Estimating the Effects of Fiscal Policy on Economic Growth in Pakistan: A Time Series Analysis

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ARTICLE DETAILS	ABSTRACT
History *Revised format:* *Nov 2019* *Available Online:* *Dec 2019* **Keywords** Fiscal policy, Economic growth, time-series, ADF, co-integration test, VECM, Pakistan	This paper is an effort to inspect the reverberations of fiscal policy on economic growth inshort along with long run. To fulfill this purpose, annual time series data for the period 1980 to 2014 is employed. At first, Augmented Dickey-Fuller (ADF) unit root test is used to check stationarity of data. The results of ADF test denote that growth rate of gross domestic product, total government revenues, total government expenditures, fiscal deficit,physical capital, and labor force participation rate are stationary at first difference, I(1). Secondly, we deploy Johansen-Juselius co-integration test to examine long run associationof fiscal policy and economic growth. The results of this test reveal long run association offiscal policy and economic growth. Finally, we treat variables by using Vector Error Correction Model (VECM) to examine short run dynamics as well as long run causal relationships. The results of this model indicate long run causal association of fiscal policyand economic expansion.

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Introduction

In an economy many variables are responsible for growth. According to many economists,the subject of growth is incomplete unless fiscal policy is included as a valuable factor in growth procedure. Government interference in the working of an economy is due to the fact that market imperfections are not a rare phenomenon. Prices and wages tend to be sticky and automatic forces fail to put the economy in economically better situation so, government's actions can be justified easily.

Great depression of 1930s pushed the United States into an economic downfall where employment opportunities were at low level and people started to migrate to western countries in search of employment. Keynes (1936) put stress on government's interventionin the form of

fiscal policy for efficiently working of the economy. Economic downfall held its roots once again in USA in 2008 and at that time fiscal policy accelerated the economic growth. So, in today's global world its importance has much more emphasized.

Governments all over the world frame and apply public policies. A public policy, in simplewords, also called fiscal policy. Fiscal policy is an effective tool to influence economic growth. The topic of fiscal policy is infinite and have various aspects convoluted. There has been a clear accord of economists that taxation and spending structure of an economyis a strong fiscal tool of the government to accomplish many goals. The most important objective may be to realize economic growth as fiscal studies show its importance in an empirical manner. Government's magnitude in advanced economies is much larger than evolving economies, so in developing economies there is much fiscal space and government can remediate actions of producers and consumers.

Fiscal policy plays a key role in attaining higher growth. It is frequently concerned with tax revenues and government expenditures. Fiscal policy aims can be allocation, redistribution, stabilization, and encouragement of economic progress, among whicheconomic progress is most important as theory identified.

Two common standpoints are listed concerning to role of fiscal policy in enriching economic growth. The ordinary neoclassical growth framework represents that course of long-run economic growth is resolved by advancement in quantities of labor, capital (physical & human), and technological growth. If public policy is able to augmentthe enticement of private sector to save and further to invest, it will modify capital/output ratio. Consequently, towering GDP growth rate will expedite per capita income, but it is possible only in the short run. In the long-term initial level of GDP growth will be restored. Chamley (1986) was also presented the same viewthat fiscal policy effects growth only in short run and it has no long run impact on growth.

Many modern economists are agreed on the point that government policy can shapethe economy. When government spends more, aggregate demand increases which brings about growth. To evaluate the impact of public policy on growth, endogenous growth patterns are used. These economists employed "Endogenous Growth Prototype" with some improvements. Agenor (2010) used endogenous framework to observe the impacts of public policy.

An important feature of research in the field of fiscal policy is to examine partially the longand short run upshots of fiscal policy. This departure is indispensable as this is the major dissimilarity between neoclassical and endogenous styles.

Moreover, the objective of this work is to probe the implications of effects of fiscal policyon economic growth underlying the economic environment of Pakistan. The study unveilseither tools of fiscal policy have positive or negative implications on economic expansionor public policy has no influence on economic growth

In addition to this, the significance of undertaken study is that it will have deeper impacts on national as well as individual level. As it will offer fiscal options if government will actupon them, these will not only contribute to growth but will also certainly effect lives of citizens and deliver them better choices to raise their level of living.

Literature Review

Many studies discussed the fiscal policy stance and its linkage with growth considering different fiscal rules. Findings are mixed depend upon the time period, data types, and techniques. Some studies have used aggregate measures and some others used disaggregated measures of fiscal

policy. Different categories of government spending are used and different types of taxes have employed. That's why results also vary. Sample sizeis the main factor in this regard. It is also noted that by using same estimation methods andvariables, results differ because of change in time period.

Abdon et al. (2014) investigated link between fiscal policy and its probable effect on economic conditions of Asia. Economic scenario of the region revealed government's intervention is at lower level and it should be more in order to make the region economically more influential. Property taxes have a more crucial effect on economic growth as compared to direct taxes.

This piece of work defines the effect of different fiscal policy variables in Nigeria. The results approve that expenditures move faster as compared to revenues. Evidence suggests that government expenditures positively interrelate with economic services and growth. Inaddition, it is also observed that better working of private sector is conditioned with the firmness of government sector as evinced by Agu et al. (2015).

Ahmad and Sheikh (2011) investigated that among other developing economies, Pakistan'stax share to GDP is very low. The paper covers the tax reforms being imposed in the last two decades. They assessed that in Pakistan, tax structure is characterized by inelasticity, non-neutrality, complexity and inefficiency. Later 1970s, with the help of policy makers and international financial organizations, many endeavors have been taken to recover tax structure. It was discovered that objectives of enhancing public receipts, upgraded tax scheme and providing tax awareness to public were not accomplished. The causes of ineffective modifications were at both political and administrative levels.

Ahmad et al. (2016) examined the interrelationship between aggregate tax proceeds and growth of economy in scenario of Pakistan. They utilized time-series sample for the period1974-2010. Their analysis was based on both short and long periods. They discovered thattotal tax income collected by government exerted negative influence on economic progress for longer periods. They observed that upsurge in total revenues by 1% reduces economicexpansion by 1.25%.

Ahmed (2011) searched the contribution of government policy in growth process of Pakistan by employing annual data pertaining to 1982 till 2010. Revenues and expenditureswere also included in the analysis. Revenues were sub-divided into two categories i.e. taxand non-tax. In addition, revenues of both federal and provincial government werecalculated to get better understanding regarding the revenues' effect. Expenditures were classified into developmental and non-developmental expenses. Empirical evidence disclosed that revenues from non-tax sources positively affected growth at both government levels. But revenues from taxes were significant only in case of federal government and negatively contributed to economic growth. Expenditures on developmental projects enhanced growth while non-developmental outlays exerted no effect on growth.

Ali and Ahmad (2010) carried out a study to examine whether growth level is disturbed byfiscal policy. The economy of choice was Pakistan. Up to a certain level, fiscal deficit is positively related with economic growth but above that level there is persistence of negative relationship. The results are consistent with the theory as positive relationship exists for temporary period. The bond turns to be negative for the longer period.

During the years 2000 to 2012, growth rates have been not so good in prospect of Nigeria.In industries like agriculture and services, there was indication of growth, but overall economic condition of economy was disappointed. The factor behind was that fiscal policymeasures were not satisfactory in nature and policy was not fully executed as propoundedby Asaju et al. (2014).

Attinasi and Klemm (2016) concluded that positive effects of fiscal consolidation were more as compared to its negative effects.

Baffes and Shah (1998) scrutinized that military expenditures showed negative connection to output growth as depicted by one half of the economies included in the sample. Barrell et al. (2013) employed NiGEM to indicate the magnitude of spending and taxation multipliers in perspective of diverse economies facing dissimilar circumstances. This approach was used to estimate the impacts of a one percentage point decrease in budget deficit by concentrating on eighteen developed countries. The value of fiscal multipliers is comparatively smaller in more integrated economies. Spending multipliers acquires larger value than others. Multipliers depend on government actions as the values of fiscal multipliers are larger if government actions are temporary, otherwise not.

Bernardi (2013) concluded that shifting of tax burden during last decade was not pervasive and enormous as believed. The tax shift put conflicted effects on economy in the short run and possibility was that it may intensify the economic collapse due to the acceptance of deterring fiscal policies in the European countries. Bhattarai (2012) clinched in his paper that through fiscal policy, economic growth and income distribution both can be obtained simultaneously. Government policies related to taxation can boost economic growth as well as reduce income inequality. Brons et al. (2000) asserted that connections among fiscal policy, private investments and output growth are complicated and diverse.

Buti and Gaspar (2015) explained that economic situations of the today's world demand for a fiscal policy to face challenges linked with global growth. They recommended that renovation of fiscal policy is required to solve issues associated with today's economies and especially in Euro area. The best way to overcome country specific problems regarding development is to restructure automatic stabilizers of fiscal policy although not so easy as tax and expenses policies integrated with the economy may contrast with bestowed benefits.

Djelloul et al. (2014) focused on interrelationship between public policy and economic advancement. The Panel analysis confirms association between fiscal policy and economic growth in the long run. Causal relationship also exists between budgetary revenues and economic growth. Moreno-Dodson (2012) concluded that counter-cyclical fiscal policy is a good choice to avoid fiscal shocks during economic fluctuations. Engen and Skinner (1992) inferred that government spending and distortionary taxation have robust effects on output growth but in negative way. Cross-country regressions were used based on data of 107 economies. It was also noticed that factors like tax system in terms of administration and magnitude of tax base also count when effect of fiscal policy on economic growth is concerned.
Gemmel et al. (2011) reconnoitered the influence of fiscal policy on growth. They used distortionary and non-distortionary tax revenue and productive and unproductive government expenses as symbols of government policy. They investigated that the impact of fiscal variables rest on their type. Economic advancement is negatively impacted by distortionary tax revenue and unproductive expenses whereas productive expenses will encourage economic advancement as long as non-distortionary revenue are utilized to sponsor them.

Kakar (2011) revealed that the relationship of fiscal policy variables is more emphasized in milieu of prolong period as compared to short duration because variables explaining fiscal policy have long run implications in case of Pakistan. Madni (2013) scrutinized the deliberate effect of various types of fiscal outlays on the economic events. These expenses are functionally divided into productive group and unproductive group. Further division of productive class describes the positive or impartial footprints onto economic growth whereas unproductive class elaborates

negative or neutral impacts onto growth. The study duration was 1979 till 2012. Findings recommend that productive spending has no influence when its consequences are probed on economic circumstances of Pakistan. Unproductive spending referred its negative contribution for growth.

Munir and Sultan (2016) discovered the aftermath of tax revenues on growth with regards to Pakistan. Real GDP was employed as a representative variable for economic growth. The separate reactions of direct and indirect levies were checked. They exposed equally temporary and permanent effects of taxes. Direct tax revenues were taken into account as a whole but indirect tax revenues were employed apart. The results endorsed that direct taxes and indirect taxes like custom duties, General Sales Tax (GST), and surcharges had positive reverberations with real GDP both in short and long span of time.

Nazir et al. (2013) also found negative interrelation between economic growth and government spending whereas taxes exert positive effects on economic growth. This study is specific to Pakistan's economic conditions and also stressed on long duration coalition between budget policy and production.

Nijkamp and Poot (2004) in a deep inspection of many research studies, explained the upshots of fiscal policies on long-term economic growth. They scanned that 17% of research scholars debated that positive link allying public policy and economic expansion; 29% discussed that the said position was negative; and 54% argued that no relationship exists as findings were statistically insignificant.

Padda and Akram (2009) noted that high ratios of implemented taxes have destroying effects on economic expansion in Pakistan, but the significant impact is temporary and not permanent.
The connection between fiscal drain and economic enlargement was inquired by Rizvi et al. (2010). Data range in-between 1979-2008 was exploited. Fiscal depletion for developmental purposes increases growth either it is short or long run. It was also noted that fiscal payouts depend upon economic augmentation.

(SDPI, 2013) explains that taxes are important for an economy's growth. The features of a good tax scheme are simplicity, transparency, impartiality and ease to pay taxes. Tax structure in Pakistan has many flaws and might not be labelled as fair and just. The costs of tax collection are high. Certain sectors enjoy tax immunities while others not. Administration is inefficient and collected revenue are less than the needs of economy. Revenue collected as a share of GDP is comparatively low than other evolving markets. As a result of tax alterations, there was an enlarged number of tax-filers and enhanced revenue were utilized to complete different projects. Due to reforms, revenue increased to 17 percent of GDP during 2011-2012. It is suggested that better results can be obtained if deregulation of economy is adopted with these tax reforms.

Srithongrung and Juarez (2015) investigated the impacts on economic growth occurred by tax dues and investment spending in different states of Mexico. The time period was 1993-2011. Taxes influence growth negatively either the relationship is temporary or long lasting. Taylor et al. (2012) unveiled of presence of powerful positive association of primary fiscal divergence with economic growth in the USA. Turrini (2008) accounted for reactions of fiscal policy to business cycles. The study focuses European countries and data lengths from 1980 to 2005 period. The variables employed were taxes and government expenses. Fiscal policy behavior was checked both in good and bad economic circumstances. The culmination reveals that fiscal policy was expansionary during economic boom indicating pro-cyclical inclination of fiscal policy whilst no strong corroboration was found out to regarding cyclical partiality of government policy during

recession. Further exploration discloses government expenditures were purely responsiblefor this occurrence. The research also evaluated the powerful and weak expenditure policies and derived that these expenditure regimes may resolve fiscal policy inclination during economic boom.

Velnampy and Achchuthan (2013) subject to Sri Lankan economic conditions and time- series analysis, also scrutinized that impacts of fiscal divergence on financial progression are neutral having insignificant results.

Theoretical Framework
In general, fiscal policy is divided into two main components:

Government Revenues
Government Expenditures

These are called two hands of public policy. The one hand i.e. government revenues collectmoney from the public and the other government expenditures, spend it to maintain a balance between income and spending.

A vast empirical literature focused on the association concerning fiscal rule and economic progress casing diverse fiscal measures. As fiscal measures are viewed, different fiscal proxies are taken into account as aggregate expenditures, aggregate tax revenue, differentcategories of government expenses and tax revenue, fiscal deficit, balance of payment deficit, primary fiscal balance etc.

Literature shows that economic growth depends on physical capital, labor force participation, total government revenue, total government expenditures and fiscal deficit. So, our work is based on how and to what extent these variables effect the economic growthof Pakistan.
So, the underlined work selected combination of variables as Growth rate of Gross Domestic Product (GRGDP), Physical Capital (KP), Labor Force Participation rate (LFP), Total Government Revenues (TOTRV), Total Government Expenditures (XPEND), and Fiscal Deficit (FISDF).

We use proxy variables as representatives of major variables. For physical capital, most common proxy is gross investment rates as this is verified through a study conducted by Barro (1991). The proxy designated to labor is labor force participation rate. In literature, commonly used proxies for fiscal rule are fiscal revenue (different categories), fiscal expenditures (different classes) and deficit. We are hiring total government revenue, total expenditures and fiscal deficit as policy variables.

Theoretical Scheme
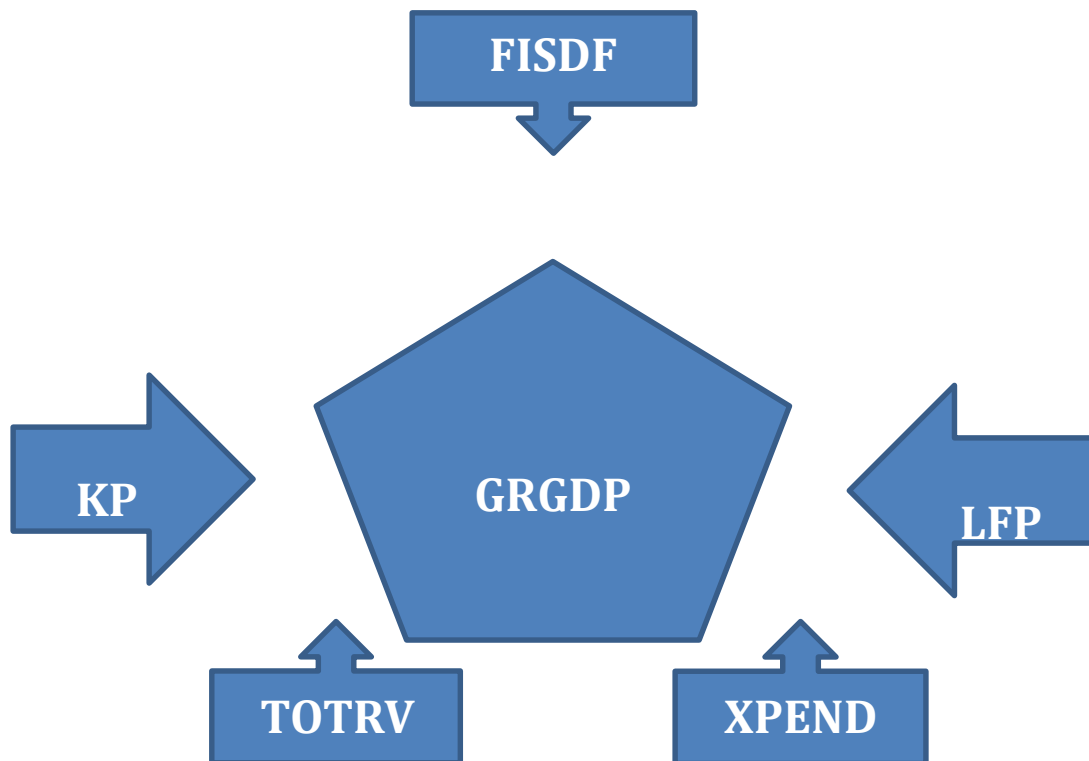
Source: Created by author

Model Originating Framework
We make use of the growth accounting framework and for this purpose standard Cobb-Douglas production function is utilized which is of the form given below:-

$$G_t = T_t KP_t^{\gamma} LFP_t^{\delta}\ FISPOL_t^{\sigma} \varepsilon t \tag{1}$$

Transforming model (1) into log form, we get

$$\mathbf{LogG_t = LogT_t + \gamma LogKP_t + \delta LogLFP_t + \sigma LogFISPOL_t + Log\varepsilon_t} \tag{2}$$
Where

$$\mathbf{LogT_t = a}$$

$$\mathbf{Log\varepsilon_t = \varepsilon_t}$$

$$\mathbf{LogG_t = a + \gamma LogKP_t + \delta LogLFP_t + \sigma LogFISPOL_t + \varepsilon_t}$$
$$\tag{3}$$

As equation (3) shows that

GRGDP = (**KP**, **LFP**, **FISPOL**)   (4)

As,
FISPOL = **TOTRV**, **XPEND**, **FISDF**   (5)

So, we can write it as

GRGDP = (**KP**, **LFP**, **TOTRV**, **XPEND**, **FISDF**)   (6)

Econometric Model
An econometric model shows the relationships among specific variables by employing economic theory, mathematical representation and statistical measures to forecast the model. We are employing linear model notifies one to one relationship.
In linear terms, the equation (6) takes the form as below:

$$\textbf{GRGDP}_t = \Omega + \Omega_1\textbf{KP}_t + \Omega_2\textbf{LFP}_t + \Omega_3\textbf{TOTRV}_t + \Omega_4\textbf{XPEND}_t + \Omega_5\textbf{FISDF}_t + \varepsilon_t \quad (7)\text{Where:}$$
Ω = Intercept Coefficient

Ω_1 to Ω_5 = Slope Coefficients

t = "1980……. 2014"

ε = Error Term

GRGDP = Growth rate of Gross Domestic ProductKP =
Physical Capital
LFP = Labor Force Participation rate TOTRV =
Total Government Revenues XPEND = Total
Government ExpendituresFISDF = Fiscal Deficit

Data Sources and Methodology
Data sources are assumed as:

WDI (database of WB)

Handbook of Statistics on Pakistan's Economy (Publication of SBP)

The data range consists of 1980 to 2014. It is the data type that is not common in use in fiscal studies.

Model estimation process is to be done in following three steps:-

First Step
ADF unit root test will be used to make sure that given series are stationary to continue further analysis. In examining the time-series data properties, different tests are used to check the stationarity but the most important one is ADF unit root test. AugmentedDickey-Fuller (ADF) test was presented by Dickey and Fuller (1979). It was first called DF test as it was based on the assumption that autocorrelation does not prevail in the model. But in the presence of autocorrelation, the test was useless. So, its developers redesigned it to overcome the problem of autocorrelation and augmented the lagged values ofdependent variable then it named ADF test.

Second Step
Johansen co-integration test is applied to know the strength and nature of long run relationship between the variables of our model. Johansen-Juselius (1990) and Johansen (1988) developed this test. The test also called Unrestricted Co-integration Rank test used to designate the long run equilibrium relationship. This test actually investigates the long run relationship between co-integrated variables or the variables that are stationary at first order I(1).

Third Step
In this final step, VECM is used to find out the nature and degree of temporal causality between the variables. Vector Error Correction Model (VECM) provides insight to short and long-term connections of our concerned variables. In this model, "error" refers to the deviation of a time series from its long run equilibrium and "correction" mentions the speed followed by underlying series to return to its equilibrium in long run. The test is based on Restricted VAR and was settled by Sargan (1964).

Estimations and Results
The estimated coefficients for above mentioned techniques are given in tables 1, 2, and three respectively.

Estimated Coefficients of ADF Test
In Table 1, results of ADF test for unit root are displayed. These results express that all concerned variables are not stationary at level I(0) but are stationary at first difference I(1).It means variables are co-integrated and can be employed for further attestation.

Estimated Coefficients of Johansen-Juselius Co-integration Test
In table 2, the findings lead to the existence of long-term relationship among GRGDP, KP,LFP, TOTRV, XPEND, and FISDF. Both test statistics i.e. Max-Eigen and Trace statistics provide same results.

Estimated Coefficients of VECM
In table 3, it is evident that no short run relationship exists between independent and dependent variables. It was attested by applying Wald statistic on obtained short run coefficients from VECM. Contrary to this, presence of long run relationship among variables is proved as Error Correction Term (ECT) is significant. It can be stated as due to fiscal variables joint in action with fundamental factors of growth, GDP growth turned to its equilibrium point at the speed of 113%.

Table 1: ADF Test for GRGDP, KP, LFP, TOTRV, XPEND and FISDF

Variables	Level			First Difference		
	Constant	Trend and Constant	None	Constant	Trend and Constant	None
GRGDP	-2.15	-2.51	-1.23	-7.27*	-7.23*	-7.36*
	(0.22)	(0.31)	(0.19)	(0.00)	(0.00)	(0.00)
KP	-1.40	-2.58	-0.88	-5.06*	-5.03*	-5.07*
	(0.56)	(0.29)	(0.32)	(0.00)	(0.00)	(0.00)
LFP	-1.74	-2.48	1.09	-7.67*	-7.45*	-7.61*
	(0.40)	(0.33)	(0.92)	(0.00)	(0.00)	(0.00)

TOTRV	**-1.91**	**-3.26**	**-0.61**	**-5.71***	**-5.61***	**-7.83***
	(0.32)	**(0.08)**	**(0.44)**	**(0.00)**	**(0.00)**	**(0.00)**
XPEND	**-0.67**	**-2.22**	**-0.93**	**-3.48***	**-3.92****	**-4.54***
	(0.84)	**(0.46)**	**(0.30)**	**(0.00)**	**(0.02)**	**(0.00)**
FISDF	**-2.54**	**-2.96**	**-0.99**	**-7.33***	**-3.89****	**-7.44***
	(0.11)	**(0.15)**	**(0.28)**	**(0.00)**	**(0.02)**	**(0.00)**

*shows significance at 1% level **shows significance at 5% levelP-values are expressed in ( )
    Source: Generated by author

Table 2: Johansen-Juselius Co-integration Rank Test for GRGDP, KP, LFP, TOTRV, XPEND and FISDF

Null Hypothesis [H0]	Alternative Hypothesis [H1]	Trace Statistic	Critical Value	Max-Eigen Statistic	Critical Value
r= 0	**r≥1**	**126.00*** **(0.00)**	**95.75**	**59.48*** **(0.00)**	**40.07**

*shows 5% significance levelP-values re expressed in ()
Source: Generated by author

Table 3: VECM for GRGDP, KP, LFP, TOTRV, XPEND, FISDF

ECT(-1)	**-1.13*(-2.71)**
R^2	**0.54**
S.E.	**1.82**
Short run Error Correction Estimates	
D(KP(-1))	**1.09** **(1.54)**
D(KP(-2))	**1.03** **(1.68)**
D(LFP(-1))	**-1.18** **(-1.53)**
D(LFP(-2))	**0.67** **(0.98)**
D(TOTRV(-1))	**-1.29** **(-1.57)**
D(TOTRV(-2))	**-0.14** **(-0.30)**
D(XPEND(-1))	**0.95** **(1.79)**
D(XPEND(-2))	**0.39** **(1.04)**
D(FISDF(-1))	**0.20** **(0.69)**

D(FISDF(-2))	0.42
	(1.84)

<center>*shows 5% significance level t- statistic in parenthesis ()
Source: Generated by author</center>

Conclusion

We can conclude that Growth rate of Gross Domestic Product (GRGDP), Physical Capital(KP), Labor Force Participation rate (LFP), Total Government Revenues (TOTRV), TotalGovernment Expenditures (XPEND), and Fiscal Deficit (FISDF) have no short-term association but are bound in a long-term relationship.

As it is concluded that in long term Physical Capital (KP), Labor Force Participation rate (LFP), Total Government Revenues (TOTRV), Total Government Expenditures (XPEND), and Fiscal Deficit (FISDF) were the factors that influence Growth rate of GrossDomestic Product (GRGDP). Literature about fiscal policy draws importance of these variables in permanent growth process. Growth process remains incomplete, if these variables are not taken into account. In particular, together these variables affect growth ina very powerful manner in perspective of long run.

Policy Recommendations

Government should surge tax revenues to prosper the Pakistan's economy as verified by empirical findings. But it should also kept in mind that revenues shouldheighten by imposing direct taxes rather than indirect taxes as burden of direct taxesis already more on people.

Public expenditures should also raise in order to obtain economic expansion. In thisregard, productive expenses should escalate but not at the cost of fundamental provisions of life.

Although the effect of fiscal deficit is positive but it is suggested that government should try to maintain it at a certain level so that it may not be able to impede growthdue to increase in debt stock in the long-term.

Physical capital stock should also proliferate as concerning to our economy, groundrealities also favor our findings. As Pakistan is a developing economy so there is need to accumulate capital for endurable growth.

Labor Force Participation should also escalate to reach higher economic expansion.In Pakistan, unemployment is not a rare situation. Government should provide workto people so on one side, they will be employed and on the other economy will develop.

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