THE MAGNITUDE AND DIMENSION OF OUTPUT MULTIPLIERS IN PAKISTAN: A STRUCTURAL VAR ANALYSIS

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CERTIFICATE

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Dedicated to

To my beloved parents

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Abstract

Output multipliers are widely used for studying the fiscal policies in different countries. After the Financial Crisis of 2007-08, especially, plethora of research have been conducted on this topic. This study attempts to find the impact of fiscal variables (government spending and taxes) on the GDP of Pakistan. This study employs the time series data over the period 1977-2016 and uses the Structural Vector Autoregressive (SVAR) model using identification scheme of Blanchard and Perotti (2002). The study finds that impact multiplier of the government spending is 1.9 i.e. in excess to unity which is expected by the standard Keynesian-Kaleckian theory. Tax multiplier is approximately zero on impact, turn negative for 2nd and 3rd lags and then turn positive for 4th lag after which it vanishes to zero in the longer run. Study suggests in the light of the findings that government spending should be increased as it has a significant role in the economic growth process of Pakistan and that tax base should be widened to achieve a balanced budget in the Pakistan.

Key Words:

Fiscal Multipliers, Ricardian Equivalence, Keynesian, Monetarist, Structural VAR, Blanchard and Perotti, Fiscal Policy effectiveness

Chapter 1

Introduction

The global financial crisis, popularly known as The Great Recession of 2007-08 put a question mark on the validity of then dominantly prevailing views about fiscal policy of government spending and taxation that were influenced by the monetarist school of economic thought. But like the Great Depression of 1929, once again, solution proposed was in favor of government spending. In other words, it is the echo back of Keynesian economics (Auerbach and Gorodnichenko, 2010).

Fiscal multipliers are defined as the change in output in response to a change in fiscal policy instruments, i.e. government spending and/or taxes. This is the Keynesian concept which maintains that in times of slack and redundant growth, it is good for a government to increase spending to create demand and this one-time spending would then stimulate the economy according to marginal propensity to consume (MPC) (Ilzetzki, Ethan, Enrique G., & A., 2013).

The underlying intuition goes with assuming that this one-time spending would create a chain of spending where first spender will spend MPC times his income and will save the rest. The next recipient will receive the spending from previous spender which is now his income and now he will spend MPC times the received income. This process continues and spending of each spender becomes income for the next and so on until a lot of transactions are induced and economy ends up with increased demand and incomes (Samuelson & Nordhaus, 2009).

This whole process involving an increase in income of the economy in a quantity more than the initial spending by government is called the multiplier effect of the government spending. In situation discussed above, the size of "government spending

multiplier" is positive and greater than one. If in any case, it is less than unity, it means that the output has not increased by an amount more than government spending hence suggesting a sterile fiscal policy (Zezza, 2012), (Mitra & Poghosyan, 2015).

Another 'Keynesian' way of stimulating the economy is reduction in tax rates. Tax rates, if reduced, will leave the consumers with more disposable incomes and they can make more purchases than before and it leads to increase in overall economic activity, hence giving rise to the tax multiplier and vice versa if tax rate is increased. This yields a negative value for tax multiplier (Illzetzki, 2013).

In recent past, after the global financial debacle, monetary policies proved to be ineffective as realized in Japan where even loose monetary policy did not yield fruitful results in countering the deflation in Japan. So, governments had to step in to fill the demand gaps in their economy (GEHRINGER, 2015).

Current study has borrowed the incite from surveying the literature related to the financial crisis, especially policy papers of IMF and European Central Bank that bore the suggestions for governments in crisis to implement the austerity measures in their economies. European economies like Germany, Austria, Italy, Spain, Ireland and Greece, went into debt crisis and except Germany and Austria, all other countries followed the suggestion of austere fiscal policy involving reduced government spending and increased taxes to address the debt problem. Germany and Austria did not follow the austerity measures and surprisingly, out-performed the rest of the countries which had to survive the debt crisis for even longer time (Bilbao-Ubillos & Fernández-Sainz, 2014). In this study, transmission mechanism of fiscal policy tools would be studied with the help of SVAR model as it is helpful in determining the channel of impact of one variable on another through structural shocks to the system. It is used as a popular tool to study the transmission mechanism of variables in a simultaneous equation system (Gottschalk, 2001).

Another incite for the current study is the government intervention of USA through American Recovery and Reinvestment Act of 2009 presented before US Congress by Christina Romer and Jared Bernstein. Despite many objections by monetarists like Barro, Lucas and Cochrane, the federal government of USA under the Obama administration sanctioned the act and bailed out the financial firms in crisis. This act was quite fruitful as it reduced the job losses in subsequent quarters and lifted the negative quarterly GDP growth of -6.4 percent to -0.7 percent in first quarter of implementation and +2.2 percent in the second quarter, (3rd quarterly report on Economic Impacts of ARRA, 2010).

Pakistan's potential to realized GDP growth gap has been quite wide in recent years- intensifying the need for fiscal policy measures if they are fruitful (which is also the objective of this study i.e. to find the size of impact of fiscal policy on GDP). This study tries to estimate the impact of fiscal policy through so called 'fiscal multipliers' for Pakistan by using the system of inter-relating equations and using identification methods suggested by economic theory and the institutional information. Also, it is imperative to know that how long a change in fiscal instrument has impact on the output.

1.1: Government Spending and Private Investment

Year	G-Spending Growth	Pvt-Investment Growth
FY 2009	35.87	12.88
FY 2010	11.19	1.20
FY 2011	18.80	8.98
FY 2012	14.63	14.88
FY 2013	14.18	12.92
FY 2014	22.36	14.13
FY 2015	4.35	5.23

Data Source: Pakistan Economic Survey: *This table shows the growth rates of revised government and private investments.*

Additionally, the topic is further justified for work in Pakistan due to the realized crowding in effect of government spending. If we analyze the recent data of government

spending growth and private investment growth from 2008-2015 with annual frequency[1], we note that both move in the same direction contemporaneously and a decrease in government spending in year 2011-12 is followed by a decrease in P-investment in the very subsequent year. This above data gives a clear picture of how both are related. All the data points show the percentage change over each year. Most of the times, they are moving in the same direction contemporaneously and on one instance, in year 2011-12 when G-spending decreases, it leads to a decrease in Pvt. Investment in very next year. This implies a relationship which is opposite to the crowding out in which an increase in G leads to a decrease in private Investment.

In Pakistan, literature on the fiscal policy is available in various dimensions but as far as studying the fiscal multipliers is related, a few studies have tried on this topic. So, naturally there remains gap in the literature that the current study has tried to contribute to. In previous studies, fiscal multipliers have been calculated through marginal propensity to consume approach (MPC) and panel VAR models. The prior discussed method includes calculating the static fiscal multipliers for the series of years through the ratio of unity to the difference of unity and MPC as interpreted by standard textbooks of Economics under the Keynesian concepts. Some of the studies that have covered the Pakistan's fiscal policy impact on output in terms of multipliers are, Hayat & Qadeer (2016), Tahir, Syed, & Sahibzada (2011), Ismail & Hussain (2010) and Khalid, Malik, & Sattar (2008). Tahir et al. (2011) and Ismail and Hussain (2010) have calculated the static multipliers which can be used to describe the past year by year responses of GDP to the fiscal policy tools but have the issue that these multipliers cannot be used for forecasting. Tahir et al (2016)

[1] One might object to the short data for deciding the crowding in or crowding out, but the reason for short span of data in the given table is that we are more interest in the current situation of Pakistan which needs to be dealt with the policy interventions, and normally, in a policy intervention, current facts and figures are more relevant than far past.

(Cerisola, 2015) and (Contreras & Battele, 2015) have calculated the fiscal multipliers for the pool of countries (and not for Pakistan individually) and Khalid et al (2008) have not covered the calculation of fiscal multipliers.

So, this study has added to the current literature on fiscal multipliers in Pakistan by calculating the dynamic fiscal multipliers (time series analysis) of government taxes and spending for short, medium and long run and based on these multipliers, policy suggestions are provided for the guidance of policy makers.

1.1. Objectives

Study has two broad objectives and one supporting objective.

A. Measuring the size of fiscal multipliers to determine the robustness of the fiscal instruments of taxes and government spending.
B. To check that how long the effect of a fiscal shock the output persists through impulse responses of the structural shocks to the government spending and taxes.
C. To suggest the best policy measure regarding the government policy of balanced budget or deficit budget. It may be also suggested that when the balanced budget would be more feasible, in short run, medium run or long run.

1.2. Rationale of the study

Pakistan is experiencing a GDP growth that is well below its potential level. So, the study in hand will try to present a solution based on empirical evidence and role of the fiscal policy in Pakistan would be revealed in the course of study. Furthermore, this study is an update to the literature on the impact of fiscal policy tools on the economic growth. Also, it has policy relevance as it concludes with suggestions and recommendations for policy makers in the end.

1.3. Literature Gap

Whether it is the related to the groups of countries or related to the single country studies, commendable literature is available globally on the current research topic. But in Pakistan, very limited literature is available.[2] Current study contributes to the existing literature by incorporating the Pakistani case. This study calculates fiscal multipliers for Pakistan by using time-series SVAR model and identification of the model would be done in similar manner as used by Blanchard and Perotti (2002) through incorporating economic theory, calculation of elasticities as well as intuition. Previous studies have calculated either the static fiscal multipliers which cannot be used in forecasting or they have been calculated for pool of countries including Pakistan but not separately. In this study, short run, medium run and long run fiscal multipliers are used to suggest the type of budget that could promote the economic growth.

1.4. Organization of the Study

Following sections comprise of literature review compiled in chapter 2. In Chapter 2, literature review is organized under different themes that include the citations of the literature related to single countries, group of countries, various methodologies, studies related to Pakistan and other sub sections that highlight the thematic overview of the previous literature. Chapter 3 comprises of the data and methodology. It contains sections of theoretical framework for the model, econometric model which again has subsections for source and construction of variables and identification method. Chapter 4 summarizes the results and discussion and in the end, Chapter 5 gives the suggestions and recommendations in the end.

[2] The available literature has not concluded in the calculation of fiscal multipliers. Separate section has listed various studies that have worked on the fiscal multipliers and/or have included Pakistan in their analysis.

Chapter 2

Fiscal Economy of Pakistan

In Pakistan, fiscal policy is one of the major stimuli that has been used over time. In countries like Pakistan, the use of fiscal policy could be very beneficial because aggregate demand mainly constitutes of the government spending. Also, fiscal instruments of government spending and taxes are beneficial for creating jobs, increasing output and incentivizing the entrepreneurs. But, on the other hand, the same fiscal policy can also create problems if it heavily leans on deficit financing through accumulation of debts which ultimately translates into sterile government spending in the shape of huge debt servicing. Following is the comprehensive analysis of the fiscal side of the Pakistan

2.1. Mechanism of Fiscal Policy in Pakistan

Fiscal Policy in Pakistan constitutes of proposing the budget which is proposed for the whole fiscal year on annual basis. Fiscal year in Pakistan begins from 1st July and ends on 30th June of the next year. Federal budget is the official document for fiscal policy of Pakistan. In budget, government spending are planned for the next fiscal year as well as financing of the budget is also proposed which comes from various sources such as taxes, government's own revenue generating assets as well as debt (Khalid M. , 2014).

In Pakistan, Ministry of Finance (MoF) is responsible for providing the budget estimates and presenting them in the federal budget before the end of each fiscal year. In federal budget government expenditure estimate is the summation of expenditure proposals by all aligned ministries as well as planning commission which provides the proposition of development projects as well as supervises the same. Over all budget process per official website of the MoF is followed by Medium Term Budgetry Framework (MTBF) and it

follows two approaches i.e. top-down (for strategic planning) and top-up for the line ministries. The MTBF involves preparation by line ministries of three-year expenditure estimates within the ceilings provided by the Ministry of Finance (for the recurrent budget) and by the Planning Commission (for the development budget). Each year, the MTBF process involves the rolling forward of the previous MTBF estimate by one year and the addition of a new outer year (Zaidi, 2004).

2.2. Recent Fiscal Position

Recent fiscal position of Pakistan is summarized in the following table. Data covered in the table is relatively of short span as the objective of the study was to study the policy intervention, so relatively smaller time period as well as recent data have been used to show the current fiscal position of Pakistan. It shows the overall fiscal deficit, expenditure side and the revenue side of the fiscal policy. Data covers the last 9 years from 2008-2016. All the values are in percent of GDP. It can be seen that the total expenditure and total taxes as percent of GDP hover around some mean value, i.e. there are not much fluctuations. Also it can be seen that most of the government spending goes into current expenditures and only a fraction of the government spending covers the development spending. Fiscal deficit is also fluctuating but with large variations. In 2008, fiscal deficit was 7.3% of the GDP which then reduced in the very subsequent year due to reduction in the government expenditure to 5.2% of GDP but it again rose to as high as 8.8% of the GDP in year 2012 and 8.2 in year 2013. But it is propitious for Pakistan economy that over all fiscal deficit has decreased to 4.6% by fiscal year 2016. On the taxation side, tax to GDP ratio has seen a downswing in fiscal year 2011 and 2012 but again established the previous level of around 14% in 2013 and 2014. Non tax revenue on the other hand has reduced over the time from its peak value of 4.9% of GDP in the covered period to

2.7% of the GDP. Due to this reason as well as not meeting the tax collection targets have exerted pressure on the government debt.

2.1 Recent Fiscal Position of Pakistan (% of GDP)

Year	Overall Fiscal Deficit	Expenditure			Revenue		
		Total Expenditure	Current	Development	Total	Tax	Non-Tax
FY2008	7.3	21.4	17.4	4	14.1	9.9	4.2
FY2009	5.2	19.2	15.5	3.5	14	9.1	4.9
FY2010	6.2	20.2	16	4.4	14	9.9	4.1
FY2011	6.5	18.9	15.9	2.8	12.3	9.3	3
FY2012	8.8	21.6	17.3	3.9	12.8	10.2	2.6
FY2013	8.2	21.5	16.4	5.1	13.3	9.8	3.5
FY2014	5.5	20	15.9	4.9	14.5	10.2	4.3
FY2015	5.3	19.6	16.1	4.2	14.3	11	3.3
FY2016	4.6	19.9	16.1	4.5	15.3	12.6	2.7

Data Source: Pakistan Economic Survey (2016-17)

2.3. Taxes

In Pakistan, tax system works at both, federal level and the provincial level. Most of the revenue contribution is made by the federal tax system that is controlled by the Federal Board of Revenue (FBR). After the 18th amendment, most of the indirect taxes, such as sales and excise tax are under the provincial autonomy. In Pakistan, taxes are mainly divided into two sub categories, i.e. direct taxes and indirect taxes. These taxes are exercised both at provincial and federal level. Following table lists down the various taxes at the two levels of governments. Following, it can be seen that federal government is responsible for collection of most of the direct and indirect taxes, hence its share is more than provincial share of government tax revenue.

There are various problems in the tax system of Pakistan. They range from narrow tax base, inadequate tax policy, weak tax enforcement system, lack of transparency, weak intelligence and investigation system and inadequate tax payer's information. These

together contribute to a very low share of the provincial government expenditures even though they have been given autonomy over their tax system to a greater extent after the 18th amendment in 2010.

LEVEL-OF GOVERNMENT	DIRECT TAXES	INDIRECT TAXES
FEDERAL	Income Tax Corporate Tax Wealth Tax Property Taxes	Sales Tax Excise Duty Import Duty Export Duty Gas and Petroleum Surcharge Foreign Travel Tax
PROVINCIAL	Land Revenue Urban Immovable Property Tax Tax on Transfer of Property Agriculture-Income Tax Capital Gains tax Tax on Professions, trades and Trade Callings	Stamp Duty Motor Vehicle Tax Entertainment Tax Excise duty Cotton fee Electricity Duty

Following graph shows the 5 years pre and post data of tax collection in Pakistan at federal and provincial levels. It can be seen that from 2010 onwards, the share of

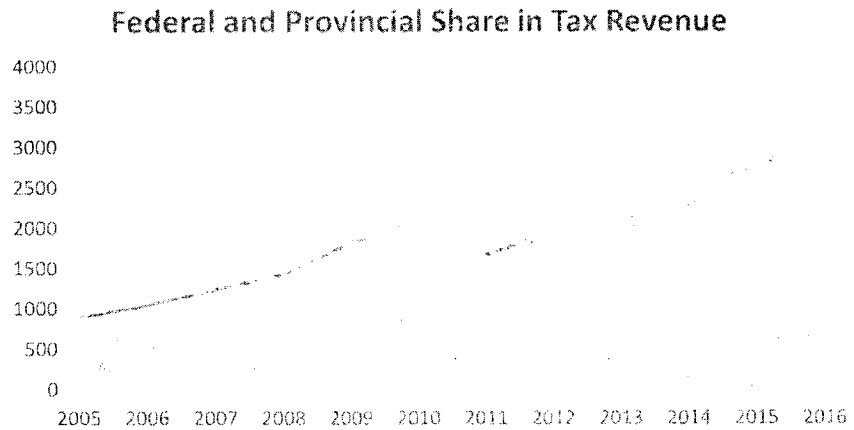


Figure 1Share of Province and Federal Tax authorities

provincial taxes which is shown in upper area of the graph is increasing after the autonomy in tax system but not at a rate that would be expected otherwise. The lower area of the graph shows the contribution of federal board of revenue while the thinner and dim area shows the provincial share in the total revenue of Pakistan.

Chapter 3

Literature Review

3.1. Background of Fiscal Multipliers

According to standard Keynesian cross model which tried to explain the dynamics of the Great Depression, explains the process as, when aggregate demand falls short to meet the surplus supply, there is a general tendency of decreasing prices in the economy. Low prices and lower demand shrink the revenues and hence the profit levels and inventories also pile up with the businesses, and consequently firing of the staff as well as closing down of some businesses starts. Overall, economy is in a situation where growth rate becomes negative and there is huge unemployment and this situation is generally known as recession and when it stretches over longer periods, it becomes depression. One way Keynes put the mainstream economists upon was the (not very welcoming) government intervention. The reason for no wide acceptance in the earlier days lied in the fact that by the time economists believed in hands off behavior of the government in case of any divergence from the full employment equilibrium. He put the theory that in this way, government purchases would push the aggregate demand upwards. These policy measures should be taken in the short run to make sure the reestablishment of equilibrium between aggregate demand and aggregate supply (Samuelson, 2009).

Capitalizing on the Keynesian theory, (Kahn, 1931) a student of Keynes presented the idea of the multiplier effect of government spending before Economic Advisory Council and in an article in 1931, (Zezza, 2012). Fiscal multipliers are the coefficients that show that how much certain government policy of spending and taxation has amplified the output. In other words, multiplier shows that how much will the output change to a given change in government spending or tax (increment/cut). Role of government spending has been discussed earlier with detail. As far as role of taxation is concerned (Romer H. &

Romer, 2010) and Romer (2010) conclude that tax hikes negatively affect the output growth.

3.2. Studies on Group of countries

Studies have been conducted on the groups of countries but small number of studies like Minea and Mustea (2015) have used the panel data for analysis. Most of the studies have used the time series data to get the estimates for the group of countries. These studies found heterogeneities in impact of fiscal policies across the countries depend upon geography, (Minea and Mustea, 2015), source of financing (Kandil, 2013), state of the development, (Fernández-Sainz, 2014), degree of openness (Vled, 2013) as well as time (Perotti, 2002). Guy and Belgrave (2011) have found that in microstates of The Caribbean, fiscal multipliers show that fiscal policy in these states is procyclical- rendering it ineffective. But other studies have found positive impact for the government spending and negative impact for tax conforming the Keynesian theories.

3.3. Single Country Studies

Single country studies aim at suggesting the policy measures to governments to achieve various objectives. Those objectives include the fiscal consolidation for debt management and achieving higher output. Some of the policy suggestions maintain that governments should focus on development/capital spending because they have higher multiplier value than current spending (Mitra and Poghsyan, 2015) and (Jain and Kumar, 2013). Jain and Kumar further compare the central government and state level fiscal multipliers for India and have found that state level spending have higher positive impact on output. Mitra and Poghsyan have concluded that in case of Ukraine, medium term tax policy would yield better results as medium term tax multipliers are insignificant. In case of Japan, Auerbach and Gorodnichenko (2013) found the fiscal multipliers weak yet significant enough to drive a policy measure in recent years.

3.4. Case studies in Pakistan

In Pakistan, studies related to fiscal multipliers are discussed in this section. These studies can be categorized into two groups. First, studies that have reported the static fiscal multipliers and second, studies that have calculated the dynamic fiscal multipliers. The first group of studies have calculated the fiscal multipliers by using the marginal propensity to consume and marginal propensity to tax for the calculation of multiplier value. Some of studies are (Tahir, Syed, & Sahibzada, 2011) and (Ismail & Hussain, 2010). Tahir et al (2011) have calculated the static fiscal multipliers for spending, taxes and imports in an open economy context. Ismail and Hussain (2010) have checked the impact of discretionary spending on output, employment and inflation in Pakistan from 1971-2010. Second pool of studies include (Hayat & Qadeer, 2016), (Cerisola, 2015) and (Khalid, Malik, & Sattar, 2008). These studies have used the recursive method for identification of structural shocks. Hayat and Qadeer (2016) have used the panel data for South Asia and Panel VAR results show that government investment multiplier is greater that the government investment multiplier. Furthermore, their results show that government spending multiplier increases with as we move into farther horizon.

In literature cited above, it is noted that gap still remains in the area of application of updated time series analysis. Moreover, SVAR model analysis could be applied to the time series data of Pakistan with the expectation of calculation of government spending and tax multipliers. These multipliers could then be used for suggesting the type of budget to the government. The short run, medium run and long run fiscal multipliers could then be used for suggesting a feasible use of one of the fiscal intervention instruments, i.e. the one that would produce more desirable outcomes for the policy makers.

3.5. Types of Fiscal Multipliers

Fiscal multipliers are investigated for impact multipliers, short term, medium term and long term multipliers (Mitra & Poghosyan, 2015), (Jain & Kumar, 2013) and (Batini, Callegari, & Melina, 2012), (Perotti, 2002). Impact of fiscal variables like government spending and tax yield the fiscal multipliers and separately, they are called the government spending multiplier and the tax/revenue multiplier (Mitra & Poghosyan, 2015), (Ban, 2014), (Fernández-Sainz, 2014) and (Batini, Callegari, & Melina, 2012).

3.6. Effectiveness, Size and Sign of Fiscal Multipliers

Modern macroeconomic school of thought (commonly known as freshwater economists) have found the fiscal multipliers less than one while those adhering to Keynesian thought (or saltwater economists) have found and forecasted the fiscal multipliers in excess to unity (Myatt & MacLean, 2012). Myatt and MacLean attribute the low size multipliers of the former school to the modeling assumptions of rational expectations. Other studies have found variations in the effectiveness of fiscal policy of various countries. High effectiveness of fiscal policy is reported by (Minea & Mustea, 2015), (Veld, 2013) and (Blanchard & Leigh, 2013)[3].

Neo-classical economists led by Barro and Lucas hold that the size of fiscal multipliers is near zero for in the presence of forward looking agents in the economy slash their spending to save for future tax repayment of certain stimulus bill which keeps the multiplier from going above unity. Barro & Redlick (2009) report the fiscal multipliers to be in the range of 0.5-0.7. On the other hand, Keynesians believe in the higher size of fiscal

[3] When European panic severed and became more prolonged after applying austerity measure (where spending cuts as well as tax hikes involved by almost all European economies that sought to reduce the debt burden of their countries but Germany and Austria did not cut the spending and the evidence shows that they performed very well), IMF's chief economist Olivier Blanchard carried out a study that involved reviewing the previous forecasts and he checked the multiplier estimates again and found that instead of forecasted value of 0.6, actual and revised multiplier estimates for government spending were between low 0.9 and high 1.7. It shows the effectiveness of fiscal stimulus

multipliers and state that the size and sign of the fiscal multipliers are dependent on several factors. These factors are the size of economy, specific monetary regime, degree of openness of economy and structure of economy, (Minea & Mustea, 2015), (Ban, 2014), (Baum, Poplawski-Ribeiro, & Weber, 2012), (Corsetti, Meier, & Müller, 2014). Among the believers of fiscal multipliers, large number prolific studies have found the fiscal multipliers of government spending to be positive and in excess to unity in the studies by (Minea & Mustea, 2015), (Veld, 2013), (Ramey, 2011), (Monacelli, Perotti, & Trigari, 2010), (Blanchard & Leigh, 2013). While investigators of the size of tax multipliers found it to be negative and small (Mitra & Poghosyan, 2015), (Perotti, 2002).

Summing up the overall debate from comprehensive review of the literature on this subtopic follows as. Salt water economists (Adherents to the Keynesian School of Economic Thought) support their stance of effectiveness of the fiscal policy through empirical evidences. As discussed above, all of the studies by saltwater economists would in one way or the other way, through empirics show that fiscal policy is effective and multipliers are well above 1 in times of recession. This validates the use of fiscal stimulus as well as the study of fiscal multipliers. On the other extreme, freshwater economists oppose the stance of their saltwater counterparts. The possible reason for the low estimates of the fiscal multipliers lie in the fact that fresh water economists use sophisticated modeling assumptions of rational expectations, putting restrictions on certain variables and also somewhat due to lack of use of IS-LM framework. Another important dimension is that of the neutrality/non-neutrality of the fiscal policy defined in terms of responsiveness of wages and prices towards the government spending. If wages and prices are non-responsive to the government spending, then it is expected to have a higher multiplier size and near zero multiplier is expected if wages and prices are highly responsive to the government spending. (Chinn, 2013).

3.7. Fiscal Multipliers in the Business Cycle

Extensive debate on the effectiveness of fiscal stimuli is further taken by the saltwater economists by checking for the size and significance of the fiscal multipliers around the business cycle. As government intervention is the echo back of Keynesian economics, which states that in times of slack growth and redundancy in the economy, so intuitively government spending must have different impact in recession than in expansion. It all relates to the well-known concept of crowding out which is supposed to be insignificant in the recession (Auerbach & Gorodnichenko, 2012).

In this quest, Auerbach and Gorodnichenko (2010, 2011, 2012 and 2013) have carried out a series of studies on the size and sign of fiscal multipliers around the business cycle. Main findings of their (2013) study are that fiscal multipliers vary in size in times of recession and expansion. They were found to be in excess to 1 (approximately 2.8) implying that there is no crowding out of private investment due to government spending. On the hand fiscal multipliers are found to be well below 1 in times of expansion during a business cycle. Preceding papers in the series confirm the same results with slight changes in magnitude of multipliers mainly. Chinn (2013) after analyzing the literature on fiscal multipliers (he evaluated comprehensive literature theoretically) confirms that the size of fiscal multipliers depends upon the state of the economy. He concludes that the degree of recession, financial system and the response of monetary policy play important role in determining the size of fiscal multipliers. Batini, Callegari, & Melina (2012) also, confirm the same results after checking for the type of feasible fiscal consolidation for Europe, Japan and USA. Their findings state that in times of recession, impact of a government spending cut or a tax hike will have higher negative effects on the output hence making the recession more worsen. So based on these results they also suggest that in order to protect

an economy's growth, consolidation (G cuts and T hikes) should be carried out slowly and gradually rather than aggressively.

3.8. Fiscal Multipliers and the Structure of Economy

Studies have been conducted to determine the factors that affect the size and sign of fiscal multipliers. Among them, size of economy, level of economic development, specific monetary regime, phase of a business cycle, openness of the economy and level of indebtedness have been some key variables in the structure of economy. Minea & Mustea (2015), Chinn (2013), Corsetti, Meier, & Müller (2014) and others have discussed related the structure of economy and the fiscal multipliers. They have discussed the possible effects of fiscal policy under different environments for the sake of explaining the multiplier size intuitively. Authors emphasize on importance of prevailing situation in an economy to be responsible for their size and sign.

3.9. Models used

Fiscal multipliers are the estimates that explain the response of economic variables to the fiscal spending and taxation. Therefore, sophisticated modeling is required for these calculations. Models used for such calculations vary from simple VAR models to complex DSGE models where simulations are used. Data used in these models also came from both the time series and panel. Vector Autoregressive models have been used rigorously in the literature. Its variants used are simple VAR based structural VARs (Recursive, Blanchard and Perroti, Sims, Blanchard and Quah) and Regime Switching VARs (Smooth Transition VAR, Threshold VAR).

In this study SVAR by Blanchard and Perotti (2002) is used to meet the objectives already discussed in the introduction section.

3.10. Summary of Literature Review

Review of the past literature shows that there had been two schools of economic thought namely the neo-classical and the Keynesian. The first school of thought has opposed the use of fiscal policy as a remedy to various shocks to output (forming business cycle) based on their economic agents who have perfect foresight of any structural shock to the fiscal variables, for example to an increase in fiscal spending, they anticipate huge tax burden, so they start saving for future repayment and economy ends up with lower private consumption and hence low multiplier is the consequence. On the other hand, Keynesians present empirical evidences of significant fiscal multipliers, for instance, in excess to unity value of government spending and negative and significant multiplier for taxes. Frequently used models that study the whole process of spending, taxes and output are captured through simultaneous equations making one system of equations. This is mainly done through the employment of VAR based models and to recover the impact of structural shocks, a variety of the identification restrictions have been imposed.

Review of the literature reveals that in Pakistan, time series analysis could be used to add to the literature of fiscal multipliers in Pakistan. Previous studies have either used the static multipliers, which cannot be used for forecasting or they have calculated the fiscal multipliers for Pakistan with the pool of countries. Also, this study would try to add to the literature of fiscal mutlipliers by calculating the short, medium and long run fiscal multipliers and suggest policy regarding the type of budget that would best suit Pakistan and help in achieving and maintain higher output growth. This study shall use time-series model Structural VAR model by Blanchard and Perotti (2002) and imposes restrictions based on institutional information for calculating the fiscal multipliers and meeting the objectives of the study.

Chapter 4

Data and Methodology

4.1. Theoretical Framework

Basic aim of our study is to explore the dynamic effects of fiscal policy of government spending and taxation in the system of equations where variables affect each other. Government spending is justified in sections above and it is suggested as a policy measure to sort out the swinging shocks of a business cycle. In the literature related to government intervention as a remedy to the shocks in output, employment and inflation, Keynes is considered as the founder of fiscal policy. Before Keynes, classical economists assumed the economy to be in equilibrium in the long run, and in short run, any departure from equilibrium was supposed to be corrected through the forces of demand and supply. Keynes was the first to propose the intervention of government by making short run policies as he was of the view "in long run, we are all dead". So, Keynes proposed that in times when economy is in disequilibrium, governments must intervene in their economies in order to remove the deflationary/inflationary gaps (Samuelson & Nordhaus, 2009).

Above paragraph showed that how short run and policy interventions are interrelated. Fiscal policy model used in this study involves the government policy of spending, taxation and their impact on the output.

Where;

$$Z_t = a_i Z_{t-i} + e_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where $Z_t = [T_t, S_t, Y_t]$, Z_{t-i} is the vector of autoregressive terms and e_t is the reduced form errors vector. T_t denotes the government tax revenue, S_t denotes the government spending and Y_t denotes the GDP. All the variables taken are in growth form containing

no time trends as confirmed also in the stationarity tests in the following chapter under section 5.1. So, now we have a system of variables which need to be studied together. For this purpose, vector autoregressive models present a pragmatic way to study this system. But we know that such a system has econometric shortcomings, one of which is the simultaneity. So instead of interpreting the coefficients of the VAR model, forecast errors would be used. These forecast errors would depend upon the structural shocks to the different variables and these structural shocks would have dying out effects on the forecast errors- hence generating the so-called impulse responses. These impulse responses could eventually be interpreted as multipliers.

4.2. Econometric Model

Following is the mathematical representation of our VAR model. This study replicates the structural VAR model used by Blanchard and Perotti (2002).

$$Z_t = A(L)\, X_t + e_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Above expression shows the reduced form of the VAR model used in this study. [A(L)] of vector of auto regressors (X_t) to be affecting the of the three variables in question, i.e. $Z_t = \begin{bmatrix} S_t \\ T_t \\ Y_t \end{bmatrix}$. Wherein $e_t = \begin{bmatrix} e_t^S \\ e_t^T \\ e_t^Y \end{bmatrix}$ represents the cross correlated reduced form forecast errors of this VAR system and the same vector would be used identify the structural shocks in the dependent variables. This identification would then be used for recovery of impact of structural shocks and finally impulse response projections is used to see the length of period of significant impact of structural shocks of each variable.

4.2.1. Source and Construction of Variables

In equation (1), vector Y_t incorporates the variables in question i.e. government spending, revenue and nominal GDP adjusted for inflation. Government spending variable

consists of consolidated public spending on government purchases and investment. Tax revenues consist of consolidated tax revenues minus government transfers. Source of all these variables is the various issues of Pakistan Economic Survey. Data used covers the period from 1975-2016 with annual frequency. Table 2 illustrate the variables involved in the analysis.

Table 3: Set of Variables

Variable	Data Span	Data Source	Form of Data
Government Spending (S_t)	1977-2016	Pakistan Economic Survey	Percentage Growth
Tax Revenue (T_t)	1977-2016	Pakistan Economic Survey	Percentage Growth
GDP (Y_t)	1977-2016	Pakistan Economic Survey	Percentage Growth

Control variable inflation is not included in the model because of two reasons, (i) GDP is already adjusted for inflation, so it is intuitively not fruitful to include inflation as a control variable once we have purged its possible effect on the endogenous variables under analysis. (ii) As VAR model specification is used, so adding extra variables would come at the cost of degrees of freedom. E.g. in current specification, there are three variables. So, choosing a lag selection criteria that suggests 4 lags for each endogenous variable, ignoring the intercepts, total number of lags would be 12. But, if we add two other exogenous variables, new number of coefficients to be estimated would increase to 20 and this is a significant loss of degrees of freedom especially when annual data is used. Another

potential control variable i.e. trade openness (TO) has not been added although it was considered but it was dropped due to very low correlation with the variables of the model. E.g. correlation coefficient of the TO and GDP was merely 0.07 as compared to the two main variables which had higher correlation coefficients. Using the same method, (Blanchard & Perotti, 2002) had dropped the control variable in their study.

4.2.2. Descriptive Statistics:

Following Descriptive statistics show the mean, maximum and the range of the data. Average growth in the government spending has been 5.99 over the years 1977-2016. Maximum growth in government spending has been in 48% in 2008 and minimum growth of government spending was -10 % in 1996. Similarly, maximum growth in tax rate is 25.88 % in 1982 and minimum growth was the contraction of 14% in 1978. While average growth rate of tax revenue was 12.9 % per year. Average GDP growth rate has been 4.9 % while maximum GDP growth was experienced in 2005-06 while lowest growth was in 2011, which was 0.36.

Figure 2 Descriptive Statistics

	G	T	Y
Mean	5.995856	12.96023	4.919000
Median	6.405059	13.60950	4.660000
Maximum	48.32392	25.88700	8.960000
Minimum	-10.21312	-14.13400	0.360000

4.2.3. Identification

Some popular identification methods used are the 'narrative approach' by Romer and Romer (1989), sign restriction of impulse responses by Uhlig (2005) and Choleski ordering by Fatas and Mihov (2001). The first one has this shortcoming that this narrative approach could not identify two shocks generating impulses in the same variable e.g. it could not purge the effect of Korean war dummy and preceding fiscal shock of the US government spending on war pile up and increased taxes. Uhlig's sign restriction method has limitation for not being able to identify the fiscal shock at right time (Blanchard & Perotti, 2002). Fatas and Mihov impose zero restriction by exploiting the Cholesky ordering of variables and place the fiscal variables in last which is akin to the monetary approach. The identification scheme that this study uses is discussed below and replicates the one used by Blanchard and Perotti (2002).

General form of the relationship of reduced form and structural shocks is represented as following:

$Ae_t = Bu_t$ ..... (II)

On the right-hand side, B is the matrix of coefficients of various structural shocks while matrix A contains the coefficients of contemporaneous reduced form shocks. Restrictions on various coefficient in both matrix A and B would be imposed per the Blanchard and Perotti (2002) procedure in which they used this identification scheme for finding the dynamic responses of the output to the government spending and taxes. They have used the institutional information of the procedure and collection of taxes (and spending as well) for restricting the system of the following equations.

$$e_t^S = b_1 e_t^Y + b_2 u_t^T + u_t^S \quad \text{..... (III)}$$

$$e_t^T = a_1 e_t^Y + a_2 u_t^S + u_t^T \quad \text{..... (IV)}$$

$$e_t^Y = c_1 e_t^T + c_2 e_t^S + u_t^Y \quad \text{..... (V)}$$

In above equations, equation (III) shows the unexpected movements in government spending equation to be the linear combination of GDP forecast errors and structural shocks in the government tax revenues along with own structural shocks. Equation (IV) relates the forecast errors of the government revenue to the unexpected movements in GDP and structural shocks in the two fiscal variables. The last equation, equation (V) depends upon the unexpected movements in the fiscal variables and has a part of structural shock of its own.

Matrix A and B from equation (II) assume values from equation (III), (IV) and (V). Following is the matrix notation of above equations.

$$\begin{bmatrix} 1 & 0 & -b_1 \\ 0 & 1 & -a_1 \\ -c_2 & -c_1 & 1 \end{bmatrix} \begin{bmatrix} e_t^S \\ e_t^T \\ e_t^Y \end{bmatrix} = \begin{bmatrix} 1 & b_2 & 0 \\ a_2 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} u_t^S \\ u_t^T \\ u_t^Y \end{bmatrix}$$

Or, $A^*e_t = B^*U_t$

Matrix A and B would be introduced to the statistical package after calculating some of the coefficients outside VAR as well as zero restrictions based on the institutional information available regarding the two fiscal variables. This institutional information includes the ordering of happening of a variable e.g. we commonly know that government spending decisions lead the tax collection (Blanchard & Perotti, 2002).

Following is the identification scheme for each coefficients involved in the matrices given above. These coefficients are, a_1, a_2, b_1, b_2, c_1 and c_2.

a. ***a_1***: This is the tax to GDP elasticity. It is the composite elasticity and the result of the product of tax revenue to its base and the tax base to the GDP elasticity. It has been introduced from the elasticity value calculated by (Bilquees, 2004) which is

0.96 for the overall tax revenue in Pakistan. It could potentially be the limitation of the study as this figure is relatively old and may not reflect the current situation of the tax structure. But the value has been used due to the fact that in recent years, the ratio of Tax to GDP has been almost the same as it was during the study by Bilquees i.e. around 14% of the GDP.

b. a_2: It is the elasticity of taxes to the government spending. This value has been calculated from within the VAR.

c. b_1: We have assumed this value to be zero as it is well known that in case of government spending, there is no contemporaneous effect of GDP on the government spending. The same is assumed by (Blanchard & Perotti, 2002).

d. b_2 : As assumed by (Blanchard & Perotti, 2002), we also assume that in case of Pakistan, government spending decision comes before the tax decision, hence, $b_2 = 0$.

e. c_1 *and* c_2 : these are the results of 2SLS equation where their values have been calculated outside VAR.

All the above restrictions if imposed on the system give us the following restriction matrices.

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & -0.96 \\ -0.08 & -0.134 & 1 \end{bmatrix} \begin{bmatrix} e_t^S \\ e_t^T \\ e_t^Y \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ na & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} u_t^S \\ u_t^T \\ u_t^Y \end{bmatrix}$$

In above matrices, 'na' shows that this value has to be calculated from within VAR which turned out to be 0.12.

Chapter 5

Results and Discussion

Following was the procedure followed to find out the value of multipliers in the study.

5.1. Unit Root

In econometric analysis, when we are concerned with the estimation of regression parameters, it is very necessary to check for the properties of the data. In order to estimate the Structural VAR in this study, unit roots were checked to confirm the that the variables used in the analysis are stationary at levels. Following are the unit root results. The test used was the Augmented-Dickey-Fuller (ADF) test. The reason for including the intercept term only is that we already know that average of all the three variable is a positive i.e. non zero number but stationarity test is not reported with a trend term with the reason being that the data was already in difference form and hence did not contain the trend. It is also obvious from the simple graphical analysis as well. Although inclusion of trend showed

Table 4 Unit Root Results

Variable	**With intercept**	**T-stat of ADF**	**Prob.**
Government Spending (G)	Yes	-7.671	0.000
Tax Revenues (T)	Yes	-5.977	0.000
GDP (Y)	Yes	-4.469	0.000

the same results as with no trend. Results without intercept and with intercept and trend all had confirmed the stationarity of the data for all variables of the study, i.e. government

spending, tax revenue and the GDP. The test confirms that all the variables are in the stationary form at level.

As parameters are calculated in the VAR by using OLS estimator, hence the stationarity in the data is good for our model although not strictly required because VAR estimates are not used or required for interpretation.

5.2. Structural VAR

In the analysis, first we run a reduced form VAR so that we may get the forecast errors for further analysis. For this purpose, first step is to have a proper lag length. Specific lag length must be chosen so that the model is parsimonious.

5.2.1 Lag Length

In a VAR model we have to choose certain lag length so that the model is better fit and/more parsimonious model. Simple introduction of lags must cost us the calculation of the true model and instead we may end up estimating the white noise process in the DGP of the model. To overcome this problem, we choose certain lag length for the model. To do this, we can lean on either of the two approaches discussed below.

5.2.1.1. Economic Theory:

If suitable economic theory is available regarding the dynamics of a DGP of a variable, we could use that to select the lag length of a variable in the VAR. But in choosing this approach, we might end up with different lag lengths for different variables in which case, better estimator would be the SUR instead of OLS. But we are concerned with the vectors of autoregressive terms, so intuitively, the lags should be equal in number in order to generate the vectors of autoregressive terms. To fulfill this objective, there is another approach.

5.2.1.2. Lag Length Selection:

In lag length criteria, we trade off parsimony over the fit of the model. There are various lag length criteria available, such as Akaike Information Criterion, Hennan-Quin Criterion, Schwarz-Baeysian Criterion, etc. that could be used to choose the lag length which yields the most parsimonious model in the VAR environment.

Based on the most lag selection criteria, e.g. AIC and SC and others, the maximum number of lags that should be included in the model to make it parsimonious is one. So, further calculations are carried out after VAR (1) model.

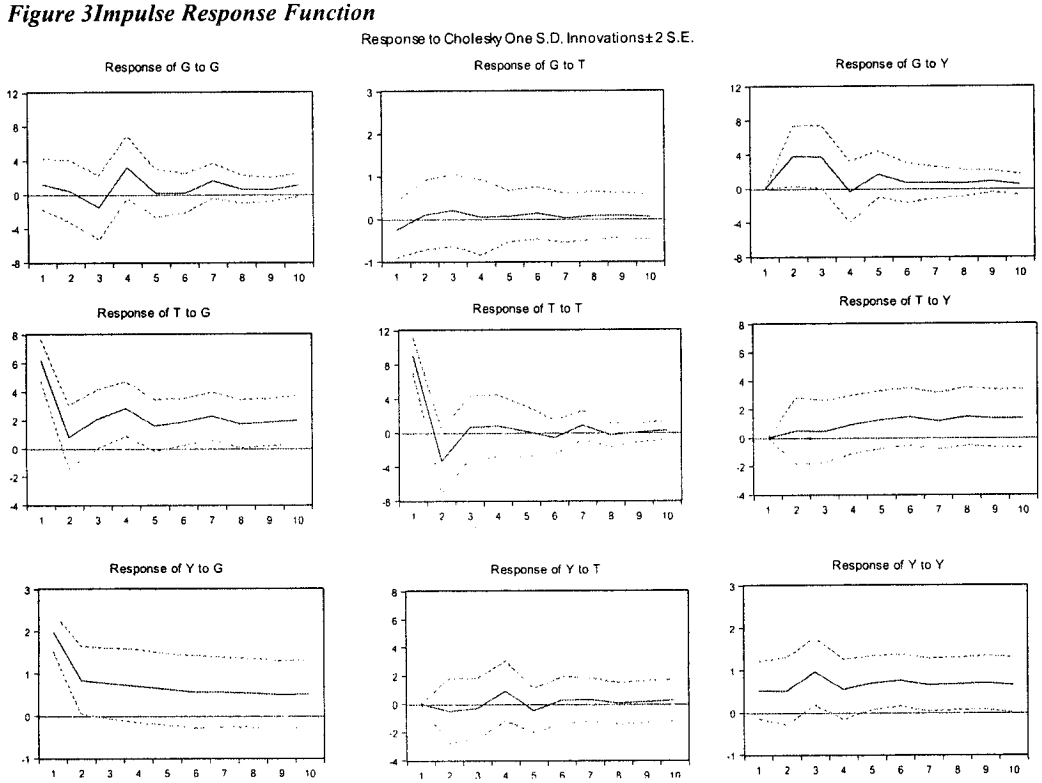
Table 5 Lag Length Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	76.56423	NA	3.76e-06	-3.976445	-3.845830	-3.930397
1	202.6317	224.8771*	6.74e-09*	-10.30442*	-9.781957*	-10.12023*
2	211.5828	14.51531	6.83e-09	-10.30177	-9.387469	-9.979439
3	218.2083	9.669555	7.98e-09	-10.17342	-8.867269	-9.712940

5.2.2. Impulse Responses:

Impulse responses show us the impact of one shock on the each variable over the time. Normally, it is characterized by a dying out response curve. Impulse Response Functions are in fact the moving average representation of Auto Regressive models that conveniently show the generation and propagation of a shock to the error term and hence they are useful in interpreting models such as VAR in order to take inferences from the shock generation and propagation process. Impulse response function and contemporaneously the variance decomposition gives meaning to a system of VAR model. Following is the graphical representation of the impulse responses of the current study.

Figure 3Impulse Response Function



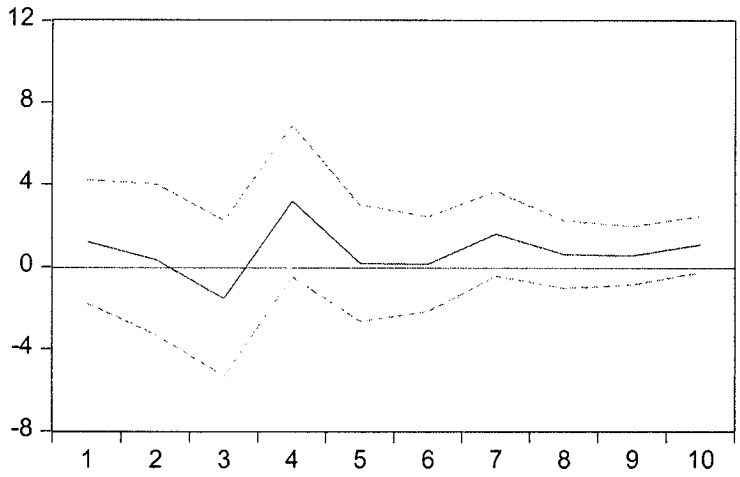
The line within the dotted lines is the value of response of a variable to each shock in the system. The dotted red lines show the lower and upper boundary of the 5% confidence interval. The plain line is well within the ranges of the dotted red lines which shows that these impulses are significant.

5.3. Responses to the Government Spending:

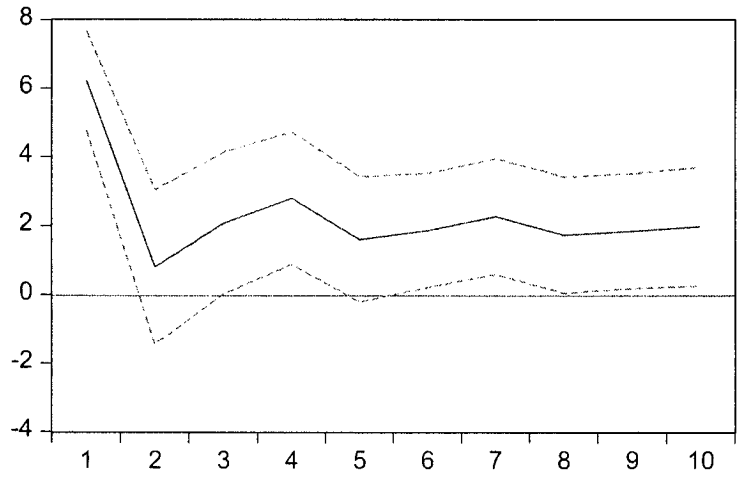
Following graphs depict the responses of the system of variables to the government spending. In panel A, government spending responses to its own shocks have been shown. Government spending shock in 1st year causes the subsequent year's spending to decreases. This has usually happened in the Pakistan when a large government spending is followed by a cut in the form of negative growth in the subsequent year. The data of government spending of Pakistan normally shows that a large government spending shock was followed by either a small or negative growth in the subsequent year. For instance, the available data shows some of the large government spending shocks such as 20.4% increase in the government spending in 1989 was followed by negative growth in the government spending in the subsequent 3 years. Similarly, in 1993, government spending increased by 17% as compared to average growth of 5.99% and in the next year, government spending saw the negative growth of-10.2%. Other examples include 48% increase in year 2006 followed by negative growth in next 2 years. The same phenomenon is vivid from the make of impulse responses of government spending to a shock in the government spending. Although, after 3rd year, the government spending response tend to be positive and then die out to zero in the 5th year of the shock. Panel B illustrates the response of taxes to the government spending. It shows positive response to the government spending. The is possible due to the fact that government spending has quite a large impact on the output. So, an increase in output causes the increase in taxes, hence the response of the taxes to government spending is following a channel after which it responds to the government spending in a way that is illustrated in the panel B of the impulse responses. This channel is also mentioned by (Blanchard & Perotti, 2002) and hence it is in conformation to the results of this study.

Figure 4Responses to the Government Spending

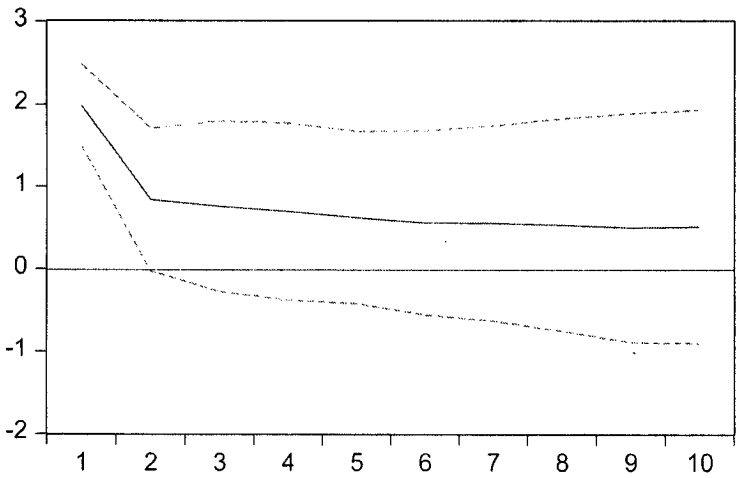
Panel A (G responses to G shock)



Panel B (Response of Taxes to G shock)



Panel C (Responses of Output to G shock)



Government spending multipliers as shown in panel C of figure 3 are conforming to various research papers on related the topic. Peak government spending multiplier value is 1.9 which is at impact. After the impact year, it slowly reduces to 0.6 in the 2nd year and 0.4 in the two subsequent years showing the dying out effect of one time structural shock to the government spending. The higher than unity value for multiplier is in alignment with the studies such as (Blanchard & Leigh, 2013) revised fiscal multipliers for Eurozone, government spending multipliers for USA by (Monacelli, Perotti, & Trigari, 2010), government spending multipliers in India by (Tapsoba, 2013).

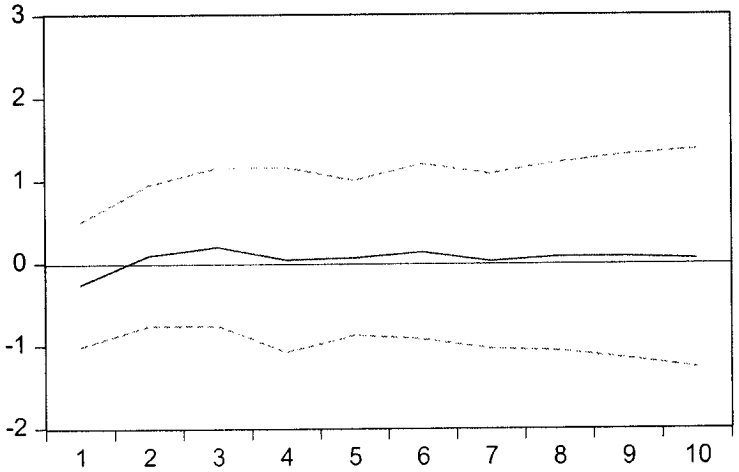
5.4. Responses to Taxes:

Figure 4 with 3 panels show the impulse responses of government spending, taxes and the output to a one standard deviation shock in the tax. Panel A shows the response of the government spending to the tax shock. As our main goal is not related to the impact of tax on the government spending, so these responses are discussed only positively. The response of government spending to the taxes is negative in the start which is also the case in (Blanchard & Perotti, 2002) and (Monokroussos & Thomakos, 2015) in case of OECD countries and Greece respectively.

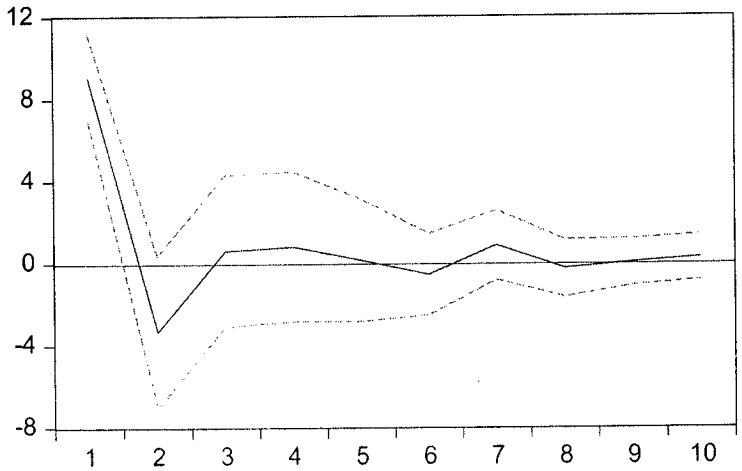
Panel B shows the responses of taxes to its own shocks. After 1 lag, the impact of shock is positive after which it becomes negative in the coming years and then it fluctuates in the medium run before dying out to zero in the longer run. Panel C shows the tax multipliers over the horizon of 10 years. Overall impact of structural shocks to the Taxes have very low magnitude of impact on the GDP. Contemporaneously, the impact of tax shock on GDP is near zero. After 1 year, the tax multiplier turns out to be -0.5 and in 3rd year of the shock, multiplier value is -0.3. After 3rd year, the tax multipliers die out to become

Figure 5 Responses to the Tax Shock

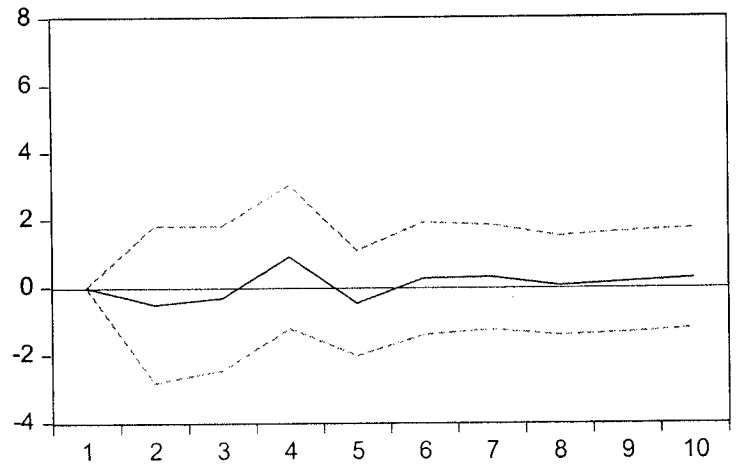
Panel A



Panel B (Response of Taxes to Tax shock)



Panel C (Response of Output to the tax shock)

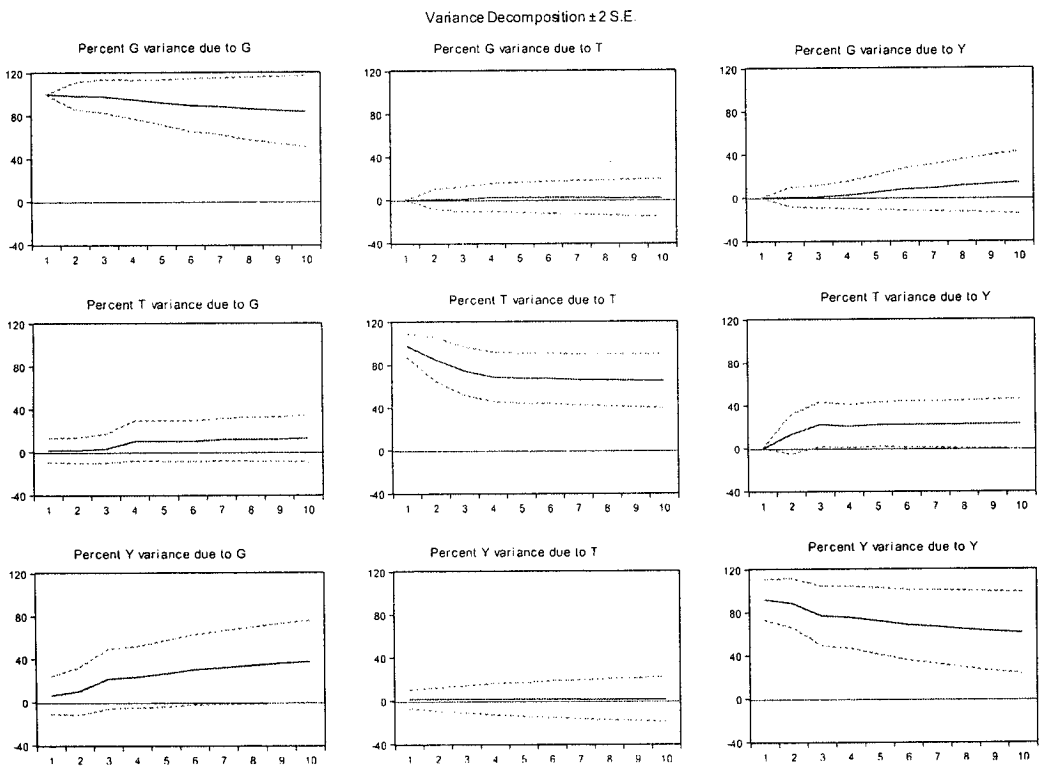


near zero and in the longer run, this impact is completely vanished to zero as we can see in the figure as well. It is conforming to the results achieved by (Blanchard & Perotti, 2002), (Monacelli, Perotti, & Trigari, 2010), (Batini, Callegari, & Melina, 2012) and others.

5.5. Variance Decomposition:

Variance Decomposition is measures the percentage wise explanation of the variables' variance due to variation in other variables. It shows this process historically. Figure above shows the variance decomposition. We can see that GDP equation's variance is explained more by the government spending. It starts from 6 percent in the first year of a shock and in subsequent years, it increases up to 37 %. This is the percentage share of government spending variations in the total variance of GDP. Variance decompositions have been presented in the tabular form in the appendix of this study.

Figure 6Variance Decompositions



Chapter 6

Conclusion and Recommendations

This study has aimed at finding the short, medium and long run fiscal multipliers for government spending and taxes. Study has used the three variable Structural VAR model with basic identification scheme of Blanchard and Perotti (2002). All the variables were used in the growth form and hence were stationary at level, which was confirmed through the ADF test. The study has found that the government spending multiplier met the Apriori expectations and it turned out to be positive. Magnitude for Government spending multiplier was found to be highest at the impact, i.e. 1.9, which means that each standard deviation of shock in the government spending will lead to 1.9 times S.D. increase in the GDP in the impact year. While in subsequent years, the government spending multiplier is reducing. Tax multiplier also met the Apriori expectation in the sense that it turned out to be negative except for the 4^{th} year of the intial shock when the tax multiplier value has turned positive. Overall, tax multiplier value has been quite low. Value of the tax multiplier was -0.5 on the first lag and -0.3 on the second lag.

Based on the results of the study, it can be concluded that in short run, fiscal policy in Pakistan is potentially quite fruitful. An increase in government spending could be expected to yield more than unity-positive multiplier on impact and positive multiplier in the short run and medium run. In case of taxes, impact multiplier is zero, then it turns negative in the short run and the medium run and in the long run, it vanishes to zero.

6.1. Discussion:

The study in hand is widely debated topic these days. There are two schools of economic thought seeking to promote their ideas by using fiscal multipliers to show the

prowess of each's ideas. First is the Monetarist school which holds the view that in presence of rational economic agents, any changes in government spending are responded by the reduced private consumption so that the agents may finance the current stimulus bill in the shape of taxes in future. Hence marginal propensity to consume lowers and hence the fiscal multipliers are less than unity. This is also called the Ricardian equivalence. On the other hand, Keynesian school of economic thought defends the Keynesian policy of government intervention in times of slack and redundant growth through making government spending and lowering tax burdens so that economy could catch up and through multiplier effect, these policy interventions increase incomes (aggregate) throughout the economy.

Since the Great Recession of 2007-08, Eurozone countries like Germany, Austria, Italy, Greece, Ukraine, Portugal and Spain went into serious debt crisis. Proponents[4] of the former school of economic thought proposed austere fiscal policy for these countries. Except Germany and Austria[5], rest of the countries followed the austerity measures and ended up with further increased pressures on economy. This supports the use of government spending. Other reasons include the failure of monetary policy in some countries, e.g. Japan. Monetary policy of Japan had not been able to induce the economic activity even after applying the Zero Interest Rate Policy (ZIRP), (Kuttner, 2014).

In case of Pakistan, due to limited literature available on the dynamic responses of output to the fiscal policy measures, the study in hand was inspired by the success of fiscal policy tools in the Great Recession and the European Debt Crisis[6], has tried to capture the significance of the fiscal policy in Pakistan through calculating the fiscal multipliers. This study serves the policy makers by proposing the type of fiscal policy suitable for adoption.

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[4] (Mitra & Poghosyan, 2015), (Blanchard & Leigh, 2013) and (Baum, Poplawski-Ribeiro, & Weber, 2012) have proposed the fiscal austerity as a solution to the debt crisis.

[5] These two countries also recovered from the crisis very soon after applying the fiscal stimulus.

[6] By this, we do not mean the debt problem of Eurozone countries was solved but this term, throughout this draft refers to the low growth in the debt struck European countries.

The two possible outcomes for policy proposition of the study are the balanced budget policy and the deficit budget policy. Furthermore, suggestions are proposed based on persistence of multipliers, i.e. short run, medium run and long run. This study bears suggestions based on the estimated empirical results from the impulse responses of the Structural VAR model.

Based on the results we have achieved from our study so far, it could be concluded that in Pakistan, fiscal policy is effective and has the ability to stimulate the economy whenever required. In Pakistani context, this study found the government spending multipliers to be significant, positive and especially the government spending multiplier which was in excess to unity and hence it also conformed to the Keynesian concept of the multiplier.

6.2. Policy Recommendations:

It could be suggested in the light of the results of this study that if Pakistan adopts such a fiscal policy where government spending is done more and more, should benefit the growth rate of GDP. But on the other hand, Taxes also show positive effect on the GDP in the medium run (although only upto to lags, after which it becomes negative according to the standard theory). This suggests that an increase in tax rate will have negative affect the GDP in the short run, positively in the medium run and negatively with near zero magnitude in the longer run. This study hence suggests;

- High positive multiplier of 1.9 and subsequent positive multiplier value of government spending suggests that government spending has an important role in the economic development of Pakistan and hence it should be increased, especially the development expenditure which creates the new opportunities for jobs and new incomes.

- Taxes should be carefully dealt with as it has negative effects for longer period of time in terms of multipliers. So, a suggestion would be to widen the tax base instead of increasing the marginal tax rates so that more revenues could lead to smaller budget deficits. This could be made possible with strengthening of the tax system, adequate tax system, strong tax enforcement, transparency and strong intelligence and investigation system.
- After 18th amendment, provinces have an important role in increasing the tax revenues. Provinces should raise more revenues because more autonomy gives them hold over various direct and indirect taxes. This step would ensure the budget surpluses at provincial level and hence would support the federal budget deficit.

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Appendix

Variance Decomposition

Variance Decomposition

Variance Decomposition of T: Period	S.E.	G	T	Y
1	6.230331	100.0000	0.000000	0.000000
		(0.00000)	(0.00000)	(0.00000)
2	6.321413	98.77684	0.634514	0.588642
		(7.03253)	(5.37951)	(4.76402)
3	6.677051	98.24368	0.802991	0.953327
		(8.00977)	(6.18777)	(5.87827)
4	7.359711	95.38431	2.178610	2.437084
		(9.27718)	(6.74400)	(7.29831)
5	7.653894	92.60207	2.388267	5.009663
		(11.2201)	(7.51676)	(9.11330)
6	8.016421	89.84776	2.278365	7.873878
		(12.8619)	(7.94224)	(10.8312)
7	8.419152	88.76097	2.188215	9.050817
		(13.7411)	(8.14741)	(11.9564)
8	8.724797	86.59906	2.040196	11.36075
		(14.9947)	(8.44006)	(13.2359)
9	9.021493	85.17700	1.934397	12.88860
		(15.9855)	(8.68630)	(14.2483)
10	9.337899	84.01183	1.879826	14.10834
		(16.8220)	(9.05959)	(15.1390)

Variance Decomposition of G: Period	S.E.	G	T	Y
1	9.169436	1.753164	98.24684	0.000000
		(5.80262)	(5.80262)	(0.00000)
2	10.47211	1.459582	85.37200	13.16842
		(6.29606)	(10.8495)	(9.46647)
3	11.23115	3.148269	74.52569	22.32604
		(7.39911)	(11.4499)	(10.2502)
4	11.70908	10.33577	69.03653	20.62771
		(9.79184)	(11.7212)	(9.84390)
5	11.83097	10.14712	67.63825	22.21463
		(9.79639)	(11.8058)	(10.1930)
6	11.86411	10.10285	67.47846	22.41870
		(9.98374)	(11.9616)	(10.3222)
7	12.02601	11.62733	66.20081	22.17186
		(10.5486)	(12.3394)	(10.3742)
8	12.06036	11.82008	65.87247	22.30746
		(10.7810)	(12.5851)	(10.5926)
9	12.10193	11.94900	65.42095	22.63006
		(10.9297)	(12.7938)	(10.8969)
10	12.16325	12.64812	64.80868	22.54319
		(11.4715)	(13.1069)	(11.1160)

Variance Decomposition of Y: Period	S.E.	G	T	Y
1	2.071877	6.409713	1.531112	92.05918
		(7.58457)	(4.88348)	(8.64676)
2	2.295766	10.10606	1.425976	88.46797
		(9.63040)	(5.65916)	(10.4147)
3	2.612034	21.43544	1.699941	76.86462
		(12.7581)	(6.03822)	(13.0978)
4	2.759148	23.10820	1.544863	75.34694
		(13.4308)	(7.02827)	(14.0169)
5	2.915342	26.43329	1.433452	72.13326
		(14.8412)	(7.56915)	(15.3670)
6	3.069101	30.03424	1.496645	68.46911
		(15.9481)	(8.12622)	(16.4670)
7	3.187843	32.05443	1.392128	66.55345
		(16.8826)	(8.58018)	(17.3051)
8	3.304040	34.02821	1.348529	64.62326
		(17.6262)	(8.98358)	(18.0196)
9	3.416721	36.08898	1.311863	62.59916
		(18.4674)	(9.26137)	(18.7500)
10	3.516798	37.49908	1.259070	61.24185
		(19.0871)	(9.62691)	(19.3090)

Cholesky Ordering: G T Y
Standard Errors: Monte Carlo (500 repetitions)

Impulse Responses

Impuse Responses in Tabular Form

Response of T: Period	G	T	Y
1	6.230331	-0.256370	0.000000
	(0.76155)	(0.33319)	(0.00000)
2	0.808987	0.097114	0.484998
	(1.37547)	(0.47041)	(1.21633)
3	2.080505	0.202053	0.435659
	(1.43656)	(0.49919)	(1.31668)
4	2.804506	0.040332	0.946062
	(1.38358)	(0.55817)	(1.36192)
5	1.607168	0.064988	1.270713
	(1.51518)	(0.48871)	(1.41667)
6	1.868324	0.138356	1.457815
	(1.59572)	(0.54166)	(1.51398)
7	2.275256	0.022319	1.164225
	(1.78822)	(0.55982)	(1.63028)
8	1.733594	0.075774	1.494197
	(1.97406)	(0.61099)	(1.89631)
9	1.844530	0.077020	1.357075

	(2.39977)	(0.65703)	(2.12572)
10	1.982916	0.050729	1.346205
	(2.75384)	(0.74440)	(2.52485)

Response of G: Period	G	T	Y
1	1.214098	9.088703	0.000000
	(1.55768)	(1.15820)	(0.00000)
2	0.355834	-3.319462	3.800154
	(2.14922)	(2.03696)	(1.99399)
3	-1.539653	0.618355	3.704133
	(2.35043)	(2.31960)	(2.13098)
4	3.193652	0.803186	-0.345449
	(2.39222)	(2.27057)	(2.17004)
5	0.180301	0.153879	1.677235
	(2.19129)	(2.15365)	(1.92813)
6	0.131800	-0.553395	0.679481
	(1.99576)	(2.03068)	(2.01853)
7	1.611064	0.872981	0.714224
	(1.91907)	(1.86104)	(1.88442)
8	0.613643	-0.264778	0.616972
	(2.05737)	(1.82138)	(1.91420)
9	0.554574	0.021787	0.834607
	(2.11669)	(2.01722)	(2.03734)
10	1.100964	0.260069	0.456314
	(2.40427)	(2.07233)	(2.23903)

Response of Y: Period	G	T	Y
1	1.907913	0.000356	0.524546
	(0.25207)	(0.04300)	(0.36000)
2	0.843173	-0.503541	0.507440
	(0.45656)	(1.32339)	(0.46976)
3	0.762574	-0.323178	0.964280
	(0.48688)	(1.27065)	(0.53037)
4	0.701305	0.906672	0.544724
	(0.55481)	(1.39836)	(0.51866)
5	0.628235	-0.468023	0.698154
	(0.63158)	(1.12738)	(0.55397)
6	0.564446	0.255047	0.763162
	(0.69716)	(1.28072)	(0.57198)
7	0.560378	0.294801	0.654554
	(0.74901)	(1.33397)	(0.63616)
8	0.539747	0.044574	0.676218
	(0.86364)	(1.40783)	(0.72982)
9	0.503090	0.145994	0.705883
	(0.95961)	(1.54443)	(0.88997)
10	0.516233	0.254530	0.651779
	(1.14322)	(1.21 098)	(1.02452)

Cholesky Ordering: G T Y
Standard Errors: Monte Carlo (500 repetitions)