Development Expenditure Allocation and District Wise Social Development: A Case Study of Punjab Pakistan

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ARTICLE DETAILS	ABSTRACT
History: *Accepted 25 April 2023* *Available Online June 2023*	*In the wake of achieving Sustainable Development Goals, this study sets to investigate the allocation of development expenditures as government policy intervention and its role in the uplifting the social condition in districts of Punjab. The constriction of a comprehensive social development is indexed using principal factor analysis. This study considered panel data for 36 districts of Punjab ranging from 2008 to 2017. Estimates from the panel Random Effect model advocated that the rise in the development expenditures by the Government of Punjab follows U shape relationship with the social condition of the province. This quadratic model helps to estimate district-wise effects of government development intervention on social development and its components via which resource mobilization optimization can be done.*
Keywords: *Development Expenditure Mobilization, Social Development Index, Panel Random Effect Model*	
JEL Classification: *H53, O12*	

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1. Introduction

Social development refers to the change that can put the people at the center of economic activity. It means a firm assurance that development process guarantees benefit to people and it focuses not only the poor but also an acknowledgement to that people and the way they interact with each other shapes development process (International Institute of Social Studies). Similarly, it can be said that social development means investing in people which implies the elimination of obstacles and the creation of capabilities. Hence, it facilitates them to accomplish their goals in life with self- esteem and pride. Social deevelopment creates change in non-economic disciplines like democracy, social freedom, peace, social justice, strong institutions, health & nutrition and education which lead to well-being of every individual (Paiva, 1977; Jones, 1981; Meinert, 1987; Estes, 1990). A recent study by Inabo and Arshed (2019) assessed the effect of mortality rate, access to improved water and access to sanitation

facilities for the case of Nigeria. The results showed that increase in access to water and sanitation and decrease in infant moratality rate lead to increase in economic progress. Similar outcome evidenced by Rizvi (2019) for the case of education expenditures and its role on growth.

Fiscal policy is an effective tool in achieving economic growth which then can translated into sustainable growth by extending expenditures to development sector. While explaining the suitability of fiscal policy for social development, we must explore the opposing theories behind it. According to Keynesian economists, increase in government spendings definitely effects economic growth in short run and may increase the long run too if it increases the capacity or resources (Loizides & Vamvoukas, 2005; Hassan & Kalim, 2012). But according to classical economists, economy is already fully employing resources in longer run, government spending will only distorts it by creating crowding out effect. Hence there is a need to investigate the effect of fiscal policy at a smaller scale where the effects of expenditures are not agreegated out.

Pakistan economy has shown a continuously growth but at the same time, macroeconomic factors are imbalanced. Pakistan's GDP growth rate is increased from 5.4% to 5.8% in 2018 (Economic Survey, 2018). In terms of human development, Pakistan ranks as one of the lowest in South Asia specifically in education and health. Literacy rate (10 years and above) is 58% only. Average annual population growth rate (1998-2017) is souring to 2.40%. Female participation in labour force is the lowest in the region. Infant mortality rate is 63 per 1000 birth and under-five mortality rate is 89 per 1000 birth depict uncertainty socially (Economic Survey of Pakistan, 2017-18). Unsatisfactory economic condition, increased poverty, lack of education, inadequate healthcare facilities, sectarian conflict, extremism, lawlessness further deteriorate the situation. To deal with social, economic and political problems, Pakistan requires a different development approach. Decentralization of power makes the planning process possible at the grass root level. It is one of the outcomes of the 18th amendment in the 1973 constitution which led to the abolition of the concurrent list now, the provinces have the responsibility to provide services (Burki, 2010). According to Burki (2010), governments are in a better position to provide basic services to people as these are closer to their beneficiaries.

Punjab (shown in figure 1) is the 2nd largest province by area of Pakistan after Balochistan with 205,345 Sq Km of area. However, population wise it is the largest province with 536 population density per Sq Km (Punjab Development Statistics, 2018). An average annual population growth rate (1998-2017) is 2.13% (Economic survey of Pakistan, 2017-18). As per the MICS 2018 report, infant mortality rate is 60 per 1000 births, youth (male) literacy rate (15-24 year) is 77.7% and youth (female) literacy rate (15-24 year) is 71.7%, whereas employment rate among population (age 10 years and above) is 92.9%. Percentage of MPI-Poor people / headcount ratio is 26.1%. Punjab province comprises 36 districts with great diversifications in term of area, environment, culture, language and population, social and economic conditions. Punjab economy plays a pivotal role in Pakistan's GDP and the overall growth rate of the country. During 2017-18, Punjab's per capita income is 2% higher than national average. Over the last five years Punjab GDP growth rate was 4.9%.

Fig: 1 Punjab Province Map District Wise

Fig: 2 Infant Mortality Rate in Punjab's Districts
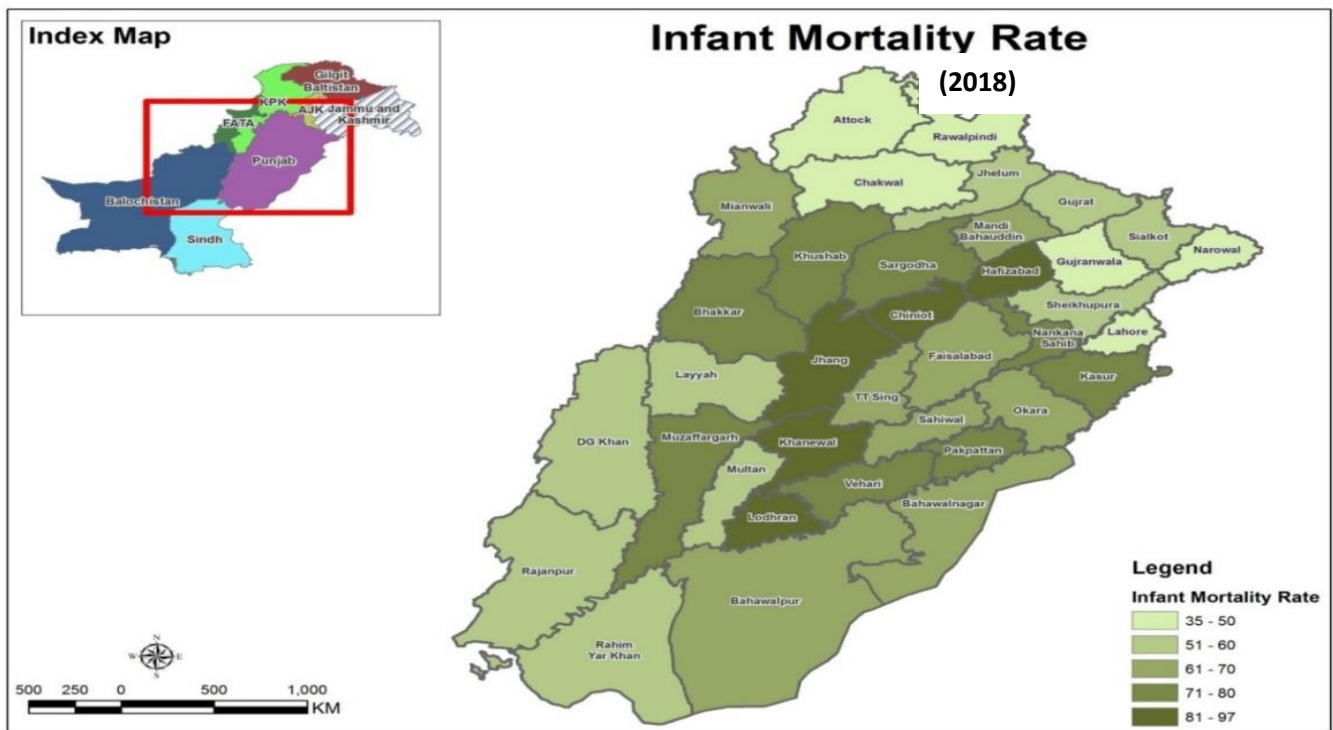
Source: MICS, 2018 Bureau of Statistics

Figure 2 is showing infant mortality rate (2018) across all over Punjab. This is an indicator of measuring social and economic well-being of a country. It is quite obvious from the map as the dark areas are reflecting the intensity of the matter where infant mortality rate is very high. Lodhran, Khanewal, Jhang, Chiniot and Hafizabad districts are showing high infant mortality rates. The poor and insufficient facilities provided by public sector have hostile effects on the quality of life. Lack of proper care, vaccination, maternal care, education of mother and unhealthy and poor facilitation in hospitals

are the major cause of high infant mortality rate in this region. Government should pay special attention to reduce health issues to ensure health children in Punjab.

Table 1 shows the status of human development across the province. Most of districts fall under the category of high level of human development and high-medium human development whereas only 3 districts Muzaffargarh, Dera Ghazi Khan and Rajanpur are in low medium human development. There is no district falls under low human development category.

Table: 1 Human Development Index in Punjab districts

National HDI Rank	District	Human Development Index
High level of Human Development		
1	Lahore	0.877
3	Rawalpindi	0.834
5	Sialkot	0.834
6	Jhelum	0.829
High-Medium of Human Development		
7	Gujrat	0.795
8	Chakwal	0.792
9	Attock	0.786
10	Faisalabad	0.782
11	Gujranwala	0.769
12	Toba Tek Singh	0763
15	Norowal	0.748
16	Nankan Sahib	0.740
17	Sheikhpura	0.738
19	Layyah	0.729
20	Sargodha	0.728
21	Multan	0.718
23	Mandi Bahauddin	0.716
24	Kasur	0.714
25	Sahiwal	0.710
26	Khushab	0.706
27	Okara	0.705
28	Hafizabad	0.705
Medium Human Development		
30	Khanewal	0.699
33	Jhang	0.682
39	Pakpattan	0.66
41	Lodhran	0.659
42	Chiniot	0.657
43	Vehari	0.655
46	Bahawalpur	0.645
47	Mianwali	0.645
49	Bahawalnagar	0.63
50	Bhakkar	0.628
51	Rahim Yar Khan	0.625

Low Medium Human Development		
58	Muzaffargarh	0.584
64	Dera Ghazi Khan	0.535
69	Rajanpur	0.506
Low Human Development		
	No District fall in this category	

Source: Punjab Growth Strategy 2023

Fig: 3 Number of malnutrition children in Punjab's Districts
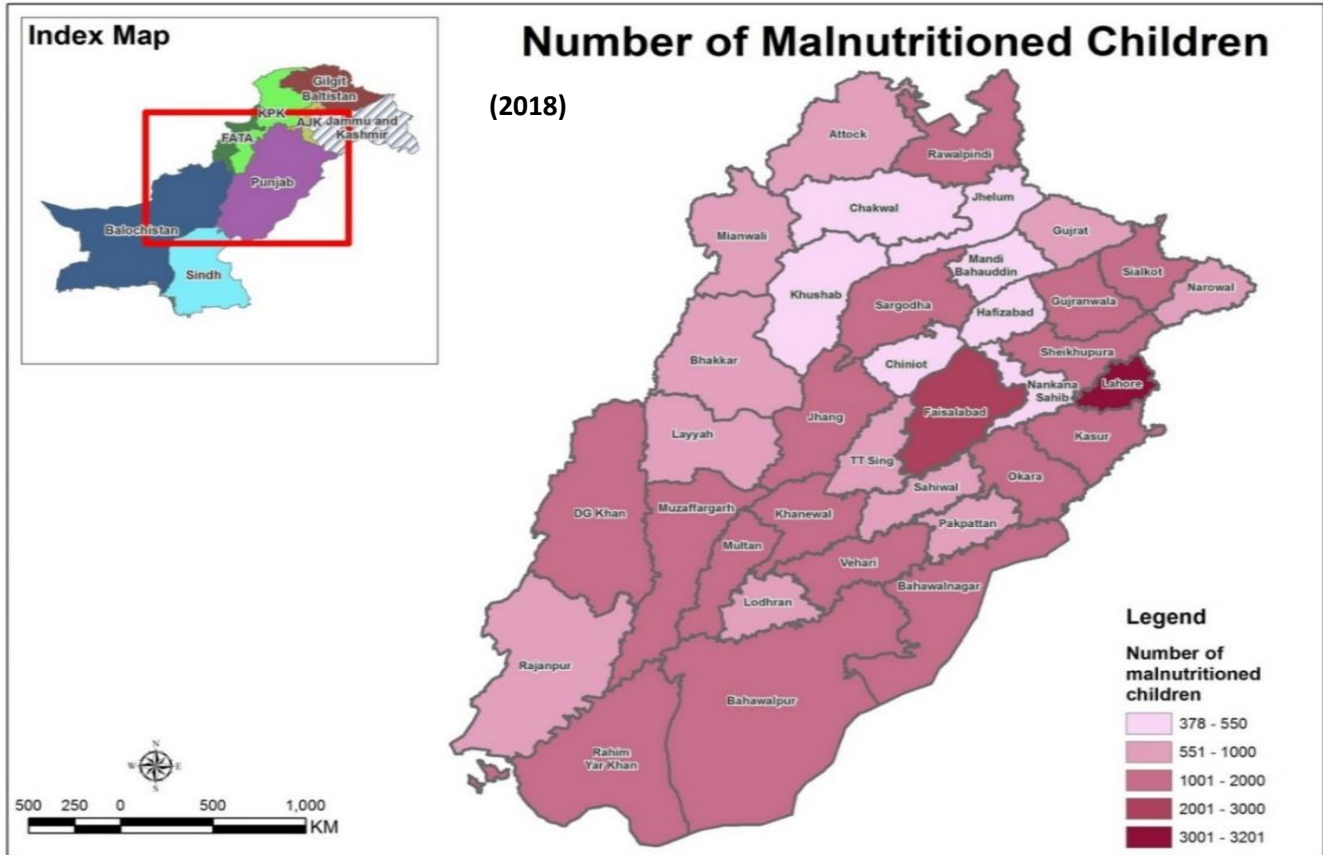
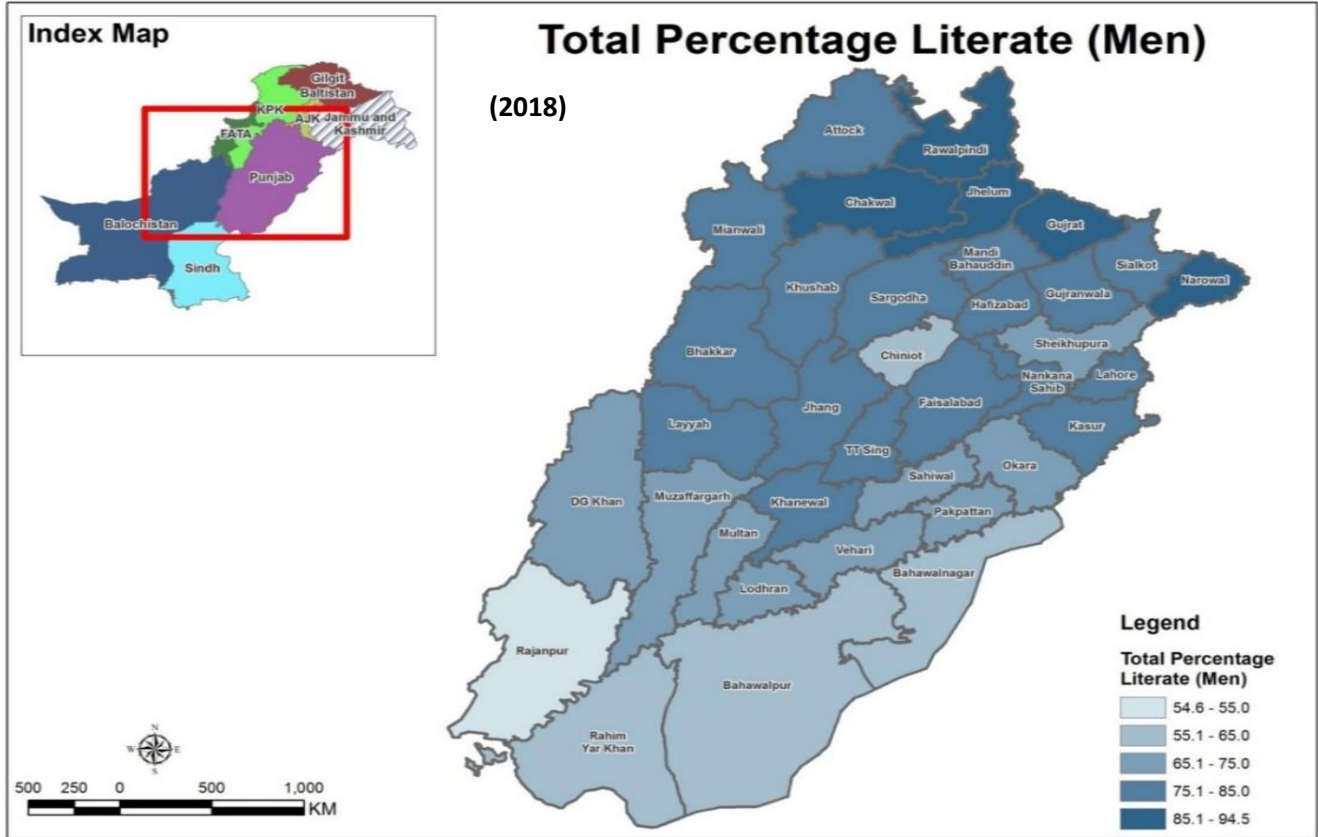**Source: MICS, 2018 Bureau of Statistics**

Figure 3 is showing number of malnourished children in all the districts of Punjab. It is quite visible from the map that Lahore district has the highest number of malnourished children among all the districts in Punjab. Although social development has been seen in Punjab, but at the same time it is facing high number of malnourished children. Low birth weight, lack of breastfeeding, lack of knowledge about nutrition, poverty, poor economic conditions, maternal education, and contagious diseases are the main causes.

Figure 4 is showing total percentage of literate men across all over Punjab. The dark areas are reflecting the high percentage. It is quite visible that districts in northern Punjab are performing well. South Punjab district are not performing well due to government negligence, lack of proper attention, insufficient resource distribution, lack of facilities, poor economic conditions, poverty and cultural obstacles.

Figure 5 is showing total percentage of literate women across all over Punjab. The dark areas are reflecting the high percentage. It is quite visible that districts in northern Punjab are performing well.

The position in Rajanpur, DG Khan and Muzaffargarh is alarming. Although literacy rate among male is also low in these districts but the condition of female literacy rate is very pathetic. Cultural obligation is one of the major reasons along with acute poverty prevailing in these areas. Due to government negligence, lack of proper attention, insufficient resource distribution, lack of facilities, poor economic conditions and cultural differences literacy rate among female is low in districts of south side of Punjab.

**Fig: 4 Total percentage literate (men) in districts**

Source: MICS, 2018 Bureau of Statistics

Figure 6 is showing average expenditure from 2008 to 2017 in all the districts of Punjab. It is quite visible that a large chunk of development expenditures incurred on Lahore district whereas Bhakkar, Khushab and Hafizabad are the most neglected districts.

Based on the evidence provided in terms of disparity of social indicators and the disparity in the development expenditures. Following are the research questions set to be answered
- Is a non liner pattern exists between development expenditures and social development?
- What is the role of other controlling variables with respect to social development?
- Does development expenditures influence indicators of social development in appropriate direction?

Fig: 5 Total percentage literates (Women) in districts
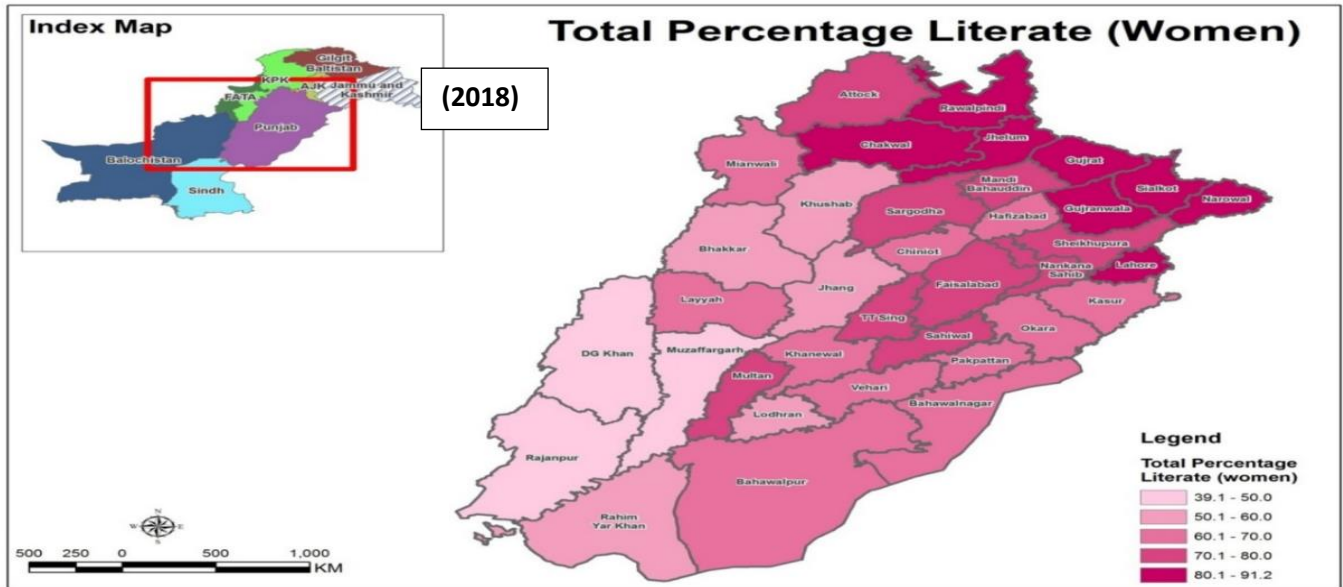
Source: MICS, 2018 Bureau of Statistics

Punjab Government is providing social services to its people as per constitution. The responsibility has shifted from federal Government to provovincial government from 2011. This study is designed to analyze the performance of Punjab Government in terms of the dispersement of total development expenditrues for its districts. For this purpose the objectives of this study are as follow:

- To investigate the non-linear impact of development expenditure on social development in Punjab.
- To assess how the incidence of development expenditures are influencing the components of social development index.

Fig: 6 Expenditure per capita (Rs. Million) in Punjab districts
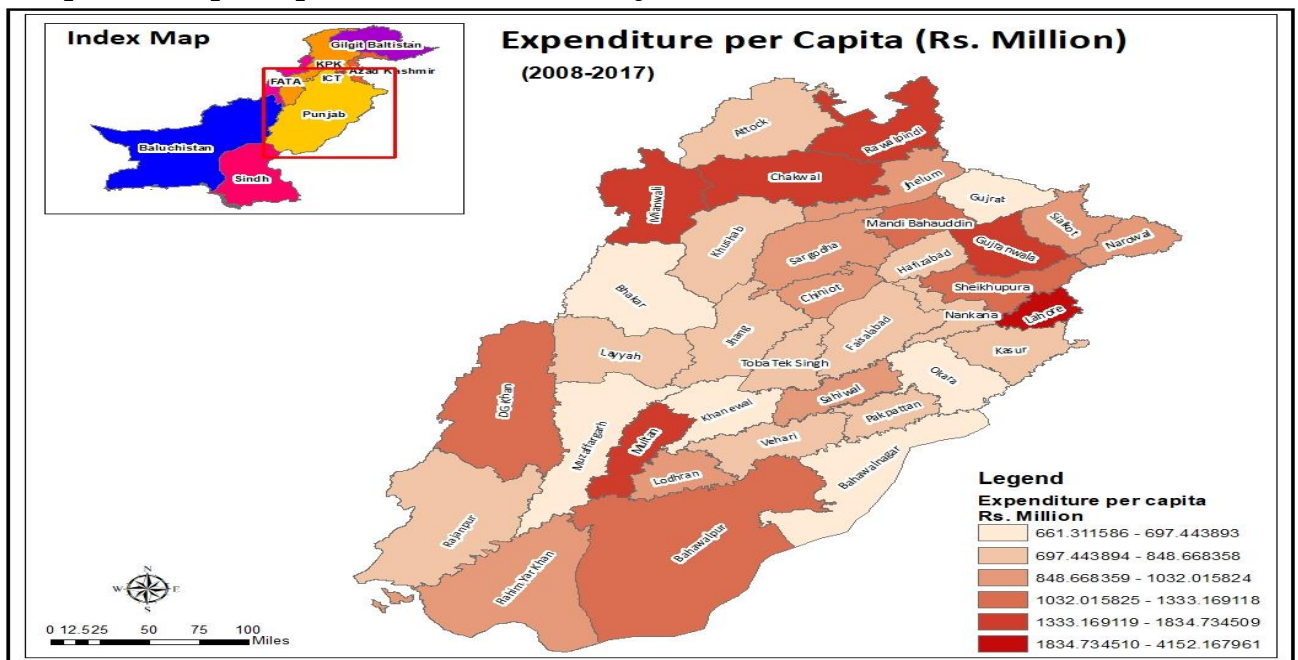
Source: MICS, 2007, 2011, 2014 and 2018 Bureau of Statistics

18th amendment of constitution of Pakistan puts great responsibility on the provinces to ensure social, economic and political reforms in order to bring social development. In the previous discussion the position of Punjab Government across the districts is quite obvious where all districts are not equally happy and prosperous. Discrimination has been found among them with regard to social development. There is a dire need to conduct a research in this regard as limited work has been found regarding social development in districts of Punjab Pakistan.

2. Literature Review

Social development is about human development and its well-being associated with economic and non-economic disciplines. It is a complex and alarming issue related to human welfare. The term development means the creation of circumstances for the recognition of human personality (Seers, 1972). According to Myrdal (1972), development means to generate employment, reduce poverty and inequity which implies a vertical movement of the social system as whole. Development means an increase in Gross National Income (real income) over a long period of time (Meier, 1976). Does real national income an appropriate indicator to measure development? Macgranahan (1972) emphasized that there are many limitation to take Per Capita Gross National Income (GNP) as a general measure of development. According to Todaro (1977), although many developing countries attained economic growth and development goals during the ear of 1950s and 1960s, but it did not represent to a better standard of living of the people. These findings clearly depict that there were some deficiencies persisted with the definitions of economic growth and economic development.

Hicks and Streeten (1979) proposed a new dimension for measuring development. This dimension incorporating social development's related indicators like health, water supply, education, food, sanitation and hosing into Gross National Product (GNP). Economic growth is no doubt has its importance, but it becomes valuable and workable when it reduces scarcities and improving lives of common people (Sen, 1996). From Adam Smith to Keynes the concept of social development has attracted the economists. It is basically the promotion of a sustainable system where the focus is to empower the marginalized segments, women and men to boost up their condition, to improve their living standard and to achieve improve their economic and social position in the society (Bilance, 1997).

Kates (2018) described social development is that every individual should be under the scope of social development and there must be social equality and high priority must be given to the development of human resources. Social development basically implies a change in social institutions.

According to Fan et al. (2008), public spending in terms of providing subsides can have positive influence on poor both in the short run and long run. During development stages, developing countries should allocate more government expenditure to those sectors that benefit the majority of poor. Castro et al. (1999) gave the idea of efficiency and equity phenomenon related to public funds spending. Education and health are the basic services which are most of the time are subsidized with public spending to serve the purpose. Funds are efficiently utilized and the outcomes may be generalized. Public spending or investment must ensure benefits to poor. Many research studies found that government spending is helpful in agricultural production growth and poverty reduction (Elias, 1985; Fan & Pardey, 1998; Fan, Hazell, & Thorat, 2000; Fan, Zhang, & Zhang, 2004). Gupta and Verhoeven (2001) analyzed the efficiency of government expenditure on health and education. They took 37 countries from Africa between 1984 and 1995. They found that health and education spending became more efficient in that period. They concluded that for attaining impressive results African countries required more public allocations.

Decentralization of public funds is the best possible way to ensure good governance and macroeconomic stability. Empirical evidence proved that local administration performed well in comparison of center in term of providing services (Campbell et al., 1991). Fan et al. (2000) conducted a study to investigate the impact of government expenditure (development and non-development) on rural poverty and productivity in case of India. He concluded that government should give more focus on development side. More investment should be done in such sectors: rural roads, agricultural research, education, health, irrigation, sail and water conservation rural and community development. Kumar (2017) suggested that in order to improve the social status of any country government should give prioritization to social sectors.

According to Land (1975), "social indicators are statistics which measure social conditions and changes therein over time for various segment of the society." Bunge (1981) divided the indicators into descriptive and normative form. Normative variables involved judgments. According to him, development is not just about economic up in 1990, UNDP (United Nation Development Programme) introduced Human Development Index which involved 03 indicators for development. Diener and Suh (1997) determined that economic indicators are not sufficient to measure a true picture of social development.

Rao (1975) determined 64 social indicators in case of India for measuring Social Development, Chakrevarty (1976) argued that education, health, employment, distribution of income, housing, and consumption are the relevant social indicators. Morris (1979) took life expectancy, adult literacy rate and infant mortality rate and constructed a physical quality of life index and used it in term of social development in his work. Ray (1989, 2008) gave 13 and 10 social indicators for measuring social development. However Ohlan (2014) provided 43 indicators for social development. Social development index (2014) described that "social development as the capacity of a society to meet the basic human needs of its citizens, establish the building blocks that allow citizens and communities to enhance and sustain the quality of their lives, and create the conditions for all individuals to reach their full potential". Kumar (2017) recommended that the selection of social indicators solely depend on the demography on the country and the availability of the data.

A study by Asghar, Hussain and Rehman (2012) assessed the role of government development spending on the poverty of Pakistan between 1972 and 2008. The results from the vector error correction model showed that increase in the health and education expenditures lead to poverty alleviation of Pakistan. Qadir and Majeed (2018) used the data of Pakistan between 1975 and 2016 to assess the role of health expenditres on life expectancy and infant mortality rate. The results show that health expenditures significantly increase life expectancy and decrease infant mortality rate. A study on SAARC economies by (Arshed et al., 2018) indicated that increase in development expenditures reduces income inequality. Similarly, for 73 developing countries, development expenditures were shown to decrease poverty gap (Hassan, Bukhari & Arshed, 2020).

A study by Mamoon, Raza and Arshed (2015) used the indicator of road length as a instrument of market access to farmers and infrastructure. The results showed that for the case of Punjab districts, increase in road length does not contribute in infant mortality rate. Further Arshed, Kalim and Anwar (2019) assessed the role of factory employment and population density on the crime rate for districts of Punjab Pakistan. The results showed that increase in employment makes them enganged in legal activities ensuring reduction in crime while high population density puts pressure on the social infrastructure which decreases the standard of living, motivating people to engage in crime.

Previous studies assessed the role of development expenditures on the social development but lack in accounting for the minimum investment required to make the social infrastructure suitable to improve social development. Secondly, there is dearth of studies at the district level of Punjab Pakistan which assessed the performance of government development expenses on the social development. There are few studies which explored the social development in districts of Punjab. A study by Arshed, Anwar and Sarwar (2016) asseted that increase in education and public order expenditures reduces while increase in health expenditrues and policy expenditures increases the crime rate. A study by Arshed et al. (2019) assessed the role of development expenditure and its types on the incidence of crime in districts of Punjab. The result showed that these development expenses improve the social conditions hence reduce crime rate.

3. Conceptual Framework

Kuznets in 1953, 1955 and in 1965 noticed an inverted U shaped relationship between economic development and income inequality. He used data sets of some industrial societies in 19th and 20th centuries and examined that at the initial stage industrial development grew income inequality but later on it stared declining when more development took place. This theory can be applicable in case of Punjab by replacing inequality with social development and growth with development expenditure. Initially social development decreases with the increase in development expenditure as policies and innervations take time to be mature and provide fruitful outcomes. It will hypothesise that development expenditure will follow U shaped pattern with social development index.

On the other hand the theory of law of diminishing returns which explains that increase in inputs are initially growth promoting but later on their usefulness falls. This theory can be applied in this model by replacing social development as output target and development expenditure as input. At start development expenditure initially lead to development but over spending may lead to wastage resources or corruption. That is why this model may leads to inverted U shape theory.

In following discussion it will try to find out the actual picture or correct situation in Punjab. Either Punjab is successful in achieving social development or not.

3.1 Research Hypothesis

This study is designed to analyze the performance of Punjab Government. Either government is successfully achieving its goal nor. For his purpose the research hypothesis of this study is as follow:
Ha: Development expenditure improves social status in the districts of Punjab

3.2 Research Model

Following figure deicts the theoretical flow of effects from independent variables to dependent variable. The model in figure 7 with hypothesed quadratic effect of government development expenditures, following is the estimation equation. The data is collected for 36 districts between 2008 and 2017. Here population density is used to control for the increase in the pressures on the available social infrastructure. Employment and productivity is incorporated to control for increase in economic progress. Road length in incorporated to control for the effect of connectivity and physical infrastructure. And lastly regime change controls for the decentralization regime. Further the construction of the social development index is made using the indciators provided in table 3.

Fig: 7 Theoretical Model
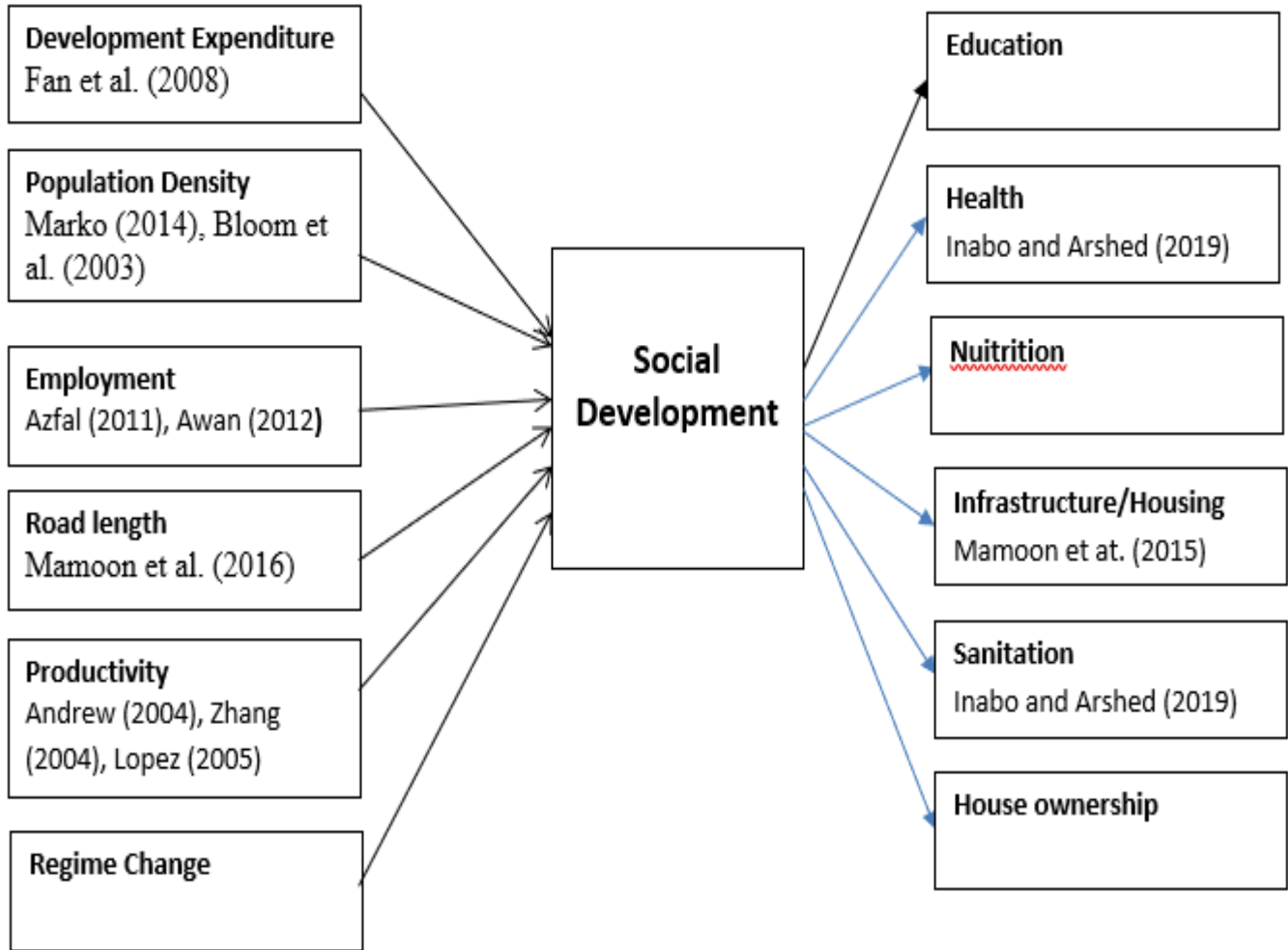
4. Date and Methodology

4.1   Data Framework

In this study, panel data is be used using districts as cross sections and years as time periods, because of its ability to manage esstiamtion problems like multicollinearity, heteroscedasticity and autocorrelation. Panel Data also provides an efficient estimated results (Hsiao, 2007). For the formulation of social development index, principal factor analysis technique will be employed. (Pakes & Griliches 1984).

4.2   Sample of Data

In this study 36 districts of Punjab considered form the period 2008-2017. Different variables would be selected such as development expenditure, population density, productivity, road length /connectivity and employment. Development expenditures data have been collected from Planning and Development Board, Government of Punjab and population density, productivity, road length /connectivity and employment related data have been collected from various issues of Punjab Development Statistics.

$$SDI_{it} = \alpha_1 + \alpha_2 LEXP_{it} + \alpha_3 LEXP_{it}^2 + \alpha_4 LDEN_{it} + \alpha_5 LROAD_{it} + \alpha_6 LPRO_{it} + \alpha_7 LEMP_{it} + \alpha_8 DUM_{it} + e_{it}$$

Table: 2 Variables Representation and Transformation

Variable	Definition	Source of data
Social Development (SDI)	*Social Development Index	Punjab Development Statistics
Development Expenditure (LEXP)	Development intervention per capita	P&D Board
Squared Development Expenditure (LEXP²)	Incorporating quadratic effect	P&D Board
Population Density (LPDEN)	people per Sq Km	Punjab Development Statistics
Road length (LROAD)	Metaled road length Km	Punjab Development Statistics
Productivity (LPRO)	Wheat productivity (Production/sown area)	Punjab Development Statistics
Employment (LEMP)	No. of employed person	Punjab Development Statistics
Dummy Variable (DUM)	Regime change (pre 2011 = 0 and post 2011 = 1)	Self calculated

* For the measurement of Social Development Index following social indicators are being used from MICS 2007, 2011, 2014 and 2018. Factor analysis technique will be employed to determine the % age contribution of selected indictors for social development.

This study will use variables in natural logarithm form. The reason behind to use this form is that to linearize the model by reducing the intensity of heteroskedasticity. This study will use square form of variable development expenditure the intention behind is that it is used to assume that the effect of development expenditures are following increasing returns is to show the marginal impact (Barro 1990).

4.3   Methodology

Zagorski and McDonnell (1995) employed factor analysis method for the formulation of social development index. Majumder et al. (1995) used several methods i-e principal component analysis (PCA), multiple factor analysis, aggregation method, monetary index, ratio index and ranking method. Awan (2012) used factor analysis technique, the taxonomic distance technique and the Z-sum techniques are used for the development of social development index. Panda et al. (2016) applied composite dimension index for this purpose.

5. Result and Discussion
5.1   Index of Social Development

Table 3 reports all the indicators which this study have proposed for the constriction of social development index.These indicators are collected from Punjab Development Reports and Multi Indicator Cluster Survey (MICS). Further, table 4 reports the KMO and Bartlett's test which indicate that the proposed indicators are sufficient in preparation of social development index. Lastly, table 5 reports the mean and standard deviation of the constituted index of social development for each district of Punjab Pakistan.

Table: 3 Components of Social development index

Sr#	Indicators	Reference
	Education	
1	Youth Literacy Rate 15-24 year (male) (%)	Awan (2012), Ohlan (2013)
2	Youth Literacy Rate 15-24 year (female) (%)	Awan (2012), Ohlan (2013)
	Health	
1	Percent of Household with Iodized Salt Consumption (%)	Awan (2012), Panda et al. (2016)
2	Infant Mortality Rate (Probability of dying between birth and the first birthday)	
	Nutrition	
1	Malnutrition (In Numbers)	Ohlan (2013)
	Infrastructure/ Housing	
1	Household Possessions (Electricity %)	Afzal (2011)
2	Percent of Household by House Ownership (%)	
	Sanitation	
1	Water on Premises (%)	Afzal (2011)
2	Percentage of Household Members with hand Washing Facilities where Water and Soap are present (%)	
3	Percentage of using Improved Sanitation (%)	Afzal (2011), Awan (2012)
	Other	
1	Child Labor (%)	Afzal (2011), Awan (2012), Panda et al. (2016)

Table 4: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.779
Bartlett's Test of Sphericity	Approx. Chi-Square	2164.982
	Df	45
	Sig.	0.000

Table:5 Social development index (2008 to 2018)

District Name	Average	Standard Deviation
Attock	0.92277	0.172475
Bahawalnagar	-0.6925	0.204373
Bahawalpur	-0.91832	0.32232
Bhakkar	-0.7192	0.283501
Chakwal	1.207565	0.298299
Chiniot	-0.8041	0.21912
DG Khan	-1.44376	0.393867
Faisalabad	1.004215	0.254213
Gujranwala	1.155822	0.163472
Gujrat	1.360551	0.246878

Hafizabad	0.146118	0.248129
Jhang	-0.7299	0.261463
Jhelum	1.196655	0.119618
Kasur	-0.39056	0.326466
Khanewal	-0.46949	0.248982
Khushab	-0.08503	0.199804
Lahore	1.529616	0.23987
Layyah	-0.79057	0.404949
Lodhran	-0.861	0.164564
Mandi Bahauddin	0.538601	0.202859
Mianwali	0.111936	0.337741
Multan	-0.16381	0.296879
Muzaffargarh	-1.46018	0.270024
Nankana Sahib	0.37935	0.360332
Narowal	0.809982	0.244564
Okara	-0.39137	0.39455
Pakpattan	-0.80586	0.399839
Rahim Yar Khan	-0.86599	0.250266
Rajanpur	-2.46064	0.33441
Rawalpindi	1.709035	0.134198
Sahiwal	-0.00663	0.265917
Sargodha	0.099767	0.311538
Sheikhupura	0.446639	0.230734
Sialkot	1.183032	0.173256
TT Sing	0.384315	0.154173
Vehari	-0.40023	0.310706

Figure 8 is showing the status of social development index in all the districts of Punjab. It can be noticed that the position of social development is better in northern districts of Punjab. Lahore, Rawalpindi, Chakwal, Jehlum, Gujrat, Sialkot, Gujranwala and Faisalabad are performing well whereas situation in Rajanpur, DG Khan and Muzaffargarh is disappointed.

This figure 9 is showing a U shaped association between social development and expenditure incurred by the Punjab government in all the districts. Here, at the earlier stage government expenditure did not fulfil its purpose to ensure improvement in social status of districts but gradually every unit of government expenditure improve the situation.

Fig: 8 Social Development Index All across Punjab between 2008 to 2018
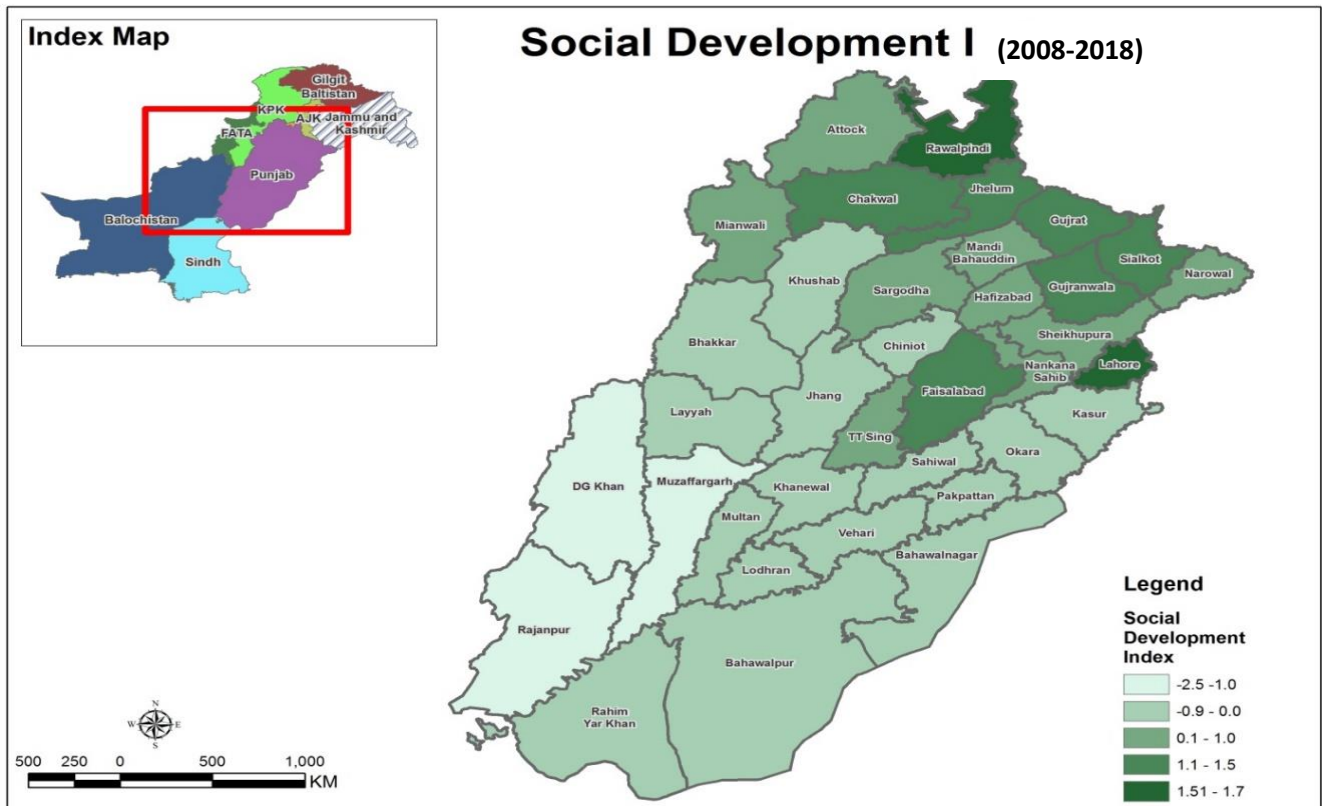
Source: MICS, 2007, 2011, 2014 and 2018 Bureau of Statistics

Fig: 9 Scatter Plot diagram of Social Development and Development expenditure
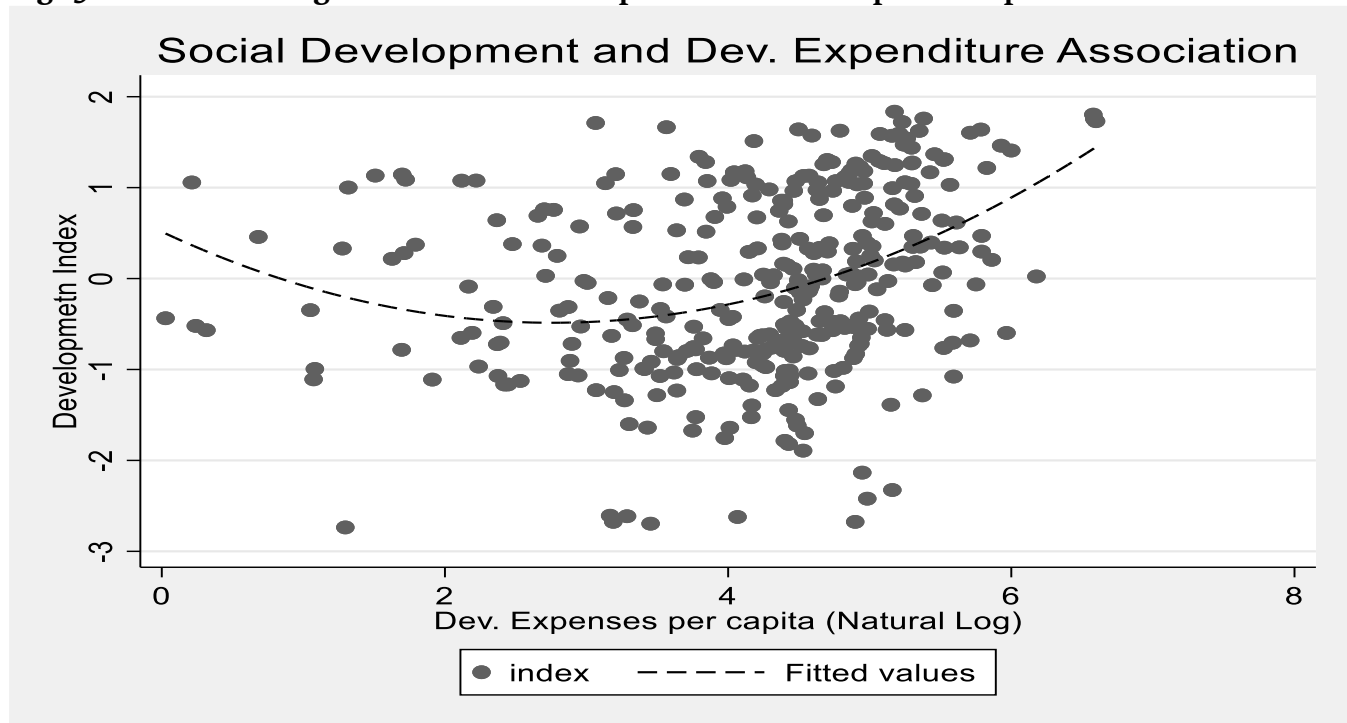
5.2   Descriptive Statistics

Table 6 reports the descriptive statistics of the indicators which are used in the construction of the social development index.

Table 6 Descriptive Statistics

Items	Minimum	Maximum	Mean	Std. Dev.
Infant Mortality Rate	35.00	130.00	75.55	17.31
Percent of Household with Iodized Salt Consumption(%)	0.80	81.00	38.15	19.67
Water on Premises (%)	37.50	99.70	83.92	11.42
Malnutrition (Numbers)	378.00	4906.00	1572.80	945.00
House Ownership (%)	64.90	97.80	86.86	5.77
Household Possessions (%)	63.50	100.00	93.81	7.19
Literacy Rate 15-24 year(male) (%)	52.30	95.70	78.43	9.00
Literacy Rate 15-24 year(female) (%)	31.40	92.90	67.75	14.93
Percentage using improved sanitation (%)	16.87	97.90	65.13	16.66
Child Labor (%)	0.90	32.70	12.51	6.92

The table 7 describes the correlation between the variables. The correlation between social development and government expenditure is 0.2901 which shows a positive relationship. While the correlation of independent variables are lower than 0.93 indicating the absence of multicollinearity.

Table 7: Table of correlation

	SDI	LEXP	LPROD	LPDEN	LROAD	LEMP	DUM
SDI	1.000						
LEXP	0.246	1.000					
LPROD	-0.232	0.064	1.000				
LPDEN	0.525	0.1266	0.094	1.000			
LROAD	-0.008	0.004	-0.004	-0.016	1.000		
LEMP	0.338	0.146	0.070	0.525	0.214	1.000	
DUM	0.095	0.727	0.216	0.056	0.0073	0.028	1.000

5.3 Estimation Results

Table 7 reports the estimates of panel random effect model. This model is selected as the hausman test has been found insignificant difference between the fixed effect and random effect model. Using 350 observations, the wald test is significant showing that overall model is fit. The overall R squared is indicating the the proposed variables are explaining 26.4% of the variation in the social development index. In this selected model the variables like factory employment and population density have a significant postivie effect on social development index. while the dummy variable of decentralization found to show development promoting effects.

Development expenditure per capita is found negative and significant and square form of development expenditure per capita has been found positive and significant which means that marginal impact is shifting from negative to positive with increasing expenditures following the Kuznets hypothesis (Kuznets, 1953, 1955, 1965). Some of the variabels are insignificant Agriculture productivity has found out to be insignificantly impacting on social development because of disparities among districts (area, weather, soil, resources etc). Same is the case with like road length; connectivity among districts is not improving social conditions. Factory employment has positive impact on social development. Population density has positive impact on social development, as according to Optimistic

Theory which tells that higher population density fuels economic growth. Lastly the dummy variable of regime change indicates that when the decentralization regime started it led to a positive effect on the social development index.

Table 7 Random Effect Model

R-Sq:	within = 0.4282		Number of obs = 350				
	between = 0.2634		Number of groups = 36				
	overall = 0.2645		Obs per group: min = 4.0				
			avg = 9.7				
			max = 10.0				
			Wald chi2(7) = 235.14				
			Prob > chi2 = 0.000				
SDI	**Coef.**	**Std. Err.**	**z**	**P.|z|**	**[95% Conf. Interval]**		
LEXP	-0.1151	0.0411	-2.80	0.005	-0.195	-0.034
LEXP²	0.0277	0.0059	4.65	0.000	0.016	0.039
LPRO	0.0244	0.0348	0.70	0.482	-0.044	0.093
LPDEN	0.3265	0.0897	3.64	0.000	0.151	0.502
LROAD	0.1142	0.0883	1.29	0.196	-0.059	0.288
LEMP	0.1913	0.0691	2.77	0.006	0.044	0.027
DUM	0.0127	0.0358	0.35	0.724	-0.056	0.090
Intercept	-4.9189	0.9177	-5.39	0.000	-6.717	-3.120

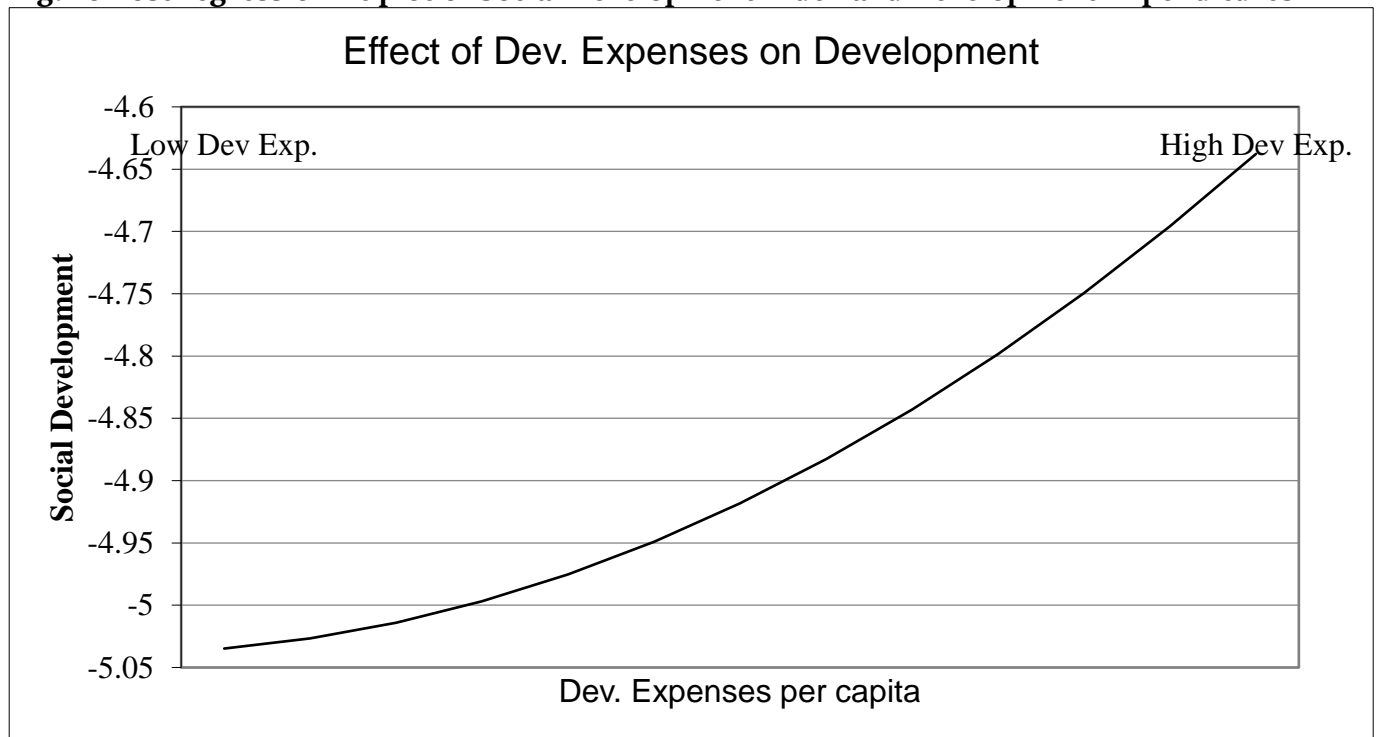**Fig: 10 Post regression fit plot of Social Development Index and Development Expenditures**

Figure 10 of quadratif fit plot using methodology of (Dawson, 2014) shows confirmed the association plot shown in figure 8, which means that based on the actual estimation coefficients, increase in the development expenditrues have positive effect on social development expenditrues.

Table 8, firstly provides the linearized effect of development expenditures on social development index based on the average incidence of development expendtirues per capita in the district. Secondly, while multiplying the linearized effect with the component matrix weights from the principal factor analysis (shown in appendix table 1), it can be seen that a 1% increase in the development expenditures per capita is moving the components of social development index in right direction except for the case of water on premises, malnutrition and house ownership. Figure 11 shows that for 1% increase in the development expenditures per capita in Punjab, there is 0.07% decrease in infant mortality rate, 0.037% increase in consumption of oidized salt, 0.08% increase in the access to electricity, 0.082% increase in male literacy rate, 0.091% increase in female litracy rate, 0.085% increase in access to improved sanitation and 0.05% decrease in child labor. These effects are supporting the theory but for the case of access to water, malnutrition and house ownership the effects are opposite, hence this study hints that the government expenditures per capita were not integrated / optimized with these targets in the past. There is a need to consider them in future.

6. Conclusion and Policy Recommendation

The main purpose of this study is to investigate the impact of development expenditure per capita on social development of the districts of Punjab while controlling for population density, productivity, road length/connectivity and employment. This study considered panel data for 36 districts of Punjab ranging from 2008 to 2017. Development expenditures data have been collected from Planning and Development Board (P&D), Government of Punjab and population density, productivity, road length /connectivity and employment related data have been collected from various issues of Punjab Development Statistics (PDS). This study adapted from the idea of Kuznets curve to test U shaped relationship between government development intervention and social development index.

In order to measure social development index for each districts principal factor analysis technique was utilized. The indicators used in the factor analysis are reported in table 3. Model selection tests indicated that panel random effect model technique is appropriate. The estimation confirmed the U shaped / Kuznets curve hypothesis while all independent varibales had positive effect on social development. While creating the channel of effects from the development expenditures to the indicators of social development, it can be seen that out of all indicators only 3 indicators were not properly targeted that is why increase in the development expenditires did not have an appropriate effect on them.

Table 8 – Marginal Effects Districtwise

District	SDI	Infant Mortality Rate	House with iodized salt consumption	Water on premisis	Under 1 year malnutrition	House ownership	House with electricity	Male literacy Rate 15-24 year	Female literacy Rate 15-24 year	Improved sanitation	Child labor
Attock	0.114	-0.083	0.043	-0.047	0.014	-0.029	0.094	0.096	0.106	0.100	-0.059
Bahakkar	0.104	-0.076	0.039	-0.043	0.013	-0.026	0.086	0.087	0.097	0.091	-0.053
Bahawalnagar	0.101	-0.074	0.038	-0.042	0.012	-0.025	0.084	0.085	0.095	0.089	-0.052
Bahawalpur	0.132	-0.097	0.050	-0.055	0.016	-0.033	0.110	0.111	0.124	0.116	-0.068
Chakwal	0.154	-0.113	0.059	-0.064	0.019	-0.039	0.128	0.130	0.144	0.136	-0.079
Chiniot	0.133	-0.097	0.050	-0.055	0.016	-0.033	0.110	0.112	0.124	0.117	-0.068
D.G. Khan	0.137	-0.100	0.052	-0.057	0.017	-0.035	0.114	0.116	0.128	0.121	-0.071
Faisalabad	0.109	-0.080	0.041	-0.045	0.013	-0.027	0.090	0.091	0.102	0.096	-0.056
Gujranwala	0.134	-0.098	0.051	-0.056	0.016	-0.034	0.111	0.113	0.126	0.118	-0.069
Gujrat	0.084	-0.061	0.032	-0.035	0.010	-0.021	0.069	0.070	0.078	0.074	-0.043
Hafizabad	0.105	-0.077	0.040	-0.044	0.013	-0.026	0.087	0.088	0.098	0.092	-0.054
Jhang	0.100	-0.073	0.038	-0.042	0.012	-0.025	0.083	0.084	0.094	0.088	-0.052
Jhelum	0.114	-0.083	0.043	-0.047	0.014	-0.029	0.094	0.096	0.106	0.100	-0.059
Kasur	0.103	-0.075	0.039	-0.043	0.012	-0.026	0.085	0.087	0.096	0.091	-0.053
Khanewal	0.079	-0.058	0.030	-0.033	0.010	-0.020	0.066	0.067	0.074	0.070	-0.041
Khushab	0.113	-0.083	0.043	-0.047	0.014	-0.028	0.094	0.095	0.106	0.099	-0.058
Lahore	0.208	-0.152	0.079	-0.087	0.025	-0.052	0.173	0.175	0.195	0.183	-0.107
Layyah	0.111	-0.081	0.042	-0.046	0.013	-0.028	0.092	0.093	0.104	0.097	-0.057
Lodhran	0.105	-0.077	0.040	-0.044	0.013	-0.026	0.087	0.088	0.098	0.092	-0.054
Mainwali	0.149	-0.109	0.057	-0.062	0.018	-0.038	0.124	0.126	0.140	0.131	-0.077
Mandi Baha UD	0.116	-0.085	0.044	-0.049	0.014	-0.029	0.096	0.098	0.109	0.102	-

Din										0.060
Multan	0.138	-0.101	0.052	-0.058	0.017	-0.035	0.114	0.116	0.129	0.122	-0.071
Muzaffargarh	0.110	-0.081	0.042	-0.046	0.013	-0.028	0.091	0.093	0.103	0.097	-0.057
Nankana Sahib	0.105	-0.077	0.040	-0.044	0.013	-0.027	0.087	0.089	0.099	0.093	-0.054
Narowal	0.122	-0.089	0.046	-0.051	0.015	-0.031	0.101	0.103	0.114	0.107	-0.063
Okara	0.090	-0.066	0.034	-0.038	0.011	-0.023	0.075	0.076	0.084	0.079	-0.046
Pakpattan	0.111	-0.082	0.042	-0.046	0.013	-0.028	0.092	0.094	0.104	0.098	-0.057
R.Y. Khan	0.105	-0.077	0.040	-0.044	0.013	-0.027	0.087	0.089	0.098	0.093	-0.054
Rajanpur	0.098	-0.072	0.037	-0.041	0.012	-0.025	0.081	0.082	0.092	0.086	-0.050
Rawalpindi	0.155	-0.114	0.059	-0.065	0.019	-0.039	0.129	0.131	0.145	0.136	-0.080
Sahiwal	0.099	-0.072	0.037	-0.041	0.012	-0.025	0.082	0.083	0.092	0.087	-0.051
Sargodha	0.107	-0.078	0.041	-0.045	0.013	-0.027	0.089	0.090	0.100	0.094	-0.055
Sheikhupura	0.128	-0.094	0.049	-0.053	0.016	-0.032	0.106	0.108	0.120	0.113	-0.066
Sialkot	0.102	-0.075	0.039	-0.043	0.012	-0.026	0.085	0.086	0.096	0.090	-0.053
Toba tek Singh	0.099	-0.073	0.038	-0.041	0.012	-0.025	0.082	0.083	0.093	0.087	-0.051
Vehari	0.085	-0.062	0.032	-0.035	0.010	-0.021	0.071	0.072	0.080	0.075	-0.044

Fig: 11 Overall net effect of development expenditures

Net effects of Development Expenditures

	SDI	Infant Mortality Rate	House with iodized salt consumption	Water on premisis	Under 1 year malnutrition	House ownership	House with electricity	Male literacy Rate 15-24 year	Female literacy Rate 15-24 year	House using improved sanitation	Child labor
Net effects	0.097	-0.071	0.037	-0.040	0.012	-0.024	0.080	0.082	0.091	0.085	-0.050
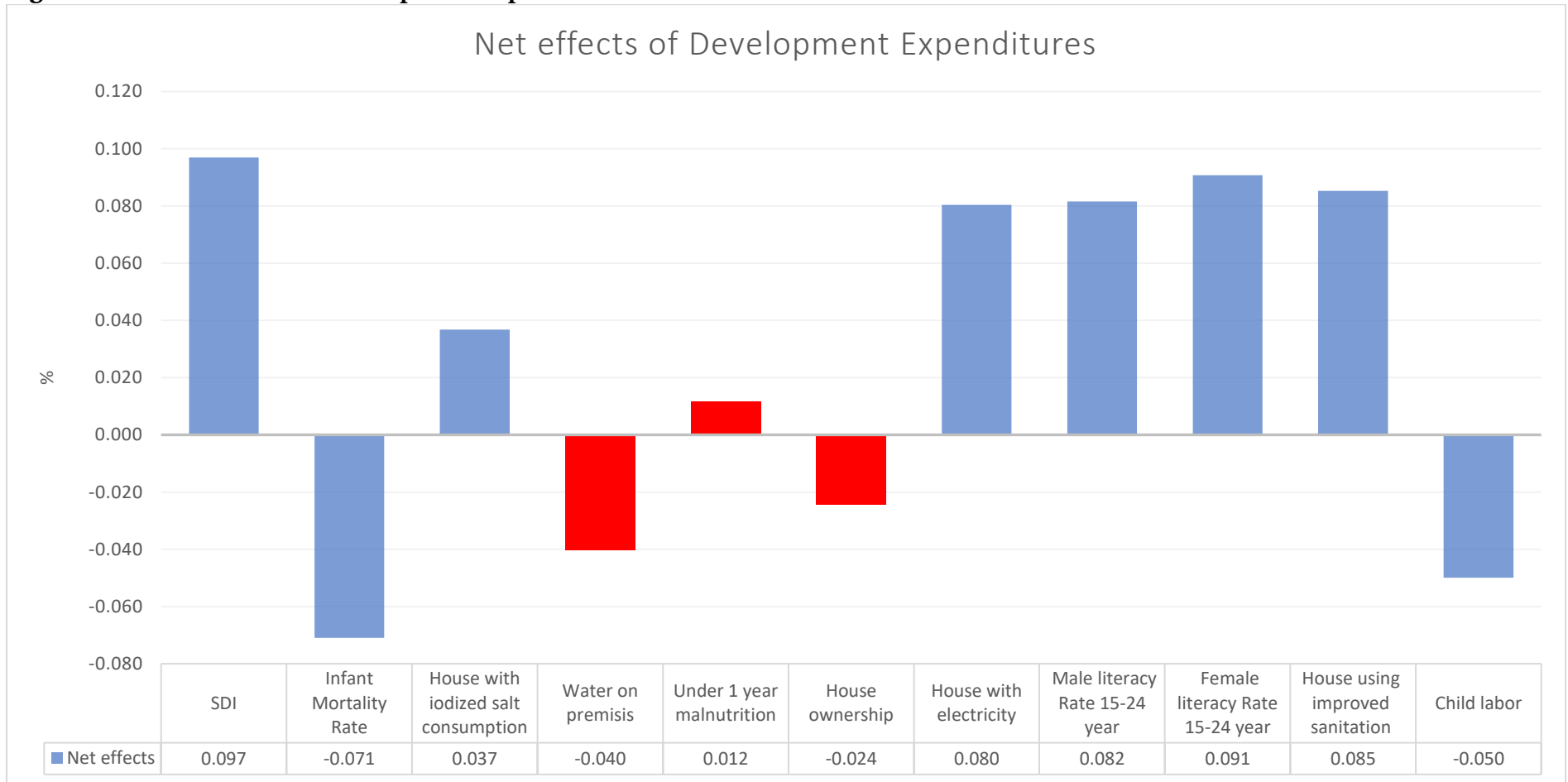
This study proposes the policy makers that, empirically the development expendtirues did nto target the access to clean water, reduction in malnutrition in under 1 year old children and increase in the house ownership of the citizens. By targeting them, then districts of Punjab will surely move toward attaining sustainable development indicators.

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Appendix

Table Appendix 1: Table of Component Matrix (Correlation)

Component Matrix	
Infant Mortality Rate	-0.732
Percent of household with iodized salt consumption	0.380
Water on Premises	-0.417
Malnutrition	0.121
House Ownership	-0.252
Household Possessions	0.829
Literacy Rate 15-24 year(male)	0.842
Literacy Rate 15-24 year(female)	0.936
Percentage using improved sanitation	0.880
Child Labor (%)	-0.515