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Interlinks of Fiscal Decentralization and Public Investment in Pakistan

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Abstract

Present work is an attempt to explore intersperse of fiscal decentralization and public investment in Pakistan. The study used a time series data from 1972 to 2013 and Johansen cointegration procedure is used for empirical investigation. It is reported that in the long run, fiscal autonomy to lower tiers of governments may help to improve the tax revenue in one fold and public investment in next fold. More importantly, the addition in subnational revenue and expenditures shares in total government revenue and expenditures will improve the level of public investment and also accelerate the economy towards high economic growth in Pakistan. These findings may also supportive for other developing countries which are struggling to adopt the decentralization process like Pakistan. Finally, the study suggested that a clear mandate of fiscal responsibilities at central and provincial level is also needed to improve the benefits of fiscal decentralization in Pakistan.

Key words: cointegration; decentralization; expenditures; Pakistan; public investment

1. Introduction

Money gets to play kind of vital role in economy's life whether it has been centralized otherwise decentralized. Each of world's countries is getting confronted with diverse issues regarding collection and distribution of money along with facing several issues i.e. imposition, collection as well as redistribution of tax. Almost all of the countries in the world got to possess two or more than two government tires. In present times, rising discussions and debates over federalism have emphasized complexity regarding fiscal distribution, administrative or political powers as well as responsibilities with respect to each government tire. It could either be addressed that dynamic and critical character with regard to decentralization or specifically in terms of fiscal decentralization has got to make it very much studied as well as researched decentralization aspect.

A large magnitude of studies does exist which examined distribution related to fiscal responsibilities getting at varied government tiers and formulated their links with economic growth. Fiscal decentralization has got to be multitasking phenomenon which always attracts international organizations' interest, authorities of the public as well as

researchers. It has been with aims of proposing as well as designing strategies to execute processes of fiscal decentralization successfully while developing economies. Moreover, fiscal decentralization' role for promoting public sector's size within evolving countries has still got to be challenging. Therefore, current work is presented as an attempt for examining fiscal decentralization's impacts over public investment with respect to developing economy i.e. Pakistan.

Pakistan has also been ranked as developing country as it got to emerge as kind of independent country in 1947 containing couple of parts known as eastern Pakistan as well as western Pakistan. Because of economic or political issues, eastern part of Pakistan got separated from Pakistan within 1971. After partition, western part known as Islamic Republic of Pakistan got to become centralized country containing four provinces along with federal area (known as central administration area).

Although, number of economic, social and political reasons which produced cause for nations' separation however majority of economic experts agreed that resources distribution carrying less inequality within different scenarios caused of separation. On the other hand, it was one of several reasons regarding the separation. However, a commission had been established after the loss of eastern part for making fair resources' distribution certain among different provinces within Western Pakistan. National Finance Commission has been known as organization which happens to implements fiscal decentralization in terms of greatest resource distributor. Key objective of it is to distribute annual revenue among not only federation but also provinces. This is the reason; a great need is there for exploring varied indirect channels through which distribution of fiscal resources could promote economic growth in developing countries like Pakistan. The current work can be taken as an attempt for filling the gap within literature with respect to fiscal decentralization over developing countries in one hand. On the other hand, it aims to investigate fiscal decentralization's impacts over public investment within Pakistani region. However, composition in relation with current work could be as followed:

Second section of the work will aim to provide reviews regarding some worthwhile studies related to fiscal decentralization however third section would be intended describing data sources along with proposed methodology. Elementary Analysis of data would be presented within section four as well as time series analysis for investigating both short and long run fiscal decentralization's association besides public investment which would be presented within section five. Results of the study would be discussed in section six. However, some of concluding remarks will be taking place at quite end of the study.

2. Literature Review

Lots of studies exist which got to determine an association of kind of fiscal decentralization with different macroeconomic variables including economic growth. It is worthy here to review kind of significant studies i.e. Smoke and Lewise (1996) which addressed major obstacles on the way of decentralization within developing countries along with introducing different strategies for minimizing all those obstacles. For embarking over fiscal decentralization, the government of state ought to observe that which particular functions local government could manage in quite better way. The underscored study reveals that the system regarding provision of local public services in

Indonesia has got to be highly centralized like all other evolving countries. Hence, Indonesia is seemed attempting for decentralizing its major public sector carrying heavier supports from global level donors but right after realizing centralized system's weaknesses. The performance of the local government got to be seemed stagnant even after these efforts. On the other hand, fiscal decentralization could enhance living standards of developing countries but just for the time when kind of additional autonomy towards local governments would make productive investment certain at very gross root stage.

Zhang and Zou (1998) utilized three levels of government which were local, state and federal however fiscal level decentralization had been determined through calculation of both local and state governments level in terms of fraction with relation to total government expending. It patently indicates that if expending of state and local level governments had got to rise in comparison with the expending of federal government, it clearly represents then a fiscal decentralization's rising level. This study had deviated from the model of Barro along with showing that kind of developed countries had got to be more decentralized in comparison with developing countries.

Demello (2000) revealed that fiscal decentralization process is basically consisted of move of revenue resources as well as expenditure functions for lowering government tiers. It is hoped that fiscal decentralization has got to be taken as process which manages government quite closer towards local people and a great mean for enhancing transparency in services delivery, accountability and enhancement of improvement with regard to efficiency of public sector as well as policy making. This study detected that fiscal decentralization process remained unable getting fruitful within developing countries because of coordination failures with respect to intergovernmental fiscal associations. Majority of developing countries remained unable meeting basic level requirements for fruitful fiscal decentralization that ensure a lead towards deficit bias in the making of decentralization policy.

Jin and Zuo (2002) observed fiscal decentralization's effects over sub-national, national as well as aggregate size of government. Findings revealed that borrowing constraints created few significant effects over these different government sizes. In the same way, revenue decentralization cause of increase in public investment level at sub-national governments however the impact of expenditure decentralization is not much supportive to increase in public investment.

Meloche (2004) explained importance of decentralization in contexts of fiscal matters however evaluating the impacts of decentralization to enhance economic growth. Findings representing economic growth revealed couple of directions. Firstly, in transition countries of Europe the expenditure share within governments of sub-national level has not been related with economic growth. Secondly, revenue decentralization doesn't secure any positive association with economic growth. Empirical findings regarding the second model either revealed that there were negative associations among size of public sector and decentralization within transition countries of Europe.

Desai, et al. (2005) observed an association between regional growth and fiscal decentralization in contexts of Russia. Findings of the study revealed that fiscal autonomy should have certain limits in regions dependent over resource as compared to resource wise rich regions. Findings either specified that kind of additional fiscal

autonomy appears as justifiable for majority of Russian regions. However, for getting control of policy of expenditure, restrictions over fiscal autonomy by central level government could be proved fruitful. Therefore, a need is there introducing or formulating diverse strategies for varied regions i.e. with respect to bankrupt regions' case or kind of fiscally depressed areas where central government's role is supposed to gain control over expenditure policies. In the same way, a greater level of centralization has been required in relation with regions which are quite wealthy. Their revenue generated through natural resources ought to be utilized for projects of finance civic infrastructure but within regions of low income, instead of distribution of revenue in terms of budgetary transfer.

Alegre (2006) described that economy of Spain has got to experience type of fastest decentralization process within Europe since democracy got there in 1978. This process is either very much peculiar, since regional governments' development has been symmetric, some of those offer even now very important differences within their fiscal autonomy levels. Through data got from the underscored economy, hypothesis is tested that regions which are decentralized spend greater part of budget towards present expenditure as compared to centralized ones. Findings are very much robust as well as conclusive to analysis of several sensitivities which is run along new equation: decentralization has got to be crucial factor for explaining public expenditure share devoted towards capital. Decentralized economies come to devote kind of smaller budget share towards public capital contrasting public expenditures. The implications of policy with regard to the findings might by controversial. However, findings recommend that certain decentralization level in terms of efficiency might be desirable, it either imply alleviation over the endowment of community capital. Although it has never been as current investigation's aim, findings open a clear door for future research lines. Specifically, whether this public expenditure reduction might have kind of negative implications over production factors' efficiency, as several theoretical models also get to suggest.

Kappelor and Valila (2008) scrutinized fiscal decentralization's impacts over determinants regarding European prolific public investment. It was detected that kind of fiscal decentralization got to accelerate productivity about public investment. However, no significant association was seen among public investment with respect to consumption oriented goods of local public or at distribution side. It was concluded by the study that decentralization appeared as very influential tool for enhancing investment level specifically in infrastructure, schools as well as hospitals which provide services to the public. Hence, this empirical examination revealed that underlying fiscal decentralization contributed towards productive sort of public investment along with raising investment within public goods including schools, infrastructure as well as hospitals.

Qing-Guang (2010) studied varied impacts related to fiscal decentralization over local public investment with respect to China. This study happened to engage panel data (from 1985 to 2008) unit root along with cointegration tests via utilization of data of 25 provinces of China. Findings of the study indicate existence of internal functional mechanism as well as long and stable equilibrium among fiscal decentralization is helpful to raise the level of local public investment. On the basis of panel error correction, it is also summarized that long run equilibrium could be secure from short term effects by ensuring the addition in fiscal autonomy and in public investment at local level.

Grisorio and Prota (2013) endeavored to analyze impact of decentralization over public expenditures with respect to Italian region. Panel data containing time duration of 1996-2008 was used by them along with fractional response model in order to estimate and formulate both long and short run interlinks regarding fiscal decentralization as well as public sector size however generalized model of error correction had also been applied. Findings revealed that fiscal decentralization in quite initial phase would happen to increase public expenditures. On the other hand, it would assist to recompose expenditures of regional government in the long run. Higher fiscal decentralization would improve investment level for enhancing human capital through the promotion of infrastructure as well as development activities. It was suggested by the study that a great need is there for comprehending expenditures' functional composition suitably. Afterwards, increment in fiscal decentralization would assist shifting of unproductive expenditures to productive expenditures and improve the return on public investment.

Keppeler et al. (2013) estimated revenue decentralization's impacts over providing infrastructure at local level. This analysis had found its basis over panel data consisted of 20 countries of Europe along with containing time duration of 1990-2009. Through applying procedure of panel data, findings revealed that rise in revenue decentralization would enhance infrastructure investment within European countries. Findings also indicated that different impacts regarding tax decentralization over regional infrastructure investment would lessen with the increment of grant receipts through regional governments. Higher level tax decentralization would get to accelerate investment within infrastructure however conditional transfers' introduction would offset kind of positive impacts regarding revenue decentralization.

Grisorio and Prota (2015) scanned fiscal decentralization's impacts over public expending in Italy in time duration of 1996-2012. For examining both long and short run relationships, this study utilized dynamic panel regression system however tax decentralization has been used in terms of an indicator relating fiscal decentralization. Findings of the study revealed that fiscal decentralization can alleviate welfare expending within long run terms however reduced infrastructure investment level. On the other hand, findings assured that fiscal decentralization could improve Italian production activities in the long run. It was also highlighted by the study that fiscal decentralization's impacts could vary for different pubic spending categories and could be supportive for local governments to behave wisely to determine spending levels to influence the location of firms and households.

It is not much clear from the previous studies to depict the sharp picture of the impact of fiscal decentralization on public investment. Therefore the present research will be an addition in literature to clear the insight of the impact of fiscal autonomy on public investment in a developing economy like Pakistan.

3. Data and Methodology

To explore the association between fiscal decentralization and public investment, the present study used the Economic survey of Pakistan (various issues), the annual reports of the State Bank of Pakistan and the handbook of statistics compiled by the Federal Bureau of Statistics (FBS) to retrieve data from the time period 1972 to 2013. Bearing in mind the weaknesses of the secondary sources of data, we have applied the maximum

data mining tools to examine the impact of fiscal decentralization on public investment. The linear form of our estimated model can be written as follows.

$$LINV = \propto_0 + \propto_1 AFDX + \propto_2 AFDR + \propto_3 FDX + \propto_4 FDR + \propto_5 INFR + \propto_i Z_i + \mu_i \quad \rightarrow (1)$$

Here public investment (INV) is the sum of total nominal investment in million made by the government during a fiscal year. Hypothetically, fiscal decentralization enhances the level of public investment which leads to enhance economic growth. Expenditures decentralization (FDX) is used to measure the spending side of fiscal decentralization and it represents the ratio of sub-national government expenditures to total government expenditures. Adjusted decentralization expenditures (AFDX) is composed of the ratio of sub-national government expenditure to national government expenditure after deducting the expenditure on defense and debt servicing. Revenue decentralization (FDR) estimates the revenue side of fiscal decentralization and this variable is composed of the ratio of sub-national government revenues to total national government revenues. Adjusted decentralization revenue (AFDR) is measured the revenue side of fiscal decentralization and the ratio of sub-national government's revenue deducting the grants in aid is taken into account. Here it is important to consider that federal spending does not include federal grants awarded to the local governments. State spending comprised of the total amount of grants a state receives minus the total amount of transfer by the state to the local governments. There is number of studies which have been used the similar measures of fiscal decentralization to explore the impact of fiscal decentralization on economic growth in Pakistan (Faridi, 2011; Faridi et al., 2012 and Hanif et al., 2014). Inflation Rate (INFR) is measured by the overall consumer price index at the national level. Inflation is used as a control variable and Z_i is a set of additional control variables which includes employed labour force (LELF) in million and Capital formation (CAP) in million rupees and μ_i is idiosyncratic error term.

4. Elementary Data Analysis

To analyze the impact of fiscal autonomy on public investment, a descriptive summary of selected variables and pairwise correlation matrix is presented as follows.

The descriptive summary of all the variables used in the next model is given as follows:

Table 1: Descriptive Summary of the Variables

	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis
INV	466797	177761	2414749	6521	640426	1.83	5.41
AFDX	0.46	0.44	0.85	0.28	0.13	0.59	3.01
FDX	0.25	0.29	0.36	0.19	0.04	0.56	2.95
AFDR	0.29	0.29	0.43	0.06	0.08	-1.04	3.99
FDR	0.32	0.34	0.47	0.07	0.09	-1.54	5.07
INFR	9.60	8.65	30.00	3.10	5.75	1.91	7.16
ELF	27.86	28.00	29.92	25.98	1.06	-0.02	2.14
CAP	16.61	17.00	20.95	11.43	2.10	-0.32	3.36

Table 1 reports the descriptive statistical summary of selected variables to examine the impact of fiscal decentralization on public investment in Pakistan. The table shows that the average inflation rate (INFR) is 9.6 for our period of analysis with variation of 5.76. The ratio of fiscal decentralization revenue (FDR) and fiscal decentralization expenditures (FDX) are 0.32 and 0.25 respectively on the average. The average values for employed labour force (ELF), adjusted variables of decentralization revenue (AFDR) and decentralization expenditures (AFDX) are 27.86, 0.29 and 0.46 respectively. The skewness values indicated that almost all variables are a little bit skewed like non-adjusted fiscal decentralization revenue (FDR) and adjusted fiscal decentralization revenue (AFDR), employed labour force ELF and capital formation (CAP) variables are negatively skewed. While public investment (INV), Inflation rate (INFR), non-adjusted decentralization expenditures (FDX) and adjusted decentralization expenditures (AFDX) are positively skewed.

Finally, the value of kurtosis indicates that the variables like public investment, inflation, capital formation, FDR and AFDR have a high peak or Leptokurtic distribution. The decentralization variables like FDX and AFDX have approximately normal distributions and employed labour force has relatively flatter or Platykurtic probability distribution.

Before estimating the equation 1, it is necessary to examine the correlation between the dependent and the independent variables. Usually, the pair-wise coefficient of correlation is used to identify the problem of multicollinearity between the variables. The high coefficient of correlation $r^2\ (x_1, x_2) \geq 0.80$ shows severe multicollinearity among the variables.

Table 2: Correlation Matrix

	INV	AFDX	AFDR	FDX	FDR	INFR	LELP	CAP
INV	1.00							
AFDX	0.59	1.00						
	(0.00)							
AFDR	0.61	0.65	1.00					
	(0.00)	(0.00)						
FDX	0.14	0.09	0.12	1.00				
	(0.38)	(0.56)	(0.53)					
FDR	0.46	0.62	0.59	0.09	1.00			
	(0.02)	(0.00)	(0.00)	(0.57)				
INFR	-0.54	-0.72	-0.62	-0.20	-0.65	1.00		
	(0.00)	(0.00)	(0.00)	(0.21)	(0.00)			
ELP	0.49	0.71	0.50	0.17	0.63	-0.44	1.00	
	(0.01)	(0.00)	(0.00)	(0.30)	(0.00)	(0.06)		
CAP	0.32	0.61	0.47	0.18	0.59	-0.63	0.51	1.00
	(0.04)	(0.00)	(0.02)	(0.26)	(0.00)	(0.00)	(0.00)	

Note: Here probability is given in parenthesis

Table 2 shows a correlation matrix of all the variables included in equation 1. It shows that the LINV is weakly correlated with adjusted and non-adjusted decentralized

expenditure AFDX and FDX (less than critical value i.e. 80%). LINV is also weakly correlated with adjusted and non-adjusted decentralized revenue AFDR and FDR. All explanatory variables are weakly correlated with the dependent variable i.e. LINV. According to the correlation matrix there is no multicollinearity between the dependent and the independent variables.

5. Time Series Data Analysis

The following model will examine the impact of revenue and expenditure decentralization, on public Investment (LINV) in the presence of different controlled variables like Inflation rate (INFR), employed labour force LELF, and capital formation (CAP). To examine the impact of fiscal decentralization on public investment in Pakistan a linear functional form of transformed Cobb-Douglas production function can be written as:

$$LINV = \propto_0 + \propto_1 AFDX + \propto_2 AFDR + \propto_3 FDX + \propto_4 FDR + \propto_5 LINFR + \propto_6 LEPL + \propto_7 CAP + \mu_i \quad \rightarrow (2)$$

To avoid the spurious regression result and to choose the right econometric technique for time series data analysis it is essential to check for stationarity of the time series data, therefore to check the stationarity we will apply the Augmented Dickey-Fuller test.

Table 3: Results of Augmented Dickey-Fuller Test (ADF) for Unit Root.

Results of unit root test with intercept				**Results of unit root test with trends and intercept**		
Variable	**Level**	**1st difference**	**Conclusion**	**Level**	**1st difference**	**Conclusion**
LINV	-2.29	-4.45**	I(1)	-3.06	-4.64	I(1)**
AFDR	-1.31	-8.96***	I(1)	-3.03	-8.21	I(1)***
AFDX	0.16	-5.52**	I(1)	-1.61	-5.27	I(1)***
FDX	-2.26	-4.95**	I(1)	-2.13	-5.83	I(1)***
FDR	-2.83	-5.81***	I(1)	-3.51	-5.78	I(1)***
INFR	-2.44	-6.26***	I(1)	-2.41	-6.33	I(1)***
LEPL	-1.04	-5.93**	I(1)	-2.67	-6.07	I(1)***
CAP	-2.76	-5.80**	I(1)	-2.78	-5.83	I(1)***

Note: (***) and (**) represents 1% and 5% level of significance.

The results of ADF test show that the time series are not stationary at the established level but all series are stationary at the first difference. When ADF test is conducted at the first difference the null hypothesis (that data is not stationary) can be rejected easily at 1% and 5% significance levels. At first difference, the results of the ADF test also show that the values of ADF statistics (with and without trend) are much below the 95% critical values.

All the time series are stationary at first difference, therefore the maximum likelihood based on Johansen test procedure will be adopted and used to determine the presence of

the co-integration. Moreover, to test the null hypothesis of co-integration vector the results of the trace statistics are reported in table 4.

Table 4: Results of Johansen Unrestricted Co-integration Rank Test

Rank r	Trace Statistic	Maximum Eigen Value
$r_0 = 0$	231.40*	0.95
$r_0 \leq 1$	139.61*	0.81
$r_0 \leq 2$	83.99*	0.68
$r_0 \leq 3$	65.69	0.54
$r_0 \leq 4$	37.28	0.37
$r_0 \leq 5$	18.76	0.25
$r_0 \leq 6$	8.55	0.15
$r_0 \leq 7$	1.17	0.04

Note: * (*) indicates rejection of the hypothesis at the 5% significance level, L.R. test indicates three co-integration equations at the 5% significance level.

Here we observed the trace statistics, which either accepted or rejected the null hypothesis. The results showed that at top three rows the trace statistics are higher than the critical value at 5% and confirm the rejection of the null hypothesis i.e. there exist no cointegration.

The existence of cointegration is also confirmed the presence of long run relationship in our estimated model. Therefore, to examine the magnitude and sign of a long run relationship the co-integration vectors have been normalized on the dependent variable. The normalized co-integration coefficients can be observed in table 5.

Table 5: Long Run Normalized Co-integration Coefficients

Dependent Variable = LINV			
Independent variables	**Coefficient**	**St. Error**	**t-statistics**
AFDX	1.25***	0.53	2.36
AFDR	2.01***	0.67	3.01
FDX	2.37***	0.89	2.66
FDR	2.64**	1.21	2.18
INFR	-0.48**	0.25	-1.92
LELF	1.02**	0.47	2.17
CAP	3.11**	1.39	2.23

Note: Here (***), (**) and (*) are showing 1%, 5% and 10% level of significance respectively.

All variables have significant relationships with public investment (LINV). The adjusted and non-adjusted decentralization revenue (AFDR and FDR) variables have a significant

and positive relationship with public investment (LINV). In the expenditure side the adjusted and non-adjusted decentralization expenditure (AFDX and FDX) variables also have a positive relationship with the dependent variable (LINV). In control variables the employed labour force (LELF) and capital formation (CAP) have a significant and positive relationship while the inflation rate (INFR) has a negative relation with public investment (LINV).

After examining the long run relationship we used the Error Correction Model (ECM) framework to determine the short run relationship. The ECM exhibits the introduction of past dis-equilibrium as an explanatory variable in the dynamic behavior of an existing variable. It shows both short run as well as long run relationships among the variables. The relationship of public investment with the explanatory variables can be expressed as:

Table 6: **Result of ECM for Short Run Dynamics**

Dependent Variable = ΔLINV			
Error Correction:	D(LINV)	St. Error	t-statistics
C	0.31	0.14	2.21
D(LINV(-1))	0.42	0.32	1.31
D(AFDX(-1))	0.18	0.22	0.81
D(AFDR(-1))	0.53	0.48	1.10
D(FDX(-1))	0.61	0.53	1.15
D(FDR(-1))	1.09	1.06	1.02
D(INFR(-1))	-0.04	0.03	1.33
D(LELF(-1))	0.72	0.51	1.41
D(CAP(-1))	0.38	0.34	1.12
EC_{t-1}	-0.28***	0.09	3.11

Note: Here (***), (**) and (*) are showing 1%, 5% and 10% level of significance respectively.

Table 6 gives the short run dynamic relationship and set of short run coefficients in the VECM which relate the error terms in the lagged period and change in public investment to changes in other variables.

The EC_{t-1} coefficient has the correct sign (that is negative) and also significant. The value of the coefficient shows the speed of adjustment and in our case it is observed at the rate of 28% which means that 28% disequilibrium from short run to long run will be corrected per year. Moreover the significant error correction term with negative sign is also confirming the long run causal relationship of public investment with adjusted and non-adjusted fiscal decentralization variables.

To determine the short run causality between the variables Granger Causality or Block Exogeneity Wald test which is based on Vector Error Correction model is performed to find the short run causality.

Therefore the results of the Granger Causality/ Block Exogeneity Wald test which is based on vector error correction are presented in table 7.

Table 7: **Results of the Granger Causality Test**

	AFDR	**AFDX**	**INFR**	**ELF**	**FDR**	**FDX**	**INV**	**CAP**
AFDR	--	0.41 (0.81)	11.42*** (0.00)	8.68*** (0.01)	0.05 (0.97)	1.88 (0.53)	17.88*** (0.00)	83.52*** (0.00)
AFDX	10.66*** (0.00)	--	10.72*** (0.00)	7.86*** (0.01)	0.47 (0.79)	0.78 (0.67)	51.04*** (0.00)	97.56*** (0.00)
INFR	5.83** (0.05)	8.11*** (0.01)	--	12.11*** (0.00)	2.12 (0.34)	7.97*** (0.01)	6.19** (0.02)	21.68*** (0.00)
ELF	4.32 (0.11)	1.20 (0.54)	9.93*** (0.00)	--	3.64 (0.16)	8.24*** (0.01)	5.85** (0.05)	10.72*** (0.00)
FDR	2.65 (0.26)	2.17 (0.33)	6.01** (0.04)	2.02 (0.36)	--	19.42*** (0.00)	21.29*** (0.00)	13.84*** (0.00)
FDX	1.57 (0.45)	3.86 (0.14)	0.80 (0.66)	0.72 (0.69)	2.94 (0.22)	--	27.50*** (0.00)	54.82*** (0.00)
INV	50.48*** (0.00)	3.46 (0.17)	1.02 (0.59)	1.71 (0.42)	8.17*** (0.00)	11.36*** (0.00)	--	9.93*** (0.00)
CAP	3.37 (0.18)	3.61 (0.16)	17.22*** (0.00)	3.01 (0.22)	0.93 (0.62)	0.76 (0.68)	9.56*** (0.00)	--
$\sum X^2$	1606.20 (0.00)	331.98 (0.00)	627.91 (0.00)	94.47 (0.00)	148.08 (0.00)	271.40 (0.00)	3829.87 (0.00)	211.45 (0.00)

Note: Here (***), (**) and (*) are showing 1%, 5% and 10% level of significance respectively.

The results of Block Exogeneity Wald test show that the presence of bidirectional causality between adjusted and non-adjusted decentralized revenue and public investment in Pakistan. There is unidirectional causality between public investment and adjusted and non-adjusted decentralized expenditures and causality is running form adjusted and non-adjusted decentralized expenditures to public investment. There exists unidirectional causality between Inflation, employed labour force and public investment and causality is running from inflation and employed labour force to public investment. While there exists bi-directional causal relationship between public investment and capital formation in Pakistan.

6. Results and Discussions

The results provide empirical evidence for the relationship between public investment, fiscal decentralization, economic growth, inflation rate and trade openness. The empirical

analysis of the study is based on Johansen's co-integration, Error Correction Model and causality for Pakistan's time series data for the period of 1972 to 2013.

Public investment has a significant positive relationship with adjusted and non-adjusted fiscal revenue. It means that more autonomy for provincial or local governments on the revenue side will raise the public sector investment level. Results in table 5 show that a 1 percent increase in adjusted fiscal decentralization expenditure and revenue will lead to a 1.25 percent and 2.01 percent increase in public investment respectively. The correlation between non-adjusted fiscal decentralization (expenditure and revenue) and public investment is much stronger than adjusted fiscal decentralization variables. In the model we controlled for the log of employed force and it is expected that the higher LELF would lead to an increase in public investment. Like previous studies, capital formation (CAP) and the consumer price index (INFR) are also used as control variables (Rogoff, 2003 and Romer, 1993).

Although our model shows a positive correlation between fiscal decentralization and public investment some previous studies found a negative relationship (Sturm et al., 1999 and Valila et al., 2005). However, the former idea seems right, only when fiscal goals achieved by shifting public investment at local levels instead of increasing the taxes or reducing the government spending. In Pakistan the positive relationship between fiscal decentralization and public investment is quite straight forward because a big proportion of public investment is financed by the tax revenue. In Pakistan the positive association of fiscal decentralization with public investment also shows the better provision of public goods and services and the improvement in infrastructure. Similarly to Spain, where the fiscal decentralization process has shown a positive impact on public investment, which improved the infrastructure (Esteller and Sole, 2005) or in Colombia and Bolivia, where the public investment has been an effective tool to improve the local needs (Faguet, 2005).

More importantly the coefficients of decentralized revenue (adjusted and non-adjusted) have a much healthier influence on public investment as compared to the expenditure decentralization. The visible difference between revenue and expenditure decentralization coefficients direct our attention towards public expenditures in Pakistan. The balance between decentralization revenue and expenditure (with no fiscal gap) is the prerequisite of successful decentralization because it will be supportive to minimize the fiscal gap in the economy. Therefore, to raise the level of public investment and to regenerate revenue through taxes, by following the distribution formulas, do not seem an adequate tool in Pakistan. It could be demoralizing to the regions or states that have significance contribution to the national revenue because through the distribution formulas they would be able to capture a specified proportion of revenue. So, adopting the marginal retention rate will increase the marginal benefits of the states or regions in Pakistan. It means that the increase in revenue decentralization would increase the percentage of revenue retained by the regions and promote the marginal benefits of public investment (Cereaga and Weingast, 2003). Despite that, some studies suggested that the grants can be used to remove the revenue bias between the high and low revenue generating territories (Hindriks et al., 2008 and Ferreira et al., 2005). Although Pakistan is following this strategy and allocating grants to the low revenue generating sub-national governments every year but in practice, the grants can diminish the marginal benefits of extra revenue generated by the sub-national governments who have to share that extra revenue with the

rest of the country. In short, the marginal benefits of revenue generation can create a competitive environment among the sub-national governments and it can promote public investment by means of fiscal decentralization.

Finally, the study found that fiscal decentralization can be considered a successful tool to improve the level of public investment in Pakistan. These findings may be helpful for other developing countries as well who are in transition period of decentralization and struggling to find the road to successful fiscal decentralization process. Here it would be important to precaution that the positive impact of fiscal decentralization on public investment are limited to the adjustments, control variables and data used in present study.

7. Conclusion

Empirical findings of the study reveal that the underscored fiscal decentralization has got very significant as well as positive influence over public investment in Pakistan. Both expenditure decentralization as well as revenue are found much supportive for increasing economic productivity related to public investment. Relying over findings of the study, it could be summarized that decentralization comes up as an influential and effective tool for enhancing public investment's level especially at times of providing public goods i.e. schools, road, hospitals as well as clean water for drinking. It is because it has generally been considered the responsibility of the state ensuring public goods' provision i.e. education, roads, health as well as access of clean water for drinking. Hence, fiscal decentralization could enhance the delivery of public goods to the local citizens indirectly via improvement of public investment at local level. Empirical findings of the study, in nutshell, exposed that fiscal decentralization contributed towards productive and fruitful public investment along enhancing public goods at local level. Relying over current findings and to raise the benefits of fiscal decentralization, it might be recommended that idea of raising public investment via taxes and through following formulas of distribution could demoralize to the regions which create significance and important contribution on the way of national revenue. In Pakistan, there is need to adopt the marginal retention rate which may increase the marginal benefits of the regions with respect to revenue generation. It means that the increase in revenue decentralization would increase the percentage of revenue retained by the regions and also promote the marginal benefits of public investment. In addition, the influence of fiscal decentralization on public investment can be fine tune by examining the impacts of fiscal decentralization on different types of public investment including investment in infrastructure development, education as well as health could exceptionally be fruitful for knowing that how fiscal decentralization has got to be supportive for accumulating public investment.

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