Impact Assessment of Fiscal Decentralization in Improving Public Service Delivery: A Case Study of Districts in Punjab

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Abstract

Countries around the globe are devolving political, fiscal and administrative powers to lower tiers of government. In Pakistan, devolution reforms were launched through Local Government Ordinance in 2001, with three interrelated objectives. Service delivery was given special prominence. It was argued that empowered, staffed and resourced local governments would deliver better resources to improve education, health and municipal services. The objective of this study is to analyze the impact of fiscal decentralization in improvement of public services across selected districts of Punjab province of Pakistan, covering the period from 2003 to 2014 pooled for 12 years. The study applied the fixed and random effects models for panel data analysis and finds that fiscal decentralization improves the delivery of education and health services in districts of Punjab during Pervaiz Musharraf's regime while this effect reversed after the change of regime in 2008.Thus, it is proposed to decentralize the fiscal, administrative and political powers after making proper planning and management. The continuous monitoring is proposed for successful implementation and effectiveness of the policy.

Keywords: Decentralization; Local Government Ordinance; Public Service Delivery; Panel Data; Fixed Effects and Random Effects

Introduction

Decentralization is the transfer of authority, power, responsibility and resources from center to units and local levels of government. Countries around the world are devolving fiscal, political and administrative powers to lower tiers. The central transfer system usually constrains the ability of local government to better provision of social services, like health, education, water supply, sanitation and housing. In various countries public services are delivered by the central government. Central government can manage efficiently by introducing more reforms at grass root levels where local governments could become more responsible for delivering resources for development projects and public services.` The reforms under decentralization should support planning at the local government level, and mobilization of local as well as external resources to the local community. Different countries provide different arguments in favor of decentralization, but most of those have given top priority to improve the quantity and quality of service

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provision (Ahmad et al. 2005; Shah and Thomson, 2004)[1][2]. Despite the benefits of resource distribution and administration under local government there are examples of lack of revenues, weaker administration, corruption and low capacity of administration at local level. Thus decentralization in some countries has not been successful and effective to improve services by local governments. For successful outcomes of decentralization, services must be delivered to targeted individuals in the community, and must strengthen the administrative and institutional ability at the local government level (Fosu and Ryan, 2004)[3]. In some other countries, the government is still making efforts for the enhancement of institutional and administrative capacity to achieve objectives of fiscal decentralization by sharing financial resources between central and local governments (Bahl, 2001)[4].

The Government of Pakistan introduced a new local governance system, the Devolution Plan 2000, on August 14, 2000 and implemented it in all four provinces under the legal framework order through Provincial Local Government Ordinance in 2001. According to this Ordinance, the greater responsibilities were assigned to local governments for the delivery of key development projects and public services. It was believed that empowered local governments would deliver better on primary health, education and municipal services. Further, the administrative and economic powers were transferred to the District, Tehsil and Union council level in Pakistan. Nazim[1] and Naib Nazim[2] were elected for each administrative structure. Financial resources were distributed to the local government through a formula based fiscal transfers from the province. There were thirteen departments under district government, including five new departments. After decentralization, district governments were responsible for direct provision of public services, while provincial government was responsible only for regulation, financing and monitoring. Local government organized financing for the expanded functions through own sources, transfers from the higher tiers[3], special grants and borrowings[4].Yet, after the change of political hierarchy in 2008, the powers were returned to the higher tiers to some extent. Pakistan witnessed two significant developments in the process of fiscal decentralization. First was the 7th National Finance Commission Award in 2010 that enhanced the share of provincial governments in the divisible pool, thus, improved their fiscal power. The second was the announcement of 18th amendment to the constitution, which had a potential to change the structure of governance. After the lapse of sixteen years, there is a need to assess the success and failure aspects of this policy in Pakistan.

The objective of this study is to assess the impact of fiscal decentralization on public services like education and health, across districts of Punjab, after implementation of the Local Government Ordinance 2001. The time span of the study is 12 years 2003-2014. In addition, the assessment is being done during two sub-periods, 2003 to 2008 and

1 Elected representative at district level.
2 Elected representative at Tehsil level.
3 Federal and provincial.
4 Internal and external.

2009 to 2014. Thus, the null hypothesis of the study states that fiscal decentralization does not improve public service delivery in eight districts of Punjab province. This study adds value to literature because only few studies tested empirically the impact of fiscal decentralization on public service delivery in Pakistan. In addition, still no research is being done on the same issue and this research is the first attempt with a special focus at district level. The sections of the study are organized as follows: the theoretical background and review of literature is being discussed in section-II. Section-III describes the models and econometric techniques for analysis with data sources. Section-IV presents findings and analysis. Section-V concludes and provides recommendations.

Literature Review

Theoretical Background

The theoretical background of decentralization can be extracted from the Tiebout Hypothesis (Tiebout, 1956)[5]. According to this hypothesis, the different local governments offer different goods and services to their residents to collect tax revenue. Thus, people move to those jurisdictions that provide them better local goods and services. Musgrave (1959)[6] presented a model in decentralization theory that showed the public sector responsibility for distribution, allocation and stabilization. This theory also allocated the functions among various levels of governments by reasoning that fiscal decentralization is an appropriate system for provision of public goods according to the local individual's preferences and tastes. Similarly, Oates(1972)[7] in the Fiscal Federalism theory provided arguments in favor of powerful policy of fiscal decentralization, providing the role of local governments for the provision of public goods according to the needs of local communities. Furthermore, according to Oates(1972)[7], well-informed local management of government can deliver resources efficiently. Efficient delivery of public services shows that services are delivered up to the level where marginal utility for last unit of services is equal to its benefits. Thus, local governments could be able to generate more revenues to spend on the needs and development of local people. Wallis and Oates (1988)[8]have developed the Wallis hypothesis, according to this hypothesis, under decentralized system the size of sub-national governments may increase. As the supply of public goods under decentralized system can be according to the local preferences, as compare to a central system, this may increase demand for local public goods and as a result, higher level of local public spending.

Empirical Literature

A large body of literature analyzed the effects of decentralization on socioeconomic variables. Proponents of decentralization give the arguments in favor of government reforms in developing countries (Shah, 1994, 1998) [9][10]whereas others criticize it (Tanzi, 1995)[11]. These disagreements arise after the implementation of such reforms in developing countries. This section presents the summary of the literature on the

relationship of decentralization and public service delivery, with special focus on health and education. In addition literature provides the basis for analytical framework for the evaluation of the decentralization reforms in the following sections.

Kazungu and Mabula (2013)[12] provided the analysis on the quality and performance of fiscal decentralization policy. The two measures, quality of education provision and education spending are used to measure impact of decentralization in Tanzania. It concluded that during Fiscal decentralization, education expenditures and quality of education improved significantly. Salinas and Sole-Olle (2010)[13] evaluated the positive impact of fiscal decentralization on educational outcomes in Spain when pupils on vocational training programs are not taken into account also richer regions showed more effects. Freinkman and Plekhanov(2009)[14]found the significant effect of decentralization on average examination results, after controlling the key inputs and regional public expenditures on education in Russian regions. In addition, the quality of municipal utilities also improved with greater provision after implementation of decentralization policy. Asfaw et al(2007)[15]evaluated the decentralization policy in India from 1990 to 1997. The assessment of the effect of this policy on health outcome measured by using rural infant mortality rates is provided and found a significant reduction in infant mortality. Khaleghian (2004)[16] reported various effects of decentralization on health outcome in low and middle income countries. This comparative analysis was conducted using the data of 140 middle and low income countries for the period 1980-1997. The different effects of decentralization have obtained in case of low and middle income countries. The results indicated the higher impact of decentralization on health outcomes in case of low income countries whereas, the reverse effect is observed in the middle income countries Arze (2003)[17] conducted the study on developing countries and identified that during greater decentralization, public expenditures on education and health as a percentage of total expenditures has increased rapidly. Moreover, the results were significant and stronger in case of developing countries. Further, the countries allocated smaller share of expenditures on these services has shown poor education and health outcomes. Habibi et al. (2001)[18] conducted the study on the impact of devolution on basic social service outcomes in Argentina for the period 1970- 1994 and found that fiscal decentralization has shown a significant impact on the provision of education and health services as well as has reduced the regional disparities. Another study by Eskeland and Filmer (2002)[19] on the same country data found that decentralization in the education sector has shown improvement in education quality with school achievement scores. Foster and Rosenzweing (2001)[20] have examined that democratic decentralization has improved allocation of resources for pro-poor local services in India. Faguet (2001)[21] identified that decentralization in Bolivia resulted to improve educational outcomes as well as the quality and access of social services. In another study Faguetand Sanchez (2008)[22], investigated the impact of fiscal decentralization in the education sector in Colombia and Bolivia and provided the comparison. The study concluded that investment shifted from infrastructure to primary social services, thus improvement in enrolment rates in public schools in both Colombia and Bolivia. Mahal, et al.(2000)[23] evaluated the progress in the process of decentralization in the provision of public services in India in addition study resulted that there was little movement towards decentralization in few states such as Maharashtra,

Gujarat, West Bengal and Karnataka. Rural local bodies functioned primarily with little control over finances, administration and expenditures, resulted in improvement in enrolment and child mortality reduced. Huther and Shah(1996)[24] conducted a study using data of a large sample of countries and concluded that decentralization has improved the quatity and quality of public services. The studies done in various countries provide the existence of positive effects of decentralization on the improvement of public service delivery.

Model and Methodology

Model

In this paper two models are developed to evaluate the impact assessment of fiscal decentralization on public service delivery. Two social services, education and health are selected.

$$PSD = f(FD, EXP, PCEXP, X) \quad (1)$$

The econometric models are

$$ED_{it} = \alpha + \alpha_1 FD_{it} + \alpha_2 \ln EXED_{it} + \alpha_3 \ln PCEXED_{it} + \alpha_4 X_{it} + \alpha_5 D + \varepsilon_{it} \quad (2)$$

$$HE_{it} = \beta + \beta_1 FD_{it} + \beta_2 \ln EXHE_{it} + \beta_3 \ln PCEXHE_{it} + \beta_4 X_{it} + \beta_5 D + \varepsilon_{it} \quad (3)$$

Equation (1) develops the model, shows that the dependent variable is public service delivery (PSD) and the explanatory variables are Fiscal Decentralization (FD), Public Expenditures (EXP), per capita public expenditures in each district(PCEXP) and a set of control variables(X). The first model in equation (2) uses primary school enrollment as a proxy to represent education output (ED). While, Fiscal decentralization (FD), log of total expenditures on education in each district (lnEXED), and log of per capita education expenditures in each district (lnPCEXED) are explanatory variables.[5] Second model in equation (3) considers proxy for health output (HE), i.e. percentage of children aged 12-23 months that have been immunized (based on recall and record-fully immunized), lnEXHE is log of public expenditures on health in each district of Punjab, lnPCEXHE represents log of per capita expenditures on health in each district. In addition, X is the set of control variables in both models, like total district output, total population of each district, population density and infrastructure[6]. All control variables are in log form. D represents time dummy variable used to capture the effects during two sub-periods, i.e. 2003 to 2008 and 2009 to 2014. In equation 2 and 3, α and β are intercepts and $\alpha_1\ \alpha_2\ \alpha_3\ \alpha_4\ \alpha_5$ are coefficients of variables for first model, while $\beta_1\ \beta_2\ \beta_3\ \beta_4\ \beta_5$ are coefficients of variables for the second model. Subscript i represents for district and t for time period. Variables description, symbols and expected signs are given in Appendix (A-2).

[5] Variable construction and expected signs are given in Appendix-(A-2)

[6] Detail and proxies of control variables is given in Appendix-(A-2)

Data Sources

This study is based on panel data set covering eight districts[7] of Punjab province, Pakistan and conducted under the period 2003 to 2014.The sources of all data series used in this study are shown in Appendix(A-2).The secondary data is used in this study and collected from Ministry of Finance, Government of Punjab[25], Punjab Development Statistics (PDS)[26], Multiple Integrated Cluster Survey (MICS)[27] and Pakistan Social and Living Standard Measurement (PSLM)[28], published by the Punjab Bureau of Statistics and Pakistan Bureau of Statistics, Govt. of Pakistan.

Methodology

To estimate the models of the study the panel data econometric techniques are selected. Panel data models examine fixed and random effects of individual or time. Before selection of the technique, the Doornick Hansen normality test[8]is applied, and result shows the normal distribution of study data. Thus, fixed effects and random effects techniques are chosen for estimation. The major difference between fixed and random effect models lies in the role of dummy variables. In a fixed effect model parameter estimate of dummy variable is the part of the intercept but in random effect model a part of an error term. In both, fixed or random effect model slopes remain the same across group or time period.

Pooled Regression

Conventional ordinary least squares (OLS) regressions produce efficient and consistent parameter estimates if the individual effect does not exist(=0). The ordinary least squares (OLS) technique is applied for analysis of the data collected for this study to compare the estimated results with other techniques.

Fixed Effects Model

The fixed effect model assumes the same slopes and constant variance across groups and examines group differences in intercepts. The least squares dummy variable (LSDV), within effect, and between effect estimation methods can be used in fixed effects models. Thus, ordinary least squares (OLS)regressions with dummies, in fact, are fixed effect models. The fixed effect models with functional forms are given in equation (4) and (5).

$$ED_{it} = (\alpha + \mu_i) + \alpha_1 FD_{it} + \alpha_2 \ln EXED_{it} + \alpha_3 \ln PCEXED_{it} + \alpha_4 X_{it} + \alpha_5 D + \nu_{it} \quad (4)$$

$$HE_{it} = (\beta + \mu_i) + \beta_1 FD_{it} + \beta_2 \ln EXHE_{it} + \beta_3 \ln PCEXHE_{it} + \beta_4 X_{it} + \beta_5 D + \nu_{it} \quad (5)$$

[7] List of districts is given in Appendix-(A-1)
[8] Test result is given in appendix

Where μ_i is independently identically distributed and represents the fixed effect specific to individual or time period that is not included in the regression. Assuming the same slopes and constant variance across individual, this model examines individual differences in intercepts. Since this individual specific effect is a part of the intercept and time invariant. The fixed effect model is estimated within effect estimation methods and errors are allowed to be correlated with the other regressors in the model.

Random Effects Model

The random effect model is based on the assumption that individual effect is not correlated with any regressor and estimate variance of the error terms specific to groups or themes. The functional forms of random effect models are;

$$ED_{it} = \alpha + \alpha_1 FD_{it} + \alpha_2 \ln EXED_{it} + \alpha_3 \ln PCEXED_{it} + \alpha_4 X_{it} + \alpha_5 D + \varepsilon_{it} \quad (6)$$

$$HE_{it} = \beta + \beta_1 FD_{it} + \beta_2 \ln EXHE_{it} + \beta_3 \ln PCEXHE_{it} + \beta_4 X_{it} + \beta_5 D + \varepsilon_{it} \quad (7)$$

Thus, ε_{it} in equations (6) and (7) is heterogeneous and an individual specific random error or a composite error term. This model is also called an error component model. In this model, the intercept and slopes of regressors are the same across individual. The intercepts are same across individuals or time periods while the difference lies in their individual specific errors. If a co-variance structure of an individual is known then the random effect model is estimated by generalized least squares (GLS). In contrast, if co-variance structure of an individual is not known the feasible generalized least squares (FGLS) method is used to estimate the variance structure .In this respect, the example of groupwise heteroscedastic regression model is provided by Greene 2003[29]. In addition, random effect model reduces the number of parameters to be estimated and produces inconsistent estimates when individual specific random effect is correlated with regressors (Green, 2008)[30]. By keeping constant the intercept and slopes, the random effect model estimates variance components for both groups and error. The difference among groups or time periods lies in the variance of the error term. There are various estimation methods for FGLS including maximum likelihood methods and simulations (Baltagi and Cheng 1994)[31]. The F-test can be applied to estimate Fixed effects, while random effects can be examined by applying the LM (Breusch and Pagan 1980)[32]test. If the null hypothesis of LM test is not rejected, the pooled OLS regression will be selected for estimation. As discussed above, the difference between fixed and random effect models lies in the role of dummies. In fixed effect model, the dummies are part of the intercept, while in random effect model, the dummies act as an error term.

Hausman Test

The Hausman specification test (Hausman, 1978)[33] provides the comparison between fixed effect and random effect models. The random effect model is preferred over fixed effect model, if the null hypothesis is not rejected. The null hypothesis is that the individual effects are uncorrelated with other regressors.

Lagrange Multiplier Test(LM)

Lagrange Multiplier test (Breusch and Pagan, 1980)[32] is used to choose the appropriate model between pooled OLS and random effect and also examines if time or individual specific variance components are zero. The test statistic follows the chi-squared distribution with one degree of freedom. Fixed effects are tested by the F-test, while random effects are examined by the LM test. If the null hypothesis is not rejected then, pooled OLS regression is preferred over random effect. In case of rejection of null hypothesis, random effect will be able to deal with heterogeneity in a better way than does the pooled OLS.

Estimation and Analysis

The estimated results after application of panel data techniques are provided and discussed in detail in this section. The descriptive statistics of the data and correlation analysis are presented and tables are given in Appendices. The empirical results of the models constructed in previous section are presented in results section.

Descriptive statistics of Data

To check the distribution of data the Doornik Hensen normality test, on all variables under this study is applied, and all found to be normally distributed, the results of the test are given in Appendix-(B-1). The important benefit of normal distribution of variables is to provide better results than the results obtained from non-normal distribution of variables. The descriptive statistics of the data are presented in Appendix-(B-2). Correlation analysis is also given in Appendix-(B-3).

Empirical Results

The estimated results on the impact of fiscal decentralization on public service delivery are obtained by applying all the three panel data techniques[9]discussed above, on equation (2) and (3). Pooled model is rejected out of three because it could not incorporate the heterogeneity of the individual units or districts; also could not estimate the individual specific effects. Fixed effects econometric model estimates district specific effects with the introduction of heterogeneity. In spite of this advantage, the parameters and the interceptre main constant across districts. In addition, the random effect model also introduces heterogeneity across districts. However, another advantage is that the specific

[9] Pooled OLS, fixed effects and random effects

distribution generates the effects in the random effects model. The cross-sectional heterogeneity is the basic assumption of the random effects model. The LM (Brusch and Pegan) test is applied and the null hypothesis[10] is rejected and favors the results obtained from random effects as shown in table(1) and (2) for equations (2) and (3) respectively.

After application of panel data techniques, there is a need to choose the best technique for the estimation of the study data, for this purpose the Hausman test is applied in order to distinguish between fixed effects model and random effects model. The result of Hausman test is shown in table (1) and table (2) that accepts the null hypothesis as the Chi^2 value is 0.82 with very high probability value (0.99). This result shows that individual specific effects are not correlated with explanatory variables for the equation (2) and (3) respectively. This concludes that the results obtained after applying random effects model are appropriate for econometric estimation and analysis of equations (2) and (3). On the basis of this finding, the results obtained from random effects models are appropriate for interpretation. A random effects model result for equation (2) is shown in table (1) and is significant as a whole, with R^2value 0.65 which is moderately good. To decide that which model is appropriate out of two, random effects model or pooled regression model, the LM (Brusch and Pegan) test is applied and result is shown in table (1) for model one. The result is significant at one percent as shown by value of $Chibar^2$, 156.64 with very low probability. Thus, null hypothesis(pooled regression model is appropriate)is rejected. This test also confirms earlier test[11]result in favor of random effects model. Further, rho value of 0.91 shows variance in the model and this represents the differences across the districts.

Impact of Fiscal Decentralization on Educational outcome

On the basis of results obtained from random effects model shown in table-(1), the fiscal decentralization (FD) is significant at 5% level, with a positive sign as expected. One million increase in local share of expenditures made by a district may cause a 15 percent increase in primary school enrollment. Moreover, a significant increase in district government spending in education is also found at one % level and result is according to the expectations. Per capita education expenditures also contribute to an increase in student's enrollment at the primary level. A percentage increase in district government spending in education sector may lead to 2.74 percent increase in primary school enrolment. A one percent increase in population density, responsible of 44 % increase in primary school enrollment significantly at 5% that is against the expected sign. Infrastructure improvement shows significant and positive effect on primary school enrolment as in result one kilometer increase in road construction may increase the primary school enrolment by 73.38 percent children. The result of dummy variable used for a change of political regime is negative and significant at 1 %. This identifies that effect of decentralization is reversed after 2008. The constant term is significant at the 1 % level, but with a negative sign.

[10] Null=individual effects are same.
[11] Hausman test.

Table-1:

Dependent variable : Primary School Enrolment(ENR)			**Model- 1**
Explanatory variables	**Pooled Regression**	**Fixed Effects**	**Random Effects**
FD			
LnEXED	7.096 (0.45)	10.36 (1.80)*	15.13 (2.13)**
LnPCEXED	2.85 (2.50)**	2.56 (3.13)***	2.74 (3.42)***
LnPOP	9.03(0.21)	9.32(1.03)	12.95(2.21)**
lnDEN	-18.38 (-4.40)***	8.92 (1.00)	-11.88 (-0.91)
lnOUTPUT	33.41 (8.78)***	12.10 (0.18)	44.46 (2.32)**
lnROAD	-3.86 (-2.07)**	14.37 (1.86)*	8.58 (1.28)
Dummy	45.85 (7.08)***	77.22 (4.36)***	73.38 (4.50)***
Constant	-7.29 (4.01)***	-5.24 (3.58)***	-5.39 (3.88)***
R2	-171.68(-6.36)***	-272.83(-4.50)***	-344.07 (-4.30)
F-statistic	0.69	0.65	0.65
Wald-Chi^2	28.35	25.75	158.11
Number of observations	P>F = 0.000 96	P>F = 0.000 96	P>chi2 = 0.000 96
Number of groups	8	8	8
Hausman Test:		Chi^2= 0.82	p>Chi^2=0.99
LM(Breusch and Pagan) Test:		Chibar^2=156.64	P>Chibar^2 =0.000***

*,**,*** denotes 10%,5%,1% significance level
t-statistics are given in parenthesis

Impact of Fiscal Decentralization on Health outcome

Estimated results of model two discussed above in equation (2) are shown in table-(2). All pooled, fixed and random effects models are applied on equation (2), and results are given in column 2, 3 and 4 respectively. Hausman test statistic is insignificant, as chi^2 value is 1.26with high probability value 0.973. Thus, on the basis of this result, the random effects model is appropriate as compared to pooled and fixed effects models. The random effects model presented R^2 value of 0.64 that is moderately good. LM test is applied to double check the model, and result found chibar^2 is 2.66 that is significant at 5% level. Thus, for health model, the random effects model is selected by applying LM test.

All the variables in equation (2) provided the signs according to the expectations based on theory except population density (lnDEN) and output (lnOUTPUT). There is a positive increase in fiscal decentralization (FD) variable and significant at 5%. Increase in local share of public expenditures by one percent in health sector, significantly raises 7.22 percent of children who immunized thus improves health condition. One percent increase in population density contributes to increase in immunization by 16.08 %, as this result is significant at 5% level and against expectation. One percent increase in roads construction raises 12.29% children who immunized, as the result is significant at 5%

level, this shows that infrastructure is also improving immunization. The result of time dummy is also significant at 1 % with negative sign, which shows that after change of political regime, the decentralization does not contribute to improvement in health outcomes; this result confirms the effect of recentralization in Pakistan. The coefficients of two control variables: population (lnPOP) and district output (lnOUTPUT) are insignificant and signs are not according to expectations. This is the evidence of economic development, and also shows that the local government is over-investing in infrastructure rather than in real output.

The Dummy variable used for structural change is not only significant with a negative sign in random effects model result, but also significant and negative in results of all models. This shows that political regime change does influence the model results. This means that policy was effective before 2008 only. Furthermore, this study focuses only on expenditure decentralization ignoring revenue decentralization, and expenditures in almost all districts are increasing throughout. Decentralization can also be analyzed from administrative and political aspects, but due to non-availability of data, those aspects could not be incorporated for analysis. Overall decentralization has positive influence on health outcome to some extent.

Table-2:

Dependent variable: Health (HE)=Percentage of children that have been immunized		**Model- 2**	
Explanatory variables	**Pooled Regression**	**Fixed Effects**	**Random Effects**
FD	6.79 (1.08)	8.47 (2.10)**	7.22 (2.50)**
LnEXHE	-0.22 (-0.09)	-0.87 (-0.38)	0.19 (0.08)
LnPCEXHE	1.32(1.23)	4.15(2.17)	7.16(3.18)
LnPOP	-14.90(-5.33)***	2.16(0.25)	-10.80 (-1.53)
lnDEN	17.31 (6.46)***	8.19(0.98)	16.08 (2.12)**
lnOUTPUT	-5.59 (-3.78)***	15.05(2.14)**	-1.88(-0.51)
lnROAD	19.24 (3.99)***	-0.55(-0.03)	12.29 (2.30)**
Dummy	-4.50 (3.16)***	-4.07 (2.50)***	-4.05 (2.83)***
Constant	4.90 (0.28)	38.18(0.65)	11.94 (0.25)
R2	0.58	0.30	0.64
F-statistic	17.56	3.93	25.64
Wald-Chi2	Prob>F= 0.000	Prob>F= 0.001***	Prob>chi2 = (0.000)
Number of observations	96	96	96
Number of groups	8	8	8
Hausman Test: Chi^2= 1.26 P>Chi^2=0.973			
LM(Breusch and Pagan) Test: $Chibar^2$=26.6 P>$Chibar^2$ =0.0513**			

*,**,*** denotes 10%,5%,1% significance level
t-statistics are given in parenthesis

Conclusion and Recommendations

This study assesses the impact of fiscal decentralization in improvement of public service delivery with special focus on health and education in eight districts of Punjab province of Pakistan, during the time period of 2003 to 2014. Panel data analysis techniques are applied for estimation of data. Two models are constructed for education and health outcomes, and estimated by applying three panel data econometric techniques, i.e., pooled, fixed and random effects models. For a selection of an appropriate model out of fixed and random effects, Hausman test and Breusch-Pagan LM test are also applied. The random effects model found to be appropriate for the study model to assess impact of fiscal decentralization on health and education outcomes. The estimated findings revealed a significant and positive effect of fiscal decentralization on health and education outcomes. Thus, the analyses evaluated that fiscal decentralization during the Pervez Musharraf regime have a positive influence on public services while this effect reversed after the change of regime in 2008, and supports the enhancement and distribution of power to lower tiers in Pakistan. The findings of this analysis are consistent to Oates (1972)[7], who found that fiscal decentralization is responsible of improving the quality of public services. Oates (1972)[7] further explains that local governments may know well about the needs and preferences of local people and thus be able to spend efficiently. For successful policy, central government must be willing to share power with local governments. This will motivate local governments to have greater fiscal autonomy, thus make it more accountable. The central government must be willing to share power with local governments. It is suggested that the transfer of fiscal, administrative and political power after making proper planning and management that would reduce district's dependency on the central government. The continuous monitoring is also suggested for successful implementation and effectiveness of the policy. The central government should facilitate local governments in planning and implementation of legal and administrative reforms and mobilization of local and external resources to develop the local community.

Indicators of fiscal decentralization are numerous. This study used the expenditure decentralization. Further research in Pakistan should take into account revenue decentralization. Eight districts of Punjab is included in study sample; further research can be conducted incorporating other districts from all provinces of Pakistan. Other proxies for education output i.e, student result, student teacher ratio and literacy rate can be used for further research. In addition, other proxies for health outcome, i.e., infant mortality rate, number of hospitals, maternal mortality rate and number of patients examined can also be used for future research.

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Appendix-A

A-1: List of Districts of Punjab Province

No.	Districts
1.	Rawalpindi
2.	Sargodha
3.	Faisalabad
4.	Gujranwala
5.	Sialkot
6.	Lahore
7.	Multan
8.	Bahawalpur

A-2: Explanation, Construction and Sources of Data

Variables Names	Variable Description	Proxies	Formula	Expected Sign	Data Source
Dependent Variables					
ED	Education	Primary school Enrolment		Positive	PDS, PSLM, MICS
HE	Health	Percentage of children aged 12-23 months that have been immunized.		Positive	PDS, PSLM, MICS
Explanatory Variables					
XED	District wise Govt. Expenditure on Education			Positive	Finance Department Ministry of Finance
PCXHE	Per Capita Health Expenditures		Total Health expenditures/ population	Positive	
X	Control Variable	Population		Negative	PDS, PSLM, MICS
PCXED	Per Capita Education Expenditures		Total Education expenditures/ population	positive	
XHE	District wise Govt. Expenditure on Health			Positive	Finance Department Ministry of Finance
X	Control Variable	Population Density	Population/ Area	Negative	PDS, PSLM, MICS
X	Control Variable	Total Yield	Sum of all crops	Positive	PDS
X	Control Variable	Metalled Road Length		Positive	PDS
D	Time Dummy	To capture the effects under two sub-periods (2003-2008 and 2009 to 2014)			

Appendix-B

B-1: NormalityTest

Normality Test	Chi^2- statistics	Probablity
Doornik-Hansen Test	19.662	0.241

Null Hypothesis: Data is Normally Distributed.

B-2: Summary Statistics

Variables	Obs	Mean	Min	Max	Std.Dev.
EDU	96	71.34	30	92	13.33
HE	96	84.88	60	98	7.6
FD	96	0.32	0.11	0.75	0.13
lnEXED	96	7.96	4.9	9.1	0.79
lnPCEXED	96	6.5	2.9	7.53	0.78
lnEXHE	96	6.5	5.6	7.7	0.41
lnPCEXHE	96	5	3.47	5.91	0.39
lnpop	96	1.5	0.9	2.2	0.35
lnDensity	96	2.9	2.1	3.7	0.41
lnOutput	96	3.08	1.9	3.9	0.52
lnRoads	96	3.4	3.1	3.5	0.15

B-3: Correlation Matrix

Variables	ED	HE	FD	lnEXED	lnPCXED	lnEXHE	lnPCEXHE	lnpop	lnDensity	lnOutput	lnRoads
ED	1										
HE	0.68	1									
FD	0.62	0.60	1								
lnEXED	0.51	0.46	0.42	1							
lnPCEXED	0.49	0.41	-0.26	0.9	1						
lnEXHE	0.43	0.11	0.44	0.32	0.11	1					
lnPCEXHE	0.16	0.21	-0.16	0.14	0.31	0.63	1				
lnpop	-0.32	-0.13	0.71	0.23	-0.22	0.48	-0.38	1			
lnDensity	0.56	0.47	0.60	0.32	-0.02	0.30	-0.35	0.75	1		
lnOutput	-0.5	-0.5	-0.03	-0.27	-0.16	0.32	0.55	-0.24	-0.46	1	
lnRoads	0.53	0.51	0.3	-0.08	0.04	0.2	0.44	-0.26	-0.54	0.38	1