The Impact of Decentralized Public Spending on Economic Growth: A Time Series Analysis for Pakistan

Muhammad Shahid
National College of Business Administration and Economics, Lahore, Pakistan
Abdul Farooq and Ahmad Nawaz
Department of Management Sciences, COMSATS Institute of Information Technology, Lahore ,Pakistan

Abstract

The study has examined the impact of decentralized public spending on the economic growth of Pakistan from 1972 to 2016. For examining the stationarity of variables, Augmented Dickey-Fuller (ADF) unit root test is used. Autoregressive Distributed Lag Approach (ARDL) is used for cointegration among the variables of the model. The estimated results of the study show that decentralized education and health expenditures have positive and significant impact on economic growth of Pakistan. Furthermore, the study shows that decentralization of education and health expenditures is growth enhancing. On the basis of results of interaction terms of health expenditures decentralization with political freedom, and education expenditures decentralization with political freedom, economic growth can be enhanced if people get more political freedom. Our results suggest that health and education expenditures carried out by provincial governments can be beneficial to economic growth if people have more political rights and provincial governments have more autonomy.

Keywords: education and health expenditures, decentralization, political freedom, economic growth.

One of the important policy variables for achieving economic efficiency is fiscal decentralization. The autonomous units can be more efficient, innovative and responsive through decentralization. It is believed that decentralization has positive relationship with economic growth because it can formulate social policies that are desired and can be implemented. Effective governance can be achieved by empowering the provincial governments. It unites different segments of federation thereby making it possible for the central government to prosper economic development efficiently and effectively (Tiebout 1956). Financial and administrative autonomy gives more powers to lower level governments. Sub-level governments can help in achieving better administration by central government with the aide of power devolution.

There are no information barriers in decentralization setup as sub-level governments are well informed and know the basic needs as required by inhabitants living across different areas of country. It helps to explore and utilize resources in a locality and promotes competition among the provinces for providing better services to the people. These are the factors that positively influence the economic development.

Fiscal decentralization (FD) is a powerful tool that sets targets for economic growth and removes unwanted interference of central government. Decentralization is a process which devolves the resources and administrative responsibilities from central level to sub level governments (Rondinelli 1981). Thus decentralization is the process of devolution of powers from center to sub-level governments in a way that resources can be utilized efficiently for improving living standard of people by sharing the work load of central government. The studies have developed different outcomes. Some studies have found supportive and substantial relationship between real GDP and FD (Iimi, 2005, Baskaran et al. 2016). Whereas some of the authors have deduced negative or no relationships between real GDP and FD (Davoodi and Zou, 1998; Rodriguez-Pose and Bwire, 2004; Thornton, 2007; Baskaran and Feld 2013, Hasanov et al. 2016). According to (Thieben 2003) an inverted U-shaped link was observed between real GDP and FD.

The financial aspect of decentralization can be dangerous if it is not planned properly because provinces can switch their costs to each other (Hagen et al. 2000; Rodden et al. 2003, Filpetti and Sacchi, 2016). The taxation system in Pakistan is centralized being a federal controlled unit. The government collects huge amount of resources and redistributes it among the provinces for the correction of fiscal gaps. The positive role of FD can be comprehended in the presence of well-defined institutional framework. This reduces corruption by increasing accountability of public officials in the political system which provides a foundation for resources to be allocated that leads to GDP growth. The current development in the area of fiscal decentralization integrates the contribution of institutions in the theorem of fiscal federalism. The basic Tiebout (1956) mechanism can be strongly realized with high level of political freedom (PF). There must be adequate channels for the citizens to prompt their inclinations in public goods and services for efficient decentralization process. The appropriate decisions in fiscal sense be implemented by the local governments with the condition that people choices are reflected in public decision making (Shah & Thompson; 2004).

The government of Pakistan has taken various steps to make the process of FD stronger. The revenue sharing process has been going on since the foundation of Pakistan. An autonomous body National Finance Commission, NFC (1951) was constituted by law to redistribute these resources. NFC awards have to be announced after every five years period for transparent distribution of fiscal resources. On the basis of 1973 Constitution, seven NFC Awards have been announced for revenue sharing. Unfortunately, the system of fiscal distribution could not perform accordingly and it lacks efficiency to settle fiscal resource imbalances among parts of the center. Recently, the two main improvements have been undertaken by the government of Pakistan while announcing the 7th NFC Award and passing the 18th Constitutional

Amendment. In both the steps taken, a large amount of resources and a broad variety of fiscal responsibilities have been relocated to the provinces. Through these developments, the division of powers would be shifted between the center and the province. The provinces would have more self-sufficiency in undertaking many tasks like macroeconomic management and facilitation of public goods and services.

This study focuses on finding the impact of level of FD and changes in the level of FD on economic growth in Pakistan during the 1972 to 2016 period. In order to attain this aim, we analyzed whether there is a significant link between FD and economic growth exists or not. In order to fill research gap, the main objective of this study is to find the effect of decentralization of education and health expenditures with the complementarity of political freedom. The role of political institutions is examined in explaining the growth effects of fiscal decentralization. The modeling framework of this study is endogenous growth model supplemented by the measures of fiscal decentralization and political institutions.

Literature Review

The impact of FD on GDP per capita growth is generated from general theory of fiscal federalism that describes the structure for the transfer of responsibilities to different tiers of governments. The economic efficiency can be generated through the process of fiscal decentralization (FD) in traditional theory of fiscal federalism. Majority of literature on FD continues to substantiate the supposedly positive effect of getting better financial autonomy to sub-national governments to boost production and distributive efficiency direct to economic development. This point of view at the back of possible positive link between FD and economic performance is based on simple principles. The fundamental, but often ignored principle of fiscal decentralization entails resource mobilization. The sub-national governments are being granted more tax autonomy and funds for the resource mobilization in their own region, instead of waiting for the availability of public goods and services from remote central authority. In this way the economic efficiency can be enhanced across territories and localities within a country using available resources.

Tiebout (1956), and Oates (1972 and 1993) argued that provision of public goods and expenditures for collective and basic infrastructure promote development if performed by lower tier of governments as these governments have more information regarding the preferences of the citizens. These advantages through FD can be more evident in larger countries with heterogeneous characteristics. In small and homogeneous countries, the delivery of public goods and services may be restricted to the local level. It is because diverse preferences of individuals promote economic efficiency through FD.

Davoodi and Zou (1998) used data over the period from 1970-1989 for 46 countries and found mixed results. They couldn't find any association between FD and economic growth in case of developed countries but found a negative relationship in case of developing countries. They observed that developed countries were more decentralized than developing countries. The authors pointed out the problem concerning measurement of fiscal decentralization, was the share of subnational government expenditures to total government expenditures. This measure did not present the sign of autonomy for subnational government expenditures in decision making.

Zhang and Zou (1998) used provincial panel data on different levels of governments during 1978-1992 and examined that expenditure decentralization had negative relationship with economic growth of provinces in China for the case of higher degree of decentralization. The results were significant and robust for negative association between FD and growth of GDP per capita across provinces of China. The outcomes were not in line with traditional theory of fiscal federalism of positive association between FD and economic growth. The understanding behind these surprising results might be due to current level of development in china where central government was restricted for public investment to develop basic infrastructure. Hence, there was a positive and significant association between development expenditure of central government and economic growth while provincial government spending and economic growth were negatively associated.

Woller and Phillips (1998) had studied a sample of 23 Least Developed Countries (LDCs) over the period 1974-1991 for the outcome of association between FD and growth rate of GDP per capita. The results suggested that inverse relationship was found between revenue decentralization and rate of economic growth but these results were weak by using averages of five-years for the explanatory variables. They had found statistically insignificant association when examining annual data and averages of three-years or amongst the other three variables of decentralization. Therefore, their study had failed to set up any systematic, strong association between the degree of FD and growth rate of GDP per capita among the selected sample of 23 LDCs. However, the results recommended that the fiscal structure of country had influenced economic growth rate and these effects would be found at rural economic development or at the local level in LDCs.

Akai and Sakata (2002) estimated the effect of fiscal decentralization more impartially for the reason that the data set carried little historical, institutional and cultural variations. They used state-level data set of the US and found positive association between fiscal decentralization (FD) and growth rate of GDP per capita. The evidence provided the contribution of fiscal decentralization to economic growth and suggested that current development in FD might fuel economic

growth in developed countries. This finding was in line with theoretical results but previous results were denied.

Thieben (2003) examined the long-run pragmatic association between FD and economic growth, total factor productivity, capital formation for the high-income OECD countries. The level of FD had converted into an intermediate level over the last 3 decades among the large number of high-income countries in OECD. The theoretical justification in favor and against FD clarifies this trend, because disadvantages for economic growth had been associated extreme centralization and decentralization. The analysis showed that there existed a positive relationship when FD was rising from low levels, arrived at a crest and then became negative. The policy implication recommended by the author was that various countries where the level of FD had been relatively low could increase to enhance growth.

Martinez-Vazquez and McNab (2003) found indirect association between FD and growth rate of GDP per capita while studying its impact on macroeconomic stability for 66 countries from 1972 to 2003. They investigated the association between FD, inflation and growth rate of GDP per capita and established the hypothesis that in high-income countries; decentralization might support price stability while it is distorted with respect to transitional and developing countries. Although, it was clear that poorly implemented fiscal decentralization might be disadvantageous for sub national governments for attracting more borrowings relative to their debt-servicing capacity which further leads to macroeconomic instability. Among high-income countries, decentralization leads to price-stability by giving more autonomy and generating own revenues but the mechanism through which this happened was not well recognized and it must be investigated.

Thornton (2007) used a cross section data set for 19 members of OECD for the period of 1980-2000 to analyze the association between FD and growth rate of GDP per capita. Current literature on the association between FD and economic growth have not provided appropriate results in determining decentralization of revenue by considering level of the autonomy in taxation arrangements at the lower tiers of governments. In practice, the revenue decentralization is overstated in this way. The results suggested that when sub-national governments got full autonomy, measuring fiscal decentralization over revenue, the impact of FD on growth rate of GDP per capita was statistically insignificant.

Malik et al. (2007) found mixed results regarding the association of FD with growth rate of GDP per capita in Pakistan. The decentralized expenditure has positive and significant impact on economic development. Whereas there is statistically insignificant impact on economic development when decentralized expenditure is calculated after subtracting defense and interest expenses. The other ratio decentralized revenue has negative relationship with economic growth.

At the initial stage of development, the central government was constrained with inadequate resources for public investment such as poverty reduction, defense, energy, debt servicing, highways etc. Such type of infrastructure development might have significant outcome for economic growth. The fiscal decentralization would be beneficial if expenditures and revenue assignments are carried out according to the level of economic development.

Rodriguez-Pose and Ezcurra (2010) analyzed the current levels of fiscal decentralization for the period of 1990 to 2005 in case of 21 OECD countries. The analysis showed that FD caused more harm as compare to beneficial for economic development. The FD has negative and significant connection with economic performance and strong results evidenced by including administrative and political decentralization. It didn't matter whether by preferences for particular categories of expenditures or came across the revenue or expenditure side of decentralization taken by lower tiers of governments. There found to be linear association with little inverted U-shaped sign: FD has negative impact on growth rate of GDP per capita and it constantly raised with the increase in level of FD in the OECD countries.

Samimi et al. (2010) found that fiscal decentralization had positive and significant influence on real GDP output of Iran. In the light of traditional theory of fiscal federalism, the results were consistent that FD usually made positive contribution to local economic growth. The most important focus of the research was to get evidence of non-linear association between FD and economic growth for the provinces of Iran. They set up an analytical model to provide fundamental results of FD and economic growth by using panel data of cross-province with fixed-effect regression model for the period of 2001-2007.

Iqbal and Nawaz (2010) used period of 1979 to 2010 to investigate the relationship between FD and macroeconomic stability and found inconclusive results. This paper was the first attempt to research the impact of FD on macroeconomic stability in Pakistan by applying Misery index. The evidence revealed a positive and significant association of FD and macroeconomic stability. The analysis depicted much weaker results in case of expenditure decentralization. The authors concluded that expenditure decentralization had been dependent upon intensity of revenue decentralization in restricting macroeconomic instability. The study also favored the procedure of fiscal decentralization in case of Pakistan's economy. In this regard, government of Pakistan has taken positive steps through 7th NFC award along with 18th Constitutional Amendment, which would be beneficial for the prosperity and macroeconomic stability in Pakistan.

Nguyen and Anwar (2011) examined the empirical association between FD and real GDP output by using panel data of 61 provinces of Vietnam. They found that fiscal decentralization had received significant place during the mid of 1990s in Vietnam. The analysis was carried out

by considering two different time periods; from 1996 to 2001 under State Budget Law 1996 and for the period 2002 to 2007 under State Budget Law 2002. The empirical analysis showed that expenditure decentralization is negatively associated with real GDP output whereas revenue decentralization is positively linked with real GDP output in Vietnam. Faridi (2011) concluded that FD was a source of improving public sector efficiency and hence led to economic development. To analyze the relationship of FD and Economic growth, Time series data was used for the period of 1972 to 2009. The results came up with the conclusion that both revenue and expenditure decentralization were positively linked with growth rate of GDP per capita in Pakistan.

Iqbal et al. (2013) found existence of positive association between revenue decentralization and economic growth. Revenue generating responsibilities added positive externalities which ultimately raised per capita income. The expenditure decentralization was negatively associated with economic growth in Pakistan. The low quality of institutions was the main reason leading to high level of corruption and the lack of accountability of public officials. The second reason was the inadequate physical infrastructure for desired results of expenditure decentralization. Composite decentralization positively contributed to economic growth. The analysis also showed that democratic institutions play a significant role to comprehend the benefits of FD. It had also examined that in order to promote economic growth, FD and democratic institutions are complement to each other.

Baskaran and Feld (2013) examined the effect of FD on economic growth for 23 OECD countries from 1995 to 2008. The analysis considered two different measures of FD. The Government Finance Statistics (GFS) style measure indicated that they found insignificant relationship between fiscal decentralization and economic growth. The other measure which accounted for the autonomy of sub-national taxation resulted negatively but was statistically significant. These results confirmed the baseline findings with the decentralized variables of own taxation but sometimes they have insignificant impacts. Thornton (2007a) had used cross-sectional data and same measures of own tax decentralization but couldn't find any relationship between fiscal decentralization and economic growth. For policy implications, the results suggested that fiscal decentralization didn't contribute more in economic growth. However the results didn't recommend avoiding the fiscal decentralization.

Filpetti and Sacchi (2016) investigated link between FD and economic growth in different institutional backgrounds among twenty one OECD countries from 1970 to 2010. They found that growth impact of FD relies critically on the autonomy of regional governments in raising tax revenue. The decentralization of taxes led to increase economic growth when combined with higher level of political and administrative decentralization. Tax decentralization (TD) is more

favorable for development if sub-level taxes succeed generally from self-governing revenues such as property taxes.

The existing literature primarily overlooks the role of political freedom in making the FD process effective with few exceptions. For example, Iimi (2005) integrates the role of political institution in analyzing the role of FD. His study finds that political institutions and FD complement each other in promoting economic growth. Iqbal et al. (2013) incorporates the role of democratic institutions in analyzing the effectiveness of FD process to enhance economic growth. Furthermore, the existing literature also ignores the role of disaggregated decentralized expenditures to promote economic growth of Pakistan. Henceforth, there is a clear need to re-examine the growth effects of decentralized public spending especially with respect to different types of decentralized current expenditures at the country level by using appropriate estimation methodology and measures of FD.

Historical Overview of Fiscal Decentralisation in Pakistan

Fiscal decentralization (FD) takes place due to inequality between generating revenue capability and expenditures demanded. The most crucial part of decentralization mechanism is reallocation of resources among the federal and provincial governments to overcome revenue and expenditures imbalances. The legislative arrangements are required for financial transfers between national and sub-national governments. It is observed that the mismatch exists between revenue generation capacity and actual expenditures requirements among different tiers of governments across developed and developing countries. Whereas, in case of Pakistan there is a serious mismatch has been observed in the sub-national revenue generation and expenditures. The statistics show that provincial governments generate only 18 percent of total revenue. On the other side, provincial governments incur approximately 38 percent of total expenditures (Pakistan statistical year book). This mismatch between revenue generation and expenditures arrangements among federal and provincial governments promotes to a huge amount of financial transfers from federal government to provincial government. Such resource distribution and transfers are implanted under the constitution and supported by legislative arrangements. The transfers from federal to provincial government normally contain revenue shares, straight transfers, grants, loans and collection of provincial revenues by federal government and shifted to provinces after deducting service charges (e.g. royalties on crude oil and gas).

The Structure of Government in Pakistan

The federation of Pakistan is governed under the constitution of 1973. The functions of the federal government and of each province are specified in the constitution of 1973. Under the federal legislative, the federal government is responsible for undertaking the functions. The

functions of federal government also include regulation and services. Functions of service nature include external affairs, foreign aid, defense, national highways, railways; stock exchanges, currency etc. (see Table 1). There is a simultaneous legislative list of functions performed by either federal or provincial or both other than the functions mentioned earlier. These functions include social welfare, education, population planning and tourism. Left over functions such as irrigation, agriculture extension, police and the justice are primarily the responsibilities of provincial governments. The district governments have not been formally part of the constitution, though they were part of Legal Framework Ordinance (LFO) of 2002 and now they got provisional amnesty under the 17th amendment.

The National Finance Commission (NFC) and Fiscal Federalism

A well-established mechanism exists in Pakistan for the reallocation of resources from federal to provincial governments. National Finance commission (NFC) is constituted for the inter-governmental transfer of resources. According to the constitution 1973, federal government was responsible to announce the NFC award every five years' time. The finance commission was nominated to propose and evaluate the process of resource distribution in Pakistan. The federal government collects the resources dispersed among the provinces. The resource distribution from central to provincial government is determined by some formula. Population has been the only criterion for distribution of resources since independence till 2009 in Pakistan. The new criterion was established for the distribution of resources in the 7th NFC award. To re-define share of each province in 7th NFC award, the following four indicators are used: (1) population, (2) poverty, (3) revenue generation capacity and (4) inverse population density (IPD) (Table 1).

Table 1. *Sharing Criterion in all NFC Awards*

Award	Sharing Criteria
NFC 1974	Population (100%)
NFC 1979	Population (100%)
NFC 1985	Population (100%)
NFC 1991	Population (100%)
NFC 1997	Population (100%)
NFC 2006	Population (100%)
NFC 2009	Population (82%) Poverty (10.3%) Revenue (5%) IPD (2.7%)

According to new formula, population has major share of 82 percent while the share of poverty is 10.3 percent, revenue generation capacity has share of 5 percent and IPD has 2.7 percent share. In the divisible pool, share of each province has varied over time (Table 2).

Table 2. *The Provincial Share (Percent) in Divisible Pool*

Award	Punjab	Sindh	KPK	Balochistan
NFC 1979	57.97	23.34	13.39	5.30
NFC 1991	57.88	23.28	13.54	5.30
NFC 1997	57.37	23.29	13.54	5.30
NFC 2006	57.37	23.71	13.82	5.11
NFC 2009	51.74	24.55	14.62	9.09

The share of Punjab based on its population in the 1991 NFC award was 57.88 and there was a slight cut in 2006. However, according to new distribution formula, the share of Punjab has declined to 51.74 percent in the 7th NFC award 2009. The share of Sindh was changed from 23.29 percent in 1991 to 24.55 percent in 2009 with the revised distribution formula. The share of KPK was changed from 13.54 in 1991 to 24.55 in 2009. In the same way, the share of Baluchistan was increased from 5.3 percent in 1991 to 9.09 percent in 2009 with the revised formula.

Theoretical Framework

The subject matter of fiscal decentralization (FD) considers the devolution of responsibilities for revenue collection and public spending from national to sub-national governments. Davoodi and Zou (1998) analyzed the impact of FD on growth by using endogenous growth model. The study is extension of endogenous growth model (Barrow 1990) with the assumptions that government expenditures are taken into account by federal, state and local tiers of governments. The empirical investigation of the impact of fiscal decentralization (FD) on economic growth through Ordinary Least Square (OLS) estimation has been conducted in a number of studies. The several studies made out problem of possible endogeneity and reverse causality between FD and growth [e.g. Zhang and Zou (1998); Lin and Liu (2000); Thiessen (2003)]. Martinez-Vazquez and McNab (2003) investigated the reverse causality in case of growing economies whether FD is beneficial or at higher levels of economic development more decentralization is required? However, due to small sample sizes the existing studies did not resolve endogeneity or the complexity in deciding suitable instruments exception of Iimi (2005). The OLS estimates give inconsistent and biased results under this condition. The instrumental variables (IV) estimation techniques are applied to tackle the problem of endogeneity.

There are two tiers of government in Pakistan: federal and provincial. In Pakistan, government spending is taken out by federal and provincial governments. The total public spending is the sum of the federal and provincial level expenditures. The benefits of FD can take place if development of FD is matched with good institutions. The role of institutions is vital to apply the decentralization theorem effectively. Iimi (2005) incorporated the interaction term of FD with political

institutions by extending further this framework. Following Iimi (2005), the modified model to confine the relationship among FD, political institutions and economic growth is as:

$$GDPg_t = f\left(\text{FD}_t, PF_t, X_{it}\right)$$

(1)

where

$GDPg$ is the growth rate of per capita output,

FD is the fiscal decentralization measures,

PF represents political freedom,

X is a set of control variables,

μ is the error term and

$t = 1, 2, \ldots, N$.

X consists of those control variables which have been used frequently in growth literature such as Mankiw et al. (1992), Barro and Lee (1996) and Sala-i-Martin (1997).

The measure of political freedom (PF) is incorporated in Eq. (1). The motive of introducing political freedom is that it has strong association with decentralization process and ultimately with economic growth in a sense that one might believe in benefits of FD depend on political freedom. If political freedom is low in a country, the benefits of FD based on Tiebout (1956) mechanism might not be realized. The benefits of FD might be realized in case of high political freedom. The interaction term FD*PF is of particular interest as it allows to test the hypothesis that FD and political institutions are complements to each other. An important aspect to be noted is that higher level of decentralization systems in both cases of fiscal and political terms may cause more corruption.

The model of disaggregated expenditure decentralization for Pakistan becomes as:

$$GDPg_t = \beta_0 + \beta_1 EED_t + \beta_2 PF_t + \beta_3 EED * PF + \beta_4 PhC_t + \beta_5 INF_t + \mu_{it}$$

(4.2)

$$GDPg_t = \beta_0 + \beta_1 HED_t + \beta_2 PF_t + \beta_3 HED * PF + \beta_4 PhC_t + \beta_5 HC_t + \mu_{it}$$

(4.3)

where

- EED is the Education Expenditure Decentralization,
- HED is the Health Expenditure Decentralization,
- EED*PF shows interaction term of education expenditure decentralization and political freedom,

- HED*PF indicates interaction term of health expenditures decentralization and political freedom.
- PhC is the measure of physical capital, Gross fixed capital formation growth rate (GFCFG) is used as proxy of physical capital,
- INF is the measure of inflation rate,
- HC represents Human Capital; secondary school enrollment is used as a proxy of human capital.

β_0, β_1, β_2, β_3, β_4 and β_5 are the scalar parameters and β is the estimated vector of parameters.

The ARDL Model to Cointegration

To find long-run relationship among different variables of time series, various techniques and methods are available. To test long-run relationship, Engle and Granger (1987) used co-integration approach, Phillips and Hansen (1990) used modified OLS procedure and maximum likelihood method by Johansen-Juselius (1990). Pesaran further extended this approach when variables of same order included in the model are combined. This test is not fit for small sample size because it has a major consequence of low power. Hence, the ARDL approach was used by Pesaran and Shin (1999) and extended it further by Pesaran et al. (2001). For several reasons, this approach has been used in case of multivariate models.

Firstly, the ARDL can be applied whether the basic regressors are stationary at level $I(0)$, purely at first difference I(1) or mix order of co-integration (Pesaran, 1997). Secondly, the ARDL is more efficient and better for small sample size (Mah, 2000) than other developed techniques (Engle and Granger, 1987, Philips and Hansen, 1990 and Johansen, 1991). Thirdly, this approach selects the adequate lags among the data generating method in the framework of specific modeling (Laurenceson et al., 2003). Pesaran and Shin (1990) argue that the ARDL gives comprehensive variation of the orders to overcome the problem of residual serial correlation and endogeneity. For the short-run dynamics and long-run equilibrium, the ARDL has better statistical approach as compared with Engle-Granger technique because the former is based on Vector Error Correction Model (VECM) and the latter is residual based (Pattichis, 1999). The ARDL is not applicable in case of $I(2)$ variables. It is required to represent an equation in a conditional ARDL model in concern to the bound testing methodology as follows:

$$\Delta GDPg_t = \beta_1 + \beta_2 GDPg_{t-1} + \beta_3 FD_{it-1} + \beta_4 PF_{t-1} + \beta_5 X_{it-1}$$

$$+ \sum_{k=1}^{p} \beta_k \Delta GDPg_{it-k} + \sum_{j=0}^{p} \delta_j \Delta PF_{t-j} + \sum_{n=0}^{p} \gamma_n \Delta X_{it-n} + \mu_{it}$$

(4.4)

where the notation Δ shows change in variables.

The study will find the trend of association between variables in bound testing of Wald test in case of Pakistan. The following factors are necessary for applying Wald test: (1) integration order I(d) of the variables in ARDL model (2) whether intercept, trend or both are incorporated in the ARDL model (3) the number of explanatory variables in the ARDL model. The calculated F-value is compared with tabulated F-value developed by Pesaran and Pesaran (1997) or Pesaran et al. (2001) and additionally developed by Narayan (2005). The null hypothesis can be rejected if the F-statistic is greater than upper critical value in spite of integration order of the variables I(0) or I(1). It means that long-run relationship exists among variables. The null hypothesis cannot be rejected if F-statistic is less than lower critical value. However, if the F-statistic falls between upper and lower bounds, the test is inconclusive. When all the variables are stationary at first difference I(1), the decision criteria is based on upper critical value. If all the variables are stationary at level i.e. they are I(0), the decision criteria is based on lower critical value. The null and alternative hypotheses for cointegration test on the basis of above equation are given as:

$$H_0 : \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0 .$$

It states that there exists no cointegration among the variables.

$$H_1 : \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq 0 .$$

It states that there exists cointegration among the variables.

If long-run cointegration relationship among variables confirms then the following Vector Error Correction Model (VECM) is needed to find short run relationship among the variables:

$$\Delta GDPg_t = \beta_1 + \sum_{k=1}^{p} \beta_k \Delta GDPg_{it-k} + \sum_{j=0}^{p} \delta_j \Delta PF_{t-j}$$

$$+ \sum_{n=0}^{p} \gamma_n \Delta X_{it-n} + \varphi ECT_{t-1} + \mu_{it} \qquad (4.5)$$

where ECT_{t-1} represents one time period lagged error correction term. The ECM specifies the adjustment speed back to the log-run equilibrium after a short-run shock. The diagnostic tests are carried out to ensure the goodness of fit of ARDL model. The sensitivity tests check the autoregressive, normality, heteroscedasticity, conditional heteroscedasticity and serial correlation related with the model.

Construction and Descriptions of Variables
The present study covers the time span from 1972 to 2016. Construction of the variables, their definitions and data sources are given as below:

Fiscal Decentralization Measures

It is important to establish measures of fiscal decentralization to examine its role empirically. In literature on budget data, there are two methods which are used to compute FD, one is decentralization of expenditure and the other is decentralization of government income. Expenditure decentralization (ED) is calculated by dividing sub-national public spending on the aggregate public spending (aggregate of national and sub-national). Oates (1972) describes revenue centralization as a ratio of the central government revenue to the total government revenue and expenditure centralization as a ratio of the central government spending to total public spending. With regards to the mentioned literature and data availability, the following measures of different types of expenditure decentralization are constructed.

Education Expenditures Decentralization

The ratio of provincial government health expenditures to total government health expenditures (Provincial as well as federal) is termed as Health Expenditures Decentralization. The education expenditures decentralization is defined as the ratio of provincial government education expenditures to total government education expenditures.

$$EED = PEE / PEE + FEE$$

where EED, PEE and FEE are 'Education Expenditures Decentralization', 'Provincial Education Expenditures' and 'Federal Education Expenditures', respectively. The data for this variable is obtained from Pakistan Statistical Year Book (various issues) published by Pakistan Bureau of Statistics, Government of Pakistan.

Health Expenditures Decentralization

The ratio of provincial government health expenditures to total government health expenditures (Provincial as well as federal) is termed as Health Expenditures Decentralization.

$$HED = PHE / PHE + FHE$$

where HED, PHE and FHE are 'Health Expenditures Decentralization', 'Provincial Health Expenditures' and 'Federal Health Expenditures', respectively. The data has been taken from Pakistan Statistical Year Book (various issues) published by Pakistan Bureau of Statistics, Government of Pakistan.

GDP Per Capita Growth Rate

The dependent variable GDP per capita growth rate (GDPPCG) is used as proxy of economic growth rate. The descriptive statistics table shows average growth rate is 2.1 for the period of 1972 to 2016. The data for the variable has been obtained from World Development Indicators published by World Bank.

Political Freedom

The Political Freedom is an average Index of Political Rights Index and Civil Liberty Index. The Index ranges from 0(Full Freedom) to 7(No Freedom). The average value of political freedom is 4.75 ranges from 3 to 6. The data has been taken from Freedom House. The freedom house established in 1972, a New York based independent think tank. This institution makes annual assessment of civil liberty and political freedom in the world.

Human Capital

The proxy of secondary school enrolment is taken as human capital. The data is taken from various issues of Economic Survey of Pakistan.

Physical Capital

The Gross Fixed Capital Formation Growth rate is used as a proxy of Physical Capital. The data for this variable is taken from World Development Indicators published by World Bank. Some studies came up with positive association of physical capital and economic growth (Jan et al., 2012).

Inflation Rate

The Inflation Rate is in annual percentage and the data has been collected from World Development Indicators published by

World Bank. The average value of inflation is 9.57 ranges from 2.91 to 26.66.

Table 3. *Descriptive statistics*

Variables	Obs.	Min.	Max.	Mean	Std. dev.
GDPPCG	45	-1.914040	6.602479	2.106378	1.986446
PF	45	3.000000	6.000000	4.756098	0.830075
GFCFG	45	-6.264080	19.90114	3.526490	6.110654
HC	45	405.9000	2753.000	1269.544	728.2636
INF	45	2.914135	26.66303	9.573054	5.368416
EED	45	0.548048	0.975944	0.853277	0.086505
EEDPF	45	2.466217	5.440202	4.052322	0.786694
HED	45	0.564127	0.988198	0.793366	0.088938
HEDPF	45	2.467611	5.226770	3.760595	0.735291

Empirical Results and Discussion

The augmented Dickey-Fuller (ADF) (1981) test results for all variables used in the model are accounted in table given below. The results reported in table are describing that GDP per capita output growth rate and physical capital are stationary at level $I(0)$. While the variables, political freedom, human capital, inflation and economic affairs expenditures decentralization are stationary at first difference $I(1)$. Hence the variables have combined order of integration. Some of the variables are stationary at level I(0) and others at first difference I(1), that suits to apply the Auto-regressive Distributed lag (ARDL) bound testing approach to co integration.

Table 4. *Results of Unit Root Test*

Variables	At Level		At 1st difference	
	t-statistics	p-value	t-statistics	p-value
GDPPCG	-5.564786	0.0000	-11.12846	0.0000
PF	-2.237688	0.1967	-6.488029	0.0000
GFCFG	-5.139609	0.0001	-9.215234	0.0000
HC	1.922534	0.9997	-4.090362	0.0028
INF	-3.230477	0.0254	-7.583488	0.0000
EED	-3.429016	0.0157	-4.810812	0.0004
EEDPF	-2.813149	0.0654	-7.396027	0.0000
HED	-4.561579	0.0008	-4.395587	0.0012
HEDPF	-2.476904	0.1285	-6.360582	0.0000

The lag order selection criterion of variables is presented in Table 5. An optimal lag length has been chosen on the basis of these criteria. The maximum two lags are permitted in Vector Auto-Regressive (VAR) to determine the optimum lag length on the basis of number of

observations, the number of variables to be analyzed and lag constraint of the cointegration test. Lag selection like Schwarz information criteria (SC), Sequential Modified Likelihood Ratio (LR), Akaik Information Criteria (AIC), Final Prediction Error (FPE) and Hannan-Quinn Information Criteria (HQ) recommend an optimal lag length of 1 in Table 4. Hence for the analysis, the lag length 1 is being used.

Table 5. *Lag Length Selection*

VAR Lag Order Selection Criteria					
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-278.6312	NA	0.087973	14.59647	14.85241	14.68830
1	-180.8553	160.4528*	0.003791*	11.42848*	13.22001*	12.07126*
2	-143.9524	49.20394	0.004144	11.38218*	14.70930	12.57592

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

The evidence can be seen from Table 6 that education expenditures decentralization is significant at 1% level and positive sign shows that it is stimulating to enhance economic growth. The results show that political freedom has negative and significant impact on economic growth. The interaction term of EED and PF has interesting finding. The negative sign of interaction term shows that less PF with Education expenditure decentralization has growth retarding effect. In other words, it is concluded that education expenditures decentralization will be beneficial when people are enjoying more political rights.

The control variable inflation has negative and significant impact on economic growth. The results are in line with the previous studies that inflation has negative and significant impact on economic growth in case of Pakistan (Ayyoub et al., 2011). The other control variable physical capital has positive and significant effect on economic growth. It means economic growth can be enhanced by increasing physical capital. The results are in line with the existing literature that physical impact has positive impact on economic growth (Jan et al. 2012).

It confirms the conclusion drawn by Hussain (2012) that education and health services delivery can be improved through the process of decentralization. The results are also in line with the findings of Filpetti and Sacchi (2016) which suggest pro-growth regional autonomy. The findings also suggest the presence of institutional void at work in the sharing of resources and power among different tiers government in the economic system, leading to *institutional coherence* (Amable, 2000). The empirical results also confirm the 18th amendment policy for decentralization of health and education sectors. Basic federalism theorem 'voting with feet' developed by Tiebout (1956) states

that it is easier for local governments to respond to the local citizens preferences.

Table 6. *Long-run Results*

Dependent variable= GDPPCG			
Variable	Coefficient	t-Statistic	p-value
EED	.96235	3.2386	.003
PF	18.6174	3.4256	.002
EEDPF	-.21686	-3.3846	.002
GFCFG	.17150	3.9225	.000
INF	-.086629	-1.6809	.103

After finding cointegration through F-Statistic in the long-run equation, the short-run analysis is found through Error Correction term (Bannerjee et al., 1998). The coefficient of ECT (-1) gives the adjustment speed of the model to long-run equilibrium. The estimated coefficient of ECT (-1) (-1.0275) is statistically significant and the negative sign shows the convergence to the equilibrium within a year. The coefficient indicates the time period is approximately a year 1/1.0275= 0.973236 for adjustment. Highly significant estimated coefficient of ECT (-1) also indicates cointegration among variables i.e. economic growth, capital expenditures decentralization, inflation, physical and human capital.

Table 7. *Short-run Results*

Dependent variable= dGDPPCG			
Variable	Coefficient	t-Statistic	p-value
dEED	.98878	3.5053	.001
dPF	19.1288	3.7132	.001
dEEDPF	-.21037	-3.5061	.001
dGFCFG	.17621	3.6956	.001
dINF	.029452	.50519	.617
Ecm (-1)	-1.0275	-7.9233	.000

Table 8. *Lag Length Selection*

VAR Lag Order Selection Criteria						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-442.1305	NA	385.2369	22.98105	23.23699	23.07288
1	-297.0239	238.1237*	1.465453*	17.38584*	19.17737*	18.02863*
2	-266.6877	40.44823	2.243223	17.67629	21.00342	18.87004

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

The evidence can be seen from Table 9 that health expenditures decentralization (HED) is significant at 1% level and the positive sign shows that it is stimulating to enhance economic growth. The results show that political freedom has negative and significant impact on economic growth. The interaction term of HED and PF has interesting finding. The negative sign of interaction term shows that less PF with health expenditure decentralization has growth retarding effect. In other words, it is concluded that health expenditures decentralization will be beneficial when people are enjoying more political rights.

The physical capital has negative and insignificant impact on economic growth. Human capital has negative and significant impact on economic growth at 1% level of significance. Some other studies also found negative impact of human capital on economic growth (Afzal et al. 2010, Middendorfe 2006).

Table 9. *Long-run Results*

Dependent variable= GDPPCG			
Variable	Coefficient	t-Statistic	p-value
HED	.90353	3.0861	.004
PF	16.2657	3.3184	.002
HEDPF	-.19451	-3.2423	.003
GFCFG	-.067440	-.90363	.373
HC	-.9368E-3	-2.2585	.031

After finding cointegration through F-Statistic in the long-run equation, the short-run analysis is found through Error Correction term (Bannerjee et al., 1998). The coefficient of ECT (-1) gives the adjustment speed of the model to long-run equilibrium. The estimated coefficient of ECT (-1) (-1.0655) is statistically significant and the negative sign shows the convergence to the equilibrium in less than a year. The coefficient indicates the time period is approximately eleven month $1/1.0655=$ 0.938527 for adjustment. Highly significant estimated coefficient of ECT (-1) also indicates cointegration among variables i.e. economic growth, capital expenditures decentralization, inflation, physical and human capital.

Table 10. *Short-run Results*

Dependent variable= dGDPPCG			
Variable	Coefficient	t-Statistic	p-value
dHED	.96270	3.1768	.003
dPF	17.3309	3.4189	.002
dHEDPF	-.20724	-3.3314	.002
dGFCFG	.022784	.43810	.664
dHC	-.9981E-3	-2.3279	.026
Ecm (-1)	-1.0655	-7.0649	.000

Conclusion

The core idea of this study is to examine the connection between decentralized public spending and growth of GDP per capita of Pakistan. Particularly, present study provides the empirical evidence that decentralized current and capital expenditures have different effects on growth of GDP per capita. In addition, this study also attempts to test the effects of economic affairs, decentralized health and education expenditures on growth of GDP per capita of Pakistan.

The relationship between educational expenditures decentralization and economic growth indicates that more the decentralization of education expenditures is done it will enhance growth. The interaction term of decentralized education expenditures and political freedom has interesting finding. The negative sign of interaction term shows that with lesser PF, Education expenditure decentralization has growth retarding effect. In other words, it is concluded that education expenditures decentralization will be beneficial when people are enjoying more political rights. The growth of GDP per capita declines as decentralized education expenditures increase in the light of less political freedom in the country. Similarly, decentralized health expenditures are also growth promoting. The interaction term of decentralized health expenditures and political freedom shows interesting outcome. The negative sign of interaction term shows that less PF with health expenditure decentralization has growth retarding effect. In other words, it is concluded that health expenditures decentralization will be beneficial when people are enjoying more political rights.

The importance of decentralization of public spending in determining economic growth has been supported by various empirical studies. Hence, in the light of empirical results, we propose that the level of decentralization of health and education expenditures should be increased. It means provision of health and education services should be carried out through provincial governments. Our results endorse the government policy in making health and education expenditures through provincial governments as mentioned in 18th Amendment.

At the end, on the basis of results of interaction terms of health expenditures decentralization with political freedom and education expenditures decentralization with political freedom, economic growth can be enhanced if people get more political freedom. Our results suggest that health and education expenditures carried out by provincial governments can be beneficial to economic growth if people have more political rights and provincial governments have more autonomy.

References

Afzal, M., Farooq, M.S., Ahmad, H.K., Begum, I. & Quddus, M.A. (2010). Relationship between school education and economic growth in Pakistan: ARDL bounds testing approach to cointegration. *Pakistan Economic and Social Review*, 48(1), 39-60.

Akai, N. & Sakata, M. (2002). Fiscal Decentralization Contributes to Economic Growth: Evidence from State-Level Cross-Section Data for the United States. *Journal of Urban Economics* 52, 93-108.

Ayyoub, M., Chaudhry, I. S., & Farooq, F. (2011). Does Inflation Affect Economic Growth? The case of Pakistan. *Pakistan Journal of Social Sciences (PJSS), 31*(1).

Amable, B. (2000). Institutional complementarity and diversity of social systems of innovation and production. *Review of International Political Economy*, *7*(4), 645-687.

Bannerjee, A., Dolado & Mestre, R., (1998) "Error-correction mechanism test for Cointegration in single equation Framework", Journal of Time Series Analysis, 19, pp. 267-283.

Barro, R. J. (1990). *Government spending in a simple model of endogenous growth* (No. w2588). National Bureau of Economic Research.

Barro, R.J. & Lee J.W. (1996). International Measures of Schooling Years and Schooling Quality. *American Economic Review* 86(2), 218-223.

Baskaran, T., Feld, L. P., & Schnellenbach, J. (2016). Fiscal Federalism, Decentralization, and Economic Growth: A Meta-Analysis. *Economic Inquiry*.

Baskaran, T. & Feld, L.P. (2013). Fiscal Decentralization and Economic Growth in OECD Countries; Is there a Relationship? *Public Finance Review*, 41(4), 421-445.

Davoodi, H. & Zou, H. (1998). Fiscal Decentralization and Economic Growth: A Cross-country Study. *Journal of Urban Economics* 43, 224-257.

Dickey, D.A., & Fuller, W.A. (1981). The likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root. *Econometrica*, 491057-1072.

Engle, R.F. & Granger, C.W.J. (1987). Co-integration and Error Representation: Estimation and Testing. *Econometrica*, 55(2), 251-276.

Faridi, M.Z. (2011). Contribution of Fiscal Decentralisation to Economic Growth: Evidence from Pakistan. *Pakistan Journal of Social Science* 31(1), 1-13.

Filippetti, A., & Sacchi, A. (2016). Decentralization and economic growth reconsidered: The role of regional authority. *Environment and Planning C: Government and Policy*, *34*(8), 1793-1824.

Government of Pakistan (2011). *Pakistan Economic Survey*. Islamabad, Pakistan: Finance Division, Government of Pakistan.

Hagen, J. V, Bordignon, M, Dahlberg, M, Grewal, B, Petterson, P & Seitz, H. (2000). Subnational Government Bailouts in OECD Countries: Four Case Studies, *Inter-American Development Bank Working Paper* R-399.

HASANOV, F., MIKAYILOV, C., YUSIFOV, S., & ALIYEV, K. (2016). Impact of Fiscal Decentralization on Non-Oil Economic Growth in a Resource-Rich Economy. *Eurasian Journal of Business and Economics*, 9(17), 87-108.

Hussain, I. (2012). Adapting Public Sector Services to Local Delivery. *The Lahore Journal of Economics,* 17:SE, 359-385.

Iimi, A. (2005). Decentralisation and Economic Growth Revisited: An Empirical Note. *Journal of Urban Economics*, 57(3), 449-461.

Iqbal, N. & Nawaz, S., (2010). Fiscal decentralization and Macroeconomic stability: Theory and evidence from Pakistan. Munich Personal RePEc Archive Paper.

Iqbal, N., Din, M. & Ghani, E. (2013). *Fiscal decentralization and economic growth: Role of democratic institutions*. PIDE Working Paper 89; 2013.

Jan, S. A., Chani, M. I., Pervaiz, Z., & Chaudhary, A. R. (2012). Physical infrastructure and economic development in Pakistan. *Middle-East Journal of Scientific Research*, 11(2), 216-220.

Johansen, S. (1991). Estimation and Hypothesis Testing of Co-integration Vectors in Gaussian Vector Autoregressive models. *Econometrica*, 59(6), 1551-1580.

Johansen, S. & Juselius, K. (1990). Maximum Likelihood Estimation and Inference on Co-integration with Applications to the Demand for money. *Oxford Bulletin of Economics and Statistics*, 52(2), 169-210.

Laurenceson, J., Joseph, C. & Chai, H. (2003). Financial Reform and Economic Development in china. Cheltenham, UK, Edward Elgar.

Lin, J. Y. & Z. Liu (2000) Fiscal Decentralisation and Economic Growth in China. *Economic Development and Cultural Change* 49:1, 1–21.

Mah, J. S. (2000). An Empirical Examination of the Disaggregated Import Demand of Korea: The Case of Information Technology Products. Journal of Asian Economics, 11(2), 237-244

Malik, S., Hassan, M. & Hussain, S. (2007). Fiscal Decentralisation and Economic Growth in Pakistan. *The Pakistan Development Review*, 45(4), 845-854.

Mankiw, G. N., D. Romer, & D. N. Weil (1992) A Contribution to the Empirics of Economic Growth. Quarterly Journal of Economics 107:2, 407–437.

Martinez-Vazquez, J. & R. M. McNab (2003) Fiscal Decentralisation and Economic Growth. *World Development* 39, 1597–1661.

Middendorf, T. (2006). Human capital and economic growth in OECD countries. *Jahrbücher für Nationalökonomie und Statistik*, 226(6), 670-686.

Narayan, P. K. (2005). The Saving and Investment Nexus for China: Evidence from Co-integration Tests. Applied Economic, 37(17), 1979-1990.

Nguyen, L. P. & S. Anwar (2011) Fiscal Decentralisation and Economic Growth in Vietnam. *Journal of the Asia Pacific Economy* 16:1, 3–14.

Oates, W.E. (1972). *Fiscal Federalism*. New York: Harcourt Brace Jovanovich.

Oates, W.E. (1993). Fiscal Decentralisation and Economic Development. *National Tax Journal*, 46(2), 237-243.

Pattichis, C. A. (1999). Price and Income Elasticities of Disaggregated Import Demand; Results from UECMs and an Application. Applied Economics, 31(9), 1061-1071.

Pesaran, M.H. (1997) The role of economic theory in modeling the long run, DAE Working Paper Series No 9622, Economics Journal , 107,178-191

Pesaran, M.H. & Pesaran, B. (1997). *Working with Microfit 4.0: Interactive Econometric Analysis*. Oxford: Oxford University Press.

Pesaran, M.H. & Shin, Y. (1999). An Autoregressive Distributed Lag Modelling Approach to Co-integration Analysis. In Strom, S. (ED), *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium, Cambridge*: Cambridge University Press.

Pesaran, M.H., Shin, Y. & Smith, R.J. (2001). Bound Testing Approaches to the Analysis of level Relationships. *Journal of Applied Econometric*, 16(3), 289-326.

Phillips, P. C. B. & Hansen, B. E. (1990). Statistical inference in Instrumental Variable Regression with I(1) Process. Review of Economics Studies, 57(1), 99-125.

Rodden, J., Eskeland, G.S. & Litvack, J. (2003). *Fiscal Decentralisation and the Challenges of Hard Budget Constraints*. Cambridge and London: MIT Press.

Rodríguez-Pose, A. & Bwire, A. (2004). The economic (in) efficiency of devolution, *Environment and Planning A*36, 1907-1928.

Rodriguez-Pose, A. and Ezcurra, R. (2010). Is Fiscal Decentralisation Harmful for Economic Growth? Evidence from the OECD Countries. Journal of Economic Geography 11(4), 619-644.

Rondinelli, D, A. (1981). *Government Decentralization in Comparative Perspective: Theory and Practice in Developing Countries*. IRAS 2, 133-145.

Sala-i-Martin, X. (1997). I Just Ran Two Million Regressions. *American Economic Review* 87(2), 178-183.

Samimi, A.J., Lar, S.K.P., Haddad, G.K. & Alizadeh, M. (2010). Fiscal Decentralisation and Economic Growth in Iran. *Australian Journal of Basic and Applied Sciences*, 4(11), 5490-5495.

Shah, A., and Thompson, T. (2004). Implementing decentralized local governance: a treacherous road with potholes, detours, and road closures *(Vol. 3353). World Bank Publications.*

Thieben, U. (2003). Fiscal Decentralisation and Economic Growth in High-income OECD Countries. *Fiscal Studies*, 24, 237-274.

Thornton, J. (2007). Fiscal Decentralisation and Economic Growth Reconsidered. Journal of Urban Economics, 61(1), 64-70.

Tiebout, C.M. (1956). A Pure Theory of Local Expenditures. *Journal of Political Economy*, 64(5), 416-424.

Woller, G.M. & Phillips, K. (1998). Fiscal Decentralization and LDC Economic Growth: An Empirical Investigation. *Journal of Development Studies*, 34(4), 139-148.

Zhang, T. & Zou, H. (1998). Fiscal Decentralisation, Public Spending and Economic Growth in China. *Journal of Public Economics* 67(2), 221-240.