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Fiscal Decentralization and Health Outcomes: Empirical Evidence from Districts of Punjab, Pakistan

Mehr-un-Nisa[1], Qamar-un-Nisa[2], Rimsha Irshad[3]

[1]Lecturer, Department of Economics, Lahore College for Women University Lahore, Pakistan.
[2]Visiting Lecturer, Lahore College for Women University Lahore, Pakistan.
[3]Senior Officer, Administration, University of Management and Technology (UMT), Lahore, Pakistan.
Correspondence: mehr.nisa@lcwu.edu.pk[1]

ABSTRACT

Aim of the Study: A large number of countries are transferring financial, administrative and political powers to the local governments. In Pakistan, devolution reforms were launched through Local Government Ordinance in 2001. This research investigates that whether higher autonomy of district governments could improve health sector outcomes, in their respective districts or not.

Methodology: The linear fixed effects and random effects regression models are employed for a panel of 34 districts of Punjab province, Pakistan, during 2003-2015.

Findings: The results reveal that fiscal decentralization improves health outcomes in Punjab province of Pakistan. The child and maternal health measures are improved with the evidence of fall in maternal and child mortality rates in Punjab.

Conclusion: The study concluded that the decentralization process during Pervez Musharraf's regime could not change the structure of the economy as a whole. Therefore, decentralization of health sector in all provinces is suggested to reinforce the benefits of fiscal decentralization.

Keywords: Sub-national Government; Decentralization; Devolution; Local Government Ordinance; Health Outcomes; Fixed Effects and Random Effects; Child and Maternal Health.

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Introduction

Countries around the globe have increasingly shifted resources and power from central authorities to lower levels of government (Treisman, 2006; Martinez-Vazquez, Lago-Penas and Sacchi, 2016). Keeping in view the growing enthusiasm for decentralization in majority of countries, the consequences of decentralization have attracted the attention of researchers and policy makers (Martinez-Vazquez *et al*. 2016). Decentralization is a broader policy framework, involving transfer of fiscal, administrative and political power to the lower levels of government (Rubio and Gomez, 2017; Asfaw et al., 2007; Ebel & Yilmaz, 2002). It is a policy tool, aims to achieve efficiency, accountability and equity. This process also has objected to improve the delivery of public services. Health care reformists usually consider the decentralization as a powerful means to improve the health care services (Rubio and Gomez, 2017). It is argued that decentralization improves health outcomes by bringing decision makers closer to the local

people, thus involves the community participation in the decision making and implementation processes (Ponce-Rodriguez *et al.,* 2012; Robalino et al., 2001; Voigt and Blume, 2012). Despite the arguments in favor of decentralization, some countries experienced little improvement in public services especially in health outcomes, while some others provides the evidence of insignificant or negative impact of decentralization on health sector indicators (Channa & Faguet, 2016; Martinez-Vazquez et al, 2017; Dwicaksono & Fox, 2018). Most of the studies have focused on theoretical concepts and limitations of decentralization while, other studies have attempted to investigate the link between the decentralization and health services and outcomes (Yusfany, 2015; West & Wong, 1995; Faguet, 2001; Akin et al, 2005; Robalino et al, 2001; Khaleghian, 2004;). A number of household surveys of different countries evaluated citizen's satisfaction with the public service delivery under the decentralized system (Diaz-Serrano and Rodriguez-pose, 2015).

Health sector cannot perform well under central government as compare to other sectors like national security and defense (Mitchell & Bossert, 2010). A study conducted on 75 developing countries examined that 84 percent countries found in implementing the policies of decentralization (Dellinger, 1994).

Decentralization in Pakistan

Pakistan has a long history of Decentralization and Recentralization from the 1960s with domination of Central authority. This system was implemented by the military government every time, while the elected government always prefers to concentrate the powers of the central authority (Cheema, Khwaja & Qadir, 2005). The military government of Pervez Musharraf (1998 to 2007) planned and implemented relatively comprehensive policies of Decentralization under the devolution plan 2002. The authority was transferred to the local elected representatives, from the hands of the bureaucracy. But immediately after the abolition of military government, the powers were again reversed to the provincial government during the next democratic regime of Zardari period (2008 to 2013). Further, a significant development was made in the distribution system of Pakistan, with introduction of the Provincial Finance Commission Award (PFC), in 2010, which enhanced the financial power of Provinces in Pakistan.

The contribution of decentralization on health related indicators at the state and municipal levels have not yet been investigated in Pakistan. In order to fill this knowledge vacuum, this study analyzed longitudinal data of 34 districts in the Pakistani province of Punjab between 2003 and 2015 to examine the theoretical and empirical evidences of fiscal decentralization on health sector indicators. Keeping in view the recent interest in decentralization in developing world, the results of this study may be interesting to scholars and policymakers all over the world.

Decentralization of Health Sector in Pakistan

The administrative system of public service delivery had been highly centralized at the provincial or at the federal level. During the study period the district government was headed by the district councilors (Zila Nazims).

In 2001, when the decentralization reforms were implemented to devolve the political, administrative, financial and decision making powers to the district governments with the objective of the establishment of local governments in all districts of Pakistan. Similarly, the health sector decision making responsibilities were devolved to elected officials of districts and to the health administrators. The decentralized system permitted the districts to set the priorities regarding budget allocation according to the needs and to improve the efficiency of the local public services and to encourage citizen's participation.

Provincial health department was responsible for regulations and policy making while decisions about operations regarding public service provision were devolved with some restrictions (Collins, Omar & Tarin, 2002; Nayyar-Stone, Ebel, Ignatova & Rashid, 2006). Civil service administrators including district coordinators (DCOs) and executive district officers (EDOs) were involved in decision making. The district health departments were organized by health sector officials including EDO, district officer

for health (DOHs), superintendents for districts (MS-DHQs) tehsil level hospitals (MS-THQs) (Nayyar-Stone, Ebel, Ignatova & Rashid, 2006).

The Pakistan Initiatives for Mothers and Newborns (PAIMAN) project- funded by the US Agency for international development – conducted a survey in ten districts of Pakistan with a five control districts. The survey findings reported significant changes in decision space, accountability and capacity that officials exercised.

The assessment of the fiscal decentralization reforms are needed to assess across districts in Pakistan. Previously, Nisa and Khalil, (2018), provided the assessment of fiscal decentralization reforms and its impact on public service delivery in case of selected districts of Punjab province Pakistan. The research can be extended by analyzing the policy impact in case of all districts of Pakistan. Thus, the key objective of this study is to assess the impact of fiscal decentralization on selected health outcomes such as children immunization, pre-natal consultation and percentage of women having T.T. Injection, across 34 districts of Punjab Province, Pakistan, focusing the Local Government Ordinance (LGO) 2001. The time span of the study is 13 years (2003-2015). The novel aspects of this study can be captured through following highlights;

1- The contribution of local Government ordinance in the delivery of public service delivery focusing health outcomes across districts which are not measured previously, across districts of Punjab.

2- The study objective is analyzed during two sub-periods i.e, 2003 to 2008 and 2009 to 2015 in order to capture the effects after change of political regime in 2008. The two period analyses provides the status of outcomes within the decentralized system and after the end of decentralization without the decentralization, thus the success and failure aspects of the policy can be captured.

3- Most of the previous studies, measures health outcome with single proxy (infant mortality/maternal mortality) for analysis of single country case. This study overcomes the issue by expanding the analysis, measuring three health sector outcomes.

Thus the hypothesis of the study states that fiscal decentralization improves health outcomes in 34 districts of Punjab province. The studies conducted previously on Pakistan could not provide empirical analysis of the decentralization and health service outcomes across districts, while only few studies could provide theoretical discussion on this study issue. The cross district comparison provides the information about the health services condition in the districts of Punjab.

The following sections are organized as the review of literature is discussed in Section2. Section-3 provides the theoretical framework. Section-4 describes the models Specifications and Methods. Section-5 presents the data and sources. Section-6 provides estimation and results. Last section (7) concludes and provides recommendations.

Literature Review

The roots of fiscal decentralization can be found from the traditional theories of fiscal federalism and intergovernmental fiscal relations which are the contributions of Tiebout (1956), Musgrave (1959), Oates (1972) and Olson (1969). Their common argument states that devolution of expenditures and tax authority can achieve efficiency in the public sector. A well-known decentralization theorem explains that in the presence of variety of preferences and wants, public services provision by the decentralized government will lead to increase in the welfare of local citizens (Oates, 1972). The decentralized government assumed to have information advantage and can create flexibility in needs and preferences of citizens. This fact leads to mobility of households as individuals can vote to the communities where their benefits and preferences are maximized (Tiebout, 1956). The countries differ on the aspect of how they decentralized. Most of the studies in literature investigate the determinants or factors of fiscal decentralization from theoretical aspects (Panizza, 1999; Arzaghi & Henderson, 2005) as well as from empirical aspects (Canavire-Bacarreza & Martinez- Vazquez, 2012).

A large number of studies around the world have examined the relationship between decentralization and various measures of individual's health status, such as life expectancy, infant mortality rate, and immunization coverage rates (Hooghe *et al*. 2016). Cross-country studies have conducted the research on decentralization and health status in case of various regions of the world, while few studies examined the relationship between decentralization and health outcome across all countries of the world. Rubalino (2001) have found the association of decentralization and infant mortality rate by analyzing the panel data of high and low income countries during 1970 1995. Their findings revealed that low income countries achieve greater benefits from decentralization. Another measure of health outcome, i.e coverage of children immunized for measles, is analyzed in a cross-country study conducted by Ebel and Yilmaz (2002), covering the data of six developing countries during 1970- 1999, identified the positive link between decentralization and immunization to cure for pertussis and tetanus (DPT), diphtheria, and measles for children under the age of 12 months. Similarly, Khaleghian (2004) also developed the link between decentralization and immunization rates for the measles and vaccine in the children of one year old for the sample of 140 low and middle income countries covering the period of 1980 to 1997. Khaleghian (2004) measured decentralization variable in different method in contrast to the other studies.

The key indicator, of fiscal decentralization usually measures through is binary variable, to represent the presence of expenditures, taxes or regulations activities on the part of sub-national authorities. In addition, two other measures of decentralization[1] were also included in the studies. The findings provided the positive impact only in low-income countries.

Bossert and Beauvais (2002) provide a comparative analysis of the health sectors of Ghana, Zambia, Uganda and Philippines, and found that the public sector investment allocated to the health sector, during decentralization reforms, varied among these countries. The study further added that in Ghana, the percentage of allocated resources in health sector raised from 22.8 % to 34 % to the district level. In Zambia, the resources allocated to health sector raised from 29.9 % to 47.7 %. In Uganda, the health sector budget was transferred to local government through a block allowance system. Finally, there is a critical relocation of resources to local government in Philippines.

Treisman (2002) analyzed the data of 166 countries, measuring the health performance indicators; one is, the share of new born children immunized for tetanus, diphtheria and pertussis and the other is, the share of population having access to 20 basic medications. The findings of the study are insignificant with the result that countries having GNP per capita greater than $ 5000 have shown poor service provision than the countries having low GNP per capita. One more addition in cross-country studies, is examined by Rubio (2010), taking data from 19 OECD countries, to check whether fiscal decentralization good for health sector performance or not. The two measures of decentralization; expenditures decentralization and revenue decentralization are measured and found that decentralization had a positive and significant effect in improving health outcome in terms of infant mortality rate.

Decentralization in some other Asian countries could not prove any improvement in health indicators. Lakshminarya,(2003) in Philippines, Noori (2006) in Uzbekistan and Sharma and Mwong (2010) in Nepal have reported poor quality of services with decline in access to health services.

Single-country case studies also examined the link between decentralization and health outcomes in different institutional set up. Yee (2001) conducted a panel study on Chinese provinces over the period 1980-1993 and concluded that expenditure decentralization is beneficial for the health sector as infant mortality rate reduced with the increase in local expenditure on health care.

Similarly, local government level study by Uchimura and Jutting (2009) have analyzed two indicators of fiscal decentralization in case of Chinese counties' expenditures and revenues and found the significant and negative association with infant mortality rate between 1995 to 2001. Similarly, Cantarero and Pascual (2008), Rubio (2011) also have identified the negative and significant relationship between

[1] administrative and political

expenditure decentralization and health outcomes in the Spanish regions and Canadian provinces respectively. Similarly, Habibi *et al.* (2003) examined infant mortality rate with measuring revenue decentralization for a panel of Argentinian provinces. Mahal et al. (2000) covering the data for the period 1970-1994 from rural India, investigated the positive impact of decentralization on child mortality. Asfaw et al (2007) corroborates the previous findings by measuring the index of decentralization.

Furthermore, positive impact of decentralization on health sector outcomes is identified by some other studies such as Habibi et al. (2003) in Argentina, in OECD countries by Rubio (2011 a,b), Cantarero and Logo-Pens (2012), Procelli in Italy (2014).

The evidences on the impact of decentralization on health outcome are still limited due to the following reasons. First, few studies have been conducted in developed countries. Second, majority research has been used only one health outcome indicator, i.e. infant mortality rate. Third, cross- country studies mostly rely on IMF GFS fiscal data, thus unable to capture the contribution of decentralization in policy and planning.

The above literature reveals that still, no attempt has been made in Pakistan to evaluate the impact of decentralization reforms of 2001, on health outcomes at local as well as at provincial level. This study will fill the gap in two aspects; first is to check this impact on health outcomes at district level and second is to measure health outcomes with the selection of three proxies (as children immunization, pre-natal consultation and percentage of women having T.T. Injection).

Theoretical Framework

A number of cross-country and country specific studies conducted research to evaluate the effect of some institutional reforms on public service delivery, represented by final outcomes i.e, infant mortality rate, literacy rate, improved drinking water supply and improved sanitation. These studies construct the following function:

$$FO = f (PX , I, C) \quad (1)$$

Where FO represents the final outcome to measure public service i.e. infant mortality rate in case of health care. The right hand side variable, PX is the public expenditure in that service. These studies also use the institutional variable (I) as discrete variable to quantify the presence or absence of institutional reforms through decentralization. The control variables (C) may also effect the final outcome.

The major problem in analyzing the function provided by equation-(1) is that it cannot consider all the relevant variables effecting final outcome, in a single equation. A long list of other factors can also affect the public service outcome i.e, demographic factors, political environment, geographical and weather conditions and cultural issues. The condition of other public services are also important factors such as, poor health condition of mothers may also effect infant mortality rate, which may be caused by low quality of water consumption and poor sanitary condition or lack of education of parents which make them unaware about taking precautionary measures for the children's health.

This research proposes to choose the intermediate outputs such as; percentage of individuals having access to health services (children having access to immunization, pregnant Women that have Received Tetanus Toxoid Injection, pregnant women having access to Govt. hospital for pre-natal consultation) rather than the use of final outcome. For evaluation of health care, availability of doctors, access to medical facilities and immunization treatment coverage measures access variables.

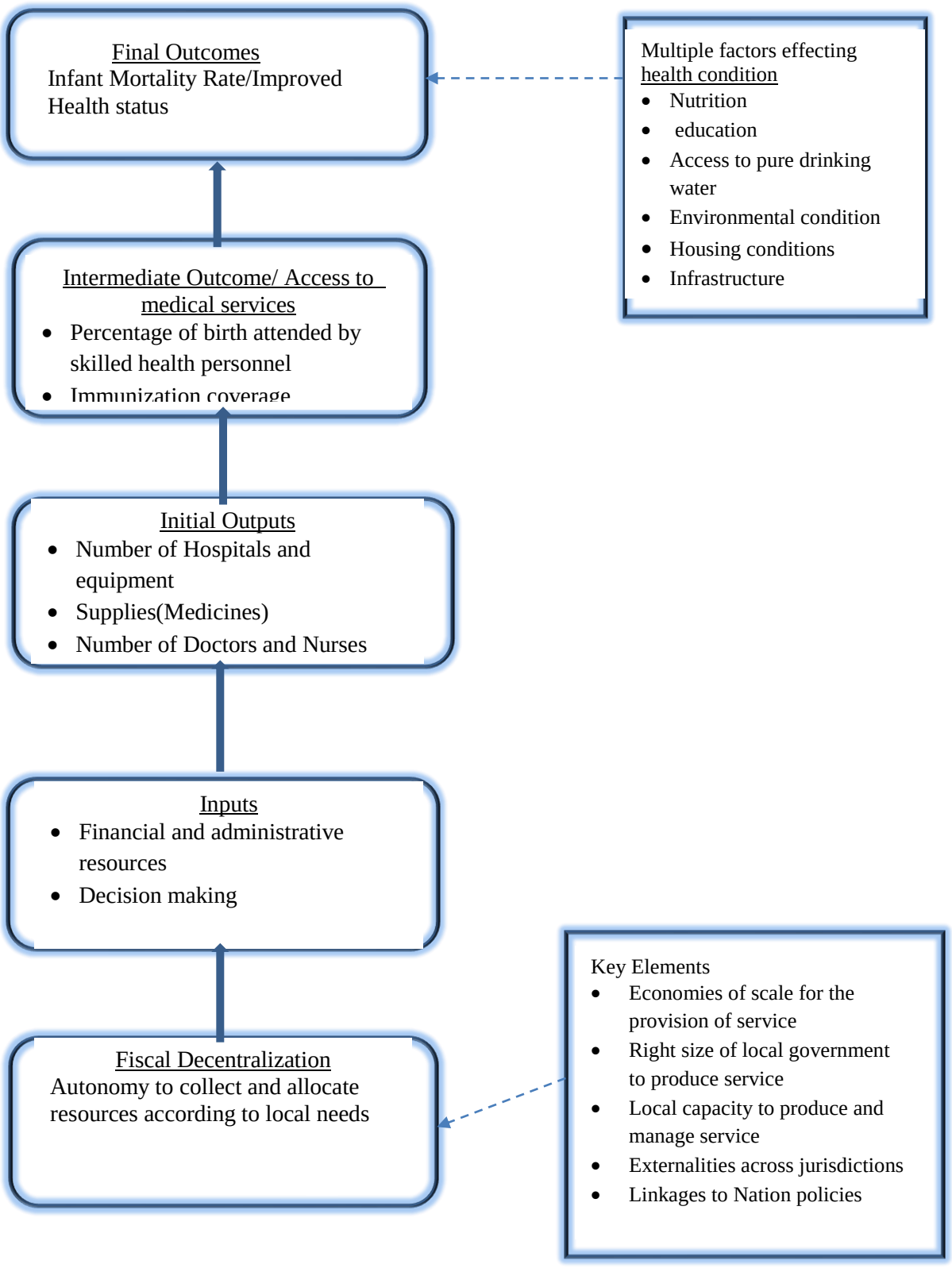

Figure-1: Framework of decentralization and health outcome.

Intermediate output for water provision is measured with the, access to improved sources of drinking water, through household connection or nearby access to drinking water.

The link of fiscal decentralization with the service delivery, through complete channel: from inputs to final output may help to understand the study framework. Figure-1 provides the production of public services, starting from inputs[2] to form service delivery platform. These inputs produce services by paying salaries to professionals[3], purchasing required supplies and equipment, providing maintenance and improving facilities. This initial output further helps to produce intermediate output, which is closely linked to access variables[4]. Finally, these access related intermediate variables leads to final outcomes, such as improved education, infant mortality, improved drinking water supply and improved sanitation.

There are number of other factors effecting final outcome, provided in figure-1. All the steps from initial input to final service provision can be significantly influenced by fiscal decentralization reforms. Fiscal decentralization can link to the public service delivery i.e health services in the way in which financial support are provided to the health sector, to achieve the technical and allocative efficiency.

The above mentioned linkage would support the policy makers to decide that what kind of public service must be provided at what level of government. Such as primary health care needs not very high specialization in medical care so, this can be managed at local government level, while secondary and territory health care needs high specialization in treatment, so it would be better to manage these at intermediate or higher tiers of government, which could provide sufficient resources for the service delivery to the local population.

Model Specifications and Methods

Models

The empirical analysis of this study is based upon panel data estimation. The variables of interest are fiscal decentralization measuring through expenditure decentralization, public health expenditures, per capita health expenditures controlling for the output, population density and road infrastructure. The general model is represented by equation-2 while three different specifications are developed to estimate the impact of fiscal decentralization on health outcomes. Health variable is measured with three proxies for each district of Punjab. Therefore, three models are constructed measuring three proxies of health outcome represented by equation 3, 4 and 5.

$$HO = f(FD, EXP, PCEX, X) \tag{2}$$

Where *HO* is measure of health outcome, and explanatory variables are fiscal decentralization *(FD),* expenditures on health sector *(EXP),* per capita expenditures on health sector *(PCEX)* and the set of control variables *(X).*

Model-1

$$IM_{it} = \alpha_o + \alpha_1 FD_{it} + \alpha_2 \ln EXP_{it} + \alpha_3 \ln PCEX_{it} + \alpha_4 X_{it} + \alpha_5 D + \varepsilon_{it} \tag{3}$$

Model-2

$$PW_{it} = \beta_o + \beta_1 FD_{it} + \beta_2 \ln EXP_{it} + \beta_3 \ln PCEX_{it} + \beta_4 X_{it} + \beta_5 D + \varepsilon_{it} \tag{4}$$

Model-3

$$PN_{it} = \gamma_0 + \gamma_1 FD_{it} + \beta_2 \ln EXP_{it} + \gamma_3 \ln PCEX_{it} + \gamma_4 X_{it} + \gamma_5 D + \varepsilon_{it} \tag{5}$$

[2] Financial and administrative resources

[3] Doctors, Nurses and managers

[4] %age of birth attended by skilled health professional, Immunization coverage, students enrolment, access to improved drinking water source, access to improved sanitation

The explanation and details of the variables selected to construct the above three models (Model-1, Model-2 and Model-3) are given in Appendix-(A-2).

Methodology

Panel data econometric approaches are chosen to estimate the study's models. Models for panel data can be examined by applying random and fixed effects of an individual or of time. The Doornick Hansen normality test is applied before choosing the estimation method, and the outcome demonstrates the normal distribution of the research data. In a fixed effect model, a parameter estimate of a dummy variable is a part of the intercept, and in a random effect model, it is a part of the error component. Slopes are constant for all groups or periods of time in both fixed and random effects models.

Fixed Effects Model

The fixed effect model analyses group differences in intercepts under the assumption that group variance and slopes are constant. Fixed effect models employ the within-effect, between-effect, and least squares dummy variable (LSDV) estimation techniques. Therefore, regressions using ordinary least squares (OLS) and dummies are fixed effect models. The functional forms of fixed effect model for equation-(1) are represented by equation- (6).

$$HO_{it} = (\alpha + \mu_i) + \alpha_1 FD_{it} + \alpha_2 \ln EXED_{it} + \alpha_3 \ln PCEXED_{it} + \alpha_4 X_{it} + \alpha_5 D + \nu_{it} \qquad (6)$$

Where μ_i is fixed effect from individual or time which is not included in the error term and regression are independently identically distributed.

In fixed effect model, individual variations in intercepts are investigated while assuming uniform slopes and variance. The intercept and a particular specific impact are both times invariant also μ_i permitted to have correlations with other predictors. Both within effect estimating techniques and least squares dummy variable (LSDV) regression are used to estimate the fixed effect model.

Random Effects Model

The random effects model is based upon important assumption of no correlation between regressors and individual effects and also estimates error variance specific to time or groups. The functional form of random effect model is represented by equation- (7).

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

The ε_{it} in equation-(6) is the composite error term which represents individual specific random heterogeneity, thus this model also known as error component model. The slope and intercept of explanatory variables remains constants across individual groups. The period and individual difference lies in individual specific errors. In the presence of known covariance structure of individuals, the estimation of random effects model performed by employing the generalized least squires (GLS). If regressors are correlated with the random effect, the estimates becomes inconsistent (Green, 2008).When the covariance structure is not known, the feasible Generalized least squares (FGLS) employ to estimate the structure of variance. The group wise hetroscedastic regression model is the example (Green, 2008). The methods to estimate the FGLS are simulations and maximum likelihood method (Baltagi & Cheng, 1994). The random effects model examine by employing LM-BP (Breusch & Pagan, 1980) test. The major difference between fixed and random effects model is based upon the role of dummy variables. In fixed effects model dummies are part of intercept, while in random effects model, dummies considered as error term.

Hausman Test

Fixed effect and random effect models are compared using the Hausman specification test (Hausman, 1978). The random effect model is preferred over the fixed effect model if the null hypothesis—that the individual effects are uncorrelated with the other regressors—is not rejected.

Data and Sources

The study models are examined by employing panel data estimation methods covering the period of 13 years (2003-2015) including the sample of 34 districts[5] of Punjab province, Pakistan. The Appendix (A-2) lists the sources of all the data series selected in this investigation The Ministry of Finance, the Government of Punjab, the Punjab Development Statistics (PDS), the Multiple Integrated Cluster Survey (MICS), published by the Punjab Bureau of Statistics, and the Pakistan Social and Living Standard Measurement (PSLM), published by the Pakistan Bureau of Statistics, Government of Pakistan provided all of the secondary data included for analysis of this study.

The variables selected in this study were subjected to the Doornik Hensen normality test, depicts the normal distribution of all the series. The test findings are provided in Appendix- (B-1). The normally distributed series can provide better findings than the estimation of non-normal distributed series. The descriptive statistics and coefficients of correlation are given in Appendix-(B-2) and Appendix-(B-3) respectively. The statistics of diagnostic tests are represented by Appendix-(B-4).

Before estimation of the models constructed previously, the Im-Pesaran-Shin test and Hadri LM Stationarity test are applied on all variables for unit root test in panel data which rejects the null hypothesis and provides that all the variables are stationary at levels. Keeping in view the findings of both; the normality test and unit root test, it is decided that pooled OLS is not appropriate technique to find model results rather alternative techniques; fixed effects and random effects are suitable for estimation.

[5] List of sample districts is given in Appendix-(A-1)

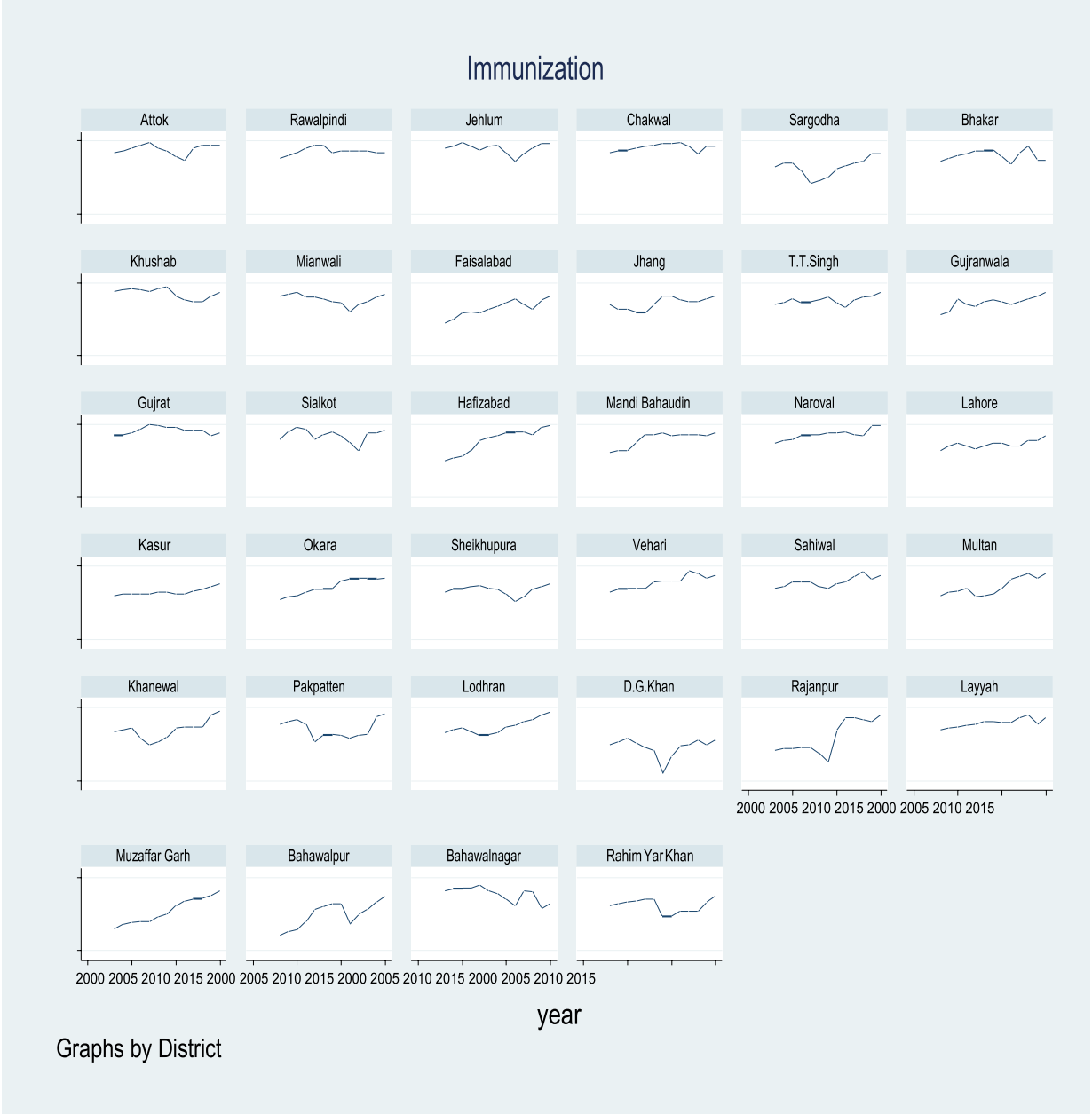
Immunization
Attok
Rawalpindi
Jehlum
Chakwal
Sargodha
Bhakar
Khushab
Mianwali
Faisalabad
Jhang
T.T.Singh
Gujranwala
Gujrat
Sialkot
Hafizabad
Mandi Bahaudin
Naroval
Lahore
Kasur
Okara
Sheikhupura
Vehari
Sahiwal
Multan
Khanewal
Pakpatten
Lodhran
D.G.Khan
Rajanpur
Layyah
Muzaffar Garh
Bahawalpur
Bahawalnagar
Rahim Yar Khan
2000 2005 2010 2015
year
Graphs by District

Figure: 1.

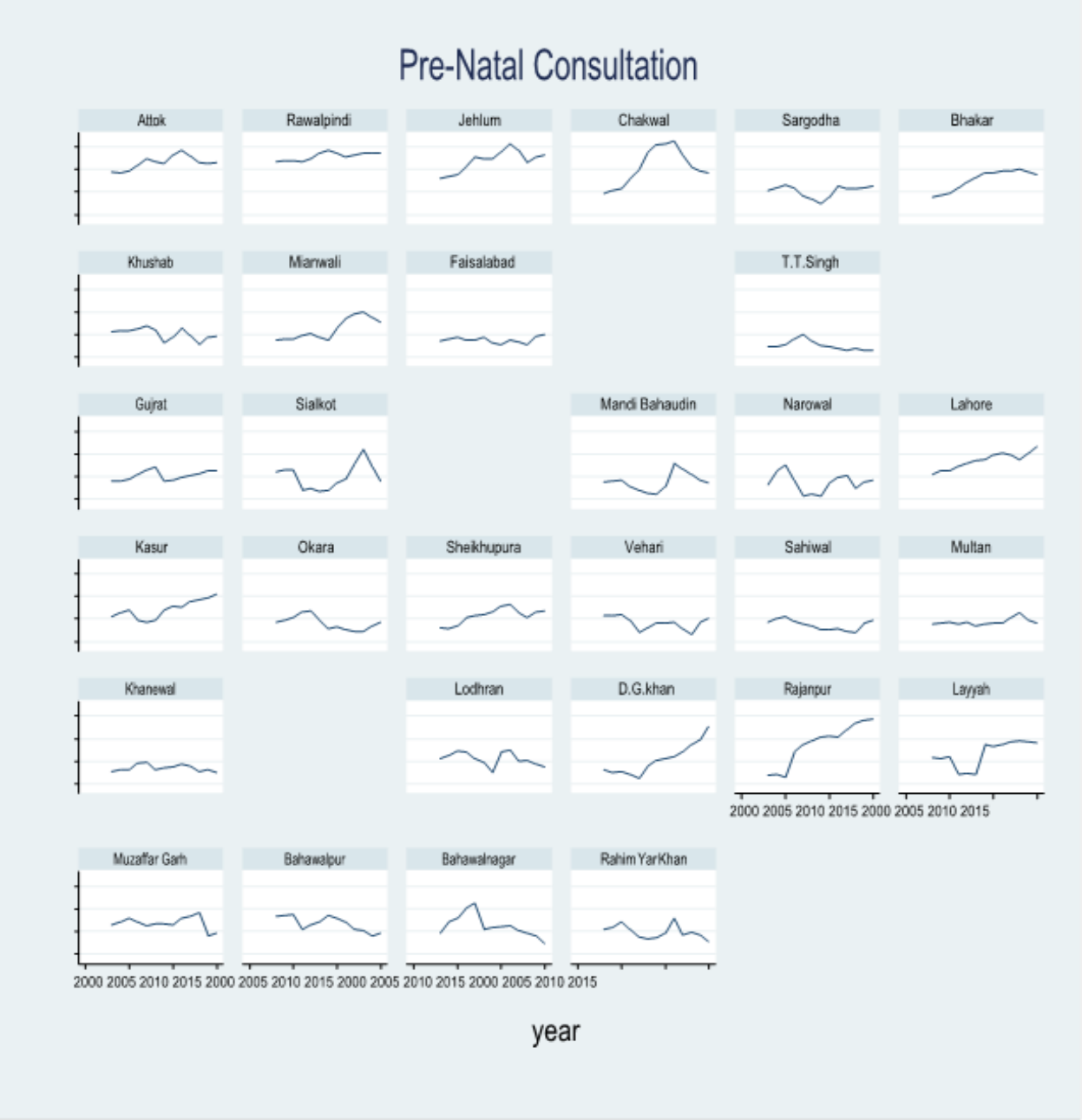
Pre-Natal Consultation
Attok
Rawalpindi
Jehlum
Chakwal
Sargodha
Bhakar
Khushab
Mianwali
Faisalabad
T.T.Singh
Gujrat
Sialkot
Mandi Bahaudin
Narowal
Lahore
Kasur
Okara
Sheikhupura
Vehari
Sahiwal
Multan
Khanewal
Lodhran
D.G.khan
Rajanpur
Layyah
Muzaffar Garh
Bahawalpur
Bahawalnagar
Rahim YarKhan
2000 2005 2010 2015
year

Figure: 2.

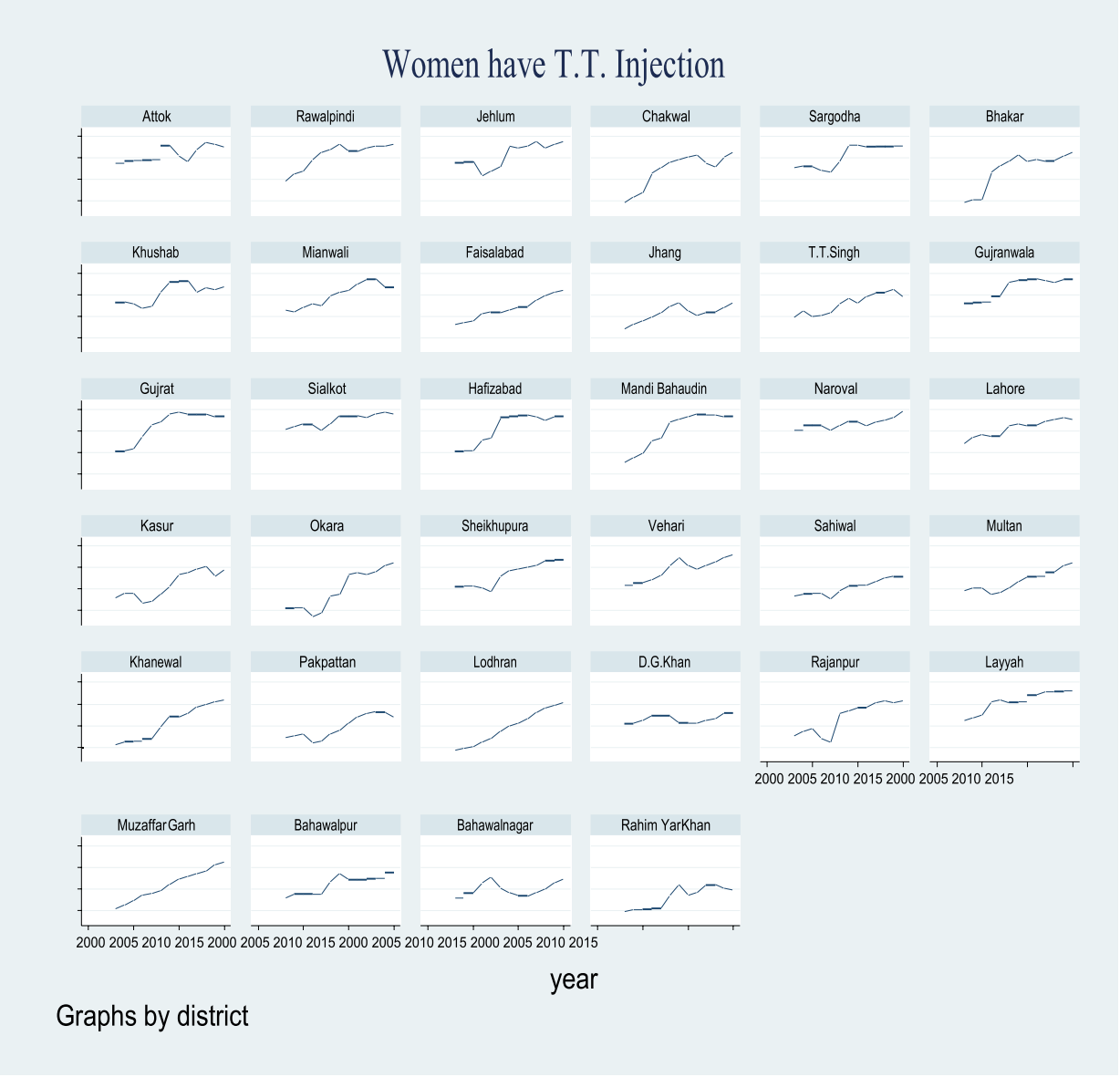

Figure: 3.

Estimation and Analysis

The findings of empirical estimation of fixed and random effect model are described in this section. The estimation of health outcomes is performed for the models constructed in previous sections (Model-1, Model-2 and Model-3). The estimation of district specific effects under fixed effects model introduces heterogeneity.

Similarly, cross-sectional heterogeneity also introduced by the random effects model. The findings of empirical estimation by employing fixed and random effects methods on three models of health outcomes-represented by equation-2, equation-3 and equation-4- are shown in table-1, table-2 and table-3.

As discussed previously, to measures the health outcome, three proxies are selected and represented by

three models. The fixed and random effects results of model-1 provide that coefficient of fiscal decentralization is positive and significant at one percent. In random effects result, one percent rise in local share of government expenditures significantly raises 12 percent of children on average who immunized that leads to improve health condition.

In fixed effects result, all other explanatory variables are insignificant except constant term. While random effect result provide that per capita public expenditures on health improves the immunization to children positively and significantly. The control variable; output, is significant but with negative sign, that is against the expectations. The Value of Hausman test is also given in Table-1 which is insignificant, meaning that the results of random effects are appropriate than those of fixed effects. Although, on the basis of data nature the fixed effects model can be preferred. As the dummy variable in model-1 is used to capture the structural changes after Implementation of fiscal decentralization reforms and in results, the coefficients of dummy variable in both models are insignificant with negative sign, whereas the constant term is significant with positive sign. This result confirms the absence of structural changes throughout the time period.

The results of second model are shown in Tabe-2. To identify the impact of fiscal decentralization on second proxy of health outcome which is measured by percentage of pregnant women that have received Tetanus Toxoid injection? The coefficient of fiscal decentralization (FD) is insignificant in the result of both fixed and random effects models. Only public expenditures in health sector influence the health outcome positively. The coefficient of control variable output is significant but with negative sign, this shows that in rural areas due to increase in crop production the household or work activities of women might increase, ultimately they could not be able to take care of their maternal health, this may leads to poor health outcome. In both modes, dummy variable is significant but with negative sign, while intercept value is positive and significant, meaning that during decentralization period the effect of policies is lesser than the effect on health sector during the recentralization duration. The Hausman test result is insignificant as the probability is very high shown in Table-2. On the basis of this result, it is concluded that the random effect results are better than fixed effects results. R-square value is moderately good.

Table-1

Model- 1
Dependent variable: IMM=Percentage that have been Immunized of children

Explanatory variables	Fixed Effects	Random Effects
FD	11.24 (2.80)***	12.03 (3.04)***
LnEXHE	2.76 (0.35)	-6.15 (-1.55)
LnPCEXHE	0.007(0.00)	9.91 (2.53)***
POP	1.11(0.51)	0.92 (0.73)
lnOUTPUT	0.48(0.73)	-1.21 (-2.45)***
lnROAD	1.55(1.51)	1.58 (1.63)
Dummy	-1.05(-1.30)	-1.16(-1.52)
Constant	50.24(5.27)***	64.47 (7.52)***
R2 within	0.40	0.41
Between	0.28	0.45
Overall	0.65	0.57
F-statistic	12.42 Prob>F= (0.00)	
Wald-Chi2		96.56 Prob>chi2 = (0.000)
Number of Observations	442	442
Number of groups	34	34

Hausman Test:	Chi^2=	$P>Chi^2$=0.872
LM(Breusch and Pagan) Test:	29.34	$P>Chibar^2$ =0.0513**
	$Chibar^2$=26.6	

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

Table-3 presents the results of Model-3, which is constructed to estimate the impact of fiscal decentralization on the third proxy of health outcome, measured by the percentage of women have pre-natal consultation from Govt. Hospital. The fixed effects results are better than those of random effects results, which can also be confirm after applying Hausman test statistics, with very low probability value. The coefficient of fiscal decentralization (FD) is positive and significant at 5 % level but the magnitude is small. Public expenditure on health sector also significantly raises the percentage of women having pre-natal consultancy from Government Hospital because the coefficient value is significant at one percent level.

Moreover, the coefficient of per capita health expenditures (LnPCEXHE) in each district is significant at 5% level but with negative sign, meaning that per capita expenditures reduce the number of women having pre-natal consultancy. Like the result achieved from previous models, dummy variable is with negative sign but insignificant. Similarly, the intercept value (constant term) is also insignificant meaning that there is no evidence of structural changes during[6] and after[7] decentralization reforms. The R2 value is moderately good. Post-estimation diagnostic tests are given in Appendix- (B-4).

Table-2

Model- 2

Dependent variable:

PW = (Percentage of Pregnant Women that have Receivd Tetanus Toxoid Injection)

Explanatory variables	Fixed Effects	Random Effects
FD	-2.02 (-0.36)	1.92 (0.34)
LnEXHE	56.47 (5.15)***	12.45 (1.71)*
LnPCEXHE	-51.13 (-4.62)***	-6.00 (-0.83)
POPmil	-8.80 (-2.88)***	-1.73 (-0.76)
lnOUTPUT	-1.30 (-1.40)	-2.63 (-3.19)***
lnROAD	2.23 (1.55)	1.30 (0.90)
Dummy	-10.27(-9.01)***	-11.91(-10.68)***
Constant	18.94 (1.42)	47.10 (3.64)***
R2 within	0.66	0.64
	0.45	
	0.38	
F-statistic	115.28	
	Prob>F= 0.00***	
Wald-Chi2		722.89
		Prob>chi2 = (0.000)
Number of Observations	442	442
Number of groups	34	34
Hausman Test:	Chi^2= 3.33	$P>Chi^2$=0.853
LM(Breusch and Pagan) Test:	$Chibar^2$=26.6	$P>Chibar^2$ =0.0513**

[6] Pervez Musharraf Regime (2003-2008)

[7] Zardari Regime (2009-2015)

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

Table-3

Model- 3		
Dependent variable: PRN =	Percentage of women have pre-natal consultation from Govt. Hospital	
Explanatory variables	**Fixed Effects**	**Random Effects**
FD	3.94 (0.62)	4.47 (0.70)
LnEXHE	28.17 (2.26)***	4.87 (0.69)
LnPCEXHE	-25.16 (-2.00)**	-0.76 (-0.11)
POPmil	-6.43 (-1.85)*	-0.79 (-0.36)
lnOUTPUT	0.00 (0.00)	-2.96 (-3.49)***
lnROAD	-0.77 (-0.47)	0.06 (0.03)
Dummy	-0.97(-0.75)	-0.70(-0.57)
Constant	7.25 (0.48)	20.19 (1.44)
R2	0.30	0.27
	0.47	0.46
	0.57	0.28
F-statistic	6.00	
	Prob>F= 0.00***	
		47.16
Wald-Chi2		Prob>chi2 = (0.000)
Number of Observations	442	442
Number of groups	34	34
		P>Chi^2=0.003***
Hausman Test:	Chi^2= 21.56	P>Chibar^2 =0.0513**
LM(Breusch and Pagan) Test:	Chibar^2=26.6	

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

Conclusion and Policy Recommendations

Decentralization is a broader concept, involving transfer of financial/fiscal, administrative and political power to the lowest level of governments. It is a policy tool that aims to achieve efficiency, accountability and equity. This process also has objected to improve the delivery of public services. Health care reformists usually considered the decentralization as a powerful means to improve the health care services. In Pakistan, still no attempt has been made to identify the contribution of fiscal decentralization on the health care outcomes. Therefore, this study has been conducted to bridge the research gap in the literature by analyzing the impact of fiscal decentralization on health sector outcomes, by collecting longitudinal data from thirty four districts of Punjab province of Pakistan, between 2003 and 2015. To measure the health outcome, three proxies are selected related to child and women health.

The results of fixed and random effects techniques reveal that fiscal decentralization improves the immunization to children and also increase the percentage of women who have pre-natal consultation from government hospitals. While, the decentralization policy did not raise the percentage of women who have Tatnus Toxide Injections during pregnancy. The health output proxies lead to maternal and child

health and improvement in these indicators may reduce the maternal mortality rate and child mortality rate. Although, the results do not reveal evidence of structural changes during the decentralization process as well as after the end of these policies. This may be due to the ineffective administrative and political decentralization[8].

According to this study, the policies regarding fiscal decentralization formulated by the Pervez Musharraf Government, had positive effects on health outcomes therefore, the government may strengthen Pakistan's decentralization system. Local governments will become more responsible as a result of having greater fiscal autonomy. Decentralization of fiscal autonomy would lessen a district's reliance on the federal government. The government must be willing to share powers with the sub-national and local governments in order to achieve the improved outcomes. After careful planning and management, it is advised to distribute the political, financial and administrative, powers. The legal and administrative reforms should facilitate the external and local mobilization of resources to meet the development goals of the local community.

Additionally, this analysis ignores revenue decentralization and solely focuses on expenditures decentralization, and expenditures are rising across all districts during the study period. Further research can be conducted taking into account the revenue measures. Decentralization may also be examined from an administrative and political perspective; however such perspectives could not be included in the research owing to a lack of data. Decentralization generally improves health outcomes to some degree.

The sample of this study consists on all (34) districts of Punjab province, future research can be conducted including all districts from Pakistan. Moreover, future research can also examine the various proxies measuring health output i.e, post-natal consultancy, life expectancy, infant mortality rate, maternal health and patients examined.

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Conflict of Interest

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ORCID iDs

Mehr-un-Nisa [1] https://orcid.org/0000-0002-9562-4291
Qamar-un-Nisa [2] https://orcid.org/0000-0001-5585-8344
Rimsha Irshad [3] https://orcid.org/0009-0006-0622-1148

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[8] Could not be captured in this study due to the non-availability of data

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Appendix-A

A-1 Sample Districts of Punjab Province

Sr.No	Districts	Sr.No	Districts
1	Rawalpindi	18	Narowal
2	Sahiwal	19	R.Y. Khan
3	Pakpattan	20	Layyah
4	Khushab	21	T.T.Singh
5	Kasur	22	Jhelum
6	Sheikhupura	23	Rajanpur
7	Bahawalpur	24	Mianwali
8	Faisalabad	25	Hafizabad
9	Mandi Bahauddin	26	Muzaffargarh
10	Multan	27	Sargodha
11	Chakwal	28	Okara
12	Gujranwala	29	Vehari
13	Bhakkar	30	D.G.Khan
14	Lahore	31	Jhang
15	Attock	32	Khanewal
16	Gujrat	33	Lodhran
17	Bahawalnagar	34	Sialkot

Source: Author

A-2 Explanation, Construction and Sources of Data

Variables Names	Variable Description	Proxies	Formula	Expected Sign	Data Source
Dependent Variables					
IMM	Health Outcome	Percentage of children aged 12-23 months that have been immunized		Positive	PDS, PSLM, MICS
PW	Health Outcome	Percentage of pregnant women have received Tetanus Toxoid Injection		Positive	PDS, PSLM, MICS
PRN	Health Outcome	Percentage of pregnant women have pre-natal consultation from Govt. Hospital		Positive	PDS, PSLM, MICS
Explanatory Variables					
FD	Fiscal Decentralization	Expenditure Decentralization	Total District expenditures/ Total Govt. Expenditures	positive	Finance Department/SBP
XHE	District wise Govt. Expenditure on Health			positive	Finance Department Ministry of Finance
PCXHE	Per Capita Health Expenditures		Total Health expenditures/population	positive	Finance Department/ PDS
X	Control Variable	Population		negative	PDS, PSLM, MICS
X	Control Variable	Total Yield	Sum of all crops	positive	PDS
X	Control Variable	Metaled Road Length		positive	PDS
D	Time Dummy	To capture the effects under two sub-periods (2003-2008 and 2009 to2015)			

Source: Author

Appendix-B

B-1 **Normality Test**

Normality Test	Chi^2- statistics	Probablity
Doornik-Hansen Test	15.351	0.421

Null Hypothesis: Data is Normally Distributed.

Source: Author

B-2

Summary Statistics

Variables	Obs	Mean	Min	Max	Std.Dev.
IMM	442	87.03	55	100	7.50
PW	442	72.61	35	98	15.07
PRN	442	23.75	3	65	12.92
FD	442	0.22	0.07	1.0	0.13
EXHE	442	493.09	99.44	2497.88	312.43
PCEXHE	442	205.66	23.57	576.65	95.87
POP	442	2.63	0.92	9.41	1.58
TOP	442	1892.29	11.5	11767	1813.70
ROA	442	2436.56	949.53	154623	7298.46

Source: Author

B-3 **Correlation Matrix**

Variables	IMM	PW	PRN	FD	EXHE	PCEXHE	POP	TOP	ROA
IMM	1								
PW	0.53	1							
PRN	0.19	0.25	1						
FD	-0.08	-0.00	0.03	1					
EXHE	0.06	0.32	0.04	0.47	1				
PCEXHE	0.37	0.46	0.20	-0.28	0.45	1			
POP	-0.20	0.04	0.02	0.84	0.60	-0.31	1		
OP	-0.36	-0.32	-0.30	0.26	0.37	-0.08	0.36	1	
ROA	0.05	0.05	-0.02	0.02	0.05	0.00	0.04	0.04	1

Source: Author

B-4

Diagnostic Tests

Models	Selected Model	Pesaran's Test of Cross-sectional Dependence H_0: no cross-sectional dependence	Wooldridge test for autocorrelation H_0: no first-order autocorrelation	Modified Wald test for groupwise heteroscedasticity* H_0: there is no heteroskedasticity
Model -1	Random Effects	4.421 Pr = (0.000)	F(1, 33) = 13.786 Prob > F = 0.412	----
Model -2	Random Effects	5.063 Pr = (0.000)	F(1, 33) = 18.15 Prob > F = 0.176	----
Model -3	Fixed Effects	1.564, Pr = 0.1178	F(1, 33) = 11.293 Prob > F = 0.341	chi2 (34) = 17.15 Prob>chi2 = 0.121

*Wald test for group wise heteroscedasticity cannot be calculated for random effects model
Source: Author