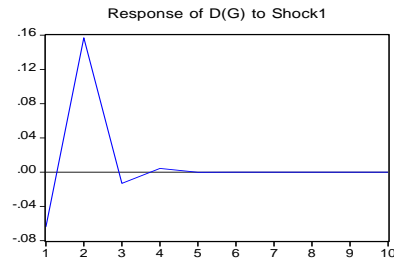
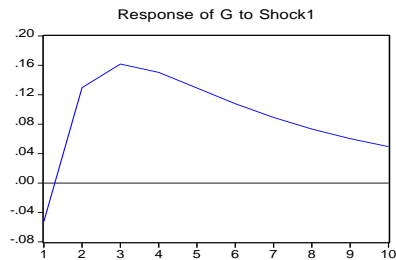
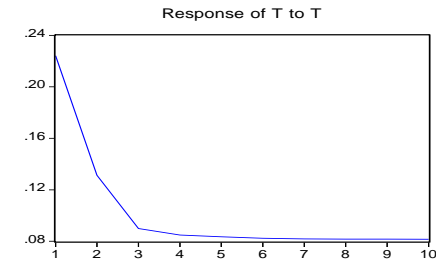
Response to Structural One S.D. Innovations



Response to Structural One S.D. Innovations



Response to Cholesky One S.D. Innovations



Note: Here Shock 1 means shock to Real Per Capita Net Tax Variable (T) in Natural Log. G refers to Government Consumption Expenditures, and X refers to GDP both in Real Per Capita Natural Logs

So we can conclude from the discussion above that in all cases of estimation, with a tax shock, conditioned on ordering of tax decisions first or government expenditures being decided first, there is not much difference in terms of the transmission mechanism towards economic activity and fiscal variables. Further there is a positive but small impact on GDP which does not turn negative. This is reconciled with the ratchet up effect of increase in G, i.e. with more tax revenues the government tends to spend more rather than retiring the debt. Finally the effect of shock is not persistent except for the last scheme of estimation. However even there the impact is quite small.

### **Dynamic Effects of a Government Expenditure Shock**

The case of government spending shocks is more logical in developing countries like Pakistan. As shown above that government has more focus on expenditure interventions rather than tax, so much so that even for increased revenues the governments tend to behave in a spendthrift manner. Here as above we have constructed the impulse responses of one standard deviation shock to the government expenditure variable under the structural factorization both for the Deterministic Trend (DT) and Stochastic Trend (ST) and a Cointegrating relationship model under the sub-case one where now government expenditures are ordered first which is followed by sub-case two where taxes are ordered first.

Government expenditure shock has lead to a positive impact on GDP variable from the first year and is significant through out in all estimation approaches used. However in the first case of DT the peak is attained in the fifth year of the shock (0.049713), from where it starts to decline but does not truncate at 0 in the reference period of ten years for which impulse responses are generated. Whereas in case of a tax shock the impulse response showed a faster truncation. Leaving aside the signs of impact,



clearly the spending multipliers are larger than the tax shocks impact purporting the traditional Keynesian theory of larger expenditure multipliers than tax multipliers for Pakistan. On the other hand government expenditures itself also show a decline which is gradual as compared to a tax shock where it falls immediately after the first impact as shown in figure 5.3. Tax shock's impact on tax variable under DT scheme of estimation reported in table 5.3 is 1.017425 in the first year and falls to 0.428276 in the next, whereas here it is 1 in the first period and 0.650830 in the second (reported in table 5.4). Here the tax variable shows a negative value upon the shock in first period, but in all next periods it has a positive value, with a peak in 3<sup>rd</sup> period of impact. This could be due to the increase in economic activity upon fiscal intervention from expenditure side and taxes responding to them as built in stabilizers.

**Table 5.4. Response to Government Shock (Sub-Case1 ; b2=0 to estimate a2, i.e. government expenditures are ordered first**

	Year 1	Year 2	Year 3	Year 4	Year 5	Peak (Year)
<b>DT</b>						
<b>GDP</b>	0.014614 (0.00485)	0.021960 (1.01966)	0.036379 (1.33518)	0.045937 (1.36104)	0.049713 (1.25970)	0.049713 (5)
<b>G</b>	1.000000 (0.00000)	0.650830 (1.00121)	0.483569 (1.27547)	0.383263 (1.35230)	0.311943 (1.33506)	1.000000 (1)
<b>T</b>	-0.1806 (0.14543)	0.252108 (1.16904)	0.325924 (1.12810)	0.299443 (1.03478)	0.251856 (0.97031)	0.325924 (3)
<b>Sig</b>						
<b>ST</b>						
<b>GDP</b>	0.034269 (0.00486)	-0.00617 (1.35000)	0.009743 (0.26243)	-0.00243 (0.09232)	0.000686 (0.03099)	0.034269 (1)
<b>Sig</b>						
<b>G</b>	1.000000 (0.00000)	-0.15322 (1.32502)	0.055895 (2.20389)	-0.00935 (0.80787)	0.001903 (0.38769)	0.156908 (2)
<b>T</b>	-0.24434 (0.14691)	0.388732 (1.56081)	-0.1465 (2.95785)	0.040693 (1.74061)	-0.00941 (0.62475)	0.388732 (2)
<b>Sig</b>						
<b>With a Cointegrating Relationship</b>						
<b>GDP</b>	0.018050	0.020996	0.021216	0.021503	0.021676	0.021767 (10)
<b>G</b>	0.109052	0.081519	0.073137	0.072963	0.072763	0.109052 (1)
<b>T</b>	0.000000	0.061309	0.075205	0.076961	0.078163	0.079267 (10)

Note: the Peak Values are taken from a sample of first Ten years only. The Significance of Impulse responses are generated from analytic asymptotic method which takes the null hypothesis of 0 in a range of One Standard Deviation innovation +- 2 Standard Errors. The Value in Parenthesis ( ) are the one sided range

Now if we look at the second scheme of estimation i.e. the ST method we find that the signs are the same but values change. Further the variables oscillate around the 0 impact value earlier than what was found in former case. Especially in the case of GDP the value falls instead of gradually building up like the former case. The reason again could be the construction of the variables i.e. being in difference form rather than in level. Similarly in the final scheme of estimation where a cointegrating relationship is imposed, the patterns in terms of sign remain the same. Even the impact in case of government expenditure itself remains the same but other than that, for tax and GDP variable, the impact never falls once reached their peak values and keeps on carrying forward hence presenting the non-stationary nature of these variables.

Now if we look at the results of the second sub-case where the taxes are ordered first and government expenditures are second i.e.  $\beta_{tg} = 0$  ( $a_2=0$  to estimate  $b_2$ ) then the results are almost the same for the two schemes of estimation i.e. DT and ST<sup>70</sup>, except for the tax variable and the peak of impact on GDP. The tax variable being ordered first does not start with a negative value in the first year of impact. Further the peak value of impact on GDP although builds gradually like the former case and also have the same year of the highest impact but the impact coefficient is slightly higher in the second case (0.049713 versus 0.058471 in the second case).

---

<sup>70</sup> Results of estimation of impulse response with figures are provided in the annexure

### Figure 5.3. Response to Government Expenditures Shock

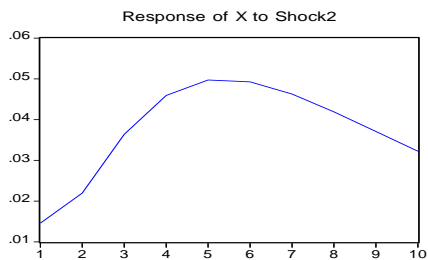
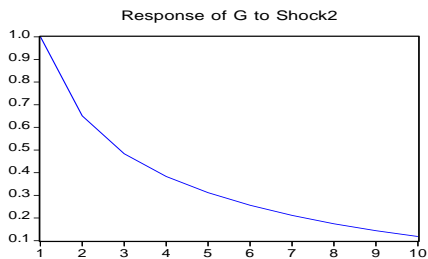
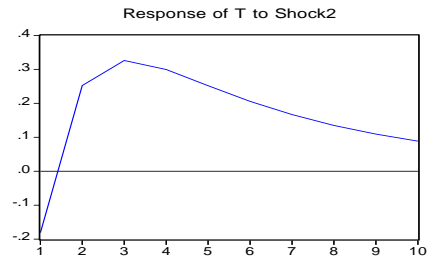
Case 1-Sub-Case 2;  $\beta_{gt} = 0$  ( $b_2=0$  to estimate  $a_2$ ), i.e. Government Expenditures are ordered first

DT

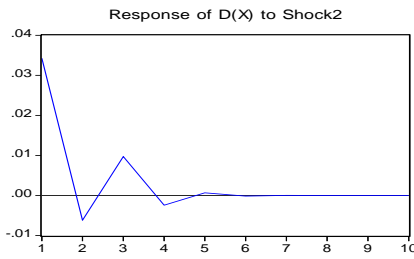
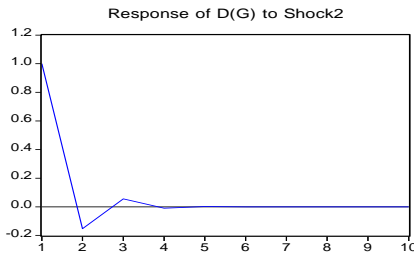
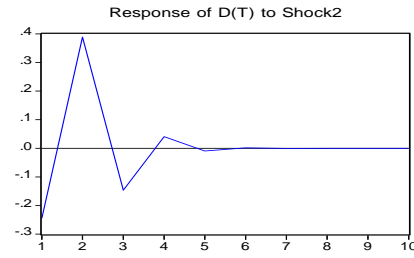
ST

With a Cointegrating Relationship

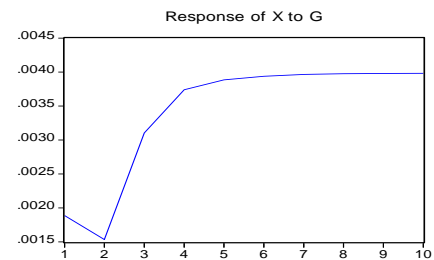
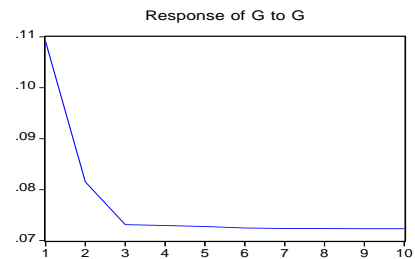
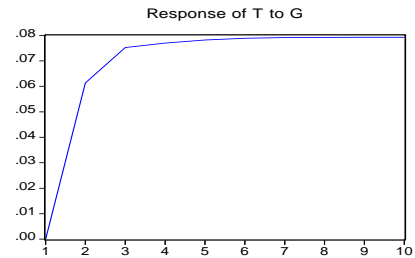
Response to Structural One S.D. Innovations



Response to Structural One S.D. Innovations



Response to Cholesky One S.D. Innovations



Note: Here Shock 2 means shock to Real Per Capita Government Consumption Expenditures (G) in Natural Log. T is Net Tax Variable, and X refers to GDP both in Real Per Capita Natural Logs.

As a whole following points are observed by this analysis. For both the tax and expenditure shocks, own variable response is quite significant (hence fundamental). Impact is positive in the longrun on the other instrument i.e. tax on expenditure and expenditure on tax, however the channels for the two may be different. For the first case it is direct impact (Ratchet up effect) and second is indirect (through increase in economic activity and increased tax collection). This will be further analyzed below by taking other definitions of tax (i.e. without netting them out).

However in terms of impact on the economic activity, contrary to standard theory, the tax variable is having a positive impact on economic activity, which is mainly due to the construction of variable where large proportion of taxes are netted out for transfers of interest payments and subsidies. Secondly due to ratchet up effect, the negative impact of tax on the economic activity may be subdued. But for the case of government expenditures the sign of the shock is following the standard theory. Further the shocks via expenditures are more persistent as compared to the tax shock, which are also similar to the large body of literature which exists in this field (e.g. Blanchard and Roberto, 2002 etc).

## **5.2 Case 2: Tax Revenues (Net of Interest Payment only, Net of Subsidies only and Total Taxes)**

As plotted in figure 5.1, the gap between total taxes and net (of interest and subsidies) has widened over time. This calls for a separate analysis of the tax variable which does not include these transfers. These transfers are committed and are unequally distributed among the domestic consumers and the outside world in the form of subsidies and interest payments. So we have done the above analysis for the tax variable being charged only of interest payment, then for only subsidies and lastly without netting any of these.

Figure 5.4 presents the impact of a tax shock in all the three cases:<sup>71</sup>

**Figure 5.4. Response to a Tax Shock**

Case 2-Sub-Case 1;  $\beta_{tg} = 0$  ( $a_2=0$  to estimate  $b_2$ ), i.e. Taxes are ordered first

**Taxes Net of Interest Payments only**

**Taxes Net of Subsidies only**

**Total Taxes**

DT

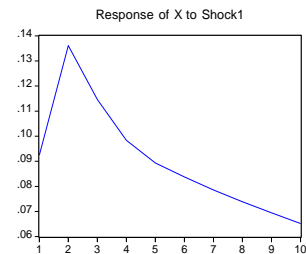
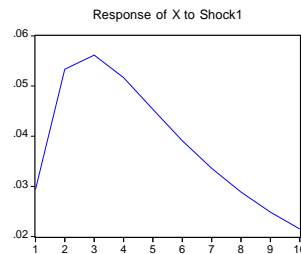
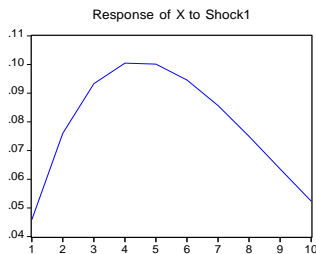
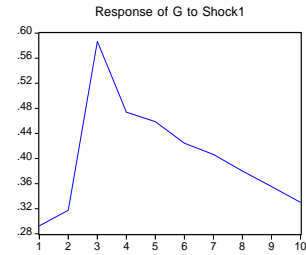
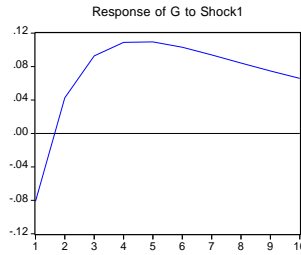
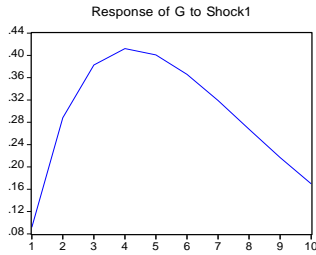
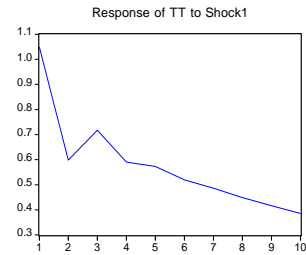
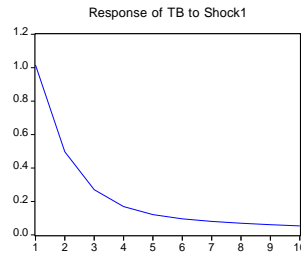
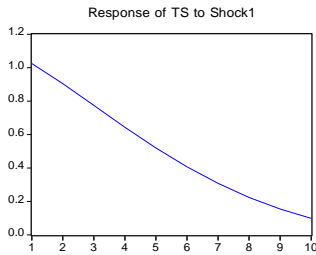
DT

DT

Response to Structural One S.D. Innovations

Response to Structural One S.D. Innovations

Response to Structural One S.D. Innovations



Note: Here Shock 1 means shock to Real Per Capita Net Tax Variables (TS, TB) and Total Taxes (TT) in Natural Log. G refers to Government Consumption Expenditures, and X refers to GDP both in Real Per Capita Natural Logs

Here in the above figure we have taken all the three cases of changing the definition of tax variable from netting of both the interest payments and subsidies to individually netting first the interest payment, then the subsidies and finally without netting any of these to see the

<sup>71</sup> We have not reported here the detailed results for contemporaneous coefficients and estimations pertaining to Stochastic Trend Method or the imposition of a Cointegrating relationship for simplicity.

difference in the dynamic response of both the government expenditures and the economic activity.

It is interesting to note here that broadly the curvature and signs of the impulses for the tax shocks are almost the same as of the original definition of the net tax shock. However there is ample difference in the case of the magnitudes, not only vis-à-vis the old definition but between the cases here as well. In the first case of netting just the interest payments (TS), the government expenditure variable responds positively to the shock in the tax variable. However like earlier cases here too the economic activity also responds positively, which as explained earlier may be due to ratchet up effect of government spending thereby affecting economic activity positively. Maximum response of both the government expenditure variable and economic activity is in the fourth year of the shock.

In the second case where only subsidies are netted from the tax variable, the own shock impact of net tax variable (TB) declines at a steeper and non-linear rate than the earlier case. Whereas the government expenditures also start with a negative impact in the first year, mainly due to the presence of subsidies in the government expenditure. So if net taxes are increased then either the subsidies have declined or the tax collection has improved. Here the case seems to be the first one, where the subsidies decline thereby indicating the government expenditures also decline. However the government expenditures again present the ratchet-up effect as they increase responding to increase in tax revenues. Similarly the economic activity also represents a lesser response as compared to the earlier shock, which dies out quickly also as compared to the earlier case.

Finally the case of taxes not netted of any of the transfers (TT) show a unique picture as compared to the earlier two. The results are similar to magnitude and signs as of the first case of

netting just the interest payments. But the uniqueness is the single peak in 3<sup>rd</sup> year for government expenditures and in the 2<sup>nd</sup> year for the economic activity. Overall the government expenditures show a ratchet up effect as earlier and that also leads to an up scaling of the economic activity due to that. In the end if we take the sub-case 2 of taking  $\beta_{gt} = 0$  (b2=0 to estimate a2), i.e. Government Expenditures are ordered first the results does not change significantly.

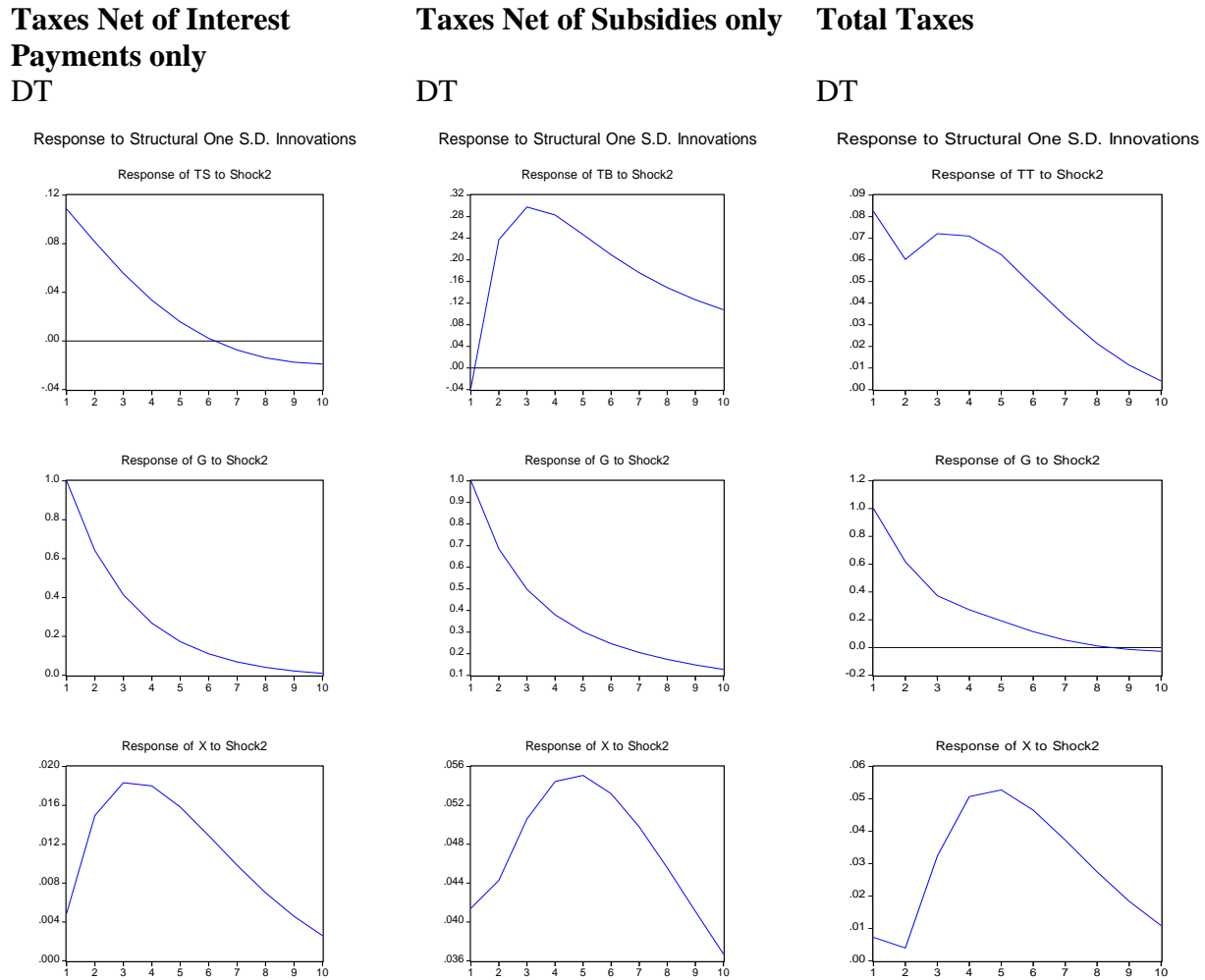
Now if we look at the effect of government expenditures shock in figure 5.5 then the picture is not much different from the earlier case of not netting taxes. In all cases government expenditures own variable represents a fundamental response which decays over time and truncates at 0, within 10 years of initial shock. Further as expected, being a developing economy with major focus on expenditure side policies (demand management policies) the impact of government expenditure shock is positive on the economic activity. In all the cases the impact gradually builds up and get to a maximum in 4 to 5 years and then decays towards 0 in the span of around a decade.

Finally the tax variable also shows the efficiency gains in all the cases, i.e. there is a positive impact on the net tax (TS, TB) and total tax variables (TT) as corresponding to a fiscal shock emanating from expenditure side leads to a positive impact on output which in turn yields positive revenues. However the impact dynamics are different in all the three cases. For the first case of netting the taxes with just the interest payments (TS) and without netting(TT), the tax variable shows a positive increase in the initial year of impact, which is maximum and then it decreases at a linear rate, even turns negative after the sixth year of impact for first case (TS). On the other hand for the second case of netting the taxes with subsidies (TB) only the tax variable

shows a gradual increase and goes to a maximum in 2 to 3 years and then declines, but never touches 0 even in 10 years of impact impulses.

**Figure 5.5. Response to Government Expenditures Shock**

Case 2-Sub-Case 2;  $\beta_{gt} = 0$  ( $b_2=0$  to estimate  $a_2$ ), i.e. Government Expenditures are ordered first



Note: Here Shock 2 means shock to Real Per Capita Government Consumption Expenditures (G) in Natural Log. Here TS, TB and TT refer to Net Tax Variables (Interest Payments only and Subsidies only respectively) and Total Taxes and X refers to GDP where all are in Real Per Capita Natural Logs.

We have also produced (reported in annexure) results of other two sub cases, i.e. ordering taxes first and then evaluating the impact of government expenditure shock on taxes and economic activity and then ordering government expenditures first and evaluating impact of a tax shock. But they were not different from these reported above.



So uptill here with the estimation results of taking different definitions of taxes (Netting all transfer payments i.e. both interest payments and subsidies, just the interest payments, just the subsidies and without netting any of these), and different cases of estimations and ordering of variables (using deterministic trend, stochastic trend and cointegration method of estimations and ordering taxes first i.e. no contemporaneous response of taxes to government expenditures and then taking government expenditures first) have not differed fundamentally in the direction of impact when compared for same method of estimation and same shock across various definitions of taxes. Although the impact's persistence, peak, trough and magnitude of impact have varied a lot across these definitions. As government expenditures have come out to be more effective towards desired outcomes we have further explored it in the next step by using different components of the government expenditures such as defense versus non-defense, interest payments versus non-interest payments case etc.

### **5.3 Case 3: Government Expenditures (Defense and Non-Defense Spending, Interest Payment Spending and Non-Interest Payment Spending, Defense and Interest Payment Spending and Non-Defense-Non-Interest Payment Spending)**

As noted in chapter for describing the history of fiscal policy in Pakistan (chapter 3) that there has been a considerable shift in the expenditure proportions. Over time the interest payment spending as proportion of the total spending have increased many folds, whereas the defense spending has declined.<sup>72</sup> By looking at impact of disaggregated expenditure shocks on economy one can infer better policy options as these have different dynamics. As noted by Blanchard and Roberto (2002) that by disaggregating the expenditure components (they disaggregated for Defense and Non-Defense expenditures only) the difference in shock persistence can be

---

<sup>72</sup> From almost 0% of GDP in early sixties, interest payment expenditures have touched almost 8% of GDP in the late nineties, whereas the defense expenditure were in the range of around 6% of GDP in all the reference years (1959-2010) except for the last decade when it declined sharply(See figure no 3.5 Chapter 3 of this dissertation).

measured. Similarly for developing country like Pakistan it is often debated whether the defense expenditures are pro-growth or not. So we expected to have difference in not only the shock persistence towards economic activity but also the magnitude of the various disaggregation's will also be significantly different.

For the purpose of estimating the impulse response now instead of running a three variable VAR, we have constructed a four variable VAR in each of the cases i.e. Defense versus Non-Defense, Interest Payments versus Non-interest payments and finally combining both Defense and Interest Payment versus Non-Defense-Non-Interest Payments.

The following structural relationships are used to derive the structural parameters for deducing the impulse responses:

$$u_t^t = \alpha_{tx}u_t^x + \beta_{it}e_t^i + \beta_{jt}e_t^j + e_t^t \quad (5.6)$$

$$u_t^i = \alpha_{ix}u_t^x + \beta_{it}e_t^t + \beta_{ij}e_t^j + e_t^i \quad (5.7)$$

$$u_t^j = \alpha_{jx}u_t^x + \beta_{jt}e_t^t + \beta_{ji}e_t^i + e_t^j \quad (5.8)$$

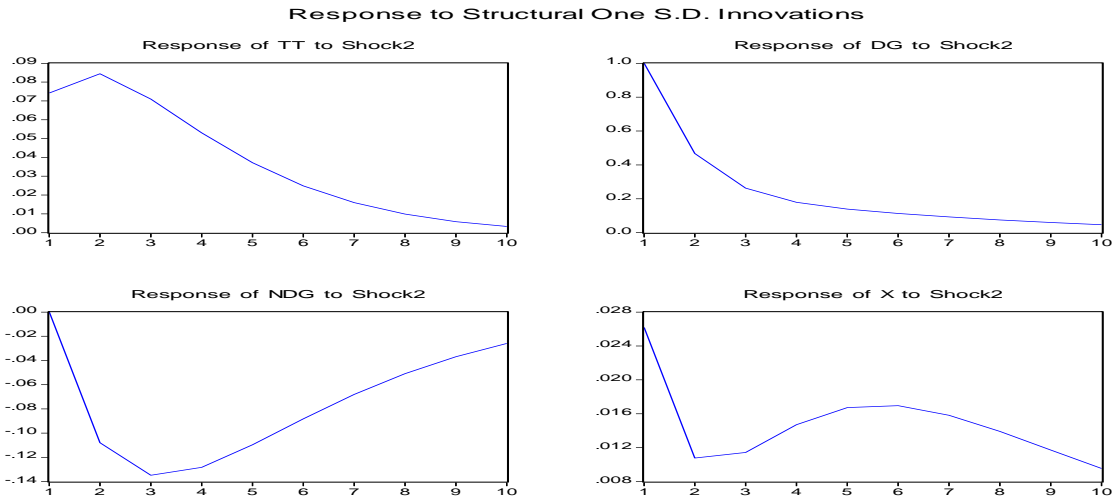
$$u_t^x = \alpha_{xt}u_t^t + \alpha_{xi}u_t^i + \alpha_{xj}u_t^j + e_t^x \quad (5.9)$$

Here i and j subscript refers to the expenditure disaggregation explained above; i.e. in the first case i represents the defense expenditure and j stands for Non-Defense expenditures. Rest of the estimation procedure is the same as earlier, where we put structural/institutional information and assumptions of ordering of expenditures and taxes to derive the rest of the structural parameters required for impulse response function estimations.<sup>73</sup>

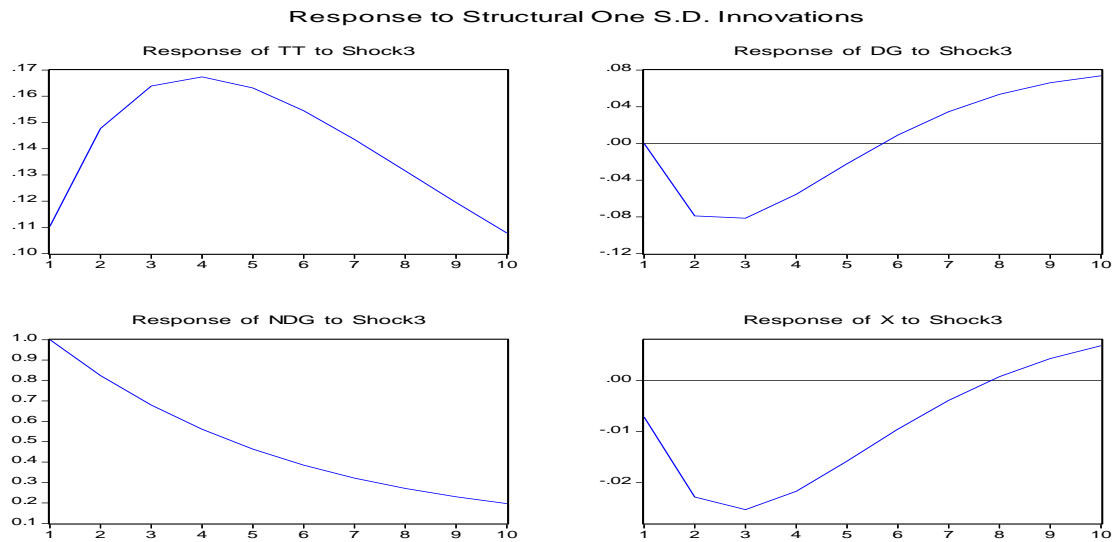
---

<sup>73</sup> For simplicity we are just presenting the cases estimated under the DT (Deterministic trend) estimation scheme explained earlier and in that we are using the second sub case where government expenditures are ordered first.

**Figure 5.6. Response to Government Expenditures Shock-Defense Expenditures**  
 Sub-Case 2;  $\beta_{gt} = 0$  (Taking b2 and b5=0 to estimate a2 and a3), i.e. Government Expenditures are ordered first  
**Defense Expenditures**



**Non-Defense Expenditures**



Note: Here Shock 2 and 3 means shock to Defense Expenditures (DG) and Non-Defense Expenditures (NDG) respectively. Here TT refers to Total Taxes and X refers to GDP in Real Per Capita. All variables are in Natural Logs.

The figure above shows the dynamic responses of disaggregated government expenditures in defense (DG) and non-defense (NDG) expenditures. It is widely debated as to

whether the defense expenditures are pro-growth or other wise. From our analysis by using the structural information on the fiscal structure it appears that there is a pro-growth impact. But before going to that let us start by looking at the impact on other variables.

First of all there is a positive impact on the total tax revenues, although at impact the increase in tax revenue is maximum and it gradually decreases, which almost becomes zero in a span of a decade. For defense expenditures itself the impact is non persistent and once impacted it gradually decreases. On the other hand the non-defense expenditures decrease upon impact and falls upto the third year as there is no matching tax revenue increase after the first two years, then starts to recover as the Defense expenditures are on the decline by then but does not touch 0 in ten years interval. Finally the economic activity increases at the impact, but falls immediately in the next period, due to the reduction in non-defense expenditures and then gradually again picks up, but it never touches zero in our analysis interval of ten years. Hence quite contrary to the common concerns the impact of defense expenditures on economic growth turns out to be positive. Without going into theoretical details, what appears to be is that most of the defense production is also done within country, so it might be coming from expenditure side.

On the other hand the non-defense expenditures have different impact on the revenue variable and economic activity. This shows the implications while making a policy decision to use them as a fiscal instrument. Upon impact the change in revenue variable is positive and greater than the impact value in case of the defense expenditures, further the revenue variable increases from its initial value of impact and reaches maximum in the fourth year of impact and from there it gradually declines. The result is quite surprising as the corresponding economic activity variable declines in the same period. Further as expected the defense expenditures decrease in the initial period of impact as more resources are transferred towards the non-defense

expenditures, but as the revenue picks up again the defense variable turns positive. Same is the case with the economic activity; it turns negative at impact which worsens till the 3<sup>rd</sup> year of impact and then start to improve. But it takes almost 8 years to recover into positive region. One of the reasons could be the high portion of interest payments and subsidies in the non-defense expenditures, which may not have positive relationship with the economic activity. This point is further taken up when the classification of the government expenditures are taken to be interest payment spending and Non-Interest payment spending.

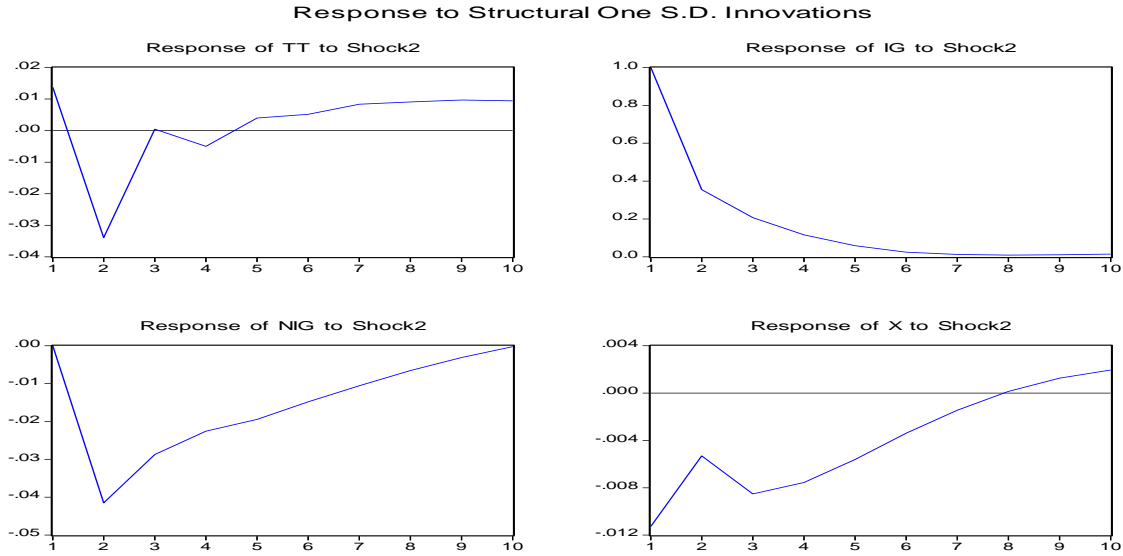
Figure 5.7 provides the impulse responses in case of an expenditure shock being disaggregated in to Interest payment expenditures and non-interest payment expenditures. Panel I contains the impact of Interest payment Shock and II consists of the shock impulses of Non-Interest payment Expenditures. Here we have taken the second sub case of estimation where government expenditures are ordered first, i.e. they do not contemporaneously respond to taxes. In the first case of Interest payment expenditures, tax revenues have a positive impact in the beginning which turns negative in the second period and then again gradually builds to stay above zero. Due to weak elasticities of tax, this behavior is certainly not linked with the change in economic activity. On the other hand for the shock variable itself (IG) the impact dies out in around 6 years of initial impact.

**Figure 5.7. Response to Government Expenditures Shock**

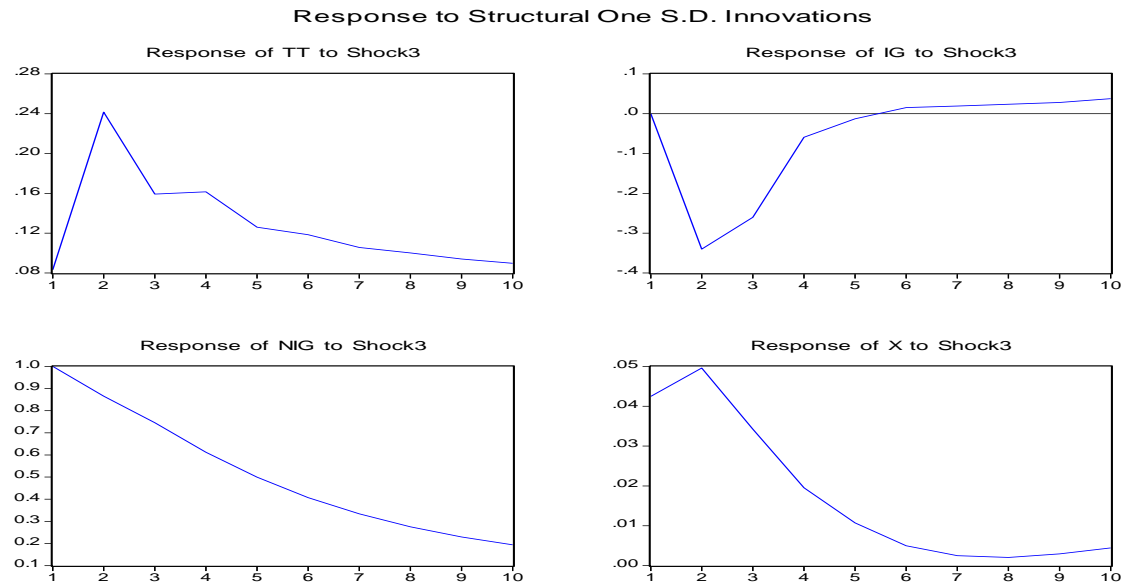
Sub-Case 2;  $\beta_{gt} = 0$  (Taking b2 and b5=0 to estimate a2 and a3), i.e. Government

Expenditures are ordered first

**Interest Payment Expenditures**



**Non-Interest Payment Expenditures**



Note: Here Shock 2 and 3 means shock to Interest Payment Expenditures (IG) and Non-Interest Payment Expenditures (NIG) respectively. Here TT refers to Total Taxes and X refers to GDP in Real Per Capita. All variables are in Natural Logs.

Further the non-interest payment variable does not change at the initial impact, and then goes to a minimum value in the second period, which is exacerbated due to less resource in the

form of tax revenues in the same period, and then gradually improved back to a zero impact by the end of the decade. Finally the impact of interest payment shock to the economic activity turns out to be negative, as the economic activity falls at the initial impact to a negative value and then gradually improves and becomes positive by the 8<sup>th</sup> year.

On the other hand with a non-interest payment government expenditure shock the impact on tax revenue variable is positive in the initial period, then it goes to maximum in two years and afterwards gradually declines towards 0 impact by the 10<sup>th</sup> year. The Interest payment expenditures impact is negative in the initial years and is lowest in the second year, then it gradually begin to rise and become positive by the 6<sup>th</sup> year. This shows the intractable nature of this variable, as compared to non-interest payment variable which as shown in the panel I, never turns positive upon impact from a shock in Interest payment. This also warrants analyzing the possible impact of revenue variable, as it plays a major role in expenditure allocation. On the other hand contrary to the impact reflected by the interest payment shock, for the economic activity variable the impact is positive at the beginning and remains positive although it gradually declines towards 0 by the 10<sup>th</sup> year of impact.

Finally to see the impact of all such charged allocations<sup>74</sup> versus non-charged allocations we have done the impulse response impact evaluation to identify the possible policy implications. These are presented in the following figure 5.8. Here as before only the deterministic trend method based estimation with the second sub case of government expenditures ordered first case is taken.

---

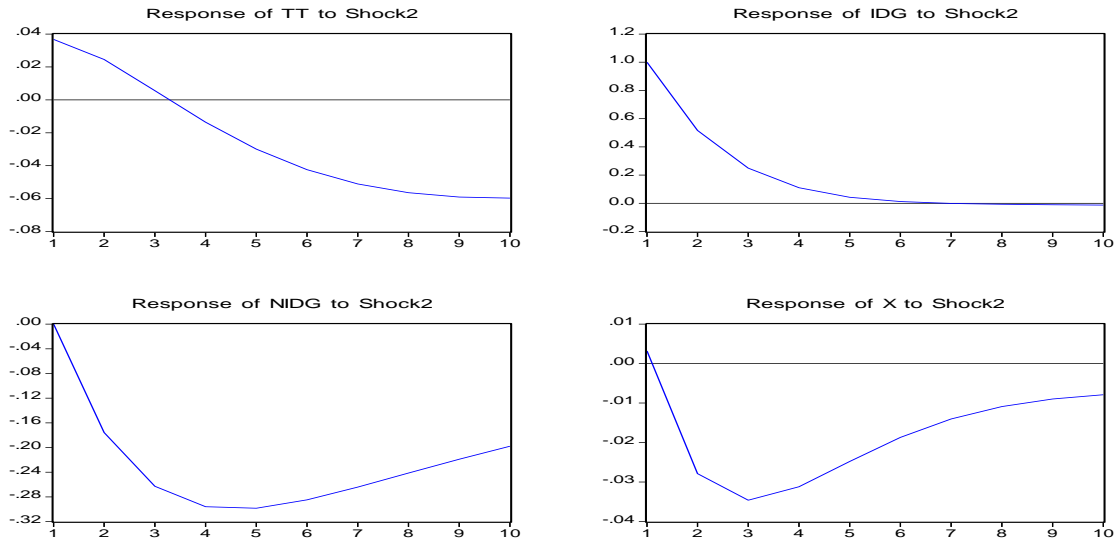
<sup>74</sup> In Pakistan there are two types of government allocations, one is called charged (must be paid) and other one is called voted (debatable and adjustable). For debate in the parliament house purpose only the voted portion of the budget is presented. Interest payment, and in applied sense defense expenditure also are not voted.

**Figure 5.8. Response to Government Expenditures Shock**

Sub-Case 2;  $\beta_{gt} = 0$  (Taking  $b_2$  and  $b_5=0$  to estimate  $a_2$  and  $a_3$ ), i.e. Government Expenditures are ordered first

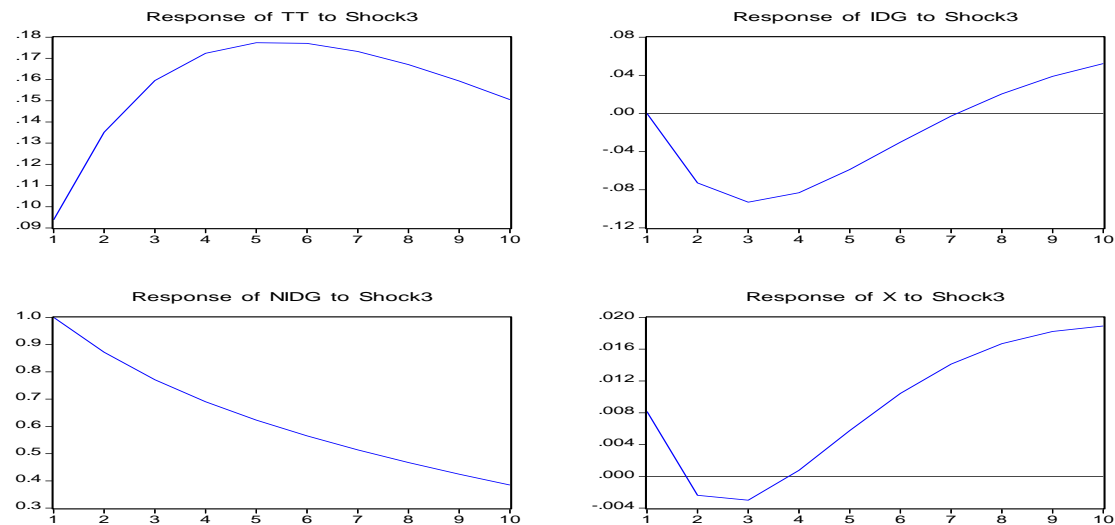
**Defense and Interest Payment Expenditures**

Response to Structural One S.D. Innovations



**Non-Defense-Non-Interest Payment Expenditures**

Response to Structural One S.D. Innovations



Note: Here Shock 2 and 3 means shock to Defense and Interest Payment Expenditures (IDG) and Non-Defense-Non-Interest Payment Expenditures (NIDG) respectively. Here TT refers to Total Taxes and X refers to GDP in Real Per Capita. All variables are in Natural Logs.



In this case, from the above figure it appears that for the first case of Interest and Defense expenditures (IDG) the impact on the tax revenue shows a positive impact in the beginning, which turns negative by the 4<sup>th</sup> year and keeps deteriorating till the 10<sup>th</sup> year.

Whereas for its own variable (IDG) the impact declines from a fundamental response in the beginning year to almost 0 in the 5<sup>th</sup> year and stays there. Corresponding to that the non-interest payment-non-defense (NIDG) variable had a negative impact which is maximum by the 5<sup>th</sup> year, after that there is a slight recovery but it never touches 0. Finally for the economic variable, clearly the aggregate impact is negative through out the analysis period. It is worse in 3<sup>rd</sup> period, after which it tries to recover but never reaches a 0 impact.

On the other hand the shock to NIDG described in the second panel shows a positive impact on revenue variable, which is maximum in the 5<sup>th</sup> year after which it starts to decline but never touches 0. IDG variable declines in the initial years but after 7<sup>th</sup> year it recovers and stays positive. Finally the economic activity contrary to the expectations fall in the initial year of impact and stays below zero for 2<sup>nd</sup> and 3<sup>rd</sup> year, but after the fourth year it keeps on increasing and never declines. The initial decline could be due to the fall in IDG, then afterwards this spending leads to substantial increase in the economic activity.

We have also analyzed the impact of tax shock to these disaggregated expenditures; the analysis reveals that both the interest and defense spending respond positively to tax shock. The defense expenditures increase substantially immediately whereas the interest payments increase at a lower rate in the beginning, but increase substantially in the latter periods. So in addition to being considered as charged these variables seems downward rigid. So when the revenues are short, these must be given priority and when revenues increase still these are increased at a proportional rate (See Annexure for the dynamics).

#### 5.4 Case 4: Revenues (Direct taxes and Indirect Taxes)

As noted above that one of our objectives is to see the dynamics of a fiscal policy shock at the disaggregated level, earlier we did that for the expenditure side by decomposing the expenditure variable in defense and non-defense, interest payment expenditures and non-interest payment expenditures and finally for combining both of them. Here we are disaggregating the revenue side in to broad categories of direct taxes and indirect taxes. This is done to analyze the possible difference in their impact and persistence on the economic variable. Hence for estimating the impulse response we have again constructed a four variable VAR as before, but here there will be just one case as compared to earlier expenditure disaggregation where there were three cases. The following structural relationships are used to derive the structural parameters for inferring the impulse responses:

$$u_t^i = \alpha_{ix} u_t^x + \beta_{ij} e_t^j + \beta_{ig} e_t^g + e_t^i \quad (5.10)$$

$$u_t^j = \alpha_{jx} u_t^x + \beta_{ji} e_t^i + \beta_{jg} e_t^g + e_t^j \quad (5.11)$$

$$u_t^g = \alpha_{gx} u_t^x + \beta_{gi} e_t^i + \beta_{gj} e_t^j + e_t^g \quad (5.12)$$

$$u_t^x = \alpha_{xi} u_t^i + \alpha_{xj} u_t^j + \alpha_{xg} u_t^g + e_t^x \quad (5.13)$$

Here i and j subscript refers to the revenue disaggregation explained above; i.e. here i will represent the direct taxes and j stands for indirect taxes. Rest of the estimation procedure is the same as earlier, where we put structural institutional information<sup>75</sup> and assumptions of ordering

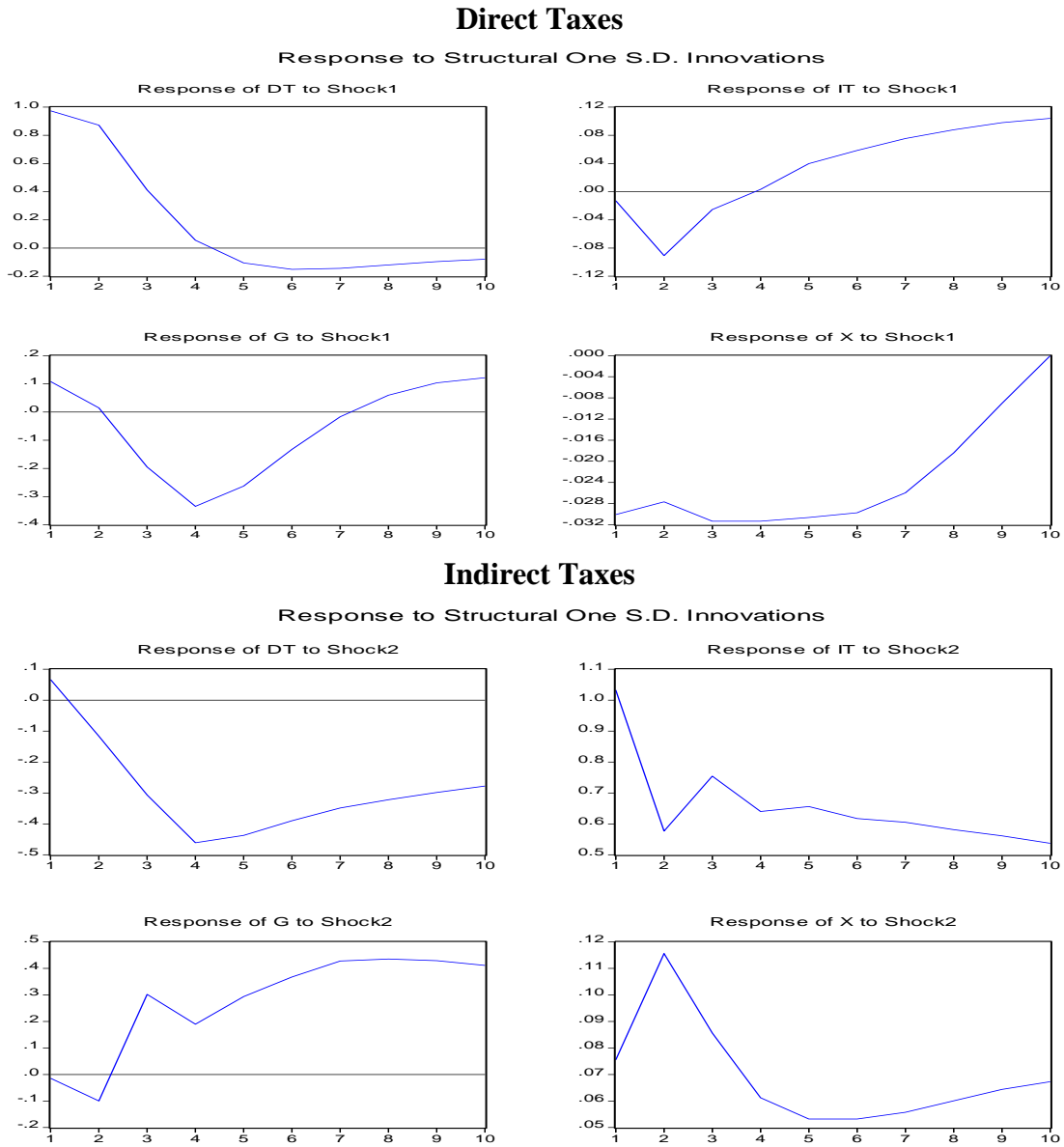
---

<sup>75</sup> Consolidated total direct taxes elasticity turned out to be 0.88 and for indirect taxes only 0.43. These results are further explained in the earlier sections of this chapter.

of expenditures and taxes to derive the rest of the structural parameters required for impulse response function estimations.<sup>76</sup>

**Figure 5.9. Response to Tax Shock**

Sub-Case 1;  $\beta_{tg} = 0$  ( Taking a3 and b3 = 0 to estimate b5 and b6), i.e. Taxes are ordered first



Note: Here Shock 1 and Shock 2 means shock to Real Per Capita Direct Tax and Indirect Tax variable simultaneously. Here DT refers to Real Per capita Direct Taxes and IDT as Real Per capita Indirect Taxes, G to Real Per Capita Government Expenditures and X refers to GDP in Real Per Capita. Here all variables are in Natural Logs.

<sup>76</sup> For simplicity again we are just presenting the cases estimated under the DT (Deterministic trend) estimation scheme explained earlier and in that we are using the first sub case where taxes are ordered first.

From the figure 5.9 we can see the dynamic impact of shock in sub heads of taxes i.e. the direct taxes and indirect taxes. What is apparent is that both the taxes have a different dynamic impact which not only differs in direction but also in persistence. In the first case we have plotted the impact of direct taxes. It appears that in case of direct taxes the government expenditures initially increase then decrease for the next 2 years and remains below zero till the seventh year after which again it is positive. While for the economic activity the impact is negative, which stays at a high negative value for about seven years then gradually truncate in the next three to a zero impact. This shows the persistence of a direct tax shock in case of economic activity. One of the reasons for such dampening effect could be because of the decline in the government expenditures for the same number of years with respect to a fiscal shock coming from direct taxes. But overall there is strong negative impact of a direct tax based fiscal shock to the economy. Which is quite opposite to what was observed in case of a total tax shock as explained above.

On the other hand in the lower panel of the above figure when we see the impact of a shock to indirect taxes then the things are more or less the same as of the total taxes. One of the reasons for this similarity is of course the higher proportion of indirect taxes in the total taxes as compared to the direct taxes. Unlike the direct taxes case the indirect taxes impact on its own variable quickly dies out in the 2<sup>nd</sup> year and remain very low till the tenth year. Corresponding to this shock direct taxes fall, one of the reason could be the decline in reliance on them as indirect taxes are on the rise. As in case of Pakistan the potential tax gap is widening due to weak tax implementation and large undocumented economy. Government expenditure presents the ratchet up effect; as the tax revenues increase the corresponding government expenditures also increase and keep on increasing. Finally the economic activity is presenting a positive impact upon

receiving a shock in indirect taxes, mainly due to weak tax elasticity (as earlier mentioned around 0.43 only) and because of the corresponding ratchet up effect in government expenditures which further exacerbate the situation. But clearly the anticipated negative impact on the economic activity due to shock in indirect taxes does not take place.

To summarize these results are supportive of the earlier studies done for other countries. Such as Barro (1989)-for the government investment, Furceri and Annabelle (2010)-both for public investment and consumption, Cogan et al. (2009), Hemming et al. (2002), Mountford and Harald (2009), Muscatelli and Patrizio (2005)-weak but positive, Plessis et al. (2007) and others. But surprisingly for Pakistan we could find only one study supportive of our results i.e. Haque and Peter (1991) whereas all others are opposite with our findings such as Javed and Umaima (2010) and Haq Tariq A. (2003). The reasons could be the estimation methodology and the fiscal policy indicator used; as here we have used institutional information on the conduct of fiscal policy for identification in the SVAR, whereas none of the above studies have used it for Pakistan and secondly we have used the government expenditures and net tax revenues for defining the fiscal policy shocks whereas most of the above studies for Pakistan have used the broad indicator of budget deficit to identify the fiscal shock.

Over the years government expenditures have changed its dynamics in terms of sub components. Therefore it was imperative to observe the separate transmission mechanism of the sub-aggregates i.e. defense and interest payment expenditures. In that respect our results are in line with those presented by Furceri and Annabelle (2010). In our analysis it turns out that defense expenditures have positive impact on economic growth while interest payments negatively affects it. These results are comparable of those of Furceri and Annabelle (2010), Rotember and Woodford (1992), Ramey and Shapiro (1997), Edelberg *et al.*(1999), Blanchard

and Roberto (2002) and Afonso and Peter (2007). Similarly disaggregated analysis for the revenue variable by splitting the tax revenues in the broad categories of direct taxes and indirect taxes were made. From that analysis it appears that direct taxes affect economic activity negatively while indirect taxes ambiguously affect economic activity positively.

## **5.5 Conclusion**

It is generally observed that governments around the world tend to behave irrationally in economic/sustainability terms by creating unnecessary budget deficits; which may be rational politically or created for strategic purposes but it not only put pressures in the fiscal resources availability in the years to come as well as retard growth in the longrun. Further over time now focus of research is turning towards disentangling the potential impacts of fiscal instruments by disaggregating both the instruments as well as the impact variables also as targeting of different fiscal instruments as an option can lead to different impact on a particular macro variable and more so differently across macro indicators of an economy.

Considering these objectives the present and the previous chapter employs the novel procedure developed by Blanchard and Roberto (2002) in using the institutional information such as the elasticity of different fiscal instruments e.g. taxes and the decision precedence while opting for a fiscal instrument. By using the SVAR methodology it was observed that government expenditures at the aggregate level affect the economy in line with the theory, i.e. it affects the economic activity positively, whereas the tax variable shock affects economic activity oppositely. The spending multipliers are larger than the tax shocks impact purporting the traditional Keynesian theory of larger expenditure multipliers than tax multipliers for Pakistan. This may be due to the fact that the tax elasticities are very low and government expenditures also behave in a ratchet up manner. Hence when revenues increase the government expenditures

also increase instead of paying of debts, which may lead to a positive impact on the economic activity.

Estimation results for different definitions of taxes (Netting all transfer payments i.e. both interest payments and subsidies, just the interest payments, just the subsidies and without netting any of these), and different cases of estimations and ordering of variables (using deterministic trend, stochastic trend and cointegration method of estimations and ordering taxes first i.e. no contemporaneous response of taxes to government expenditures and then taking government expenditures first) have not differed fundamentally in the direction of impact when compared for same method of estimation and same shock across various definitions of taxes. Although the impact's persistence, peak, trough and magnitude of impact have varied a lot across these definitions. Government expenditures have come out to be more effective towards desired outcomes. These results are in conformity of the earlier studies done for other countries however for Pakistan we could find only one study supportive of our results. The reasons for these differences with studies in Pakistan are attributed to the difference in estimation methodology and the fiscal policy indicator used.

Further by looking at the dynamics in terms of sub components it was observed that there is a separate transmission mechanism of the sub-aggregates i.e. defense and interest payment expenditures. In our analysis it turns out that defense expenditures have positive impact on economic growth while interest payments negatively affects it. These results are comparable with a number of studies. Similarly disaggregated analysis for the revenue variable by splitting the tax revenues in the broad categories of direct taxes and indirect taxes it appears that direct taxes affect economic activity negatively while indirect taxes ambiguously affect economic activity positively, again for the reason of ratchet up effect seems to be the reason.

This situation is further analyzed in the next chapter to see what are the impacts of shocks in various definitions of fiscal variables used here, on sub components of the economic activity; namely from expenditure side consumption, private investment and net exports.



**Appendix**  
**Estimation Results of Case 1**

**Table 5.5. Response to Tax Shocks (Sub-Case2 ;  $\beta_{gt} = 0$  b2=0 to estimate a2, i.e. Government Expenditures are ordered first**

	Year 1	Year 2	Year 3	Year 4	Year 5	Peak (Year)
DT						
GDP	0.033973 (0.00000)	0.060613 (0.67282)	0.061156 (0.70535)	0.054473 (0.62160)	0.046502 (0.55294)	0.061156 (2)
G	0.000000 (0.00000)	0.165181 (0.66049)	0.188732 (0.67352)	0.172110 (0.63125)	0.146899 (0.59825)	0.188732 (3)
T	1.018006 (0.00000)	0.445785 (0.77027)	0.240549 (0.56401)	0.156947 (0.49048)	0.115618 (0.46597)	1.018006 (1)
ST						
GDP	0.033670 (0.00000)	0.031547 (0.71185)	-0.003727 (0.35995)	0.001482 (0.02879)	-0.00021 (0.01807)	0.033670 (1)
G	0.000000 (0.00000)	0.149640 (0.69859)	-0.009646 (1.22248)	0.003785 (0.74753)	-6.6E-05 (0.23597)	0.149640 (2)
T	1.017845 (0.00000)	-0.31944 (0.82266)	0.080424 (1.66699)	-0.017132 (1.27683)	0.003046 (0.59051)	1.017845 (1)

Note: the Peak Values are taken from a sample of first Ten years only. The Significance of Impulse responses are generated from analytic asymptotic method which takes the null hypothesis of 0 in a range of One Standard Deviation innovation +- 2 Standard Errors. The Value in Parenthesis ( ) are the one sided range

**Table 5.6. Response to Government Expenditure Shock (Sub-Case1 ; a2=0 to estimate b2, i.e. taxes are ordered first**

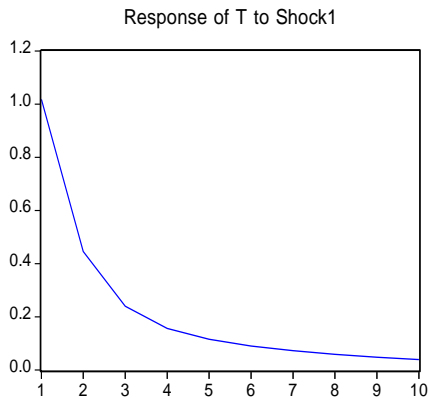
	Year 1	Year 2	Year 3	Year 4	Year 5	Peak (Year)
DT						
GDP	0.021013 (3.9E-21)	0.033376 (0.98874)	0.047898 (1.33300)	0.056196 (1.38204)	0.058471 (1.29515)	0.058471 (5)
G	1.000000 (0.00000)	0.681941 (0.97186)	0.519117 (1.29585)	0.415680 (1.40794)	0.339611 (1.41195)	1.000000 (1)
T	0.011137 (0.00000)	0.336071 (1.11776)	0.371231 (1.15625)	0.329003 (1.10423)	0.273633 (1.05703)	0.371231 (3)
ST						
GDP	0.043108 (0.00000)	0.002115 (1.34620)	0.008765 (0.23955)	-0.00204 (0.09326)	0.000630 (0.02990)	0.043108 (1)
G	1.000000 (0.00000)	-0.11394 (1.32349)	0.053363 (2.17157)	-0.00836 (0.64492)	0.001886 (0.33203)	1.000000 (1)
T	0.022847 (1.6E-20)	0.304880 (1.52013)	-0.12539 (2.85724)	0.036196 (1.50962)	-0.00861 (0.70786)	0.304880 (2)

Note: the Peak Values are taken from a sample of first Ten years only. The Significance of Impulse response are generated from analytic asymptotic method which takes the null hypothesis of 0 in a range of One Standard Deviation innovation +- 2 Standard Errors. The Value in Parenthesis ( ) are the one sided range

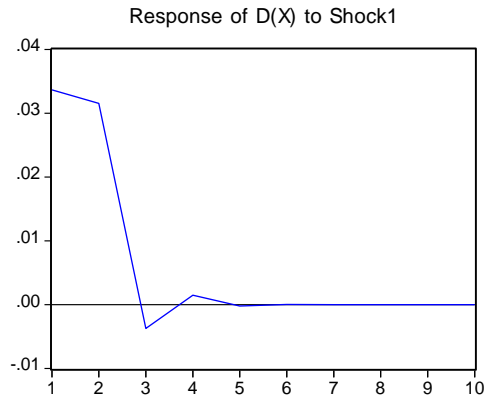
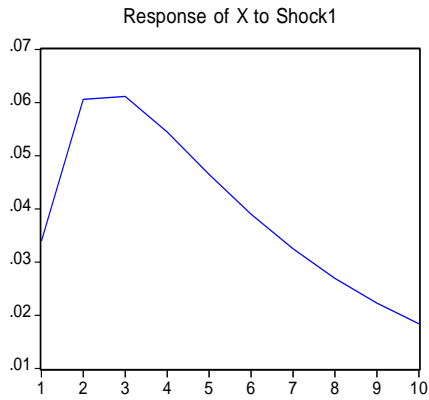
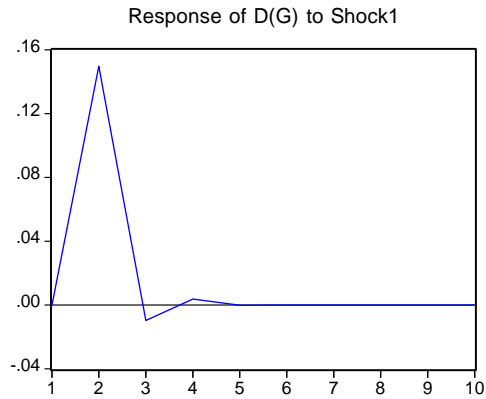
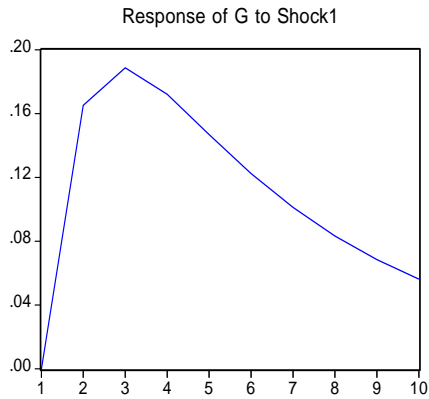
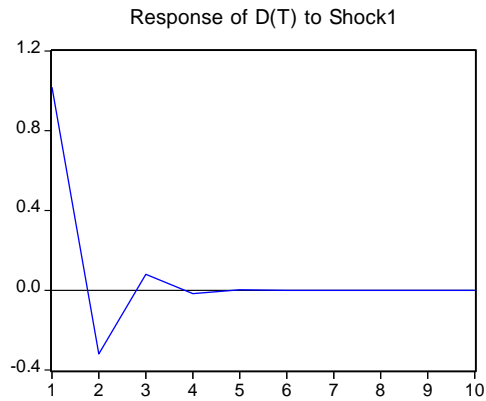
**Figure 5.10. Response to Tax Shock**

Case 1-Sub-Case 2;  $\beta_{gt} = 0$  ( $b_2=0$  to estimate  $a_2$ ), i.e. Government Expenditures are ordered first  
 DT ST

Response to Structural One S.D. Innovations



Response to Structural One S.D. Innovations



Note: Here Shock 1 means shock to Real Per Capita Net Tax Variable (T) in Natural Log. Here G refers Government Consumption Expenditures, and X refers to GDP both in Real Per Capita Natural Logs

**Figure 5.11. Response to Government Expenditure Shock**

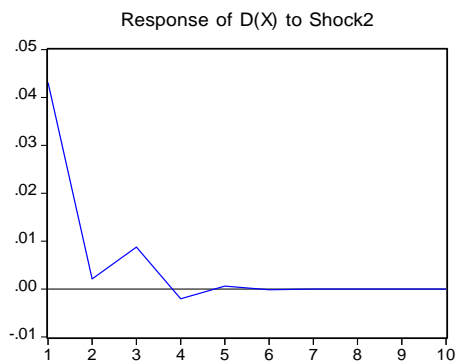
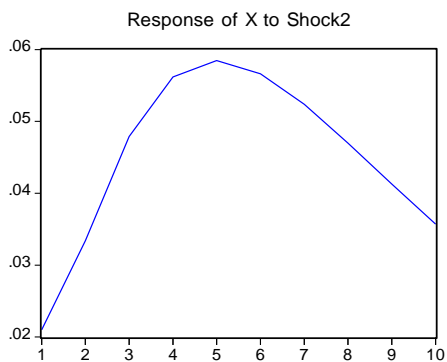
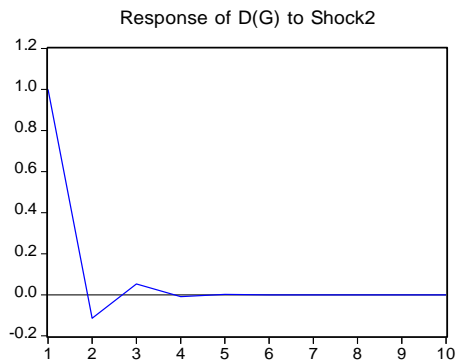
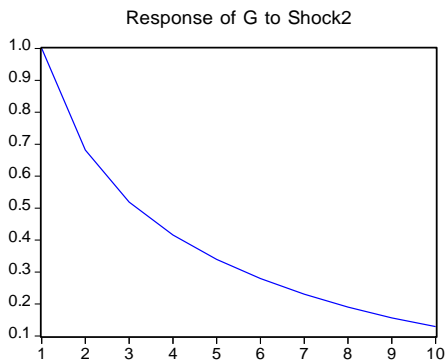
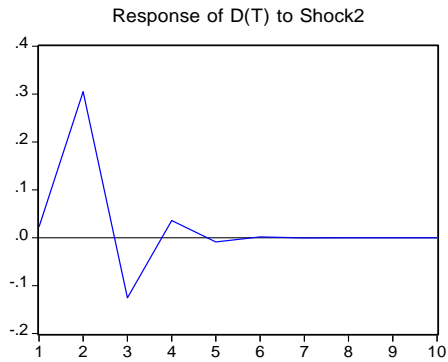
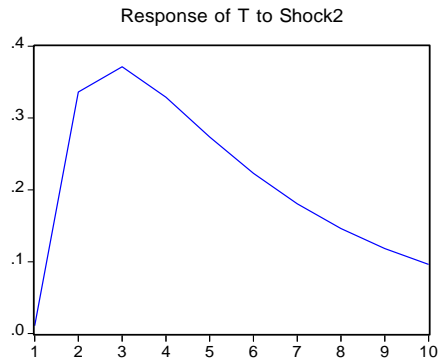
Case 1-Sub-Case 1;  $\beta_{tg} = 0$  ( $a_2=0$  to estimate  $b_2$ ), i.e. Taxes are ordered first

DT

ST

Response to Structural One S.D. Innovations

Response to Structural One S.D. Innovations



Note: Here Shock 2 means shock to Real Per Capita Government Consumption Expenditures (G) in Natural Log. Here T Net Tax Variable, and X refers to GDP both in Real Per Capita Natural Logs.

**Figure 5.12. Response to Tax Shock**

Case 1-Sub-Case 2;  $\beta_{gt} = 0$  ( $b_2=0$  to estimate  $a_2$ ), i.e. Government Expenditures are ordered first

**Taxes Net of Interest  
Payments only**

**Taxes Net of Subsidies only**

**Total Taxes**

DT

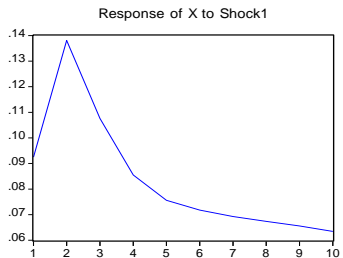
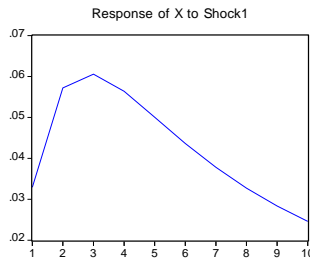
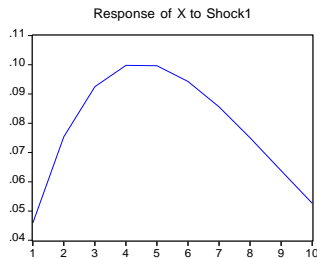
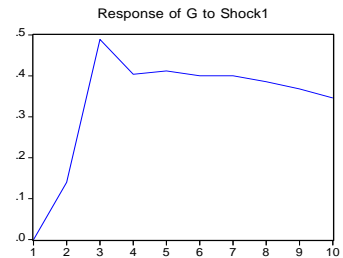
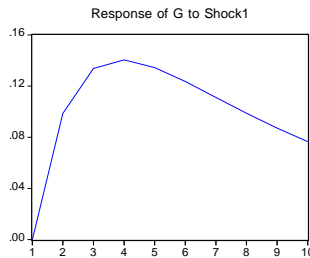
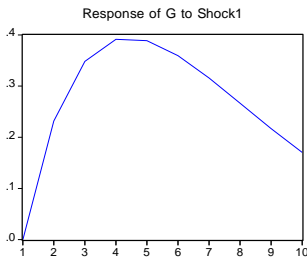
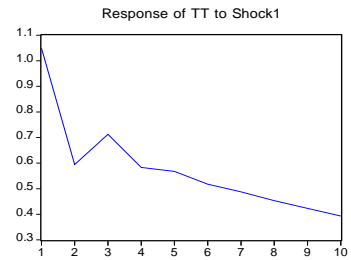
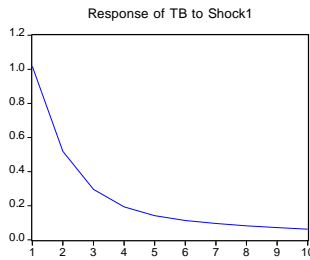
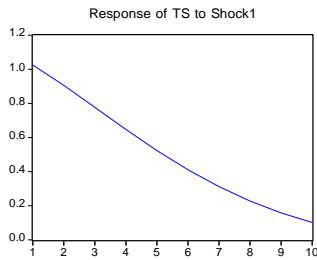
DT

DT

Response to Structural One S.D. Innovations

Response to Structural One S.D. Innovations

Response to Structural One S.D. Innovations



Note: Here Shock 1 means shock to Real Per Capita Net Tax Variables (TS, TB) and Total Taxes (TT) in Natural Log. Here G refers Government Consumption Expenditures, and X refers to GDP both in Real Per Capita Natural Logs

**Estimation Results of Case 2**

**Figure 5.13. Response to Tax Shock**

Case 2-Sub-Case 2;  $\beta_{gt} = 0$  ( $b_2=0$  to estimate  $a_2$ ), i.e. Government Expenditures are ordered first

**Taxes Net of Interest  
Payments only**

**Taxes Net of Subsidies only**

**Total Taxes**

DT

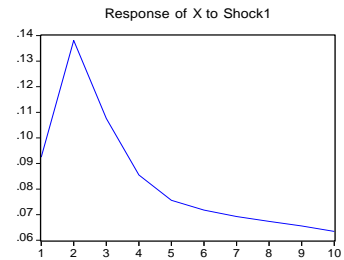
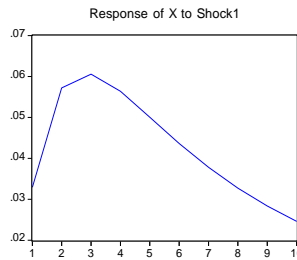
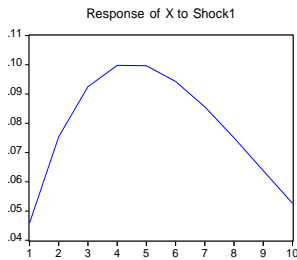
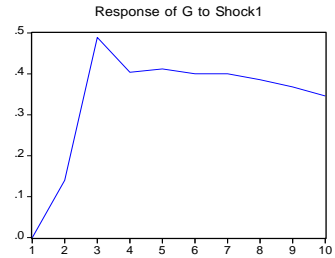
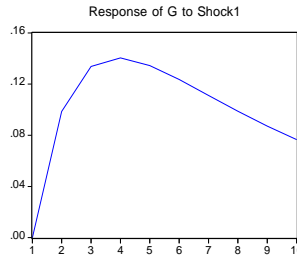
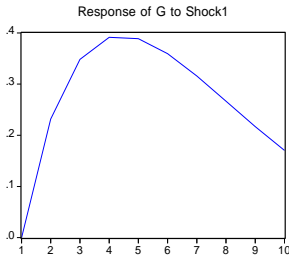
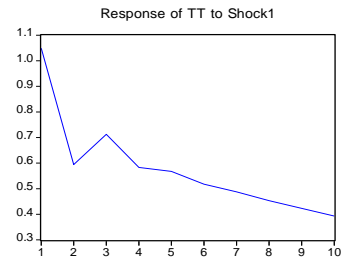
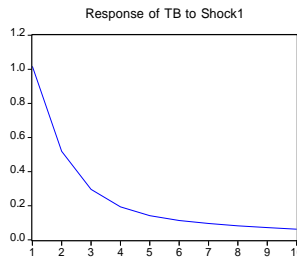
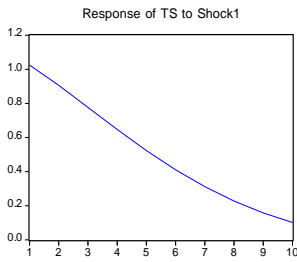
DT

DT

Response to Structural One S.D. Innovations

Response to Structural One S.D. Innovations

Response to Structural One S.D. Innovations

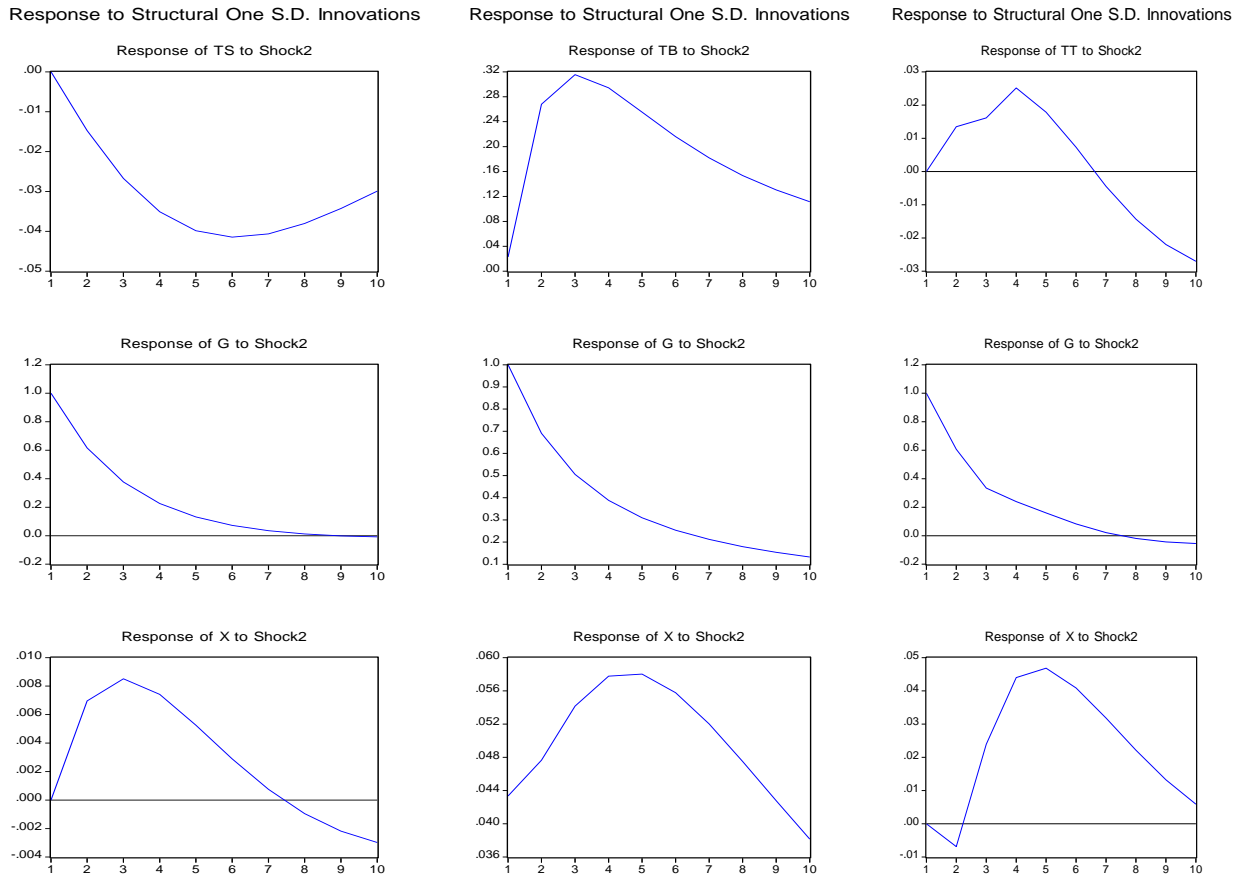


Note: Here Shock 1 means shock to Real Per Capita Net Tax Variables (TS, TB) and Total Taxes (TT) in Natural Log. Here G refers Government Consumption Expenditures, and X refers to GDP both in Real Per Capita Natural Logs

**Figure 5.14. Response to Government Expenditures Shock**

Case 2-Sub-Case 1;  $\beta_{Tg} = 0$  ( $a_2=0$  to estimate  $b_2$ ), i.e. Taxes are ordered first

**Taxes Net of Interest Payments   Taxes Net of Subsidies only   Total Taxes**  
**only**  
**DT                                      DT                                      DT**



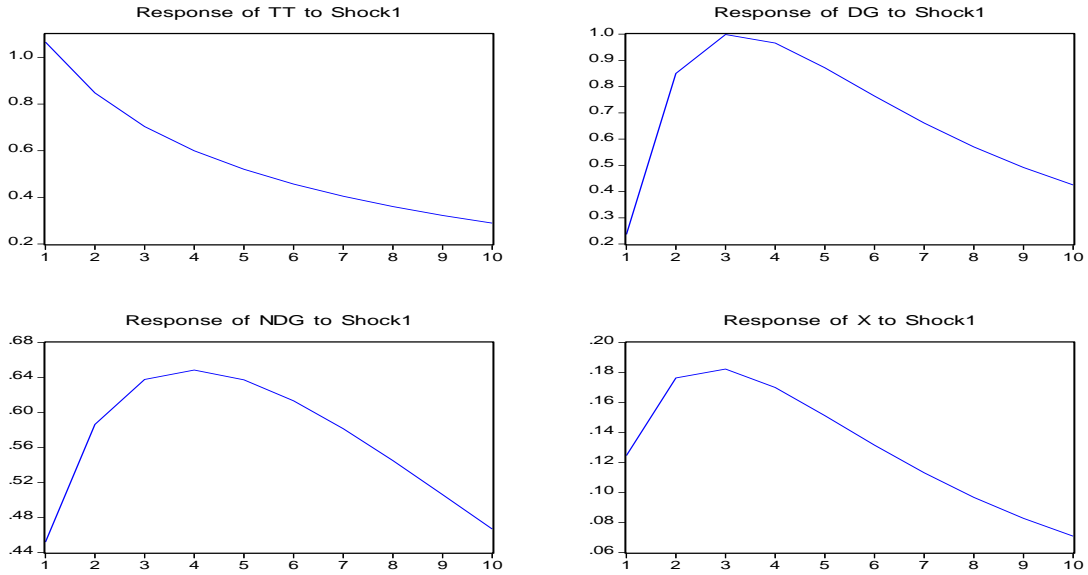
Note: Here Shock 2 means shock to Real Per Capita Government Consumption Expenditures (G) in Natural Log. Here TS, TB and TT refer to Net Tax Variables (Interest Payments only and Subsidies only respectively) and X refers to GDP where all are in Real Per Capita Natural Logs.

**Figure 5.15. Response to Tax Shock**

Sub-Case 1;  $\beta_{ig} = 0$  ( Taking a2 and a3= 0 to estimate b2 and b5), i.e. Taxes are ordered first

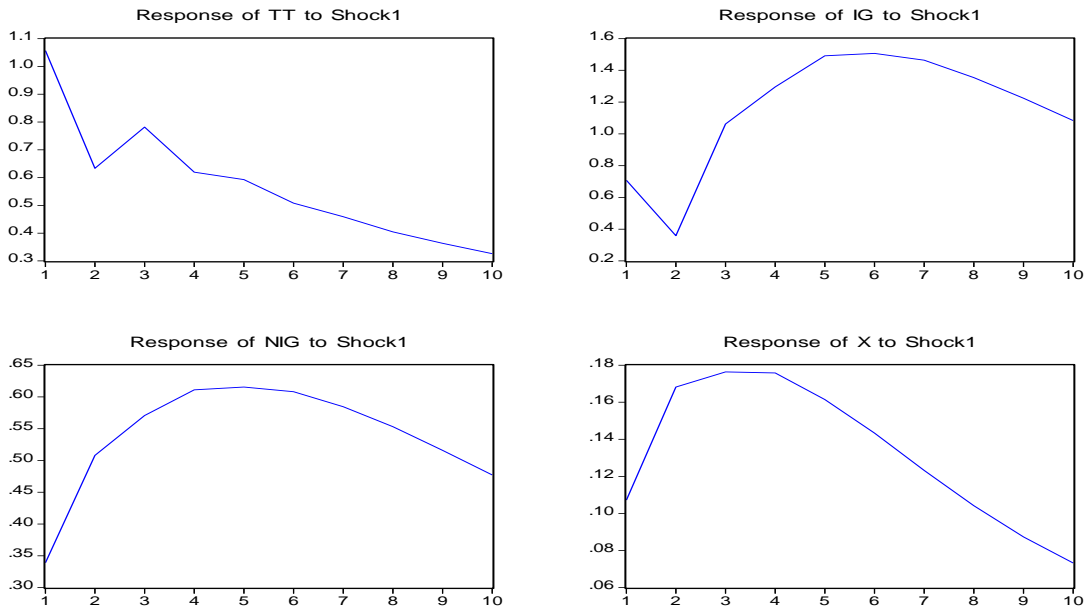
**Defense and Non-Defense Spending**

Response to Structural One S.D. Innovations



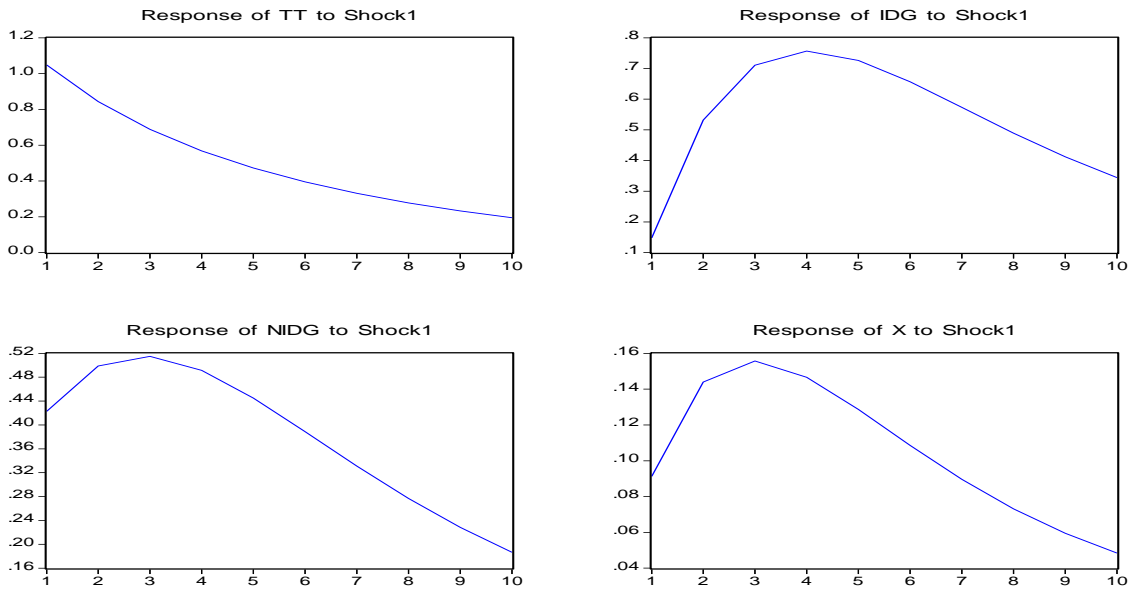
**Interest Payment Spending and Non-Interest Payment Spending**

Response to Structural One S.D. Innovations



## Defense and Interest Payment Spending and Non-Defense-Non-Interest Payment Spending

Response to Structural One S.D. Innovations



Note: Here Shock 1 means shock to Real Per Capita Total Tax Variable. Here DG refers to Real Per capita Government Defense Expenditures and NDG as Real Per capita Government Non-Defense Expenditures, IG to Real Per Capita Government Interest Payments Expenditures and NIG to Real Per Capita Government Non-Interest Payments Expenditures, IDG to Real Per capita Government Defense and Interest Payments Expenditures and NIDG to Real Per capita Government Non-Defense and Non-Interest Payments Expenditures and X refers to GDP in Real Per Capita. Here all variables are in Natural Logs.



## Chapter 6

### **Fiscal Policy Effects on Disaggregated Macroeconomic Indicators in Pakistan**

The case of sub components of economic activities (private consumption, private investment, exports and imports) are interesting in two respects; first it helps in explaining the theoretical merits and demerits of a particular theory e.g. going back to our theoretical chapter we stated that in case of a standard government spending shock both the schools of thought namely the neoclassical and Keynesian models will predict a positive impact on the economic aggregate. But the situation can be quite opposite in case of sub components of the GDP. On the one side neoclassical models predict that there will be a negative effect on private consumption (Baxter and King, 1993) while on the other hand a Keynesian model will go differently about it. Further in case of private investment there are less clear impacts as well (Blanchard and Roberto, 2002). Again for the neoclassical there will be a positive impact on economic activity from a fiscal shock if the shock is sufficiently persistent and at the same time the taxes are non-distortionary. While for a Keynesian model the prediction would be for a positive impact on investment if the accelerator effects are dominant as compared to negative effects of higher interest rates.

With this back drop and more theoretical and empirical details provided in the literature review chapter it is quite significant to analyze the effect of fiscal shocks both from the tax side and expenditure sides on the sub components of GDP in this chapter. The chapter describes the reduced form of VAR to be estimated then it analyzes the effect of fiscal policy variables on the private consumption, private investment and finally on the exports and imports.

We have estimated a four variable VAR, while keeping the component of GDP being analyzed ordered at the last.

$$u_t^t = \alpha_{tx} u_t^x + \beta_{tg} e_t^g + e_t^t \quad (6.1)$$

$$u_t^g = \alpha_{gx} u_t^x + \beta_{gt} e_t^t + e_t^g \quad (6.2)$$

$$u_t^x = \alpha_{xt} u_t^t + \alpha_{xg} u_t^g + e_t^x \quad (6.3)$$

$$u_t^{xi} = \alpha_{xi,t} u_t^t + \alpha_{xi,g} u_t^g + e_t^{xi} \quad \square \quad (6.4)$$

Here the last equation depicts the structural relationship between the reduced form residuals of the *i*th component of the GDP under analysis used for identification.

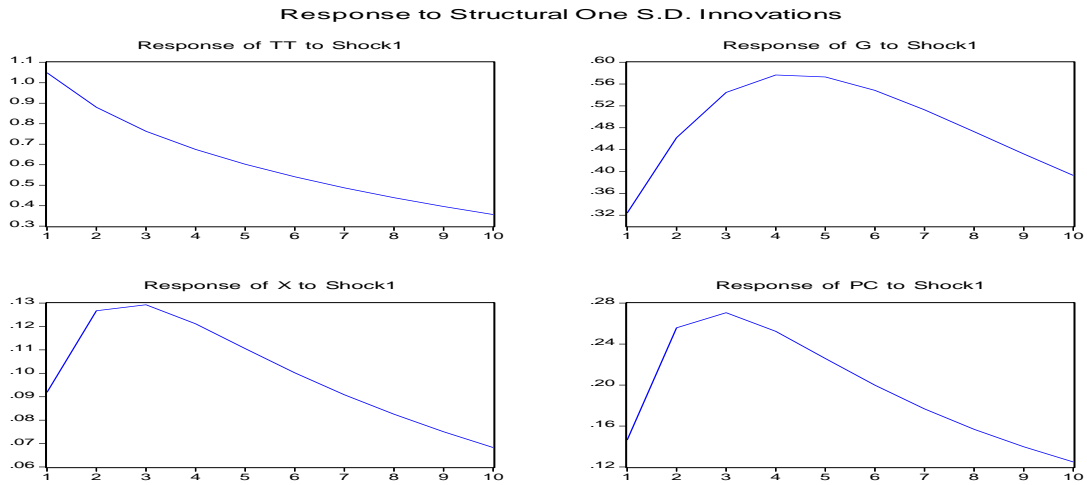
### 6.1. Private Consumption

The figure 6.1 presents the impulse response of shocks to fiscal variables. First panel shows the impact of a tax shock evaluated while taking the first case of taxes being ordered first and estimated under the deterministic trend (DT) scheme. Clearly from the figure it is evident that private consumption variable responds exactly the same in terms of direction and peaks as of the total economic activity. Although the magnitude of impact is different, here the private consumption responds twice as much as of the total economic activity. Mainly due to the reason that private consumption is the single largest tax base of indirect tax-GST. As explained above that the taxes have very low elasticity and seems to be well below the threshold level of taxes. At the same time government expenditures present a ratchet up effect due to increased revenue resulting in a distorted picture.

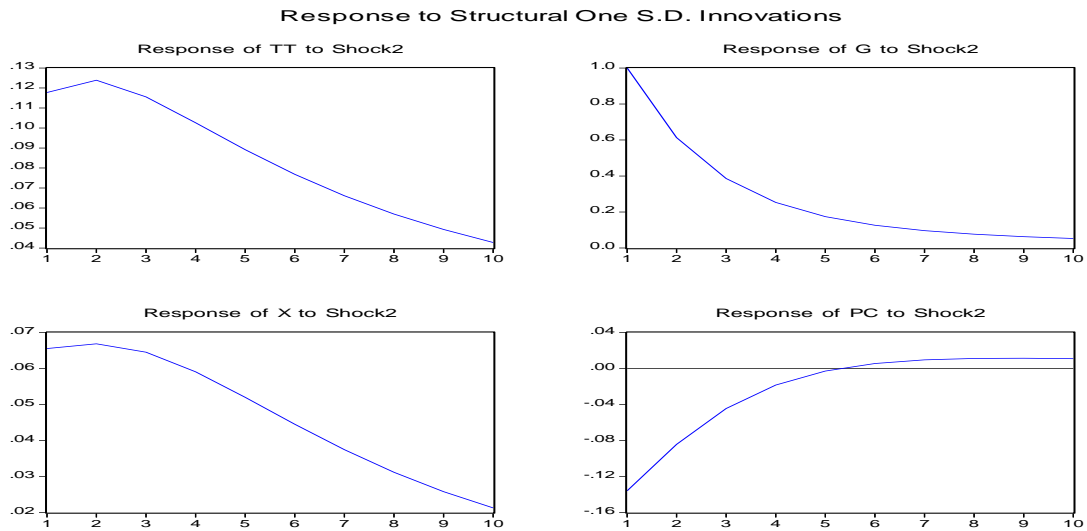
Whereas in second panel depicting the effects of government expenditure shocks estimated under the second sub-case where government expenditures are ordered first, i.e. they do not correspond to taxes contemporaneously and as before under the DT scheme of estimation, it is clearly a case of neoclassical school of thought prediction (Baxter and King, 1993). Private consumption falls upon impact in the first year, however showing resilience starts to improve,

but takes 6 years to come back to a zero impact and thereafter remains close to zero. This is quite in contradiction to the impact on the aggregate economic activity in the same period.

**Figure 6.1. Private Consumption Impulse Response to Fiscal Shock**  
*Impact of a Tax Shock (Sub-Case 1;  $\beta_{tg} = 0$  ( Taking  $a_2 = 0$  to estimate  $b_2$ ), i.e. Taxes are ordered first)*



*Impact of a Government Expenditure Shock (Sub-Case 2;  $\beta_{gt} = 0$  ( Taking  $b_2 = 0$  to estimate  $a_2$ ), i.e. Government Expenditures are ordered first)*



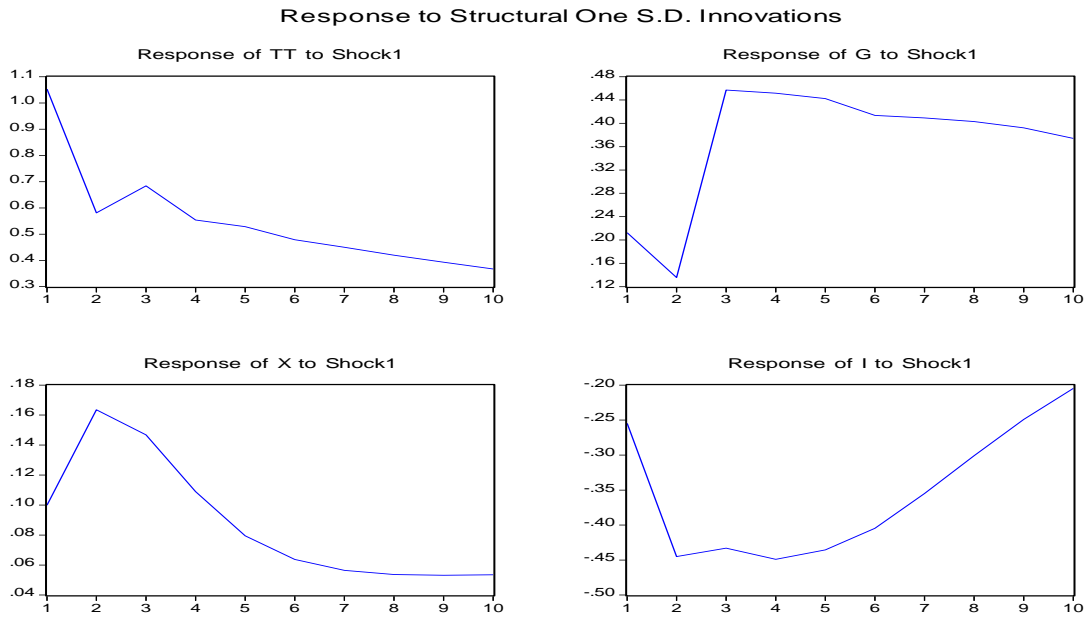
Note: Here Shock 1 and Shock 2 means shock to Real Per Capita Total Taxes and Government Expenditure variable simultaneously. Here TT refers to Real Per capita Total Taxes, G refers to Real Per Capita Government Expenditures, X refers to GDP in Real Per Capita and PC stands for Real Per Capita Private Consumption expenditures. Here all variables are in Natural Logs.

## 6.2. Private Investment

The figure 6.2 represents the impact of fiscal shocks to variables in the form of impulse response. This time we have added the sub component private investment and the rest of the estimation procedure is the same.

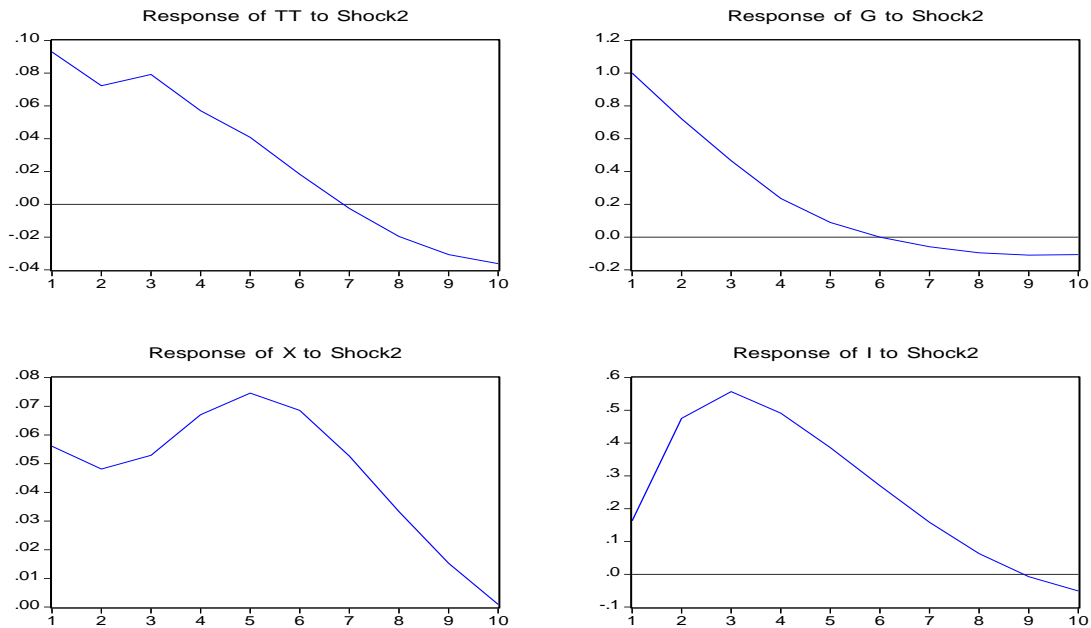
### Figure 6.2. Private Investment Impulse Response to Fiscal Shock

*Impact of a Tax Shock (Sub-Case 1;  $\beta_{tg} = 0$  ( Taking  $a_2 = 0$  to estimate  $b_2$ ), i.e. Taxes are ordered first)*



*Impact of a Government Expenditure Shock (Sub-Case 2;  $\beta_{gt} = 0$  ( Taking  $b_2 = 0$  to estimate  $a_2$ ), i.e. Government Expenditures are ordered first)*

### Response to Structural One S.D. Innovations



Note: Here Shock 1 and Shock 2 means shock to Real Per Capita Total Taxes and Government Expenditure variable simultaneously. Here TT refers to Real Per capita Total Taxes, G refers to Real Per Capita Government Expenditures, X refers to GDP in Real Per Capita and I stands for Real Per Capita Private Investment expenditures. Here all variables are in Natural Logs.

Now in the first panel impact of a tax shock is depicted. As stated earlier that for private investment both the main stream economic schools of thought predict the same sign although with different back ground assumptions, which shadows the clarity of results a bit. However here the case is as per standard theory, with a tax shock the private investment falls, and keeps falling till the 2<sup>nd</sup> period, where it stays for another two years and then start picking up. As per the neoclassical school of thought requirement, the tax shock seems quite persistent and does not die out quickly, hence the private investment is never positive in our ten year impulse response analysis.

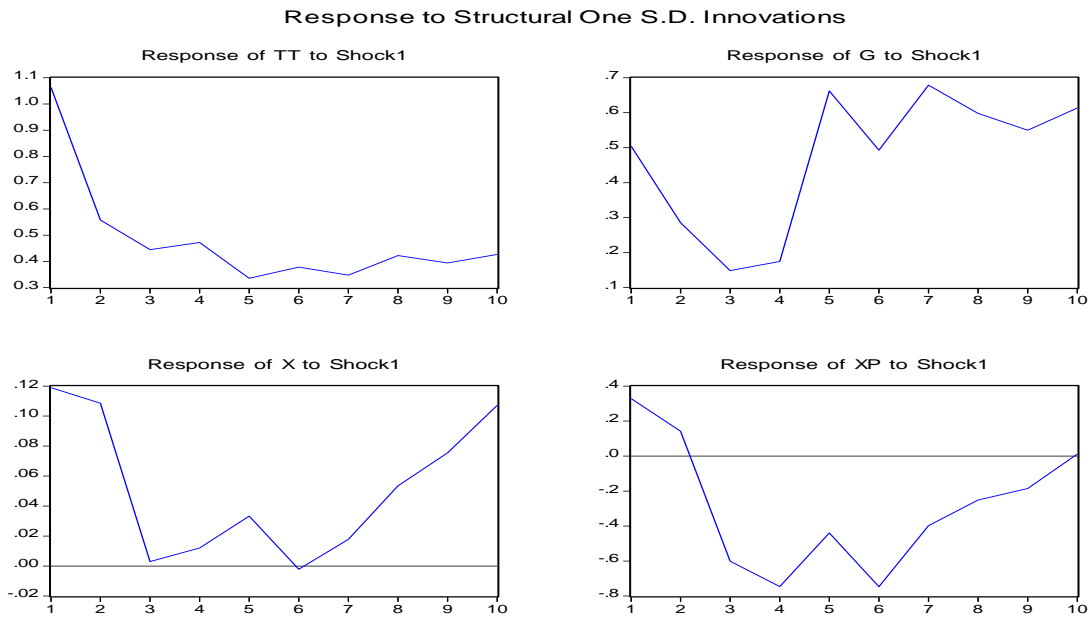
Again in the second panel the same results in terms of direction but with different persistence and magnitudes appears. With a fiscal shock now coming from the expenditure side we see the private investment being supplemented instead of being crowded out. A typical

developing economy phenomenon where private investments are more feasible if there are complementing government expenditures. Private investment variable shows a positive impact at the beginning which gradually increases up to the third year, after which it starts to fall gradually only to turn negative in the last year. This could also be due to the accelerator effects coming from increased GDP in the same periods.

### 6.3. Exports and Imports

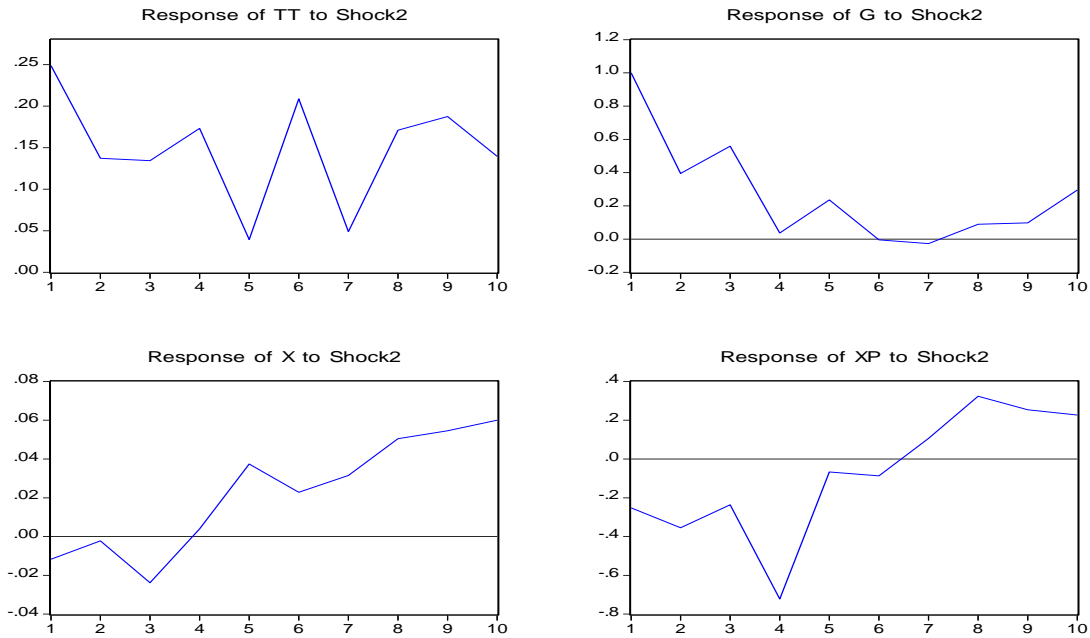
Finally we have done analysis for external sector i.e. exports and imports separately instead of net exports as the dynamics of fiscal instrument's impact is different in the aggregate case as compared to a disaggregate one.

**Figure 6.3. Total Exports Impulse Response to Fiscal Shock**  
*Impact of a Tax Shock (Sub-Case 1;  $\beta_{tg} = 0$  ( Taking  $a_2 = 0$  to estimate  $b_2$ ), i.e. Taxes are ordered first)*



*Impact of a Government Expenditure Shock (Sub-Case 2;  $\beta_{gt} = 0$  ( Taking  $b_2 = 0$  to estimate  $a_2$ ), i.e. Government Expenditures are ordered first)*

### Response to Structural One S.D. Innovations



Note: Here Shock 1 and Shock 2 means shock to Real Per Capita Total Taxes and Government Expenditure variable simultaneously. Here TT refers to Real Per capita Total Taxes, G refers to Real Per Capita Government Expenditures, X refers to GDP in Real Per Capita and XP stands for Real Per Capita Total Exports. Here all variables are in Natural Logs.

The figure 6.3 provides the impulses of a tax shock and a government expenditure shock; here our focus is on explaining the impact on total exports. In the first panel we have plotted the tax impacts. With increased taxes the exports increase in the first period, this may be due to the simultaneous increase in economic activity, after which the exports fall up to the sixth year of impact. From where it starts to recover and gets back to a zero impact in the tenth year of impact. What is interesting here is the shape and direction of impulse responses of economic activity and that of the total exports are almost the same. Hence the taxes may be affecting exports not directly but through the economic activity decline as well.

In the second panel impact of government expenditures are shown, here also the same results have occurred. At the an initial impact, exports initially fall, but starts to recover from the second year and crosses the zero line in the sixth period after which the impact is positive and

increasing. Again interestingly the impulse of exports follows the direction and impulse of the economic activity, but with a lag, i.e. the shape is of the impulse for exports are the same as of the economic activity with one period lag. Here the case of government expenditures crowding out exports is dubious.

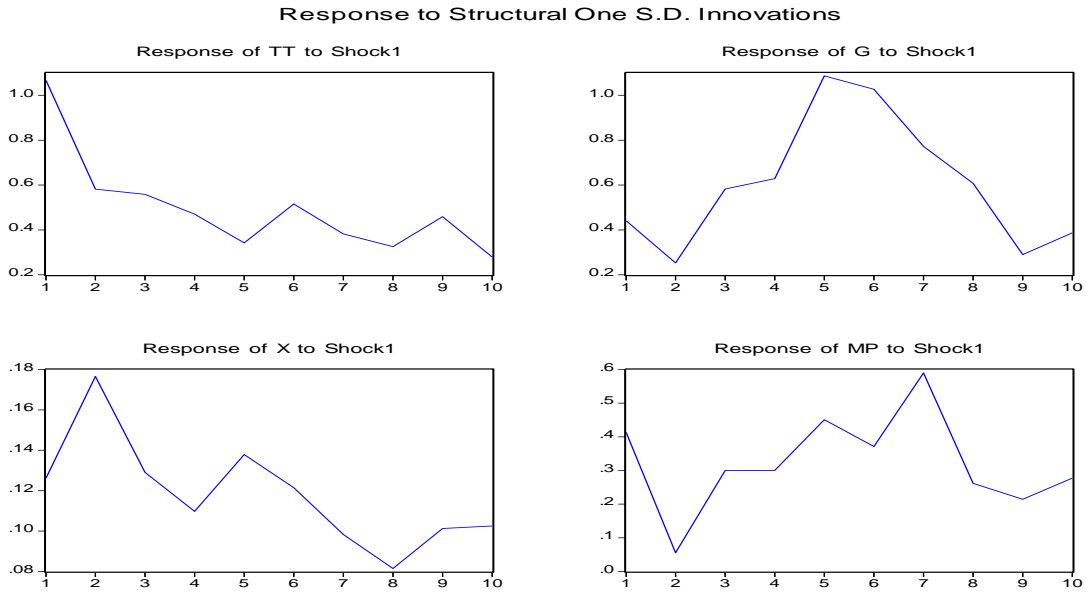
On the other hand opposite effects are observed for impulses of total imports. For the first case of a tax shock we see that the imports increase and stay positive for the decade of our analysis. The main reason for this is apparent that the twin deficit phenomenon seems to hold for Pakistan. With increased revenues, as narrated earlier, the government expenditures increase and present a ratchet up effect, which in turn leads to increased imports.

The same is verified if we look at the second panel where the impact of a government expenditure shock is observed to be positive on imports and it decays with the gradual decrease in the government expenditure impulse variable and turns negative as the government expenditures impulse turns negative. Hence there seems to be a strong correlation in the imports and government expenditures which may lead to validity of twin deficits case for Pakistan.

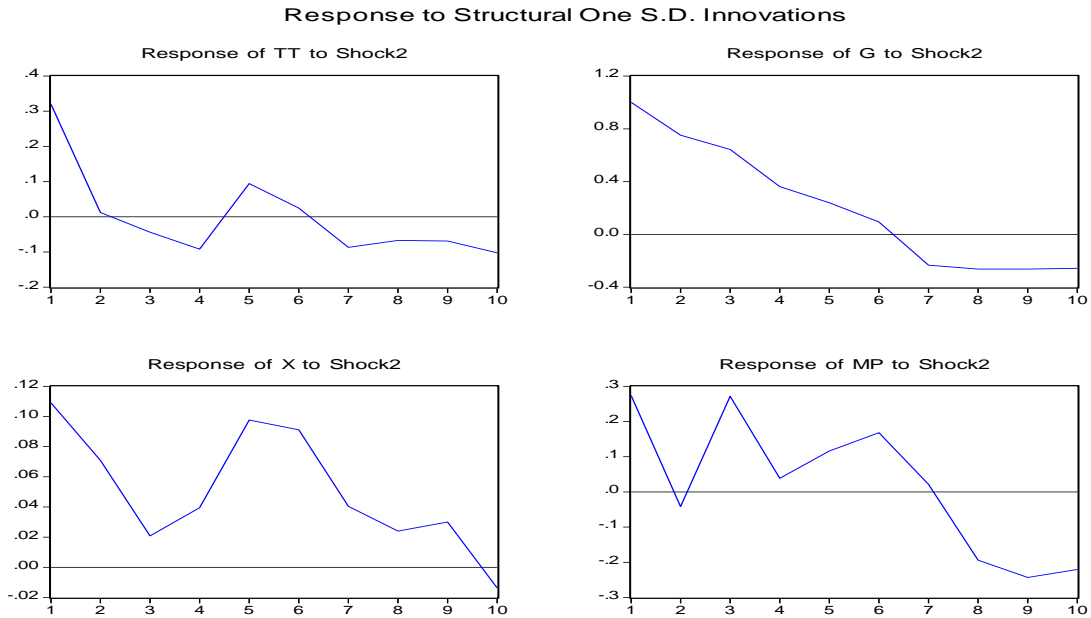


**Figure 6.4. Total Imports Impulse Response to Fiscal Shock**

*Impact of a Tax Shock (Sub-Case 1;  $\beta_{tg} = 0$  ( Taking  $a_2 = 0$  to estimate  $b_2$ ), i.e. Taxes are ordered first)*



*Impact of a Government Expenditure Shock (Sub-Case 2;  $\beta_{gt} = 0$  ( Taking  $b_2 = 0$  to estimate  $a_2$ ), i.e. Government Expenditures are ordered first)*



Note: Here Shock 1 and Shock 2 means shock to Real Per Capita Total Taxes and Government Expenditure variable simultaneously. Here TT refers to Real Per capita Total Taxes, G refers to Real Per Capita Government Expenditures, X refers to GDP in Real Per Capita and MP stands for Real Per Capita Total Imports. Here all variables are in Natural Logs.

Summarizing the results it was observed that private consumption is crowded out with increased government expenditures. This is also comparable with findings of Javed and Umaima (2010), Furceri and Annabelle (2010), Cogan et al. (2009) and opposite with Hemming et al. (2002), Blanchard and Roberto (2002), Perotti Roberto (1998) and Mountford and Harald (2009). Further private investment is crowded in with government expenditures a case consistent with the Keynesian school of thought and negatively affected with taxes. This is comparable with Furceri and Annabelle (2010), Cogan et al. (2009), Mountford and Harald (2009), Blanchard and Roberto (2002) and opposite for Hemming et al. (2002) and Haq Tariq A. (2003) where they found it to be insignificant.

#### **6.4 Conclusion**

In this chapter fiscal policy effectiveness for the components of GDP was evaluated. It was observed that private consumption is crowded out with increased government expenditures, a result consistent with the neoclassical school of thought, whereas it increases with increase in taxes. This is also comparable with findings of other authors. One of the reasons that private consumption responds like this is that it is the single largest tax base of indirect tax-GST. As taxes in Pakistan have very low elasticity and seems to be well below the threshold level of optimal taxes this seems plausible. Further government expenditures present a ratchet up effect due to increased revenue resulting in a distorted picture. Similarly private investment is crowded in with government expenditures a case consistent with the Keynesian school of thought and negatively affected with taxes. A fiscal shock now coming from the expenditure side supplemented the private investment instead of crowding it out. A typical developing economy phenomenon where private investment decision are more feasible if there are complementing government expenditures. This result is also consistent with other findings. Finally for the

external sector, firstly for exports; these decline with increased government expenditures while for imports; these increase with increased level of government expenditures thus suggesting the theoretical case of twin deficit phenomenon to hold for Pakistan.

## **Chapter 7**

### **Conclusion and Policy Implication**

Fiscal policy as a subject of interest and development for both academicians and policy makers evolved since the understanding of macroeconomics started to take place. In today's time it is the single most used fundamental policy tool out of other options which are used by the policy makers to achieve the desired goals. In the short run it can be used to counter output cyclical and/or stabilize volatility in macro variables, whereas in the long run fiscal policy can also affect both the demand and supply side of the economy. But in most traditional analyses it is assumed that fiscal policy requires to be adjusted to ensure the inter-temporal budget constraint is satisfied, whereas in comparison the monetary policy is free to adjust its instruments without constraints such as stock of money supply or the nominal interest rate.

Interestingly, despite the fact that there is a renewed emphasis on the fiscal policy as a staunch instrument for managing the demand side of Economy there is little empirical knowledge about the systematic effects of different fiscal policy instruments. In order to gauge the effects of shocks in fiscal policy or its responsiveness to various macro variables (i.e. the automatic stabilizers property of fiscal instruments) one has to see the stance by composition of budget from both the share of components and their classifications. The issue which remains potential is the evaluation of fiscal policy effectiveness. As fiscal Policy is considered to have dynamic transmission mechanism, because it carries longer policy lags for different macro variables and it can affect the economy dynamically with different theoretical assumptions about the structure of the economy differently. It can have direct or indirect effects on levels and growth rates of demand side and supply side variables such as output, prices, exchange rate, interest rate, balance of payment, debt, consumption, investment, labor supply and its (fiscal policy) own future variables.

Therefore in the context of developing economies, such as Pakistan, it becomes crucial to ascertain the fiscal policy effectiveness as active fiscal policy or a non-Ricardian policy is practiced and large seigniorage revenues exist. In this context we have identified the fiscal policy effectiveness towards impacting the aggregate economic activity and its components using the data from 1960-2010. However sensitivity analysis of the above is not carried out by considering different fiscal policy and monetary policy instruments while taking combinations of active/passive fiscal policy and passive/active monetary policy roles. Further optimal fiscal rules for stabilization and growth objectives for Pakistan can be simulated on the basis of the transmission mechanism through some future research also.

In Pakistan's case it is evident that fiscal policy has been playing a major role in providing policy options for the government through out her history of economic management. There seems to be regime switching among the components, across fiscal instruments and across level of the governments. For that we have estimated elasticities of fiscal indicators at disaggregated level on revenue side for both the federal and provincial governments.

We then employed the novel procedure developed by Blanchard and Roberto (2002) in using the institutional information such as the elasticity of different fiscal instruments e.g. taxes and the decision to identify the transmission channel for fiscal policy instruments affecting the aggregate and the disaggregated economy for Pakistan. By using the SVAR methodology it was observed that government expenditures at the aggregate level affect the economy in line with the theory, i.e. it affects the economic activity positively, whereas the tax variable shock affects economic activity opposite to the theory. This may be due to the fact that the tax elasticities are very low and government expenditures also behave in a ratchet up manner, as also pointed out by Khalid *et al.*(2007) while estimating fiscal reaction function for Pakistan. Hence when revenues

increase the government expenditures also increase instead of paying off the debt, which may lead to a positive impact on the economic activity.

Further we estimated separately, the fiscal policy effectiveness for fiscal policy instrument sub-components i.e. defense and interest payment expenditures. In our analysis it turns out that defense expenditures have positive impact on economic growth while interest payments negatively affects it which is comparable to a number of studies (please see chapter five for detailed results). Similarly disaggregated analysis for the revenue variable by splitting the tax revenues in the broad categories of direct taxes and indirect taxes were also made. From that analysis it appears that direct taxes affect economic activity negatively while indirect taxes ambiguously affect economic activity positively.

Finally the fiscal policy effectiveness for the components of GDP was estimated. It was observed that private consumption is crowded out with increased government expenditures, a result consistent with the neoclassical school of thought, whereas it increases with an increase in taxes. Similarly private investment is crowded in with government expenditures a case now consistent with the Keynesian school of thought and negatively affected with taxes. For the external sector, firstly for exports; these decline with increased government expenditures while for imports; these increase with increased level of government expenditures thus suggesting the theoretical case of twin deficit phenomenon to hold for Pakistan.

### **Policy Conclusion**

- Government expenditures as a policy instrument appear to be more effective as compared to taxes. Three possible reasons for such an outcome appears; low tax base, less elastic taxes and ratchet up effect on government expenditures. Hence there is a need to reform our taxation system.

- Private investment is supplemented with government expenditures, hence increase in development is inevitable for increasing the pace of economic growth.
- Finally aggregate indicators of policy intervention variables; here the Fiscal policy, such as budget deficit and the outcome variable, here the economic activity (such as the GDP) may give a picture which is different from what is happening at the disaggregate level for both the intervention and outcome variables. Hence fiscal policy conduct may incorporate the disaggregated level of instrumentation and outcome variables should also be seen in component wise effects.

### **Future Areas of Research**

- The Political Economy of Fiscal Policy seems (not modeled here, but needs to be evaluated by some future study) to be more significant as compared to the economic rationale of policy actions, implying that institutions such as Fiscal Responsibility and Debt Limitation Law (FRDLL-2005) needs to be studied and strengthened.
- Transparency of objectives for Fiscal policy conduct is required; implying a study of identification and ex-post evaluation of policy goals/outcomes both for the shortrun and the longrun.
- Optimal fiscal rules for stabilization and growth objectives for Pakistan can be simulated on the basis of the transmission mechanism examined here, through some future research.

## References

- Abbass Ahsan and Vaqar Ahmed (2008), "Development Paradox in Pakistan", Paper prepared for National Conference on "Towards Resolving Economic Challenges Faced by Pakistan", June.
- Afonso Antonio and Peter Caley (2008), "The Dynamic Behavior of Budget Components and Outputs", *Economic Modeling*, Vol 25, pp: 93-117.
- Ahmad I. and A. Qayyum (2008), "Effect of Government Spending and Macro-Economic Uncertainty on Private Investment in Services Sector: Evidence from Pakistan", *European Journal of Economics, Finance and Administrative Sciences*, ISSN 1450-2275 Issue 11.
- Ahmad Mushtaq (1998), "Fiscal Adjustment: Trade-offs of Macro-economic Goals and Recent Policy Reforms in Pakistan", *The Pakistan Development Review*, Vol. 4, No. 37, pp: 1123-1142
- Ahmed Viqar and Rashid Amjad (1984), *The Management of Pakistan's Economy 1947-82*, UGC Monograph Series in Economics, Oxford University Press, Karachi.
- Alesina A., Ardagna S., Perotti R. and Schiantarelli, F. (2002), "Fiscal Policy, Profits and Investment", *American Economic Review*, Vol. 92, No. 3, pp. 571-589.
- Alesina Alberto (1997), "The Political Economy of Growth", paper prepared for the Annual World Bank Conference on Development Economics, April 30 and May 2, Washington, World Bank.
- Alesina Alberto and Perotti Roberto (1995), "The Political Economy of Budget Deficits", Staff Papers- International Monetary Fund, Vol. 42, No. 1, March, pp: 1-31.



- Alesina Alberto, Silvia Ardagna, Roberto Perotti and Fabio Schiantarelli (2002), “Fiscal Policy, Profits, and Investment”, *American Economic Review*, American Economic Association, vol. 92, No. 3, pp: 571-589, June.
- Ali Shahid and Naved Ahmad (2010), “The Effects of Fiscal Policy on Economic Growth: Empirical Evidences Based on Time-series Data from Pakistan”, *The Pakistan Development Review*, Vol. 49, No. 4, Part II, Winter
- Ansari M.I. (1996), “Monetary versus Fiscal Policy: Some Evidence from Vector Autoregression for India”, *Journal of Asian Economics*, Vol.7, No. 4, PP: 677-698.
- Antonio Fatás (1998), “Does EMU need a fiscal federation?”, *Economic Policy*, CEPR & CES & MSH, Vol. 13, No. 26, pp. 163-203.
- Applied Economics Research Centre (AERC), *Resource Mobilization by Federal Government in Pakistan*, Research Report No.91, 1992, pp.67.
- Aqeel Anjum and Nishat Mohammed (2000), “The Twin Deficits Phenomenon: Evidence from Pakistan”, *The Pakistan Development Review*, Vol. 39, No. 4, pp. 535-550.
- Asdrubali Pierfederico, Sorensen Bent E and Yosha Oved (1996), “Channels of Interstate Risk Sharing: United States 1963-1990”, *The Quarterly Journal of Economics*, MIT Press, vol. 111, No. 4, pp: 1081-1110, November.
- Balassa, Bela (1988), “Public Finance and Economic Growth”, Policy, Planning and Research Department, Working Papers, Vol. 1, No. WPS31.
- Barro R. and Sala I Martin X. (1995), “Technological Diffusion, Convergence, and Growth”, *Journal of Economic Growth*, Vol. 2, pp. 1-27.
- Barro Robert J. (1974), “Are Government Bonds Net Wealth”, *The Journal of Political Economy*, Vol. 82, No. 6. Nov. – Dec., pp. 1095-1117.

- Barro Robert J. (1981), “Output Effects of Government Purchases”, *Journal of Political Economy*, University of Chicago Press, vol. 89, No. 6, pp: 1086-1121, December.
- Barro Robert J. (1989), “The Ricardian Approach to Budget Deficits”, *Journal of Economic Perspectives*, Vol. 3, No. 2, Spring, pp. 37-54.
- Barro Robert J. (1990), “Government Spending in a Simple Model of Endogenous Growth”, *Journal of Political Economy*, Vol.98, No 5.
- Barry, Frank & Devereux, Michael B (1995), “The ‘Expansionary Fiscal Contraction’ Hypothesis: A Neo-Keynesian Analysis”, *Oxford Economic Papers*, Oxford University Press, Vol. 47, No. 2, pp. 249-64.
- Baxter M. and King R. (1993), “Fiscal Policy in General Equilibrium”, *American Economic Review*, Vol. 83, No. 3, pp: 315-334.
- Beetsma, R., Giuliodori, M., Klaassen, F. (2006), “Trade spill-overs of fiscal policy in the European union: A panel analysis”, *Economic Policy*, No. 21, pp. 640–687.
- Bernanke Ben and Frederic Mishkin (1992), “Central Bank Behavior and the Strategy of Monetary Policy: Observations from Six Industrialized Countries”, Published in *NBER Macroeconomics Annual*, Vol. 7. pp. 183-238.
- Bernanke Ben S. (1986), “Alternative explanations of the money-income correlation”, *Carnegie-Rochester Conference Series on Public Policy*, Elsevier, Vol. 25, No. 1, pp. 49-99, January.
- Bernanke, Ben S and Ilian Mihov, (1998), “Measuring Monetary Policy”. *The Quarterly Journal of Economics*. Vol 113, No. 3: 869-902.

- Bertola Giuseppe and Allan Drazen (1993), “Trigger Points and Budget Cuts: Explaining the Effects of Fiscal Austerity”, *American Economic Review*, American Economic Association, vol. 83, No. 1, pp: 11-26, March.
- Bilquees Faiz (2004), “Elasticity and Buoyancy of the Tax System in Pakistan”, *The Pakistan Development Review*, Vol. 43, No. 1, pp. 73–93, Spring.
- Blanchard Oliver and Roberto Perotti (2002), “An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output”, *The Quarterly Journal of Economics*, November, pp: 1329-1368.
- Bodmer Frank and Alain Geier (2004), “Estimates for the Structural Deficit in Switzerland, 2002 to 2007”, *OECD Journal on Budgeting*, Vol. 4, No. 2, pp. 1608-7143.
- Bose N., Haque M., and Osborn D. (2003), “Public Expenditure And Economic Growth: A Disaggregated Analysis for Developing Countries”, Centre for Growth and Business Cycle Research Discussion Paper Series (University of Manchester), No. 30.
- Boskin Michael J. (1988), “Consumption, Saving and Fiscal Policy”, *The American Economic Review*, Vol 78, No.2, pp. 401-407, May.
- Braun Miguel (2001), “Why is Fiscal Policy Procyclical in Developing Countries?,” in *Three Essays on Economic Policy in Developing Countries*, PhD Dissertation, Harvard University Economics Department.
- Brian Henry (2004) “Fiscal Policy in the UK”, *Economic Outlook*, April.
- Bukhari S. Adnan H. A. S. and Safdar Ullah Khan (2008), “Estimating Output Gap for Pakistan Economy: Structural and Statistical Approaches”, *SBP Working Paper Series*, No. 24, June.

- Burney Nadeem A. and Akhter N. (1992), "Government Budget Deficits and Exchange Rate Determination: Evidence from Pakistan", *The Pakistan Development Review*, Vol. 31, No. 4, pp. 871-882.
- Burney Nadeem A. and Attiya Yasmeen (1989), "Government Budget Deficits and Interest Rates: An Empirical Analysis for Pakistan", *The Pakistan Development Review*, Vol. 28, No. 4, pp. 971-980.
- Burnside C., Eichenbaum M. and Fisher J.D.M. (1999), "Assessing the Effects of Fiscal Shocks", Northwestern University, Mimeo.
- Calvo Guillermo (1983), "Staggered Prices and in a Utility-Maximizing Framework", *Journal of Monetary Economics*, Vol. 12, No. 3, pp. 383-98
- Campbell John and Gregory Mankiw (1989), "Permanent Income, Current Income, and Consumption", *Journal of Business and Economic Statistics*, No. 31, pp. 265-79, July.
- Campbell, John and Gregory Mankiw (1990), "Consumption, Income, and Interest Rates: Reinterpreting the Time-series Evidence", in Olivier Blanchard and Stanley Fischer, eds., *NBER Macroeconomics Annual 1990*, Cambridge, MA: MIT Press, pp. 186-216.
- Canzoneri M., Cumby R. and Diba B. (2002), "Should the European Central Bank and the Federal Reserve be Concerned about Fiscal Policy", Paper prepared for the FRBKC's Jackson Hole Symposium on Rethinking Stabilization Policy, August.
- Carl E. Walsh (2003), *Monetary Theory and Policy*, 2nd Edition, MIT Press Books, The MIT Press, volume 1, number 0262232316.
- Castro Vitor (2003), "The Impact of Conflicts of Interest on Inflation Stabilization", NIPE Working Papers 8/2003, NIPE - Universidade do Minho

- Christiano Lawrence J., Martin Eichenbaum and Charles L. Evans (1999), “Monetary Policy Shocks: What Have We Learned and to What End?”, in: Taylor, John B. and Michael Woodford, eds.: *Handbook of Macroeconomics Volume 1A*. Handbooks in Economics, vol. 15. Amsterdam; New York and Oxford: Elsevier Science, North Holland, 65-148.
- Christiano, Lawrence J., Martin S. Eichenbaum, and Charles L. Evans, (2001) “Nominal Rigidities and the Dynamic Effects of a Shock to Monetary Policy”, NBER Working Paper no. 8403, July.
- Christopher A. Sims (1986), “Are forecasting models usable for policy analysis?”, *Quarterly Review*, Federal Reserve Bank of Minneapolis, Issue Win, pp. 2-16.
- Clarida Richard, Galí Jordi and Gertler Mark (1999), “The Science of Monetary Policy: A New Keynesian Perspective” CEPR Discussion Papers 2139, C.E.P.R. Discussion Papers.
- Claus I., A. Gill, B. Lee, and N. McLellan (2006), “An Empirical Investigation of Fiscal Policy in New Zealand”, New Zealand Treasury Working Paper, No. 06/08.
- Cogan John F., Tobias Cwik, John B. Taylor and Volker Wieland (2009), “New Keynesian Versus Old Keynesian Government Spending Multipliers”, NBER Working Paper No 14782, March.
- Cohen Darrel and Glenn Follette (2000), “The Automatic Fiscal Stabilizers: Quietly Doing Their Thing”, FRBNY Economic Policy Review, April.
- Corsetti, G., Muiler, G.J. (2006), “Twin deficits: Squaring theory, evidence and common sense”, *Economic Policy*, No. 21, pp. 598–638.
- Corsetti, Giancarlo, A.Meier and G.Muiler (2009), “Fiscal Stimulus with Spending Reversals”, IMF Working Paper, WP/09/106.

- Davide Furceri & Annabelle Mourougane (2010), “The Effects of Fiscal Policy on Output: A DSGE Analysis”, OECD Economics Department Working Papers, No. 770, OECD Publishing.
- De Castro Francisco and Pablo Hernandez de Cos (2007), “The Economic Effects of Fiscal Policy: The Case of Spain”, *Journal of Macroeconomics*, Doi: 10.1016/j.jmacro.2007.08.009
- Devereux, Michael B & Love, David R F (1995), “ The Dynamic Effects of Government Spending Policies in a Two-Sector Endogenous Growth Model”, *Journal of Money, Credit and Banking*, Blackwell Publishing, Vol. 27, No. 1, pp. 232-56, February.
- Drazen Allan (2001), “The Political Business Cycle After 25 Years”, NBER Chapters, in: NBER Macroeconomics Annual 2000, Vol. 15, pp. 75-138, National Bureau of Economic Research, Inc.
- Dullien Sebastian (2005), “Measuring China's Fiscal Policy Stance”, *Macroeconomics*, 0502032, EconWPA.
- Edelberg, W., M.Eichenbaum and J. Fisher (1999), “Understanding the Effects of Shocks to Government Purchases”, *Review of Economic Dynamics*, Vol. II, pp. 166-206.
- Emanuele Millemaci, Giamboni Luigi and Waldmann Robert (2007), “Evaluating how Predictable Errors in Expected Income Affect Consumption”, MPRA Paper 12939, University Library of Munich, Germany.
- Enders Walter, *Applied Econometric Time-series*, 2<sup>nd</sup> edition, 2004, New York: Willey.
- European Commission (2003), *Public finances in EMU*, European Economy, Reports and Studies No. 3.

- Fatás Antonio and Ilian Mihov (2001), “The Effects of Fiscal Policy on Consumption and Employment: Theory and Evidence”, CEPR Discussion Papers 2760, C.E.P.R. Discussion Papers.
- Fatima Mahnaz and Qazi Masood Ahmed (2001), “ Political Economy of Fiscal Reforms in the 1990s”, *The Pakistan Development Review*, Vol. 40, No. 4, pp. 503–518, Part II, Winter.
- Fischer Stanley and Easterly William (1990), “The Economics of the Government Budget Constraint”, *The World Bank Research Observer*, Vol.5, No. 2. July, pp: 127-142.
- Fleming J. Marcus (1962), “Domestic financial policies under fixed and floating exchange rates”, *IMF Staff Papers* 9: 369–379. Reprinted in Cooper, Richard N., ed (1969). *International Finance*. New York: Penguin Books.
- Furceri Davide and Annabelle Mourougane (2010), “The effects of fiscal policy on output and debt sustainability in the EURO area: A DSGE analysis”, Economics Department Working paper No. 770, Organisation for Economic Co-operation and Development.
- Gali J., Lopez-Salido D. and Valles J. (2005), “Understanding the Effects of Government Spending on Consumption”, NBER, Working Paper, No. 11578.
- Ganelli Giovanni (2000), “Useful Government Spending, Direct Crowding-out and Fiscal Policy Interdependence”, University of Warwick, January.
- Gavin Michael and Roberto Perotti (1997), “Fiscal Policy in Latin America”, NBER Chapters, in: *NBER Macroeconomics Annual* 1997, Vol. 12, pp: 11-72 National Bureau of Economic Research, Inc.
- Ghosh Sugata and Iannis A. Mourmouras (2004), “Debt, Growth and Budgetary Regimes”, *Bulletin of Economic Research*, Vol. 56, No. 3, PP: 241-250

- Giannoni, M.P. and Woodford, M. (2003), “Optimal Inflation Targeting Rules”. NBER Working Paper No, 9939.
- Giavazzi, F., Pagano, M. (1990), “Can severe fiscal contractions be expansionary? Tales of two small European countries”, NBER Macroeconomics Annual, Vol. 5, pp. 75–111.
- Giorno Claude, Pete Richardson, Deborah Roseveare and Paul van den Noord (1995), “Potential Output, Output Gaps and Structural Budget Balances,” OECD Economic Studies, Vol. 1, No. 24.
- Girouard Nathalie and Christophe André (2005), “Measuring Cyclically-Adjusted Budget Balances for OECD Countries”, OECD Working Paper Number 434.
- Giuliodori, M. and Beetsma, R. (2005), “ What are the trade spill-overs from fiscal shocks in Europe? An empirical analysis”, De Economist, No. 153, pp. 167–197.
- Goodfriend Marvin and and King Robert (1997), “The New Neoclassical Synthesis and the Role of Monetary Policy," NBER Chapters, in: NBER Macroeconomics Annual 1997, Vol. 12, pp. 231-296.
- Goyal Rajan, J.K. Khundrakpam, Partha Ray (2004), “Is India’s public finance unsustainable?; Or, are the claims exaggerated?”, Journal of Policy Modeling, No.26, pp. 401–420.
- Guajardo et al. (2011) “A New Action-based Dataset of Fiscal Consolidation” IMF working Paper WP/11/128.
- Gupta S., Clements B., Baldacci E. and Mulas-Granados C. (2005), “Fiscal Policy, Expenditure Composition and Growth in low-income Countries”, *Journal of International Money and Finance*, Vol. 24, pp. 441-463.



- Hairault Jean-Olivier and Portier Franck (1993), “Money, New-Keynesian Macroeconomics and the Business Cycle”, *European Economic Review*, Elsevier, vol. 37, No 8, pp.1533-1568, December.
- Hakro Ahmad Nawaz (2009), “Twin Deficits Causal Link-Evidence from Pakistan”, *International Research Journal of Finance and Economics*, No. 24.
- Haq Tariq A. (2003), “ Fiscal Strategy for Growth and Employment in Pakistan: an Alternative Consideration”, A Case Study Prepared within the Framework of ILO’s Global Employment Agenda, Employment paper No 2003/56.
- Haque Nadeem U. and Peter Montiel (1991), “The Macroeconomics of Public Sector Deficits: The Case of Pakistan”, *World Bank Working Papers*, No. WPS 673, May.
- Harvey, A.C. (1993), *Time-series Models*, The MIT Press, Cambridge, Massachusetts.
- Hayashi Fumio (1982), “The Permanent Income Hypothesis: Estimation and Testing by Instrumental Variables”, *Journal of Political Economy*, Vol. 90, pp. 895-916.
- Hemming Richard, Michael Kell and Selma Mahfouz (2002), “The Effectiveness of Fiscal Policy in Stimulating Economic Activity-A Review of the Literature”, *IMF Working Paper* No WP/02/208, December.
- Heppke-Heppke-Falk K. H., J. Tenhofen and G. B. Wolff (2006), “The Macroeconomic Effects of Exogenous Fiscal Policy Shocks in Germany: A Disaggregated SVAR Analysis”, *Deutsche Bundesbank. Discussion Paper* No. 41.
- Hoepfner F. (2003), “Business Cycle Effects of Fiscal Policy: Empirical Evidence from Germany”. dissertation. de.

- Hussain Akmal (2004), “ Institutions, Economic Structure and Poverty in Pakistan”, *South Asia Economic Journal*, Institute of Policy Studies, Sri Lanka ,Vol. 5, No. 1, January-June, Sage Publications.
- Hussain Ishrat (2004), “ Pakistan’s Economic Progress Since 2000: False Dawn or a Promising Start?”, paper presented at a seminar at the Paul H.Nitza School of Advanced and International Studies (SAIS), John Hopkins University, Washington, D.C. on October 6.
- Imran Ali and Adeel Malik (2009), “The Political Economy of Industrial Development in Pakistan: A Long-Term Perspective”, *Lahore Journal of Economics*, No.14: SE, pp: 29-50, September.
- Indraratna Yuthika (1991), “The Measurement of Tax Elasticity in Sri Lanka: A Time-series Approach”, World Bank.
- Iqbal Z. (1994), “Macroeconomic Effects of Adjustment Lending in Pakistan”, *The Pakistan Development Review*, Vol. 33, No.4, pp. 1011–1031.
- Iqbal Z. (1995), “Constraints to the Economic Growth of Pakistan: A Three-Gap Approach”, *The Pakistan Development Review*, Vol. 34, No. 4, pp. 1119–1133.
- Iqbal, Z. and G. M. Zahid (1998), “Macroeconomic Determinants of Economic Growth in Pakistan”, *The Pakistan Development Review*, Vol. 37, No. 2, pp. 125–148.
- Iris Claus & Aaron Gill & Boram Lee & Nathan McLellan (2006), “An empirical investigation of fiscal policy in New Zealand”, Treasury Working Paper Series, No. 06/08, New Zealand Treasury.
- Isabel Argimón & Francisco de Castro & Ángel Luis Gómez (2007), “A simulation of the effects of the personal income tax reform on the tax burden”, Banco de España Occasional Papers, Occasional Papers, No. 0702, Banco de España.

- Jafari S. A., M. Alizadeh, and K. Azizi (2006), “Longrun Relationship Between Budget Deficit and Macroeconomic Performance of the Iranian Economy: A Theoretical and Empirical Analysis”, *Quarterly-Journal of the Economic Research*, Vol.10, No. 4, pp. 25–46.
- Javid Attiya Y., Muhammad Javid and Umiamma Arif (2010), “Fiscal Policy and Current Account Dynamics in Case of Pakistan”, *The Pakistan Development Review*, Vol. 49, No.4.Winter.
- Javid Attiya, and Umaima Arif (2009), “Dynamic Effects of Changes in Government Spending in Pakistan’s Economy”, *The Pakistan Development Review*, Vol. 48, No.4, pp. 973–988.
- Junsoo Lee & Walter Enders (2004), “Testing for a unit-root with a nonlinear Fourier function”, *Econometric Society*, Far Eastern Meetings 457, Econometric Society.
- Kazimi Aqdas Ali (1992), “Ricardian Equivalence: Some Macro-econometric Tests for Pakistan”, *The Pakistan Development Review*, Vol. 31, No. 4, pp. 733-758.
- Kemal M. Ali (2007), “A Fresh Assessment of the Underground Economy and Tax Evasion in Pakistan: Causes, Consequences, and Linkages with the Formal Economy”, PIDE Working Papers, No. 13. Pakistan Institute of Development Economics, Islamabad.
- Khalid Mahmood (2002), “Underground economy and tax evasion in Pakistan: Causes, Consequences and linkages with Formal economy” Unpublished Mphil Thesis, Department of Economics, Quaid-i-Azam University, Islamabad.
- Khalid Mahmood (2010), “Taxation Structure in Pakistan; Tax Elasticity, Buoyancy, Tax Evasion and Tax Incidence analysis”, unpublished work in progress.
- Khalid Mahmood, Shahid Wasim M. and Sattar Abdul (2007), “Fiscal Reaction Function and Transmission Mechanism for Pakistan”, *The Pakistan Development Review*, Vol. 46, No. 4, pp. 435—447, Part II, Winter.

- Khilji Nasir M. and Akhtar Mahmood (1997), “ Military Expenditures and Economic Growth in Pakistan”, *The Pakistan Development Review*, Vol. 36, No. 4, pp. 791—808, Part II, Winter,
- Kneller R., Bleaney M. and Gemmell N. (1999), “Fiscal policy and growth: evidence from OECD countries”, *Journal of Public Economic*, Vol. 74, pp. 171-190.
- Lane Philip R. (2003), “The cyclical behaviour of fiscal policy: evidence from the OECD”, *Journal of Public Economics*, Elsevier, vol. 87, No. 12, pp: 2661-2675, December.
- Leeper E. M. (1991), “Equilibria under Active and Passive Monetary and Fiscal Policy”, *Journal of Monetary Economics*, Vol. 27, No. 1, February, pp: 129-147.
- Leeper Eric M. (1990), “The Dynamics of Interest Rate and Tax Rules in a Stochastic Model”, Board of Governors of the Federal Reserve System: International Finance Discussion Papers, No. 375, February.
- Linnemann Ludger and Andreas Schabert (2003), “Fiscal policy in the New Neoclassical Synthesis”, *Journal of Money, Credit and Banking*, Vol.35, No.6, Part 1, pp.911-929, December.
- Lippi, M. and Reichlin, L. (1994), “VAR analysis, non-fundamental representation, Blaschke matrices”, *Journal of Econometrics*, No. 63, pp. 307–325.
- MacKinnon J. G. (1996), “Numerical distribution functions for unit root and cointegration tests,” *Journal of Applied Econometrics*, Vol. 11, pp. 601–618.
- Malik W. Shahid (2007), “Money, Output and Inflation; Evidence from Pakistan”, *The Pakistan Development Review*, Vol. 45, No. 4.

- Malley Jim and Hassan Molana (1998), “Fiscal Policy and the Composition of Private Consumption: Some Evidence from the U.S. and Canada”, Working Paper No. 9804, Business School - Economics, University of Glasgow, March.
- Mansfield Charles Y. (1972), “Elasticity and buoyancy of a tax system: A method applied to Paraguay”, *International Monetary Fund Staff Papers*, Vol. 19, No. 2, pp. 425-46, July.
- Marcellino M. (2002), “Some Stylized Facts on Non-Systematic Fiscal Policy in the Euro Area”, CPER Working Paper series, No.3635.
- McCallum Bennett T. and Nelson Edward (1999), “An Optimizing IS-LM Specification for Monetary Policy and Business Cycle Analysis”, *Journal of Money, Credit and Banking*, Blackwell Publishing, vol. 31, No. 3, pp. 296-316, August.
- Mendoza E., Milesi-Ferretti G. and Asea P. (1997), “On the ineffectiveness of tax policy in altering longrun growth: Harberger's superneutrality conjecture”, *Journal of Public Economic*, Vol. 66, pp. 99-126.
- Mohsin Hasan M. (2004), “The Estimation of Elasticity and Buoyancy of Federal Taxes in Pakistan”, MSC unpublished thesis, MSc Financial and Industrial Economics, Royal Holloway University of London, July.
- Monetary Policy Statement, State Bank of Pakistan, 2008
- Mountford Andrew and Harald Uhlig (2009), “What are the effects of fiscal policy shocks?”, *Journal of Applied Econometrics*, Vol. 24, No. 6, pp. 960-992, September.
- Mundell Robert A. (1963), “Capital Mobility and Stabilization Policy Under Fixed And Flexible Exchange Rates”, *Canadian Journal of Economic and Political Science*, Vol. 29, No. 4, pp. 475–485. doi:10.2307/139336. Reprinted in Mundell, Robert A. (1968). *International Economics*. New York: Macmillan.

- Muscatelli V. Anton and Patrizio (2005), “Analyzing the Interaction of Monetary and Fiscal Policy: Does Fiscal Policy Play a Valuable Role in Stabilisation”, *CESifo Economic Studies*, Vol. 51, No.4, PP 549-585.
- Nahyun Abdul Sattar (2010), “Fiscal Theory of Price Level for Pakistan”, Unpublished PhD Thesis.
- Obstfeld M. and K. Rogoff (1995), “Exchange rate dynamics redux”, *Journal of Political Economy*, Vol. 103, No. 3, pp. 624-660.
- Obstfeld, M. and K. Rogoff (1996), *Foundations of International Macroeconomics*. Cambridge, MA and London: The MIT Press.
- Odedokun, M. (2001), “Public Finance and Economic Growth”, WIDER Discussion Paper, 72/2001.
- Pasha Hafiz (1995), “Political Economy of Tax Reforms: The Pakistan Experience”, *Pakistan Journal of Applied Economics*, Vol. II, Nos 1 and 2, pp: 143-4
- Pasha, Hafiz and M. Asif Iqbal (1994), “Taxation Reforms in Pakistan”, *Pakistan Journal of Applied Economics*, Vol. 10, Nos.1 and 2, pp. 50.
- Perotti, R. (1999), “Fiscal policy in goods times and bad”, *Quarterly Journal of Economics*, Vol. 114, No. 4, pp. 1399–1436.
- Perotti, R. (2001). What do we know about the effects of fiscal policy? In: Bordinon, M., da Empoli, D. (Eds.), *Politica Fiscale flessibilita` dei mercati e crescita*. Franco Angeli, Milano.
- Perotti, R. (2004), “Estimating the effects of fiscal policy in OECD countries”, In: *Proceedings, Federal Reserve Bank of San Francisco*.
- PIDE Monetary Policy View Point, 2008.

- Plessis Stan DU, Ben Smit and Federico Sturzenegger (2007), “ The Cyclicity of Monetary and Fiscal Policy in South Africa Since 1994”, CID Working Paper No. 163, Centre for International Development at Harvard University.
- Polito Vito and Mike Wickens (2007), “Measuring the Fiscal Stance”, Discussion Papers in Economics, No. 14, Department of Economics and Related Studies, University of York, Heslington, York, YO10 5DD.
- Prest Alan R., (1962), “The Sensitivity of the Yield of Personal Income tax in the United Kingdom”, *The Economic Journal*, Vol. 72, No. 287, pp.576-596.
- Ramey, V. and M. Shapiro (1997), “Costly Capital Reallocation and the Effects of Government Spending”, Carnegie-Rochester Conference Series on Public Policy.
- Rehman, F., and Zeshan, M. (2011), “Expansionary Fiscal Contraction: Evidence from Pakistan,” *Pakistan Journal of Social Sciences*, Vol. 28, pp. 80-92.
- Reinhart Carmen M., Rogoff Kenneth S. and Savastano, Miguel A. (2003), “Addicted to Dollars”, NBER Working Paper Series, No. w10015, October.
- Rezk K., M. C. Avramovich and M. Basso (2006), “Dynamic Effects of Fiscal Shocks upon Diverse Macroeconomic Variables: A Structural VAR Analysis for Argentina”, XLI Annual Reunion of the Argentine Association of Political Economy, National University of Salta.
- Roeger Werner and Jan in 't Veld (2009), “Fiscal policy with credit constrained households”, *European Economy - Economic Papers*, Vol. 357, Directorate General Economic and Monetary Affairs, European Commission.
- Romer David (2007), *Advanced Macroeconomics*, McGraw Hill Irwin, New York.

- Romero, D.A., D. and R. Strauch (2007), “Public Finances and Long Term Growth in Europe. Evidence from a Panel Data Analysis”, *European Journal of Political Economy*.
- Rosensweig Jeffrey and Ellis W. Tallman (1993), “Fiscal Policy and Trade Adjustment: Are the Deficits Really Twins?,” *Economic Inquiry*, Oxford University Press, vol. 31(4), pages 580-94, October.
- Rotember, J. and M. Woodford (1992), “Oligopolistic Pricing and Effects of Aggregate Demand on Economic Activity”, *Journal of Political Economy*, Vol. CX, pp. 1153-1207.
- Samudram, M., M. Nair, and S. Vaithilingam (2009) Keynes and Wagner on Government Expenditures and Economic Development: The Case of a Developing Economy. *Empirical Economics* 36, 697–712.
- Sargent Thomas J. (1982), “Beyond Demand and Supply Curves in Macroeconomics”, *American Economic Review*, American Economic Association, vol. 72, No. 2, pp: 382-89, May.
- Sargent, Thomas J. (1987), *Macroeconomic Theory*, Academic Press, 2nd Edition.
- Sen Pronab (2002), “A Note on Estimating Tax Elasticities”, Government of India Planning Commission Working Paper Series No. 6/2002-PC.
- Shabbir T. And A. Mahmood (1992), ”The Effects of Foreign Private Investment and Economic Growth in Pakistan”, *The Pakistan Development Review*, Vol. 31, No.4, pp.831-841.
- Sinha D. (1998), “Government Expenditure and Economic Growth in Malaysia”, *Journal of Economic Development*, vol. 23, No. 2.
- Social Policy and Development Centre, *Social Development in Pakistan: Annual Review 1999*, Oxford University Press, Karachi, 1999, pp: 58-59.



Stan du Plessis & Ben Smit & Federico Sturzenegger (2007), “The cyclicity of monetary and fiscal policy in South Africa since 1994”, Working Papers 12/2007, Stellenbosch University, Department of Economics.

Swedish Fiscal Policy “Report of the Swedish Fiscal Policy Council” 2010

Talvi Ernesto and Vegh Carlos A. (2000), “Tax Base Variability and Procyclical Fiscal Policy”, *NBER Working Papers* No 7499, National Bureau of Economic Research, Inc

Tanzi V. and Zee H. H. (1997), “Fiscal Policy and Longrun Growth”, *IMF Staff Papers*, Vol. 44, No. 2, pp. 179-209.

Tornell Aaron and Lane Philip (1999), “Are Windfalls a Curse? A Non-Representative Agent Model of the Current Account and Fiscal Policy”, *NBER Working Papers* No 4839, National Bureau of Economic Research, Inc.

Uhlig Harald (2005), “What are the Effects of Monetary Policy? Results from an Agnostic Identification Procedure”, *Journal of Monetary Economics*, Vol. 42, Issue 2, pp. 381-419, March.

Van den Noord, P. (2000), “The Size and Role of Automatic Fiscal Stabilizers in the 1990s and Beyond”, *OECD Economics Department Working Papers*, No. 230, OECD Publishing. doi: 10.1787/816628410134.

Woodford M. (2001), “Fiscal Requirements for Price Stability”, *Journal of Money, Credit and Banking*, Vol. 33, No. 3, pp. 669-728, August.

Yun Tack (1996), “Nominal Price Rigidity, Money Supply Endogeneity, and Business Cycles”, *Journal of Monetary Economics*, Vol. 37, No. 2, pp. 345 – 370

Zaidi S.Akbar (2005), *Issues in Pakistan’s Economy*, Oxford University Press, Karachi, Pakistan.