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Fiscal Consolidation and Economic Growth: Insights from the Case of Pakistan

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The primary objective of this paper is to find whether fiscal consolidation has positive impact on economic growth in Pakistan or not, using nonlinear specification. In addition to checking nonlinear relationship between fiscal deficit and economic growth, we also compute optimal level of fiscal deficit that enhances growth, using data from 1976 to 2015. The results show that at the current level, fiscal deficit is positively associated with economic growth but fiscal deficit at a very high level would be damaging for growth. The nonlinear association between fiscal deficit and economic growth suggests that Pakistan would need to keep fiscal deficit in check and keep on practicing fiscal prudence. The analysis of data reveals that although the fiscal deficit has come down over the years, capital, or development, expenditures have also come down. According to the calculations in this paper, the optimal level of fiscal deficit is 0.74 percent of GDP, implying that Pakistan's expenditure composition and tax structure needs to be revisited to achieve higher economic growth.

JEL Classifications: 2SLS
Keywords: Economic Growth, Fiscal Consolidation

1. INTRODUCTION

Ever since its inception in 1947, Pakistan has experienced chequered economic growth but the identification of the underlying causes has hitherto remained elusive. There are many factors that are cited for the haphazard growth experience and one of the reasons singled out is fiscal imprudence. It is argued that in order to achieve high and sustainable economic growth, Pakistan's economy must achieve fiscal soundness, among other things, and to this end fiscal consolidation is advocated. Consequently, fiscal consolidation through increasing revenues and decreasing deficit financing has been the focus of almost all the governments that have come into power, especially since 1990s[1] but the outcomes have not been impressive. Given the amount of debate, fiscal reforms and their impact on economic performance have generated, this paper seeks to explore the fiscal consolidation-economic growth nexus deeper.

A strand of literature on fiscal consolidation shows that the fiscal contraction may stimulate growth [see, for example, Dabrowski (1996): McDermott and Wescott (1996); Perotti (1998, 1999); Gupta, *et al.* (2005) and by Hagen and Strauch (2001), inter alia]. It is argued that prudent fiscal policy, which means low fiscal deficit and manageable public debt, is crucial for sustainable economic growth [Mauria, *et al.* (2013)]. The

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[1]See *Economic Survey of Pakistan 2007-08*, Finance Division, Government of Pakistan.

argument is that if the growth in debt services exceeds growth in revenues, it can lead to economic turmoil [Oblath (1995)]. In such a scenario, fiscal consolidation is advocated, which focuses on elimination of debt and frugality [Gupta, *et al.* (2005)]. At the same time, the literature also emphasises that mere fiscal consolidation may not do the job. Consolidation that focuses on expenditure cuts, especially cuts in current expenditures, is more successful as compared to the consolidation that seeks to achieve increase in revenues or cut in investment [Hagen and Strauch (2001); Perotti (1998) and Alfonso, *et al.* (2006)]. Moreover, the expansionary impacts of fiscal consolidation also depend upon its adoption as a part of broader adjustment program [McDermott and Wescott (1996)].

The evidence, therefore, seems to suggest that growth does not always respond positively to fiscal consolidation [see, for example, Hjelm (2007 and 2002) and Harnandez de Cos and Moral-Benito (2011)]. The ambiguity in the literature about the expected effect of fiscal consolidation on economic growth is the motivation behind the current paper. Our primary objective in this paper is to find whether fiscal consolidation has positive impact on economic growth in the case of Pakistan or not. Specifically, the paper explores the nonlinear relationship between fiscal deficit and economic growth. Examination of the impact of expenditure composition as well as composition of taxes on the long-run economic performance is also part of our objectives. Finally, we also compute optimal level of fiscal deficit that enhances growth the maximum.

The rest of the paper proceeds as follow. The Section 2 reviews the literature on fiscal consolidation. Section 3 is devoted to the explanation of the model used in the paper, while Section 4 discusses the data. Descriptive statistics are presented in Section 5. The econometric technique used in the analysis is presented in Section 6 and the empirical results and findings are presented, and discussed, in Section 7. Section 8 concludes the discussion and also presents policy recommendations. It also highlights different dimensions that need to be explored further on the topic of fiscal consolidation.

2. LITERATURE REVIEW

Different theoretical perspectives are present in the literature regarding the impact of fiscal deficit on growth. The Keynesian view suggests that an increase in government spending would affect the output level in an economy positively. According to this view, during the time of economic recessions, government should engage in active fiscal policy and run a deficit to stimulate aggregate demand. The neoclassical perspective, on the other hand, considers fiscal deficits bad for the economy because increase in government spending leads to borrowing, which puts the pressure on interest rate. As a result of the hike in interest rate, the private investment is crowded out by public borrowing. Furthermore, the effectiveness of the fiscal policy is dependent on time. The lagged response makes it difficult for the fiscal policy to be effective.

The Ricardian Equivalence Hypothesis (REH) posits that individuals anticipate that the increase in government expenditures through borrowing in the current period would lead to higher taxes in the future. The individuals respond to this phenomenon by decreasing demand and therefore the net impact of fiscal expansion may be neutral. The rational expectation models also suggest similar responses to the fiscal policy.

The modern synthesis identifies the automatic stabilisers in the economy, which act counter-cyclically. According to the synthesis, fiscal deficit is a natural phenomenon during recessions whereas fiscal surplus may occur during the expansion phase of the economy. It implies that the economy moves toward full employment equilibrium automatically and the discretionary fiscal policy is impotent and difficult to implement. However, the government can use active fiscal policy to respond to major depressions. The supply side perspective argues that the deficit leads to higher taxes and taxes are always distortionary and change the incentives that affect the supply. The proponents of this perspective believe that the policies that are fully anticipated have no effect on the output level. However, unanticipated policies affect the output level through the supply side.

The theoretical literature on the topic at hand has also spawned substantial empirical literature. One of the earlier empirical studies that triggered the debate on fiscal consolidation and its impact on economic growth was by Giavazzi and Pagano (1990). They took the case of Sweden and Ireland and found that there is an expansionary effect of fiscal consolidation. This expansionary effect emerges due to increase in the private consumption expenditure. The study described four channels through which fiscal consolidation effects the consumption. These channels are tax channel, inflation channel, interest rate channel, and the substitution channel. An increase in the tax rate during fiscal consolidation is regarded as contractionary, while fall in inflation and real interest rate are regarded as expansionary. The fourth channel—the substitution channel—is based on how the consumers regard the provision of public goods, such as provision of schools and hospitals.

McDermott and Wescott (1996) explored the factors that determine the success or failure of fiscal consolidation. The magnitude and the composition of consolidation were identified as important factors in this regard. Hagen and Strauch (2001) also argued that the most of the successful consolidation episodes feature expenditure cuts, especially greater cuts in the current expenditure than in the investment expenditure. Similarly, Alesina (2012) also supported expenditure-reducing fiscal consolidation. Nonetheless, he argued that fiscal consolidation should be done in conjunction with pro-growth policies. Gupta, *et al.* (2005) examined fiscal consolidation for the less-developed countries and concluded that strong budgetary positions are associated with higher economic growth and the composition of expenditures also matters in this regard. Perotti (1999) and Afonso, *et al.* (2006) also found the expansionary effects of fiscal consolidation for central and eastern European countries.

Hjelm (2007) and Hjelm (2002) explored the role of monetary policy and exchange rate in the event of fiscal consolidation. The analysis suggested that fiscal consolidation preceded by real depreciation in the exchange rate was more successful. The author argued that the positive effects of the current account improvement and expenditure reallocation spread through the conventional Keynesian channel. Harnandez de Cos and Moral-Benito (2011) also supported the Keynesian view for the OECD countries.

The discussion on fiscal consolidation is further extended by Perotti (1998), who brought institutional setup in the picture, along with its macroeconomic effects and

implementation. In a similar vein, Angelopoulos and Philippopoulos (2007) introduced the quality of infrastructure into the debate on fiscal policy. The duration and determinants of fiscal consolidation were explored by Illera and Granados (2008) by taking the case of 15 European economies for the period, 1960-2004. Both the parametric and non-parametric analyses yielded that the longevity of fiscal consolidation depended on the level of debt, the quality of consolidation, where the quality of consolidation is measured by the share of primary expenditures in total deficit and the political fragmentation in the economy. The economic variables were found to be robust in determining the duration of fiscal consolidation but the non-economic variables were not robust to different specifications.

Hogan (2004) pointed out the econometric drawbacks of the studies on fiscal consolidation that used panel data. He concluded that the expansion in the private consumption was not enough to offset the contractionary impact of public consumption in an economy. Similarly, Cournède, *et al.* (2013) argued that fiscal consolidation may require increase in harmful taxes and cut down in valuable expenditures. Therefore, it can create difficulties for the government to achieve other policy goals. They stressed the need for structural reforms along with fiscal consolidation in order to achieve short term as well as long term goals.

Nauschnigg (2010) argued that if government reduces its fiscal deficit, or increases its fiscal surplus, then the private sector and/or external sectors need to reduce their surplus or increase their deficit. If this is not followed accordingly, then the economy will move into a recession, which may further accumulate the public debt since lessons from the Great Depression tell us to use expansionary fiscal and monetary policies in order to boost the economy. Pennings and Ruiz (2013) found that fast episodes of consolidation have higher multipliers, thus supporting consolidation at a steady pace. It suggested that consolidation at a steady pace would reduce the adverse effects of fiscal consolidation.

According to Huixing, Leeper, and Leith (2013), fiscal consolidation is effective in a very particular set of conditions. They argued that people form expectations for fiscal consolidation as debt level rises. Both consumers and producers anticipate higher taxes as fiscal consolidation starts due to rise in the debt level. However, consolidation done through spending cuts instead of increased taxes surprise the agents. This condition is dependent on the reputation of the government and when monetary policy is consistent with fiscal consolidation, i.e., when the central bank relaxes monetary policy.

Akram, *et al.* (2011) evaluated the fiscal position in Pakistan by analysing all the expenditure heads, along with their impact on economic growth and poverty. The Pakistani economy is found resilient against the economic recessions but is unable to tackle the deficit problem efficiently, mainly due to the revenue side problems. Fatima, *et al.* (2011) explored the link between the fiscal deficit and investment expenditure keeping in view the importance of investment in the economic growth of a country. The analysis of data, from 1980 to 2009, shows that the deficit problem is primarily due to gloomy situation of revenue efforts.

Apart from fiscal consolidation, optimal fiscal deficit level has also been explored in the literature. Fay and Porter (2006) suggested that the major relevant factors to decide optimal fiscal deficits include (i) intergenerational distributive effects of deficits,

which includes the change in debt burden; (ii) the composition of taxes and spending, especially the way it is spent on different items; (iii) macroeconomic indicators such as growth, savings, and inflation; (iv) national debt levels; and (v) the expected impact of certain political and procedural aspects of the budget process. However, they exclusively focused on the growth enhancing fiscal deficit, ignoring other aspects. Adam and Bevan (2005), using Bootstrap methodology, calculated growth enhancing threshold level of fiscal deficit for developing countries consistent with the productive spending and seignorage financing, which they found to be 1.5 percent of GDP. On the other hand, Onwioduokit (2012) found the optimal threshold level to be 5 percentage of GDP for Western African countries.

3. MODEL

Although the literature review in the preceding section shows that there is no consensus on the effects of fiscal consolidation on economic growth, it highlights one crucial factor which is that fiscal consolidation without regard to revenue-side or expenditure-side consolidation might prove to be counterproductive. Most of the empirical literature on the topic, indeed, shows that expenditure-side fiscal consolidation is more conducive to growth. There is a strong theoretical rationale for pursuing expenditure-based fiscal consolidation as against revenue-based consolidation. An increase in revenues leads the agents to reduce consumption, which could lead to slowdown in economic activity. This is especially important in the case of countries like Pakistan where increase in direct taxes has proved to be immensely difficult proposition for the economic managers. Also, as is well-known, an increase in indirect taxation almost always leads to losses in efficiency, in addition to negative welfare effects.

Similarly, wasteful expenditures could lead to crowding out of the private investment due to public borrowing. The Keynesian perspective opposes fiscal consolidation on the grounds that a reduction in development expenditures may lead to stagnation and unemployment. These theoretical arguments provide strong rationale to pursue the debate on fiscal consolidation for the case of Pakistan, especially consolidation through current expenditure reduction. As will be discussed below, in Pakistan the capital expenditures have come down considerably over the years thereby hampering economic growth. Another factor that is very important is that in the case of less-developed countries, as shown by Gupta, *et al.* (op cit.), there is a strong possibility of nonlinear relationship between fiscal consolidation and economic growth. We have also taken this factor into account in the empirical investigation.

We follow the model used by Gupta, *et al.* (ibid) and regress growth of per capita GDP on fiscal variables, along with a set of non-fiscal control variables. Our model is as follows:

$$\textit{Economic Growth} = f\,(L, K, HK, TO, \textit{Components of Budget Deficit})$$

where *L*, *K*, *HK*, and *TO* are labour force, physical capital, human capital and trade openness, respectively. These are the variables suggested by the economic growth theory to explain economic growth [see, for example, Mankiw, Romer, and Weil (1992); Barro (2003); among others].

The components of budget deficit include revenues and expenditures. We have also bifurcated revenues into tax revenues and non-tax revenues. Tax revenues are further subdivided into direct and indirect taxes. Expenditures are also subdivided into current and capital expenditures. These bifurcations are done to separate the impact of fiscal variables from the effect of traditional variables on economic growth. Gupta, *et al.* (op. cit.) have suggested that the ambiguous association of fiscal variables and economic growth could be due to non-linear association among the variables. To account for the non-linear association, we have also used squared terms of both the budget deficit and the composition of taxes and expenditures.

4. DATA

The time-period used in the paper for the analysis is from 1976 to 2016. Data on both the fiscal and the non-fiscal variables are taken from the Handbook of Statistics of Pakistan 2010 and various issues of the Pakistan Economic Survey. One of the major issues we faced regarding data is the non-availability of data on certain variables on a single base-year. To circumvent this problem, we converted the data to a single base year using the growth projections method.[2] Real GDP growth and real per capita growth are used as proxies for economic growth. Gross Fixed Capital Formation (GFCF) is taken in millions at constant prices, which is also used to construct capital stock series (K). To estimate the capital stock series, data on depreciation rate is obtained from the Penn World Tables (PWT 9.0).[3] Trade openness is measured by adding exports and imports in million rupees and dividing by GNP in million rupees at current market prices. Employed labour force is measured in millions. Primary school and secondary school enrolment rates are used as a proxy for human capital (HK). Time series of primary school and secondary school enrolment rates are obtained by dividing the two rates by population in the relevant age groups, i.e. 5-9 and 10-14 age groups respectively. The enrolment rate data are obtained from the various issues of the Pakistan Economic Survey, whereas population in the age groups 5-9 and 10-14 is taken from UN statistics.

The fiscal variables, namely total revenues, total tax revenues, direct tax revenues, indirect tax revenues, total expenditures, current expenditures, capital expenditures, external and domestic financing of budget deficit, interest payments, and overall fiscal deficit are divided by GDP at market prices to transform each variable in percentage of GDP term. Primary deficit is calculated by subtracting overall fiscal deficit from the interest payments.

5. DESCRIPTIVE STATISTICS

There are numerous reasons cited for high budget deficit, among which, lower tax revenues take the top spot. It has been observed that reduction in revenue collection, in general, leads to reduction in expenditures, especially in the development expenditures. Another important reason for high deficit is the unforeseen circumstances such as floods, earthquakes etc., which leads to higher deficit despite cut in capital expenditures.

[2]Using growth rates of each variable in different years irrespective of their base years to obtain series on one base.
[3]The methodology is given in Appendix A.

In budget 2016-17, the maximum budget (35.5 percent of total budget)[4] was allocated to debt servicing,[5] which is among the major causes of high deficit budget.

Currently, fiscal policy in Pakistan is aimed at encompassing both expenditure- and revenue-based consolidation through prudent expenditure management and efficient resource mobilisation.[6] Government is taking austerity measures to manage fiscal profligacy as a result of which the fiscal deficit came down to 5.3 percent of GDP in 2015 from 7.3 percent in 2008. Similarly, due to expenditure-based consolidation, the government expenditures stood at 20.14 percent of GDP in 2015 as compared to 21.4 percent in 2008. The austerity measures and current expenditure curtailment has made it possible to bring the current expenditures down to 16 percent of GDP from 17.4 percent during the 2008-2015 period. On the other hand, the tax revenues increased from 9.9 percent of GDP in 2008 to 11 percent in 2015. This shows that the measures taken to consolidate the fiscal aspect of the economy have started showing results. But low real growth rate, which was 5 percent in 2008 and 4 percent in 2015, has left a question mark over the success of fiscal consolidation, at least in the short-run. It can be seen from the Figure 1 below that the budget deficit started declining only in 1997 and the process continued until 2004. However, after 2004 the budget deficit again started showing an increasing trend.

Fig. 1. Budget Balance as Percentage of GDP and GDP Growth

Table 1 shows that the average budget deficit since 1976 has been 6.40 percent of GDP. Among several episodes of high and low budget deficits, the maximum budget deficit was in 1976 (Figure B1, Appendix B[7]). On average, deficit was 4.88 percent during 1976-1980. In the first 25 years of the time-period used for analysis in this paper (1976-2000), the average budget deficit was more than 7 percent, while during the last one and a half decades it has remained close to 5 percent, despite it being as high as 8.2 percent of GDP in 2013. On the other hand, average primary deficit has been 2.2 percent since 1976. Few episodes of primary surplus are also apparent in Figure B2, especially during 1997-2004, which shows significant impact of the interest payments on the budget deficit.

Table 1

Trends in Fiscal Variables and GDP Growth

Year	*Budget Balance*	*Primary Balance*	*Tax Revenues*	*Non-Tax Revenues*	*Direct Taxes*	*Indirect Taxes*
1976–2015	–6.40	–2.20	10.95	3.98	2.76	8.20
2001–2015	–5.13	–0.82	9.65	3.66	3.30	6.36
1976–198	–4.88	–0.63	9.54	3.70	3.26	6.28

[4]The calculation is done by taking values from Federal Budget 2016-17: Annual Budget Statement.

[5]Revised estimates of 2015-16 show that share of debt servicing was 35.6 percent of total budget (see Federal Budget 2016-17: Annual Budget Statement).

[6]See Pakistan Economic Survey 2012-13, Finance Division, Government of Pakistan.

[7]The graphical representation of all the variables other than GDP growth and budget balance is relegated to appendix.

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1976–1990	–7.42	–4.71	12.06	4.28	2.00	10.06
1981–1990	–7.01	–3.66	11.98	4.94	2.08	9.90
1991–2000	–6.78	–0.49	11.24	4.00	3.09	8.15
2001–2010	–4.47	–0.23	9.42	3.82	3.18	6.24
2011–2015	–6.46	–2.01	10.11	3.33	3.52	6.58

Year	Current Spending	Capital Spending	Interest Payments	GDP Growth	Per Capita GDP Real Growth
1976–2015	16.67	5.53	4.50	4.93	2.56
2001–2015	15.36	3.57	4.55	4.32	2.16
1976–1980	15.23	3.54	4.54	4.39	2.17
1976–1990	16.49	8.09	3.19	5.87	3.08
1981–1990	17.58	7.30	3.80	6.14	3.10
1991–2000	18.92	4.63	6.39	4.41	2.38
2001–2010	15.08	3.51	4.60	4.55	2.20
2011–2015	15.92	3.68	4.45	3.87	2.05

Note: Calculations are done by excluding FY2016 because FY2016 values are provisional.

Table 2 reports the correlation of the fiscal variables with GDP growth. Although correlation of GDP growth with budget deficit is low, it is positive (5.05 percent), which shows that higher budget deficit is positively associated with growth. Nevertheless, it is not statistically significant. On the other hand, it is negatively correlated (–34.7 percent) with the GDP per capita growth. More importantly, correlation between GDP growth and primary deficit is negative (–31 percent), while correlation between primary deficit and GDP per capita growth is also negative (–56 percent). Moreover, both the GDP and GDP per capita growth are negatively correlated with interest payments, i.e., –41 percent and –45 percent respectively. This implies that the fiscal consolidation along with reduction in interest payments may lead to higher economic growth.

Table 2

Correlation Matrix

	GDP Growth	GDP Per Capita Growth
Budget Deficit (% of GDP)	5.05	–34.76
Primary Deficit (% of GDP)	–30.85	–55.70*
Interest Payments (% of GDP)	–41.21**	–45.12**

Note: * and ** indicate significant at 1and 5 percent level of significance.

Figure B3 also gives interesting insights from the data. We have estimated trend curves using polynomial equation of degree 6. This gives us non-linear movement of each variable. Cyclical movements in both the variables, namely GDP growth rate (GDPG) and per-capita GDP growth (PGDPG), show that as budget deficit declines GDP growth increases and vice versa. This result alludes to the importance of fiscal consolidation to boost growth. This does not, however, imply statistical significance.

A sudden decline is also observed in the tax revenues during the period 1996–2000, from the high of about 13 percent in 1980. Thereafter, tax revenues have remained relatively flat at around 9-10 percent (see Figure B4). Figure B5 shows that a major portion of the revenues comes from tax revenues. The share of non-tax revenues, in total revenues, was less than 20 percent in 1970s, which has now slightly increased to more than 20 percent. The decline in total tax revenues is associated with decline in indirect taxation, while direct taxes have remained almost flat (Figure B5, Appendix B). The share of direct taxes in total tax revenues has increased from 15 percent in 1990 to 35 percent in 1998 but no further increase is evident after 1998, which is clear from Figure 9. On the expenditure side, capital spending has been declining since 1976 from more than 10 percent of GDP to close to 2 percent in 2013 and 2014. On the other hand, although current spending has declined over the years, it is still close to 12 percent of GDP. Interestingly, the share of capital spending in total expenditures, which was more than 40 percent during the late 1970s, has been declining continuously and now it is less than 20 percent.

It may be concluded from the above discussion that continuous decline in the capital spending, as well as in the total tax revenues, along with increase in budget deficit could be one of the reasons for low GDP growth. Therefore, there is a possibility that increase in capital expenditures, coupled with decline in interest payments, may lead to higher economic growth.

6. ECONOMETRIC METHODOLOGY

Theoretically, labour, physical capital, and human capital affect economic growth through production of goods and services. Economic growth, in turn, affects demand for labour, capital and human capital. Similarly, there are several other variables in our model that may be influenced by various other variables not present in the model, potentially giving rise to the problems of endogeneity. To solve the problem of endogeneity, we need more than one instrument because potentially every explanatory variable in the model may be highly endogenous. To circumvent the problem of endogeneity, a linear combination of lagged variables is used as instruments for each explanatory variable. This process of using multiple instruments to get instrumental

variable estimator is known as two-stage least square (2SLS) estimator, which is the estimation technique used in this paper.

2SLS is relatively easier to apply in time series data than in cross section or panel data. In time series, in general, we do not need to find different instruments for each endogenous variable [Woolridge (2009)]. Instead, lags of the explanatory variables do the satisfactory job. The condition is that the number of instruments should be greater than the number of parameters estimated in the equation. The validity of instruments is determined by the J-statistics. The null hypothesis assumes that all the instruments are exogenous. If few instruments are exogenous and few are endogenous then the J-statistics will be large. If null hypothesis is rejected, then we need to look for other exogenous instruments until our null hypothesis is accepted. Furthermore, in order to check the presence of unit-root in the time series of the variables used in the analysis, we employ Augmented Dickey-Fuller (ADF) test.

7. RESULTS AND FINDINGS

As a first step, we checked for the presence of unit-root in all the variables. Table 3 reports the results of ADF test employed to check stationarity. All the variables are taken in the natural log form. The results show that budget deficit, direct taxes, and indirect taxes are trend- stationary but non-stationary if we do not include the trend term in the equation but stationary at first difference. Moreover, capital stock and total expenditures are non-stationary both at level and the first difference; they are integrated of order 2. Apart from these five variables, all other variables are integrated of the same order.

Table 3

Results of Augmented Dickey-Fuller (ADF) Test

Variable	Level	First Difference	Second Difference	I(d)
GDP	–2.25	–5.43*		I (1)
Labour	–1.82	–4.14*		I(1)
Capital	–2.88	–1.61	–3.81**	I(2)
Primary School Enrolment	–2.42	–4.05**		I(1)
Secondary School Enrolment	–2.37	–3.93**		I(1)
Trade Openness	–2.26	–4.52*		I(1)
Budget Deficit	–3.86** (–0.75)	–3.52**		I(0)
Tax Revenues	–3.62** (–1.04)	–3.58**		I(0)
Direct Taxes	–3.34** (–1.45)	–3.90**		I(0)
Indirect Taxes	–2.31	–4.63*		I(1)
Total Expenditures	–1.65	–3.13	–3.92**	I(2)
Capital Spending	–2.07	–3.53**		I(1)
Current Spending	–1.46	–3.59**		I(1)

Note: *, ** and *** indicate significance at 1, 5, and 10 percent level of significance, respectively.

The 2SLS estimation technique, as discussed in the previous section, is used to estimate the parameters of the equation to avoid the problem of endogeneity. Lagged values of the different variables used in the model are used as instruments. Up to 3 lagged values of each variable are used in each regression. The condition on the validity of instruments is that the number of instruments is at least as many as, or greater than, the parameters estimated in the equation. In our case, instruments are greater than the estimated parameters, i.e. $j \geq k$, where j is the number of instruments and k is the number of estimated parameters. Value of J-statistics (see Table 4) show that instruments used in all the four regressions are statistically within a given bound, i.e. in each case, we accept our null hypothesis that all the instruments are valid.

Table 4 reports the results of 2SLS and OLS regressions. In all the equations, the natural log of real GDP is the dependent variable. We have reported the results of OLS regression for the sake of comparison. The results show that the results from the two estimation techniques are similar and the difference is only in the magnitudes of the coefficients. The results show that labour force, capital stock, trade openness, and human capital are positively related with the GDP growth, which is as predicted in the theory. It is important to mention that we also used several dummies to capture the impact of primary deficit, taxation reforms, expenditure changes, regime changes etc. All the dummy variables came out to be insignificant and did not change the magnitude, signs and significance of other variables and for this reason, we have not included those dummy variables in our model.

The Equation 1 is the basic equation estimated in which budget deficit and its squared terms are used as independent variables, along with other control variables. Coefficient of budget deficit and budget deficit squared shows that association between GDP and budget deficit is non-linear. This implies that some budget deficit is good for growth but it starts to affect economic growth negatively once it crosses a certain level. It shows that some fiscal consolidation is needed to keep the deficit under control to boost growth.

Fiscal consolidation, as discussed above, in general, is more successful when it is done by cutting down expenditures. However, fiscal consolidation may also be achieved by raising revenues since raising the revenues leads to reduction in budget deficit. To see the impact of revenues and expenditures on economic growth separately, in Equation 2 (Table 4) we have used total revenues and total expenditures instead of budget deficit. The results are significant and in line with the results found in the literature; that is, very high expenditures are negatively associated with GDP growth.

In Equation 3 we have only included components of total expenditures, namely only current and capital expenditures, along with other control variables, omitting components of revenues. Capital spending and current spending in Equation 3 affect GDP growth positively, while the squared terms of both the variables have negative association with the GDP growth. Interestingly, current expenditures turn out to be significant and positive in affecting the GDP growth, whereas the coefficient of capital expenditures, though positive, is insignificant. The insignificant association of capital spending could be due to lower share of capital spending in total expenditures and the nature of capital spending. Development expenditures, especially on social sector, are

quite low in Pakistan and probably it is for this reason that capital expenditures are not a significant factor in explaining GDP growth.

In Equation 4, we have included the components of tax revenues; that is, direct taxes, indirect taxes, capital spending, and current spending, along with total expenditures and other control variables. Direct and indirect taxes show insignificant association with the GDP growth. This implies that an increase in revenues may not enhance growth. This gives another indication that our tax structure is not growth enhancing and we need structural changes in the tax regime. Although taxation distorts production and create inefficiencies in the economic system, taxation policies are a tool used to boost equity to give government space for expenditures where markets fail. In order to make the taxation system growth friendly, reforms are needed to increase the tax-base instead of increasing the existing tax rates, which increase the tax burden on existing tax payers. The coefficient of total expenditures in Equation 4 is both positive and significant. This result, coupled with the result that direct and indirect taxes are not significant in explaining growth, has important implications. It means that increase in revenues may not effect growth directly but through increase in expenditures, particularly through increase in capital expenditures.

Table 4

Results of Ordinary Least Squares and 2-Stage Least Squares Regression

Dependent Variable: Natural Log of Real GDP								
	Equation 1		Equation 2		Equation 3		Equation 4	
Variables	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Constant	–3.36**	–2.87**	4.07	2.28	–2.28	–6.43***	2.17	4.47***
Labour	0.91*	1.04*	0.34**	0.41**	0.14	0..06	0.40**	0.46*
Capital	0.54*	0.50*	–0.04	–0.03***	0.49**	0.90*	0.17	–0.04
Primary School Enrolment	–0.16**	–0.17	0.14***	0.13	0.10	0.06	0.13***	0.16
Secondary School Enrolment	0.30*	0.43*	–0.01	0.07	–0.02	0.001	0.00	–0.01
Trade Openness	–0.02	–0.06***	0.03	0.07	–0.04	0.01	0.03	0.03
Budget Deficit	0.96*	0.94**						
(Budget Deficit)^2	–0.04*	–0.04**						
Total Revenues			–0.66	–1.88**	–0.68	–1.19**		
(Total Revenues)^2			0.03	0.08**	0.03	0.05***		
Direct Taxes							0.12	0.15
(Direct Taxes)^2							–0.01	–0.01
Indirect Taxes							–0.58	–0.88
(Indirect Taxes)^2							0.03	0.04
Total Expenditures			1.67*	2.87*			1.35**	1.64**
(Total Expenditures)^2			–0.06*	–0.11*			–0.05**	–0.06**
Capital Spending					0.52	0.40		
(Capital Spending)^2					–0.020	–0.01		
Current Spending					1.11*	1.69*		
(Current Spending)^2					–0.04*	–0.07*		
R^2	0.9978	0.9968	0.999	0.9980	0.9992	0.9988	0.9989	0.9986
	0.9973	0.9960	0.9987	0.9973	0.9989	0.9982	0.9985	0.9980
F-statistic	2033	1286	3296	1419	107.2	1770	102	1603
J-Statistic		18.01		12.09		10.18		16.57
Prob.		0.39		0.74		0.75		0.41

Note: *, **, *** indicate significant at1, 5 and 10 percent level of significance, respectively.

One of the contributions of the present paper is the calculation of optimal level of budget deficit that enhances growth. Onwioduokit (2012) used lowest residual sum of squares and Fay and Porter (2006) used bootstrapping methodology to calculate threshold level of fiscal deficit. We have calculated growth maximising optimal level of budget deficit using the first order conditions. Using the estimates of Equation 1 (Table 4) the optimal level of fiscal deficit comes out to be 0.74 percent of GDP. This optimal level of budget deficit that would enhance the growth to its potential level is surprising and indeed impracticable. For the West African Monetary Zone, Onwioduokit (2012) estimated the optimal level of fiscal deficit at 5 percentage of GDP, while Fay and Porter (2006) got 1.5 percent level for developing countries. Pakistan has never achieved such low level of fiscal deficit as a percentage of GDP.

It must be borne in mind, however, that the calculation is ex-post and not ex-ante. It is argued above that in Pakistan revenues, especially those collected through indirect taxation, are very low, current expenditures are high and capital/development expenditures are low as well. Therefore, given these factors and trend of these variables in the data, it should not come as a surprise that the optimal level of fiscal deficit, as a percentage of GDP, is so low. What it essentially means is that in order to grow, Pakistan needs to rev up revenue collection and increase capital expenditures.

8. CONCLUSIONS AND POLICY RECOMMENDATIONS

This paper has made an attempt to explore the association between fiscal variables and economic growth in Pakistan, following the discussion and functional form used in Gupta, *et al*. (op. cit). Our results suggest that there exists nonlinear association between fiscal deficit and growth and reduction in fiscal deficit beyond a certain level may be growth-enhancing. However, given the current levels and structure of revenues, taxation, expenditures, and fiscal deficit, our results do not show that fiscal consolidation would enhance growth.

One of the important conclusions drawn from the analysis is the negative correlation between growth and interest payments. Negative correlation is also found between primary deficit and growth, which strengthens the result that we need to reduce our primary deficit to boost growth. Primary deficit combined with higher interest payment will be a double blow to the economy and therefore it is extremely important to curtail both the interest payments and the primary deficit. An important implication of the present paper is that our tax structure is not beneficial for the growth process. The positive association of both direct and indirect taxes with growth is insignificant from which we may conclude that increase in tax revenues will not enhance growth. It is very much possible that growth effects tax revenues and not the other way round. At the same time, we cannot preclude the fact that tax revenues increase fiscal space which may affect growth indirectly through increase in capital expenditures.

Following Abdon, *et al.* (2014), it may be argued that spending on the social sector may enhance long-term growth but to spend on the social sector government needs fiscal space. To increase the fiscal space, we need more revenues, which has not happened for the last many decades despite several ineffective tax efforts. Another way is the reduction in expenditures by cutting down our interest payments, curtailment of the inefficient use of expenditures and reduction in leakages, which eat into resources

and are highly unproductive. Very high levels of expenditures, especially current expenditures, have negative impact on growth, while capital expenditures have positive impact on the long run growth. Development expenditures have externality effects and also have higher multiplier effect but they should not come at the cost of crowding out of private investment. The share of capital expenditure has been declining despite persistent budget deficit, which may be one of the reasons why capital spending is insignificantly associated with growth. It shows that capital expenditures incurred in the past have not been very productive.

Finally, one surprising result of our analysis is the very low threshold level of fiscal deficit to GDP ratio. It practically implies balanced budget, which is not possible, at least in the case of Pakistan because it is operating well below its capacity utilisation potential. What it suggests is that Pakistan needs to enhance tax revenues, reduce current or wasteful expenditures, and raise capital expenditures. Furthermore, such a low level of fiscal deficit is not possible when interest payments are too high. As far as optimal level of growth enhancing fiscal deficit is concerned, Amador (1999) concludes that in the case of proportional intervention costs, the optimal ceiling depends positively on the cost parameter and on the variance of the budget deficit, while the optimal ceiling depends negatively on the average budget deficit. We have not included intervention costs, variance of fiscal deficit and average budget deficit in the paper. Moreover, fiscal deficit creates problem with increase in debt, thus in future research it is one of the areas that should be explored.

There are a few important lessons that can be drawn from the results and analysis in this paper. At the current level, capital spending is not contributing to growth in a significant way. There is a need to boost capital spending in those areas that are highly productive and efficient. What has been hurting Pakistan is high share of interest payment, in the government's financial commitments. Even though it is extremely difficult to curtail interest payments, government can reduce future interest payment obligations through prudent borrowing. The required increase in tax revenues to meet government's financial commitments will take time and monumental efforts but in the short-term policy-makers can focus on withdrawing exemptions given through infamous statutory regulatory orders (SROs) and withdrawing subsidies where they are not needed to increase tax revenues.

APPENDIX A

CAPITAL STOCK[8]

The capital stock series is estimated using data on Gross Fixed Capital Formation (GFCF) in constant prices and capital stock depreciation rate.[9] The data on depreciation rate is obtained from Penn World Tables (PWT 9.0). One of the most widely used methods to estimate capital stock is Perpetual Inventory Method (PIM). The idea behind PIM is that capital stock is an inventory, which increases with investment. The investment stays in the economy once it has entered the system, though it depreciates over time at some rate, but

[8]The discussion in this sub-section is based on Berlemann and Weselhöft (2014).

[9]Some authors assume constant depreciation rate but we have used, following Berlemann and Weselhöft (ibid.), time-varying depreciation rate.

never reaches zero [Berlemann and Weselhöft (2014), p. 4]. The name Perpetual Inventory Method is derived from this so-called "perpetuality" of investment.

The net capital stock at the beginning of period can be written as a function of net capital stock at the beginning of period, , , *investment in the previous period , and consumption of fixed capital stock, . Hence, we have:*

... ... *(1)*

Assuming capital stock depreciates at the rate , we can write capital stock as:

... ... *(2)*

Iteration of this equation backward up to the initial period leads to the following equation:

... ... *(3)*

The PIM requires an estimate of initial capital stock in order to arrive at a series of capital stock for subsequent years. One way is to guess the initial value and then estimate capital stock for later years, using data on GFCF but it is highly arbitrary. Another method reported in the literature to obtain the initial capital stock is to use the following equation:

... ... *(4)*

where *is initial capital stock, in period , is GFCF in period , is growth rate of GFCF for the entire period for which the capital stock period is to be estimated, and is capital stock depreciation rate. The rationale behind using the above equation to estimate initial capital stock is that capital stock and investment grow at roughly the same rate and growth rate of investment can be used to approximate initial capital stock. Following Berlemann and Weselhöft (ibid.), we regress GFCF on time to derive initial investment for the period , using data from to . Specifically, the following equation is used to estimate initial investment, using the OLS method:*

... ... *(5)*

Next, using the estimated parameters, and from Equation 5, we calculate fitted value of investment for period :

... ... *(6)*

This gives us a series of investment, ranging from to , using exponential function. We use the first value of fitted investment for to calculate initial capital stock, using Equation 4. Instead of calculating growth rate of investment, , *calculated from the data, we use b as a measure of trend investment growth. Capital stock for subsequent years is then calculated using Equation 1 above.*

APPENDIX B

Fig. B1. Budget Balance

Fig. B2. Budget Deficit and Primary Deficit

Fig. B3. Share of Tax and Non-Tax Revenues

Fig. B4. Share of Current and Capital Spending

Fig. B5. Share of Direct and Indirect Taxes

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