National College of Business Administration & Economics Lahore

AN ANALYSIS OF INTER-DISTRICT HUMAN DEVELOPMENT DISPARITIES IN PUNJAB, PAKISTAN

BY

MUHAMMAD QASIM

MASTER OF PHILOSOPHY
IN
APPLIED ECONOMICS

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A dissertation submitted to
Faculty of Social Sciences

In Partial Fulfillment of the
Requirements for the Degree of

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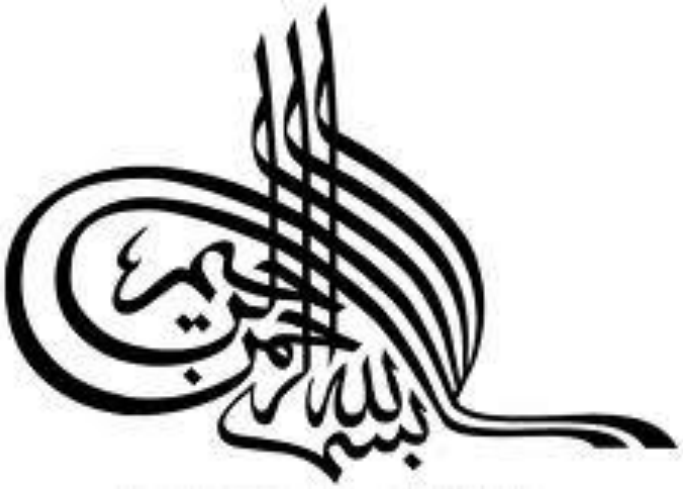

IN THE NAME OF ALMIGHTY ALLAH

THE MOST BENEFICENT, COMPASSIONATE

AND THE MOST MERCIFUL

NATIONAL COLLEGE OF BUSINESS ADMINISTRATION & ECONOMICS LAHORE

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Dissertation Committee:

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Member

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Member

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Rector
National College of Business Administration & Economics

DECLARATION

It is to declare that this research work has not been submitted for obtaining similar degree from any other university/college.

MUHAMMAD QASIM
May, 2014

DEDICATED
TO

My Parent

&

My Teachers

ACKNOWLEDGEMENT

RESEARCH COMPLETION CERTIFICATE

Certified that the research work contained in this thesis entitled **"An Analysis of Inter-District Human Development Disparities in Punjab, Pakistan"** has been carried out and completed by **Muhammad Qasim** under my supervision during his **M.Phil. Applied Economics** Programme.

(Prof. Dr. A.R. Chaudhary)
Supervisor

SUMMARY

Present study investigates the current status of human development and human development disparities across the districts of Punjab. We have calculated Human Development Index (HDI) and Non-Income Human Development Index (NIHDI) for thirty-five districts of Punjab. Districts have been ranked on the basis of their values of HDI and NIHDI. We have also investigated some socio-economic determinants of human development disparities across the districts of Punjab. The results of our study indicate that huge human development disparities exist across the districts of Punjab. Some districts like Rawalpindi and Lahore have high human development status with high HDI and NIHDI values whereas some districts like Bahawalpur and Rajanpur are lagging behind in human development with low HDI and NIHDI values. Comparison of income index (INI) and NIHDI reveals that some districts like Narowal and Gujranwala have performed well in terms of NIHDI than INI. Similarly some other districts like Dera Gazi Khan, Muzaffar Garh and Rahim Yar Khan have performed better in terms of INI than their performance in NIHDI. Social infrastructure, remittances, industrialization and population density have been found important determinants of human development disparities across the districts of Punjab. All four variables show a positive and significant relationship with HDI. Out of four variables, three variables except population density show positive and significant relationship with NIHDI. Population density has insignificant association with NIHDI. So, the districts with poor human development especially the districts in Western and Southern regions of Punjab are identified as target for special policy interventions to improve human development.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 FROM ECONOMIC GROWTH TO HUMAN DEVELOPMENT

Human development is the primary objective of all developing economies of the world. It has great importance in social planning. Every individual, society and nation wants a prosperous life. Different instruments are used, investments are undertaken and different policy frameworks are designed to achieve this target. Development may mean different things to different people. Human development does not have any unanimous working definition.

Traditionally Gross Domestic Product, (GDP) per capita and GDP per capita growth have been used as an indicator to measure economic progress and human well-being of a society. Economic growth had been the primary focus of the economists and development planners. Growth in capital stock was considered as a mean and growth in GDP per capita was taken as an end. Per capita income and growth of per capita income were frequently used to compare the well-being of the people of the different countries and regions (UNDP, 1990).

However income per capita hides so many aspects of the socio-economic conditions of a society. Dasgupta and Weale (1992) describe that per capita income is not an appropriate measure to examine the well-being of a society because it does not necessarily tell about social condition of the society. Anand (1994) points out that income approach is a narrow approach to measure well-being of people and to examine the development of a society. According to him, people and their lives are the real end of all development policies. Income has instrumental importance to improve the quality of life of the people but it cannot be a direct measure of living standard.

According to Streeten (1995) three justifications can be given for the emphasis on economic growth as an indicator to measure the degree of development of an economy. First, through market forces it would automatically increase the labour demand, productivity and wages. So in that way, economic growth would spread its benefits broadly and with the passage of time income inequality would also decrease. Second justification is related to government especially democratic government. It is assumed that with increase in GDP per capita government will increase the tax collection from

the rich people of the society and will distribute collected taxes among the poor people of the society through public provision of social services. As a result, both poverty and inequality in that society would automatically be decreased. Similarly through market interventions government can also reduce poverty directly where they feel that poor people are not getting benefits from market forces. The third justification is that addressing the problem of poverty is not compulsory at the early stage of development. Once economy succeeds to build physical capital, infrastructure and productive potential of the economy then the benefits of economic growth will be transferred to the poor automatically. It means that some sort of inequality may be inevitable for economic growth. In the early stages of development inequality will increase but after that, with increase in income, inequality will decrease, which suggests an inverted U shaped relationship between economic growth and income inequality. This kind of relationship was investigated empirically turned as Kuznets's inverted U hypothesis in literature (Kuznets, 1955). But the literature shows that above mentioned three justifications have proved true only in those economies who focused on land reforms, education and health. Thus there may not be an automatic process by which GDP growth would have a reducing effect on poverty and inequality.

According to Sen (1988), growth and development are two different concepts. Economic growth is concerned only with improvement in GDP per capita and it does not explain about the distribution of GDP among the population. It is possible that a country or a society has greater expansion in GDP per capita but has unequal distribution of income. It is possible that the poor section of society gets little benefits of GDP per capita growth. According to him GDP is only a mean to achieve well-being but not itself an end to all development activities. Development is a very broad concept. It relates to that "what people can actually do and be". He argues that a basic distinction should be made between the means and the ends of development. Development focuses directly on the lives of people. Development process is more linked with elimination of different ills of a society such as hunger, under nutrition and child mortality.

Haq (1995) describes that people are the means as well as the end of economic development. Generally when economists talk about means of development they discuss about stock of physical capital which along with other factors of production plays an important role in production process. However evidence suggests that despite having abundant physical capital, many societies could not perform well in terms of various indicators of economic development.

Thus per capita income growth is not an appropriate measure of development. To address the short comings of income approach of development, different alternative approaches can be used to examine the development of a society. The basic needs approach introduced by International Labour Organization (ILO, 1977) is one of such approaches. This approach suggested the use of different indicators related with basic needs such as food, water, clothing and shelter. Physical Quality of Life Index (PQLI) introduced by Morris (1979) is another measure of the degree of development. This was the one of the pioneer attempt to measure the degree of development of a society with the help of combined index constructed by using three indicators of infant mortality, life expectancy and literacy. Nowadays it has become an established wisdom among development economist that instead of using income as a sole indicator of development, some comprehensive and holistic measure of human development should be used for analyzing human development of a country or region. It is argued that income is only a mean to achieve a goal of development and some basic distinction is required between means and ends of development (Anand, 1994). Human Development Index (HDI) is one of such composite measure. This index introduced by United Nations Development Program (UNDP, 1990) in its first human development report is a better measure of human development due to holistic approach used in its construction. Human development is a broad concept. It is a process to enlarge the choices of people. UNDP introduced an index to measure the degree of development with three basic elements of human development. It evaluates the average improvement of a nation in basic three aspects of human development: a long and healthy life, access to knowledge and decent standard of living. HDI is the geometric mean of normalized indices measuring the improvements in each aspect (UNDP, 2011). In its human development report published in 2010 UNDP has also introduced some new indices to measure human development. Non Income Human Development Index (NIHDI) is one of such measures. It is constructed by using the indicators related with health and education. Unlike HDI, it does not use Gross National Product (GNP) in its construction. HDI is the geometric mean of normalized indices measuring the improvements in three aspects which are a long and healthy life, access to knowledge and decent standard of living but NIHDI takes in to account only two aspects of a long and healthy life and access to knowledge. Thus NIHDI focuses only non-income dimensions of human development.

1.2 STATEMENT OF THE PROBLEM

It is observed that human development disparities exist across the countries and regions. Different countries have different HDI values like

Australia 0.929, Germany 0.905, Singapore 0.866, United States 0.910, China 0.687, Saudi Arabia 0.770, India 0.547, Sudan 0.408 and Afghanistan 0.398. These disparities exist even among those countries which fall in the same range of GDP per capita. For example Sri-Lanka and Egypt fall in the same range of GDP per capita but both have different human development status like HDI value of Sri Lanka is 0.691 whereas HDI value of Egypt is 0.644. Similarly as Pakistan and Viet Nam fall in the same range of GDP per capita but both have different human development status like HDI value of Viet Nam is 0.593 whereas HDI value of Pakistan is 0.5042 (UNDP, 2011). There may be various factors which may be held responsible for human development disparities. Differences of institutional quality have been identified as one of the most important of these factors.

North (1990) describes that development disparities across the countries are due to difference in quality of institutions. According to him countries differ in human development due to different institutional arrangements. However differences in human development can also be observed across the regions of the same country even with same institutional arrangements. Pakistan may be an interesting case study in this regard, where regional disparities exist among the provinces as well as within provinces.

UNDP (2003) calculated human development indices at districts level in Pakistan. Their results show that there are big human development gaps among the districts of Pakistan; for example HDI value of Jhelum is 0.703 and HDI value of Dera Bhugti is 0.285. Jamal and Khan (2007) and Siddique (2008) have also pointed out big human development imbalances among the districts of Pakistan.

Inequality in public provision of social services like clean drinking water, education, and health relate facilities in Pakistan has been also investigated by Chaudhary and Chaudhary (1998). Easterly (2001) called this type of economic growth as “growth without development”.

Punjab is the most populated and developed province of Pakistan. More than half of the population of Pakistan resides in Punjab. The developmental gaps across the districts of Punjab are also clearly observable. The existing literature shows that there are massive human development disparities across the districts of Punjab. The HDI value of Sheikhupora is 0.62, Lahore 0.558, Muzaffar Garh 0.459, Dera Ghazi Khan 0.471 and Multan is 0.494 (UNDP, 2003). Human development disparities among the districts of Punjab have also been pointed out by Jamal and Khan (2007). According to them HDI value of Jhelum is 0.7698, Kasur 0.7132, Bhakkar 0.7058 Rajanpur 0.631, D.G Khan 0.6307, Muzaffar Garh 0.6201, Bahawalpur 0.6182 and Lodhran is 0.614.

There may many factors like social infrastructure, remittances, industrialization and population density which are responsible for human development disparities across the districts of Punjab. The countries that have strong social infrastructure are more developed (Chin and Chou, 2004). Remittances have contributed significantly to improve the education and health status of a region (Kireyev, 2006). The economic development of a region has been associated with industrialisation, particularly growth in manufacturing production (Szirmai, 2009). Enoch and Nakamura (2008), Keskinen (2008) concluded positive correlation between population density and economic development.

It is important to study development disparities among regions because it may create a severe type of rivalry and distrust among the different regions which can be dangerous for social cohesion (Pervaiz and Chaudhary, 2010). This distrust and rivalry can hamper the development and wellbeing of the people in different ways. Azfar (1973) points out that inter-regional disparity has created rivalry among the different regions of Pakistan. It implies that inter-regional disparities should be taken care off at policy making and academic levels. The present study tries to examine the current status of human development and human development disparities across the districts of Punjab. It also aims to investigate some socio-economic factors responsible for these human development disparities among the districts of Punjab.

1.3 SCOPE OF THE STUDY

Human development is an important goal of every nation. The people are the means and also the end of all development activities. This study investigates the current status of human development and human development disparities of thirty-five districts of Punjab. One district, Chiniot, is excluded because of some data limitations. We have calculated Human Development Index (HDI), Non Income Human Development Index (NIHDI), Education Index (EI), Health Index (HI) and Income Index (INI) for thirty-five districts of Punjab. We have examined the human development and human development disparities of the districts with the help of these indices. We ranked all districts with respect to their values of HDI, NIHDI, EI, HI, and INI. This study has also found some socio-economic determinants responsible for human development disparities among the districts of Punjab. Income per capita is normally used to compare the development and underdevelopment of different countries and regions. However income per capita hides so many aspects of the socio-economic conditions of a society. In our study, we have, therefore, used different indices to compare the human development status of the districts of Punjab. This study may be helpful for the government of Punjab

for better allocation of resources among the districts. It may be helpful for policy makers to guide them in adopting such policies which may work to minimize human development disparities among districts of Punjab.

1.4 OBJECTIVES OF THE STUDY

This study has following objectives:

1. To calculate the HDI, NIHDI, EI, HI and INI for the year 2011 for thirty-five districts of Punjab.

2. To examine the current status of human development and human development disparities among the districts of Punjab.

3. To find out some socio-economic determinants of human development disparities across the districts of Punjab.

1.5 HYPOTHESES OF THE STUDY

Null hypotheses of this study are:

1. Social Infrastructure does not affect HDI.
2. Social Infrastructure does not affect NIHDI.
3. Industrialization does not affect HDI.
4. Industrialization does not affect NIHDI.
5. Remittances do not affect HDI.
6. Remittances do not affect NIHDI.
7. Population density does not affect HDI.
8. Population density does not affect NIHDI.

1.6 ORGANIZATION OF THE STUDY

This study is organized as following. We have discussed, introduction in chapter one. Chapter two consists of brief review of literature. Chapter three consists of theoretical framework and methodology. Chapter four is about empirical results and discussion and chapter five consists of conclusions and policy implications.

CHAPTER 2

LITERATURE REVIEW

There have been number of studies across the countries and across the regions of the world which discuss the issue of human development disparities and the factors responsible for these disparities. Some of these were about the measurement of human development and human development disparities and some related to their determinants. Mera (1973), Ewusi (1976), Hardy (1980), Antle (1983), Eberts (1986), Kim (1995), Bhattacharya (1998), Dholakia (2003), UNDP (2003), Adams (2006), Siddique (2008), Szirmai (2009), Adenutsi (2010), Yang (2011), Roy (2012), were some important studies in this regard.

United Nations Development Programme (UNDP) calculated Human Development Index (HDI) and published annual human development reports. These reports examined the status of human development across the countries and across the regions of the world. The reports indicated that there were human development disparities across the countries and across the regions of the world. Norbakhsh (2002) examined the regional human development disparities in Iran. The study calculated HDI for provinces of Iran and ranked the provinces according to their human development status. The study used literacy and combined enrollment rate as proxy for education index, life expectancy for health and income per capita for income index. The results indicated that some provinces performed well in terms of HDI and some other provinces had low human development status. Human development disparities existed across the provinces of Iran.

UNDP (2003) examined human development disparities among the provinces as well as among the districts of Pakistan. The report calculated HDI for the year 1998 with three basic dimensions (education, health and income) of human development. The report used literacy rate and primary enrollment rate for education index. The health index constructed for provinces as well as for districts with infant survival rate and immunization rate. The shortcoming of health index was that provincial infant survival rates were used for the respective districts which were meaningless to compare human development disparities across the districts. The report used agricultural crop value and manufacturing value added as proxy to calculate GDP per capita at districts level. The results revealed that human development disparities existed among the provinces and within provinces. Human development disparities were investigated by UNDP (2005) across the districts of Karnataka state in India.

The report calculated HDI after using infant survival rate for health index, adult literacy rate, primary and secondary enrollment rate for education index and per capita income for income index. The report also ranked the districts according to their performance in human development. The results showed that there were huge human development gaps among the districts. The HDI value of Raichur district was 0.547 whereas HDI value of Bangalore Urban was 0.753.

Jamal and khan (2007) investigated human development disparities across the provinces as well as across the districts of Pakistan. The study calculated HDI for the provinces as well as for the districts. The study used some proxies for three dimensions, adult literacy and combined (primary, secondary and tertiary) enrollment rate for education whereas age and sex specific death rates to compute the probability for life expectancy at birth and immunization rates for the construction of health index. The income index for districts was constructed using agricultural crop value and manufacturing value added. The deficiency in the construction of health index was that provincial level health proxy applied for respective districts. The study calculated HDI at two point of time 1998 and 2005 and analyzed inter-temporal change in human development across the provinces and across the districts of Pakistan. According to their results, HDI values of provinces and districts improved significantly but some provinces and districts improved more as compared to other provinces and districts. Punjab had high HDI value as compared to other provinces but growth in HDI from 1998 to 2005 of Khyber Pakhtunkhwa (KPK) was high. There was no significant reduction in human development disparities across the provinces as well as across the districts of Pakistan from 1998 to 2005.

Hardly, there have been two studies UNDP (2003) and Jamal and Khan (2007) which examine human development disparities across the districts of Pakistan. Both have been a deficiency in measurement of district specific health outcomes by using the value of provincial health indicators for each district. As a result, the issue of measuring human development disparities among the districts of Pakistan has not been resolved. The interactions between HDI and socio-economic variables have not been determined, and the causes of human development variations across the districts of Pakistan have not been discovered.

There may be various factors which may be held responsible for human development disparities. Many economists such as Marshall (1890), Anas (1992), Easterly and Rebelo (1993), Fox (1990), Henderson and Clark (1990), Krugman (1991), World Bank (1991), Gramlich (1994), Kim (1995), Kanaiaupuni and Donato (1999), Becker et al., (1999), Chelliah and

Shanmugam (2000), Edwards and Ureta (2003), Hanson and Woodruff (2003), Córdova (2005), UNDP (2005), Lopez et al (2007), Hawash (2007), Fayissa and Nsiah (2010) and Tripathi and Pandey (2012) have been identified social infrastructure, remittances, industrialization and population density may determine human development across the countries and across the regions of a country.

Different studies indicated that population density, social infrastructure, remittances and industrialization had significant relationship with development from different perspectives. Malthus (1798) studied the universal tendency of population growth and economic development. According to him, if there were no checks on population growth, then population would increase at geometric rate but at the same time due to diminishing returns, food supplies can increase only at arithmetic rate. Because, each member of population would have less land to work and its marginal production would start to decline. But this prediction missed empirical support. The theory ignored the impact of technological progress on growth rate. The modern economic growth is associated with rapid technological progress in the form of scientific, technological and social innovations. All countries therefore have the potential to increase their economic growth as compared to their population growth. Marshall (1890) described that agglomeration of population increased specialization. Miyashita (1986) pointed out that population density increased agriculture productivity and specialization. Hirschman and Lindblom (1962) described that inter-sectoral backward and forward linkages to economic development in manufacturing were perceived to be much stronger as compare to mining or agriculture which were typically characterised by weak linkages. Papanek (1967) described that industrialization had significant positive impact on economic growth of Pakistan.

Many studies indicated that the social infrastructure had significant relationship with economic development. Mera (1973), Hardy (1980), Antle (1983), Eberts (1986), revealed that social infrastructure had positive relationship with economic development. Romer (1986) indicated investment on human capital as a main source for fast economic growth. Henderson and Clark (1990) described that there was positive impact of population density on productivity. Krugman (1991) pointed out that agglomeration of population expanded economic activity, increased specialization and division of workers. Ravallion (1991) investigated the impact of public expenditures towards provision of social services like infrastructure, education and health facilities on human development. The study examined the relationship of public provision of social services with human development of developing countries by using different indicators of education and health as proxy for human development. The results showed that public expenditures related to public

provision of social services especially towards education and health facilities had positive relationship with human development. Anand and Ravallion (1993) worked on the role of private income and public provision of social services in human development of developing economies. The study concluded that private income and public expenditures on health and education facilities had positive impact on human development. It suggested developing economies could improve their human development through increasing public expenditures on education and health.

Lucas (1993) described that due to industrialization, Korea achieved high level of economic development. Kim (1995) examined the impact of industrialization on human capital accumulation. The study concluded that industrialization had positive relationship with human capital accumulation in Korea. He mentioned that the government policies regarding industrialization and human capital accumulation played vital role to improve human development. Tiffen (1995) investigated the relationship between population growth, population density and economic growth in Kenya. The study covered the time period from 1932 to 1990. The results showed that population growth and population density both had strong positive relationship with economic growth in Kenya. Becker et al., (1999) highlighted three important conclusions about the relationship between population density and economic development. First population density had positive impact on productivity. Second high population density enhanced technical innovation and third, population density increased investment in human capital because the productivity of human capital was higher in those regions where population density was high.

Prabhu (1999) investigated the relationship between economic growth, human development and public provision of social services in Maharashtra state of India. The study examined the role of social infrastructure in human development at state level and also at regional level in Maharashtra over the period of 1960 to 1995. The results showed that social infrastructure had positive relationship with human development and government expenditures on social infrastructure promoted human development across the regions. Chelliah and Shanmugam (2000) discussed some factors which were responsible for human development disparities across the districts of Tamil Nadu. They argued that industrialization and agricultural productivity had important role in the human development. The districts with high degree of industrialization and high agricultural productivity had high levels of human development. Jamal and Khan (2002) investigated the relationship of social development and human development with economic growth in Pakistan. The study constructed Social Development Index (SDI) for social development, growth rate of GDP per capita used for economic growth and HDI for human development. They also examined the causality of economic growth, human

development and social development. The results showed that social development and human development had positive relationship with economic growth and all three variables had causal relationships in Pakistan. Chin and Chou (2004) studied the relationship between social infrastructure and economic development among the developing countries of the world. The study concluded that social infrastructure had strong positive relationship with economic development. Those countries which were more efficient in social infrastructure had better economic development as compare to other countries. Public expenditures on social infrastructure had positive impact on human development (Adeyemi et al., 2006) and (Akram, 2007).

Remittances had significant relationship with human development from different aspects. Edwards and Ureta (2003), Hanson and Woodruff (2003), Córdova (2005), Lopez et al (2007) and Amuedo-Dorantes, Sainz and Pozo (2007) concluded that remittance transfers improved education and health outcomes among recipient households. Yang (2003) examined the relationship between remittances and human capital investment in Philippines. The results indicated that the remittances contributed positively in enhancement of human capital in Philippines. Adams and Paje (2005) studied the impact of remittances on the poverty in developing countries. The results showed that remittances significantly reduced the level of poverty in developing countries. They indicated that remittances in human development of the developing countries. Iqbal and Sattar (2005) investigated the impact of remittances on the economic development of Pakistan. The results showed that remittances had positive effect on economic development of Pakistan. The study argued, after empirical analyses from 1972 to 2003, that remittances were an important source to increase economic development of Pakistan. Adams (2006) concluded from an empirical study that remittances generally reduced poverty and could redistribute income.

UNDP (2005) investigated the impact of industrialization on human development in Kenya. The report studied the relationship of industrialization with different human development indicators like income, education, employment, agricultural productivity, skill formation and entrepreneurship. The overall results showed that there was strong, significant and positive impact of industrialization on human development in Kenya. This report also mentioned some challenges of industrialization to human development in Kenya like rapid urbanization, uneven development and limited skills over specialization, poor worker health, environmental degradation and over-crowded services. The report suggested that industry could be supportive for human development with tackling poverty through industrialization, improving opportunities to work, clean and healthy environment, job security and quality of infrastructure, protection of children, training and education, addressing

gender disparity, information and awareness. Hawash (2007) described that industrialization played a vital role to promote economic development in Egypt. Castaldo and Reilly (2007) examined the pattern of household's expenditures after receiving the remittances in Albania. The results showed that Albanian migrants consumed more shares of remittances on human capital (education and health) as compare to other consuming goods. The remittances had positive impact on human development in Albania. Knudsen et al (2008) concluded that the population density had positive correlation with creativity, innovation and human capital.

Brown (2008) examined the impact of remittances on human development in two Pacific island countries, Fiji and Tonga by using the household's data. The results revealed that there was strong positive correlation between remittances and human development in Fiji and Tonga. The remittances significantly increased human development status of both countries. Kaijage and Siegel (2008) reviewed the impacts of remittances on receiving countries at the micro and macro level. The reviewed showed that remittances were beneficial at family, community and national level through human capital formation, investment, poverty alleviation, and macro-economic stability. Siddique (2008) found households income per capita, poverty and public provision of social services as determinants of capability development across the districts of Pakistan. She constructed public provision of social services index with education, health, water and sanitation facilities. The results of regression indicated that income, public provision of social services had positive impact on capability development and poverty had negative relationship with capability development.

Pillai (2008) examined the relationship between human development, economic growth and social infrastructure in Kerala State of India. The study argued that due to strong social infrastructure, Kerala had top ranked position in human development among the Indian states. The empirical results showed that social infrastructure had positive and significant relationship with human development in Kerala State. The human development and economic growth both had causal relationship in Kerala. Keskinen (2008) studied the relationship of population density and economic development in two areas Tonle Sap and Mekong Delta. These two areas were unique in characteristics, Tonle Sap was the area of Cambodia and Mekong Delta was the area of Vietnam. The Mekong had high population density and more developed area as compared to Tonle Sap. The results of empirical analysis showed that population density had positive impact on economic development in both areas. Barseghyan (2008) concluded that population density was positively correlated with productivity through economies of scale.

Szirmai (2009) described that virtually all cases of high, rapid, and sustained economic growth in modern economic development associated with industrialisation, particularly growth in manufacturing production. The manufacturing sector offered special opportunities for economies of scale. Szirmai found significant positive correlation of 0.79 between the income per capita and the industrialization. Fayissa and Nsiah (2010) investigated the relationship between aggregate remittances and economic growth with unbalanced panel data from 1980 to 2004 in thirty-seven African countries. The results indicated positive relationship between remittances and economic growth in African countries. Adenutsi (2010) analyzed the long run impact of remittances on human development in low income countries. He selected eighteen Sub-Saharan countries and used panel data from 1987 to 2007 for the study. He concluded that remittances had strong positive and significant impact on the human development in Sub Saharan countries. Yang (2011) studied the relationship between remittances and human development. The results showed that there was positive relationship between remittances and human development aspects (education, health and earning), which could help to reduce poverty. Kibikyo and Omar (2012), Hassan, Mehmood and Hassan (2013) described that remittances had strong positive relationship with different human development indicators.

Mukherjee and Banerjee (2010) analyzed relationship of education infrastructure and health infrastructure with their outcomes among the fifteen states of India. The results showed that education infrastructure and health infrastructure had positive relationship with literacy rate and child survival rate. The health infrastructure had positive relationship with different outcomes of education whereas education infrastructure had weak relationship with different health outcomes. Sanchez and Sbrana (2009), Odawara and Loayza (2010), Patra and Acharya (2011), Kusharjanto and Kim (2011), Roskruge, Grimes, McCann and Poot (2012), Sahoo, Dash and Nataraj (2012), Tripathi and Pandey (2012) described that social infrastructure had positive relationship with economic development.

CHAPTER 3

THEORETICAL FRAMEWORK AND METHODOLOGY

An overview of existing literature shows that there are various factors which may be held responsible for human development disparities across the countries and among the regions of a country. Present study investigates human development disparities and some important socio-economic determinants of human development disparities among the districts of Punjab, Pakistan. Normally, income per capita is used to examine the well-being of a region or country. However income per capita hides so many aspects of the socio-economic conditions of a society. Dasgupta and Weale (1992) describes that per capita income is not an appropriate measure to examine the well-being of a society because it does not necessarily tell about social condition of the society. Therefore this study uses HDI and NIHDI to examine human development and human development disparities. Social infrastructure, remittances, industrialization and population density are considered as the determinants of HDI and NIHDI. Public expenditures on social infrastructure may increase human development (Adeyemi et al., 2006; Akram, 2007 and Siddique, 2008). Remittances may contribute to human development by affecting education and health outcomes (Kibikyo and Omar, 2012; Mehmood and Hassan, 2013). Industrialization can enhance income of the people through the creation of job opportunities. It also promotes innovations, labour skills and technical education by improving returns to human capital formation (Hawash, 2007). Productivity of human capital is higher in those regions where population density is high. So, population density increases investment in human capital and promotes human development (Becker et al., 1999). This shows that social infrastructure, remittances, degree of industrialization and population density may lead to differences in human development.

This study calculates HDI and NIHDI for thirty-five districts of Punjab for the year 2011. It also investigates the impact of social infrastructure, remittances, degree of industrialization and population density on HDI and NIHDI. The study uses two regression models, the first model finds out the determinants of HDI and the second model discovers the determinants of NIHDI across the districts. Both regression models are estimated using Ordinary Least Square (OLS) method. The models used for the present study are given below:

$$HDI_i = f\left(SI_i, REM_i, IND_i, PD_i\right) \tag{3.1}$$

$$NIHDI_i = f\left(SI_i, REM_i, IND_i, PD_i\right) \quad (3.2)$$

The stochastic form of the above models is given below:

$$HDI_i = \alpha_1 + \beta_1 SI_i + \beta_2 REM_i + \beta_3 IND_i + \beta_4 PD_i + e_i \quad (3.3)$$

$$\text{NIHDI}_i = \alpha_2 + \gamma_1 SI_i + \gamma_2 REM_i + \gamma_3 IND_i + \gamma_4 PD_i + \mu_i \quad (3.4)$$

HDI_i = Human Development Index of i^{th} district
$NIHDI_i$ = Non Income Human Development Index of i^{th} district
SI_i = Social Infrastructure of i^{th} district
REM_i = Remittances of i^{th} district
IND_i = Industrialization of i^{th} district
PD_i = Population Density of i^{th} district
i = 1, 2, 3, ……., 35.

3.1 SPECIFICATION OF THE VARIABLES CHOSEN FOR THE PRESENT STUDY

HDI and NIHDI are used as dependent variables whereas social infrastructure, remittances, industrialization and population density are used as independent variables. HDI and NIHDI are constructed in this study and data for independent variables is taken from various statistical surveys. The details of construction, brief description and data sources of the variables are given in the following:

3.1.1 Human Development Index

Human development index (HDI) constructed in this study covers three dimensions. These dimensions include average achievements by the districts in health, education and income. The average achievements are measured through three indices i.e. health index, education index and income index.HDI is a composite index which combines these three indices with equal weightage. UNDP has been reporting HDI for a large numbers of countries since 1990 at annual basis. After 1990, UNDP has revised the formulation of the index at several times. In 2010, UNDP made a few changes in the construction of education index. Mean years of schooling and expected years of schooling were used instead of adult literacy rate and combined enrollment rate.

The studies which calculated HDI across the districts of Pakistan were conducted by UNDP (2003) and Jamal and Khan (2007). UNDP (2003) calculated HDI for the year 1998. The report used adult literacy rate and primary enrollment rates for education index. The health index was constructed by using infant survival rate and immunization rate. The report proxied provincial infant survival rate for each district due to unavailability of district data. District GDP per capita was used as income index which was calculated by using agricultural crop value and manufacturing value added.

Jamal and Khan (2007) calculated HDI for the years 1998 and 2005 and analyzed the inter-temporal change in human development across the districts of Pakistan. They used adult literacy rates and combined (primary, secondary and tertiary) enrollment rates for education index whereas life expectancy at birth and immunization rates for the construction of health index. The study proxied provincial estimates of life expectancy at birth for each district within the province. Income index consisted of district GDP per capita which was calculated with the help of agricultural crop value and manufacturing value added.

Both UNDP (2003) and Jamal and Khan (2007) have the deficiency in measurement of district specific health outcomes by using the value of provincial health indicators for each district. This study has constructed HDI by using district specific health indicators instead of provincial indicators as a proxy for district health achievements. We have used adult literacy rate and combined enrollment rate for construction of district education index. Child survival rate and immunization rates have been used for the construction of health index. Income index is constructed by calculating district GDP per capita. Districts share of agricultural crop value and manufacturing value added have been used for estimating district GDP per capita. These three indices are combined with equal weightage in order to calculate a composite HDI for thirty-five districts of Pakistani Punjab using 2011 data. Equation 3.5 and Figure 3.1 explain the methodology of constructing HDI.

$$HDI = \left(1/3\ Health + 1/3 Education + 1/3 Income\right) \qquad (3.5)$$

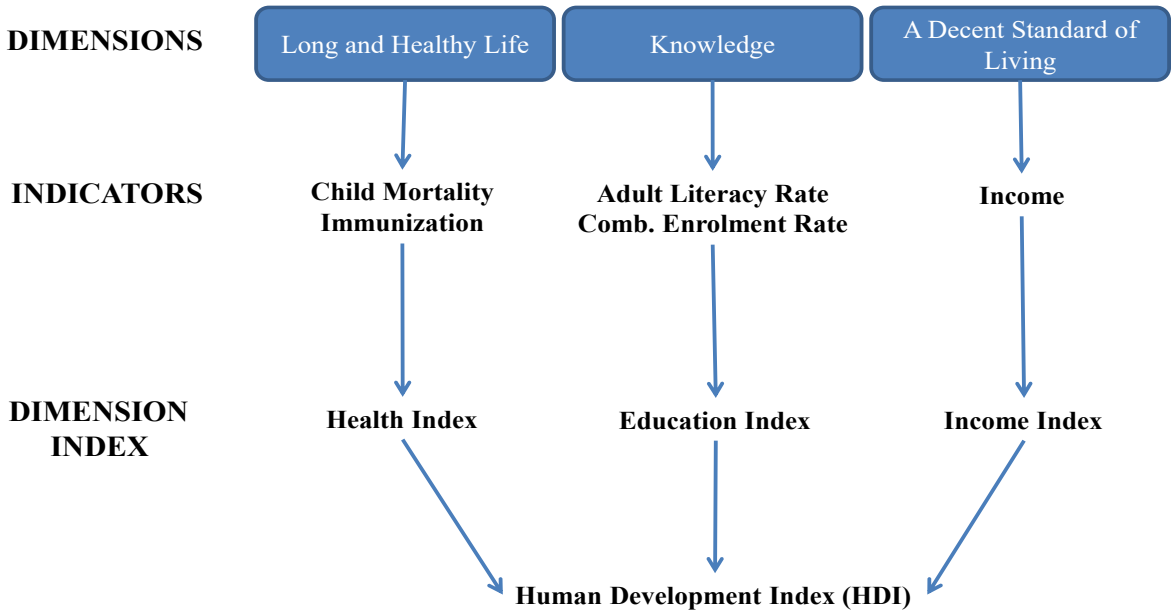


Figure 3.1: Construction of HDI

3.1.2 Education Index

Education index is constructed using combined (primary, secondary and territory) enrollment rate of age cohort 5 to 24 years and literacy rate of 10 years and above population. Both variables are normalized by using their actual, maximum and minimum values. 100 percent is considered as maximum and 0 percent as minimum for educational attainments. Composite education index combines these two normalized variables by assigning two-third weightage to literacy rate of ten years and above population and one-third weightage to combine enrollment. Equation 3.6, 3.7 and 3.8 explain the methodology of calculating education index.

Literacy Index (LI)
= actual – minimum/maximum – minimum (3.6)

Combined Enrollment Index (EI)
= actual – minimum /maximum–minimum (3.7)

Education Index (EDI)= 2/3 ALI + 1/3 EI (3.8)

3.1.3 Health Index

Anand and Sen (1994) suggest that child mortality (i.e. additive inverse of child survival rate) and life expectancy are more suitable proxies for health because both present more comprehensive picture of health. Due to unavailability of district specific data for life expectancy, we used under five survival rate and immunization rate in construction of health index. Both variables are normalized by using their actual, maximum and minimum values. 100 percent is considered as maximum and 0 percent as minimum for health outcomes. The child survival rate is a consistent and more comprehensive representative measure of health condition of a society as compared to immunization rates. It is an outcome of different health relates activities and facilities. That's why we gave a higher weight to child survival rate in the calculation of health index. Composite health index combines these two variables by assigning 70 percent weight to child survival rate and gives 30 percent weight to immunization rate. Equation 3.9, 3.10 and 3.11 explain the methodology of calculating health index.

Child Survival Index (CSI)
= actual – minimum / maximum – minimum (3.9)

Immunization Index (IMI)
= actual – minimum / maximum – minimum (3.10)

Health Index (HI)= 0.7 CSI + 0.3 IMI (3.11)

3.1.4 Income Index

To calculate real GDP per capita in terms of purchasing power parity (PPP$), we have used method proposed by UNDP (2003) at district level in Pakistan. We have calculated real GDP per capita for Punjab and its thirty-five districts. First we have estimated the real GDP (PPP$) per capita of Punjab by using data from Pakistan Household Integrated Economic Survey (PHIES, 2011). The average monthly household's income of Pakistan and all provinces has been given in (PHIES, 2011). We calculated the ratio of the average household's income of Punjab to the average household's income of Pakistan. Then this ratio is multiplied to real GDP (PPP$) per capita of Pakistan, which is collected from World Development Indicators (WDI, 2011), to attain real GDP (PPP$) per capita of Punjab.

To attain real GDP (PPP$) per capita for thirty-five districts of Punjab, we added agriculture-crop value and manufacturing value added of each

district. Then this sum has been divided on the same at national level to obtain ratio of district income to the national income. This ratio is then multiplied to real GDP (PPP$) of Pakistan in order to attain district real GDP (PPP$). In last round, real GDP (PPP$) per capita for each district is obtained by dividing each district real GDP to the size of their respective population. Formulas to calculate real GDP (PPP$) per capita of Punjab and its thirty five-districts are given below;

Step 1:
Real GDP (PPP$) Per Capita of Punjab from (PHIES, 2010-11).

$$\text{R.GDP(PPP\$) P.C(Punjab)} = \frac{\text{Average Household's Monthly Income (Punjab)}}{\text{Average Households Monthly Income (Pakistan)}} \text{ X } \text{Real GDP (PPP\$)P.C (Pak)}$$

Step 2:
Real GDP Per Capita of each district of Punjab from agricultural crop value (ACV) plus manufacturing value added (MVA) method.

$$\text{Real GDP (PPP\$) (District)} = \frac{\text{ACV + MVA (District)}}{\text{ACV + MVA (Pak)}} \text{ X } \text{R.GDP (PPP\$) (Pak)}$$

$$\text{Real GDP (PPP\$) Per Capita (District)} = \frac{\text{Real GDP (PPP\$) (District)}}{\text{Population (District)}}$$

The limitation of the calculated district income is the assumption of equal percentage share of services in district GDP which is equal to the share of services in national GDP. This limitation is due to unavailability of district data for services sector.

To calculate normalized values of income index we have set 100 $ (PPP) as a minimum value for income index which is suggested by UNDP as subsistence level internationally and world real GDP per capita (PPP$), which is 9814 $ (PPP), is taken as maximum value for income index.

Income Index (INI)
= (actual–100 $(PPP))/(9814 $ (PPP) – minimum) (3.12)

3.1.5 Non Income Human Development Index

In its human development report published in 2010 UNDP has introduced some new indices to measure human development. Non Income Human Development Index (NIHDI) is one of such measures. It is constructed by using the indicators related with health and education. Unlike HDI, it does not use Gross National Product (GNP) in its construction. HDI measures the improvements in three aspects which are a long and healthy life, access to knowledge and decent standard of living. But NIHDI takes into account only two aspects which include a long and healthy life and access to knowledge. Thus NIHDI focuses only on non-income dimensions of human development. The construction of NIHDI is given below:

$$NIHDI = (1/2\ Health + 1/2\ Education) \qquad (3.13)$$

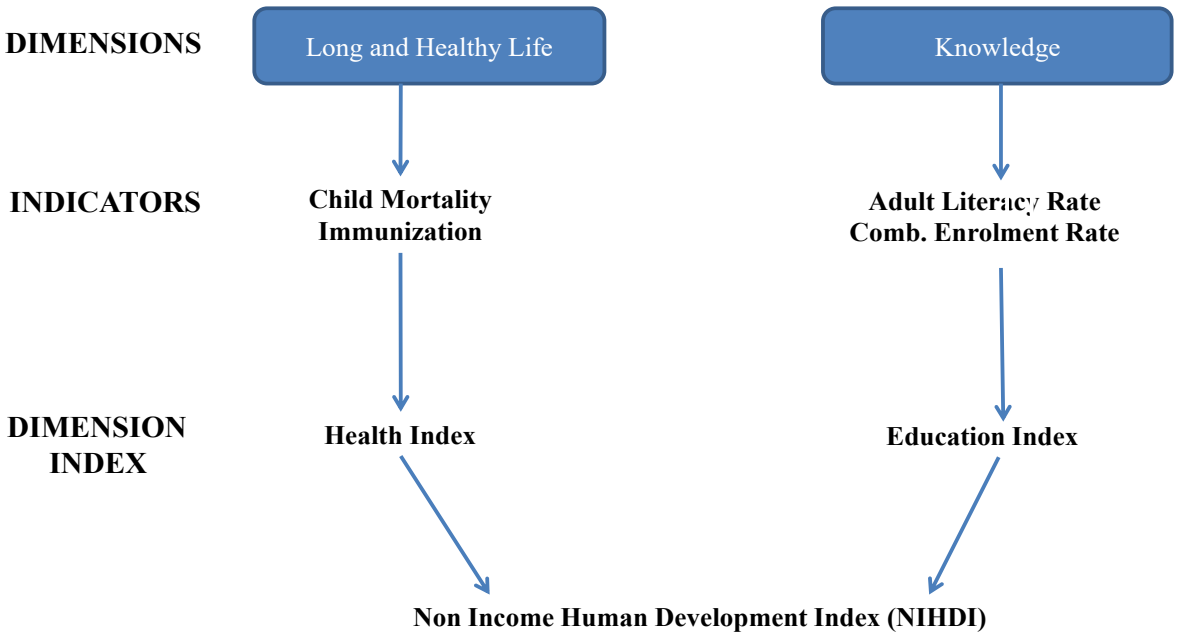


Figure 3.2: Construction of NIHDI

3.1.6 Social Infrastructure

It is very hard to find a generally agreed definition of social infrastructure but commonly it is related to schools, libraries, universities, clinics, hospitals, courts, museums, theatres, playgrounds, parks, fountains and statues etc. It is defined as the infrastructure that promotes the health, education and cultural standards of the population (Snieska and Simkunaite, 2009). We have used educational institutions (primary, secondary and tertiary)

per person of the age cohort 5 to 25 year and health institutions (hospitals, dispensaries, rural health centers, basic health units, sub-health centers) per person as proxies for social infrastructure at districts level. We have constructed social infrastructure index with the help of Principal Component Analysis (PCA). In education institutions we have included government mosque schools, government primary schools, government middle schools, government high schools, higher secondary schools by government and others, intermediate and degree colleges by government and others.

3.1.7 Remittances

Remittances relates to those transfers which are received by the household in the home place. In present study we have taken domestic remittances and foreign remittances in millions. Domestic remittances include those remittances which are received by the district from other districts of the same country. Foreign remittances include the remittances which are received by the district from foreign countries. So we have used total remittances (domestic plus abroad).

3.1.8 Industrialization

Generally Industry refers to that sector of economy which is related with manufacturing and production of different products. In literature different proxies have been used for industrialization to examine its relationship with economic development. We used degree of industrialization which we estimated by dividing the total number of factories of a district to its population as proxy for industrialization and examined the effect of industrialization on the human development of thirty five districts.

3.1.9 Population Density

Population density is mid-year population divided by land area in square kilometers. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship, except for refugees not permanently settled in the country of asylum, which are generally considered as part of the population of their country of origin. Land area is a country's total area, excluding area under inland water bodies, national claims to continental shelf, and exclusive economic zones. We have used population density (thousand people per square km) for the districts of Punjab.

3.2 DATA SOURCES

We have used cross sectional data for thirty-five districts of Punjab for the year of 2010-11 for present study. The data for HDI, NIHDI and determinants of human development disparities have collected from different kind of sources. The data of adult literacy rate, immunization rate and combined enrollment rate for thirty-five districts has taken from Pakistan Social and Living Standard Measurements Survey (PSLM, 2011). PSLM (2011) survey is conducted by Pakistan Bureau of Statistics (PBS) at district level with 76546 households sample from entire country to achieve Millennium Development Goals. This survey covered 14,549 enumeration blocks and 25,875 villages from Punjab. Data of child survival rate for the districts of Punjab is collected from Multiple Indicator Cluster Survey (MICS, 2011), which is conducted by Punjab Bureau of Statistics with the collaboration of UNDP and United Nations International Children's Emergency Fund (UNICEF). The survey covered 6,368 clusters and 91,280 households in urban and rural areas throughout the province.

Agriculture crops production data at district level, Punjab level and national level is taken from Crops Area Production by Districts (2011) published by Ministry of Food Pakistan and from Agriculture Marketing Information Services (AMIS, 2011) conducted by Government of Punjab. The prices data of agriculture crops is collected from Pakistan Statistical Year Book (2011), Pakistan Economic Survey (2011) and AMIS. The data of manufacturing value-added at districts level is collected (with this assumption that districts shares remained constant for the year of 2011) from Census of Manufacturing Industries (CMI, 2006). The data of World real GDP and Pakistan real GDP in PPP$ for 2010-11 is collected from World Development Indicators (WDI, 2011), districts population data is collected from (Punjab Development Statistics, 2012). Punjab Development Statistics (2012) is annually published by Punjab Bureau of Statistics. The data of social infrastructure, degree of industrialization and population density (estimated) is also collected from Punjab Development Statistics (2012), whereas data of total remittances (within country plus abroad) is collected from (MICS, 2011) which is conducted by Punjab Bureau of Statistics with the collaboration of UNDP and United Nations International Children's Emergency Fund (UNCIEF).

CHAPTER 4

EMPIRICAL RESULTS AND DISCUSSION

This chapter presents the empirical results of calculated Human Development Index (HDI), Non Income Human Development Index (NIHDI), Education Index (EI), Health Index (HI), Income Index (INI) and determinants of HDI and NIHDI. The chapter consists of two sections. First section reports the ranking of the districts on the basis of above mentioned indices. In the second section we have investigated some factors which may be held responsible for the differences of HDI and NIHDI across the districts.

4.1 EMPIRICAL RESULTS OF HDI, NIHDI, EI, HI AND INI

Thirty five districts of Punjab are ranked on the basis of current values of HDI, NIHDI, EI, HI, and INI. These ranks indicate the disparities of human development among the districts of Punjab.

Table 4.1
Ranking of the Districts based on HDI

	Districts	HDI		Districts	HDI	
		Value	Rank		Value	Rank
A (Category)	Rawalpindi	0.6731	1	Nankana Sahib	0.5505	19
	Lahore	0.6667	2	Mandi Bahuddin	0.5470	20
	Sheikhupura	0.6487	3	Narowal	0.5452	21
	Faisalabad	0.6267	4	Toba Take Singh	0.5411	22
	Sialkot	0.6198	5	Okara	0.5408	23
	Kasur	0.6171	6	Hafizabad	0.5359	24
B (Category)	Multan	0.6071	7	Rahim Yar Khan	0.5302	25
	Jhelum	0.5985	8	Layyah	0.5299	26
C (Category)	Chakwal	0.5983	9	Vehari	0.5064	27
	Khushab	0.5776	10	Muzaffar Garh	0.5047	28
	Jhang	0.5770	11	Sargodha	0.5006	29
	Attock	0.5690	12	Dera Gazi Khan	0.4992	30
	Mianwali	0.5665	13	Pakpatten	0.4787	31
	Bhakhar	0.5643	14	Bahawalnager	0.4769	32
	Gujrat	0.5642	15	Lodhran	0.4753	33
	Gujranwala	0.5630	16	Bahawalpur	0.4521	34
	Khanewal	0.5567	17	Rajanpur	0.4515	35
	Sahiwal	0.5559	18	PUNJAB	0.5567	

Source: Author's Calculation

The results of HDI have been reported in Table 4.1. The results indicate that overall Punjab is not at better position in human development. The HDI value of Punjab is 0.5567 which is not comparable with HDI developed nations. UNDP (2011) has categorized those nations in medium human development category which have the values of HDI in the range of 0.5220 to 0.6980. Keeping in view UNDP criteria, twenty-six districts and overall Punjab fall in medium human development category. Whereas nine districts of Punjab fall in low human development category. Results of the districts presented in Table 4.1 reveal that some districts have high HDI values but some districts are lagging behind with low HDI values.

To discuss the results in detail, we have divided thirty-five districts in three categories A, B and C. The districts having HDI values in the range of 0.61 and above are fall in category A. The districts having HDI values in the range of 0.51 to 0.60 are listed in category B. The districts which have HDI value 0.50 and below are fall in category C.

The Rawalpindi has first rank in terms of human development and the value of HDI is 0.6731 whereas Rajanpur stands on last position with HDI value 0.4515. Table 4.1 shows that category A is performing well as compare to other districts. The results indicate high human development disparities are existed across the districts. HDI value of Rawalpindi is 0.6731, Lahore 0.6667, Multan 0.6071, Vehari 0.5064 and Bahawalpur is 0.4521. The performance of category B districts in terms of human development is low as compare to category A and the performance of B category is high as compare to category C. Overall results indicate that category C has lower performance regarding human development. Moreover the results of the Table 4.1 clarify that southern districts like Rajanpur, Lodhran, Muzaffar Garh, D.G Khan, Vehari, Bahawalpur, Bahawalnager, Layyah and Rahim Yar Khan are lagging behind in human development.

To examine the difference in income and non-income human development among the districts of Punjab we have calculated NIHDI and compared it with INI. The results of INI and NIHDI for the districts have been given in Table 4.2.

Table 4.2
Ranking and Comparison of Districts based on NIHDI with INI

NIHDI		Districts	INI	
Value	**RANK**		**Value**	**Rank**
0.7046		PUNJAB	0.2608	
0.7003	18	Sheikhupura	0.5455	1
0.6936	21	Kasur	0.4640	2
0.7715	5	Lahore	0.4571	3
0.7133	15	Faisalabad	0.4536	4
0.7885	2	Rawalpindi	0.4422	5
0.6980	19	Multan	0.4252	6
0.6652	26	Bhakhar	0.3626	7
0.7516	7	Sialkot	0.3562	8
0.6437	29	Okara	0.3352	9
0.6282	31	Rahim Yar Khan	0.3342	10
0.7073	16	Khushab	0.3183	11
0.7393	10	Jhelum	0.3169	12
0.6823	24	Sahiwal	0.3033	13
0.6850	23	Khanewal	0.3002	14
0.7141	14	Mianwali	0.2713	15
0.6132	32	Dera Gazi Khan	0.2712	16
0.6286	30	Muzaffar Garh	0.2569	17
0.7395	9	Jhang	0.2519	18
0.7298	13	Attock	0.2475	19
0.6937	20	Hafizabad	0.2202	20
0.6085	33	Pakpatten	0.2191	21
0.7979	1	Chakwal	0.1991	22
0.7341	12	Nankana Sahib	0.1837	23
0.7034	17	Layyah	0.1829	24
0.6818	25	Vehari	0.1558	25
0.6019	35	Bahawalpur	0.1524	26
0.7371	11	Toba Take Singh	0.1475	27
0.6036	34	Rajanpur	0.1472	28
0.7731	4	Gujranwala	0.1432	29
0.7752	3	Gujrat	0.1422	30
0.7512	8	Mandi Bahuddin	0.1386	31
0.6487	27	Bahawalnager	0.1333	32
0.6486	28	Lodhran	0.1288	33
0.6875	22	Sargodha	0.1268	34
0.7562	6	Narowal	0.1237	35

Source: Author's Calculation

The results of Table 4.2 reveal that Rahim Yar Khan, D.G Khan, Muzaffar Garh, Layyah, Vehari, Bahawalpur and Rajanpur are performing well in income as compare to Narowal, Gujranwala, Gujrat and Mandi Bahuddin but these districts have low ranking in NIHDI. The high values of INI and lower NIHDI values of southern districts show that southern districts are neglecting in public provision of social services related to education and health (education infrastructure, health infrastructure, sanitation facilities and clean drinking water etc.). The results of Table 4.2 also highlight that the districts which have more distance from capital cities (Islamabad and Lahore) have low NIHDI. On the other hand, the public provision of social services increase the value of NIHDI and that is in favor of those districts which have less distance to capital cities.

Table 4.3
Ranking of the Districts based on EI

Districts	EI		Districts	EI	
	Value	RANK		Value	RANK
PUNJAB	0.5241		Khushab	0.5206	18
Chakwal	0.6507	1	Sargodha	0.5108	19
Gujranwala	0.6505	2	Hafizabad	0.5103	20
Rawalpindi	0.6401	3	Layyah	0.5013	21
Lahore	0.6315	4	Multan	0.4931	22
Gujrat	0.6101	5	Khanewal	0.4819	23
Sialkot	0.6023	6	Vehari	0.4811	24
Toba Take Singh	0.6017	7	Sahiwal	0.4809	25
Jhang	0.5914	8	Bhakhar	0.4603	26
Narowal	0.5732	9	Bahawalnager	0.4412	27
Mandi Bahuddin	0.5717	10	Okara	0.4311	28
Jhelum	0.5711	11	Rahim Yar Khan	0.4143	29
Nankana Sahib	0.5605	12	Pakpatten	0.4012	30
Attock	0.5602	13	Lodhran	0.4011	31
Mianwali	0.5421	14	Muzaffar Garh	0.3921	32
Sheikhupura	0.5405	15	Dera Gazi Khan	0.3913	33
Faisalabad	0.5317	16	Bahawalpur	0.3909	34
Kasur	0.5304	17	Rajanpur	0.3011	35

Source: Author's Calculation

The results of Education Index are presented in Table 4.3. The EI value of Chakwal is 0.6507, Lahore 0.6315, Rawalpindi 0.6401, Lodhran 0.4011, Muzaffar Garh 0.3921, Dera Gazi Khan 0.3913 and Rajanpur 0.3011. The results reveal that there is huge difference between Chakwal and Rajanpur in status of education. Chakwal, Gujranwala, Rawalpindi, Lahore, Gujrat and

Sialkot have high education status on the other hand Bahawalnagar, Okara, Rahim Yar Khan, Pakpatten, Lodhran, Muzaffar Garh, Dera Gazi Khan, Bahawalpur and Rajanpur have low education status. The value of EI shows that the southern districts have lower ranking positions than others. The overall results of Table 4.3 indicate that there are education inequalities across the districts.

Table 4.4
Ranking of the Districts based on HI

Districts	HI		Districts	HI	
	Value	RANK		Value	RANK
PUNJAB	0.8852		Khanewal	0.8882	18
Chakwal	0.9452	1	Jhang	0.8877	19
Gujrat	0.9404	2	Mianwali	0.8861	20
Narowal	0.9388	3	Sahiwal	0.8837	21
Rawalpindi	0.937	4	Vehari	0.8825	22
Mandi Bahuddin	0.9307	5	Hafizabad	0.8772	23
Lahore	0.9116	6	Toba Take Singh	0.8741	24
Jhelum	0.9076	7	Bhakhar	0.8701	25
Nankana Sahib	0.9075	8	Muzaffar Garh	0.8652	26
Rajanpur	0.9062	9	Sargodha	0.8643	27
Layyah	0.9056	10	Sheikhupura	0.8601	28
Multan	0.903	11	Kasur	0.8569	29
Sialkot	0.901	12	Okara	0.8563	30
Attock	0.8994	13	Bahawalnager	0.8562	31
Lodhran	0.8961	14	Rahim Yar Khan	0.8421	32
Gujranwala	0.8955	15	Dera Gazi Khan	0.8352	33
Faisalabad	0.8949	16	Pakpatten	0.8159	34
Khushab	0.894	17	Bahawalpur	0.8131	35

Source: Author's Calculation

The results of Table 4.4 indicate that there is inequality in health outcomes across the districts. Chakwal is on first position and its HI value is 0.9452 whereas Bahawalpur stands on last rank and HI is 0.8131. The performance of Chakwal, Gujrat, Narowal, Rawalpindi and Lahore is high in term of HI value whereas Muzaffar Garh, Sheikhupura, Kasur, Okara, Bahawalnager, Rahim Yar Khan, Dera Gazi Khan, Pakpatten and Bahawalpur have low health performance.

Table 4.5
Ranking of the Districts based on INI

Districts	INI		Districts	INI	
	Value	RANK		Value	RANK
PUNJAB	0.2608		Jhang	0.2519	18
Sheikhupura	0.5455	1	Attock	0.2475	19
Kasur	0.4641	2	Hafizabad	0.2202	20
Lahore	0.4571	3	Pakpatten	0.2191	21
Faisalabad	0.4536	4	Chakwal	0.1991	22
Rawalpindi	0.4422	5	Nankana Sahib	0.1837	23
Multan	0.4252	6	Layyah	0.1829	24
Bhakhar	0.3626	7	Vehari	0.1558	25
Sialkot	0.3562	8	Bahawalpur	0.1524	26
Okara	0.3352	9	Toba Take Singh	0.1475	27
Rahim Yar Khan	0.3342	10	Rajanpur	0.1472	28
Khushab	0.3183	11	Gujranwala	0.1432	29
Jhelum	0.3169	12	Gujrat	0.1422	30
Sahiwal	0.3033	13	Mandi Bahuddin	0.1386	31
Khanewal	0.3002	14	Bahawalnager	0.1333	32
Mianwali	0.2713	15	Lodhran	0.1288	33
Dera Gazi Khan	0.2712	16	Sargodha	0.1268	34
Muzaffar Garh	0.2569	17	Narowal	0.1237	35

Source: Author's Calculation

The results of Table 4.5 indicate that there are high income inequalities across the districts. There is high difference between the INI value of first rank position district and last rank position district. The INI value of Sheikhupura is 0.5455 on the other hand the value of Narowal is 0.1237. There some southern districts like Rahim Yar Khan, Muzaffar Garh and Dera Gazi Khan have high INI values as compare to some other districts like Gujranwala, Gujrat and Narowal but due to having low values of EI and HI these districts have low overall HDI ranking. The INI values of the districts are Sheikhupura is 0.5455, Kasur 0.4641, Bhakkar 0.3626, Muzaffar Garh 0.2569, Chakwal 0.1991, Gujranwala 0.1432 and Narowal is 0.1237.

4.2 THE DETERMINANTS OF HDI AND NIHDI

Table 4.6
Determinants of HDI across the Districts of Punjab

Dependent variable = HDI			
Variable	**Coefficient**	**T-Statistic**	**Prob-Value**
Constant	0.416229	14.22767	0.0000
IND	0.244561	2.895155	0.0070
PD	0.073369	1.872807	0.0709
REM	0.210867	1.951867	0.0603
SI	0.153773	2.574078	0.0152
F-Statistic = 6.837336			
Prob(F-Statistic) = 0.000490			
R-Squared = 0.476890			
Adj-R- Squared = 0.407142			
Durbin-Watson Stat = 2.296086			

Source: Author's Calculation

The results of Table 4.6 reveal that all four variables Social Infrastructure (SI), Remittances (REM), Industrialization (IND) and Population Density (PD) have positive and statistically significant impact on HDI across the districts of Punjab. The results show that the coefficient of industrialization is significant at 1 percent level of significance and the coefficient of social infrastructure is significant at 5 percent. But the coefficients of population density and remittances are significant at 10 percent level. The estimates indicate that 1 unit increase in industrialization increase human development by 0.2445 units. The results show that one unit positive change in population density improves human development by 0.0733 units. Similarly, human development responds 0.2108 units to one unit change in remittances while one unit increase in infrastructure leads to 0.1537 units improvement in human development. The explanatory power of the model is 0.4768 which explains that these four variables determine the 48 percent human development across the districts. The districts having better social infrastructure, more inflows of remittances, higher degree of industrialization and dense population may have higher HDI ranking.

(A) Diagnostic Tests

Diagnostic tests for normality, serial correlation, heteroskedasticity and model specification are applied. The results of these tests are shown in Table 4.7.

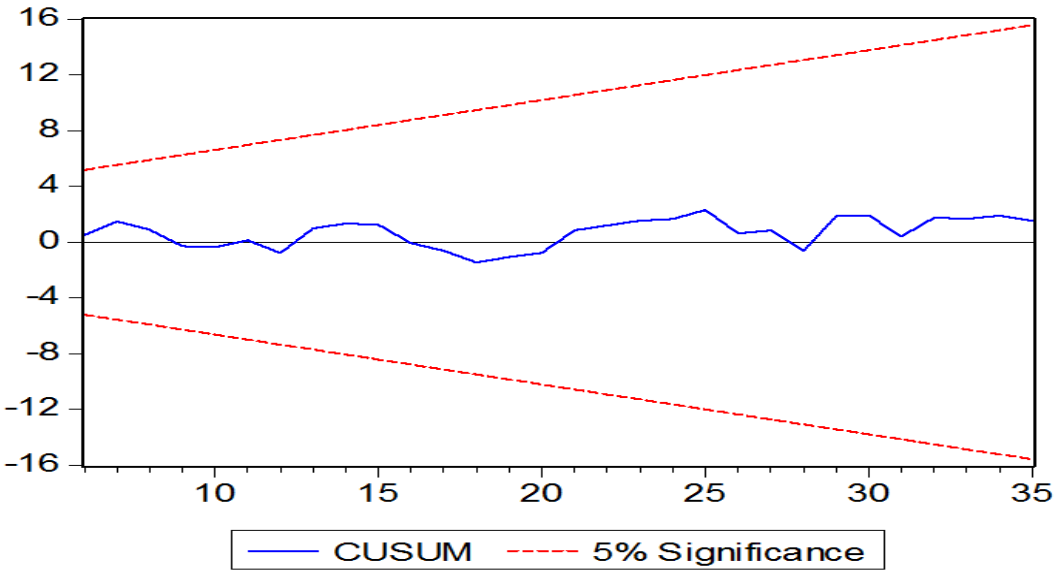
Table 4.7
Diagnostic Tests

Normality Test (Jarque-Bera Statistic)	Jarque-Bera Statistic = 0.3018	Probability = 0.8599
Serial Correlation (Breush-Godfrey Serial Correlation LM Test)	F-statistics = 0.7579	Probability = 0.3911
Heteroskedasticity Test (White Heteroskedasticity Test)	F-statistics = 0.2879	Probability = 0.9639

Source: Author's Calculation

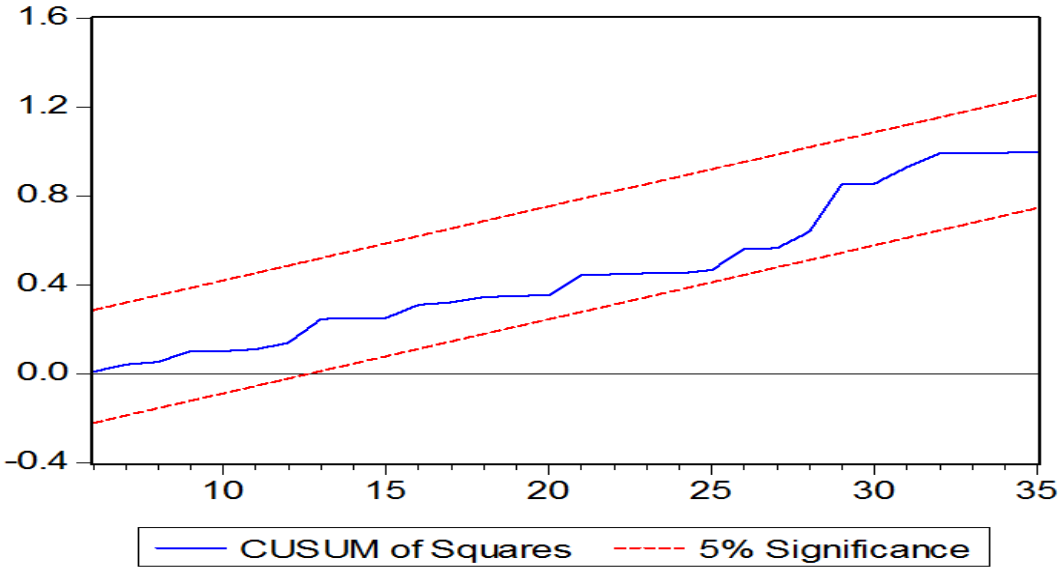
The results of these tests indicate that the residual is normally distributed and there is also no problem of serial correlation and autoregressive conditional heteroskedasticity.

To analyze the stability of the coefficients together the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMsq) are applied. The graphical representation of (CUSUM) and (CUSUMsq) are shown in Figure 4.1 and 4.2. If the plot of these statistics remains within critical boundaries of the five percent significance level, the null hypothesis stating that the regression equation is correctly specified cannot be rejected. The results of the Figure 4.1 and 4.2 indicate that the plots of both statistics (CUSUM) and (CUSUMsq) are within the boundaries, so it is clear that our model is correctly specified.



The straight lines represent critical bounds at 5% Significance level.

Figure 4.1: Plot of Cumulative Sum of Recursive Residuals



The straight lines represent critical bounds at 5% Significance level.

Figure 4.2: Plot of Cumulative Sum of Squares of Recursive Residuals

Table 4.8
Determinants of NIHDI across the Districts of Punjab

Dependent variable = NIHDI			
Variable	**Coefficient**	**T-Statistic**	**Prob-Value**
Constant	0.487937	15.00677	0.0000
IND	0.157677	1.670333	0.0953
PD	0.046731	0.936437	0.3565
REM	0.440375	3.898905	0.0005
SI	0.284635	3.446218	0.0017
R-Squared = 0.574924			
Adj-R-Squared = 0.518247			
F-Statistic = 10.14390			
Prob(F-Statistic) = 0.000026			
Durbin-Watson Stat = 2.228256			

Source: Author's Calculation

The results of Table 4.8 show that Social Infrastructure (SI), Remittances (REM) and Industrialization (IND) have positive and statistically significant impact on NIHDI. But the relationship between population density and NIHDI is insignificant. The results show that the coefficients of Industrialization, social infrastructure and remittances are respectively significant at 10, 1 and 5 percent level of significance. The estimates indicate that 1 unit increase in industrialization increase human development by 0.1576 units. The results show that one unit positive change in remittances improves human development by 0.4403 units. Similarly, human development responds 0.2846 units to one unit change in social infrastructure.

(B) Diagnostic Tests

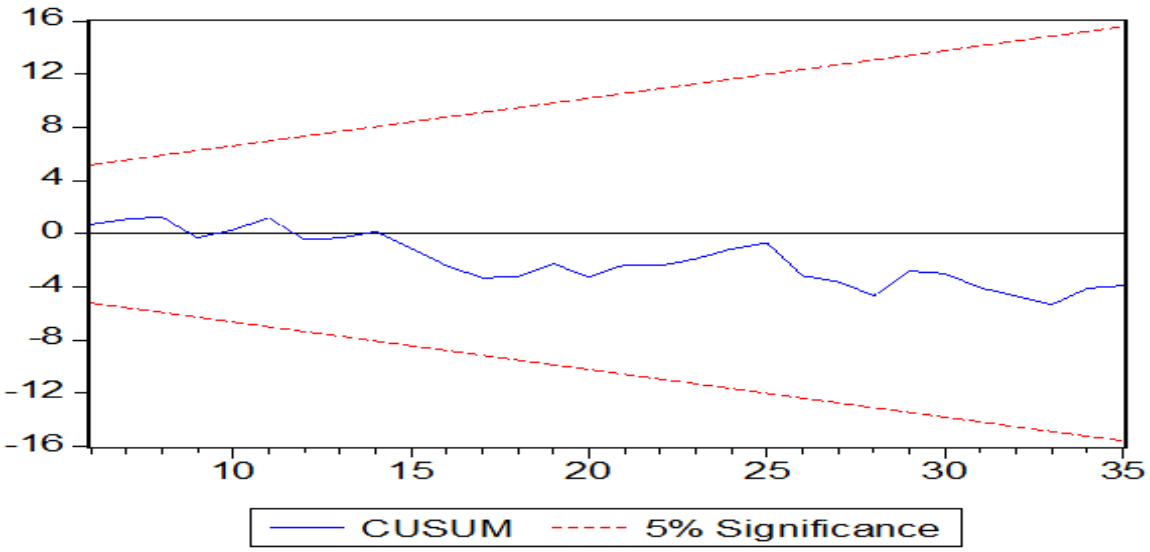
Diagnostic tests for normality, serial correlation, heteroskedasticity and model specification are applied. The results of these tests are shown in Table 4.9.

Table 4.9
Diagnostic Tests

Normality Test (Jarque-Bera Statistic)	Jarque-Bera Statistic = 0.0437	Probability = 0.9783
Serial Correlation (Breush-Godfrey Serial Correlation LM Test)	F-statistics = 0.4810	Probability = 0.4934
Heteroskedasticity Test (White heteroskedasticity Test)	F-statistics = 0.8431	Probability = 0.5741

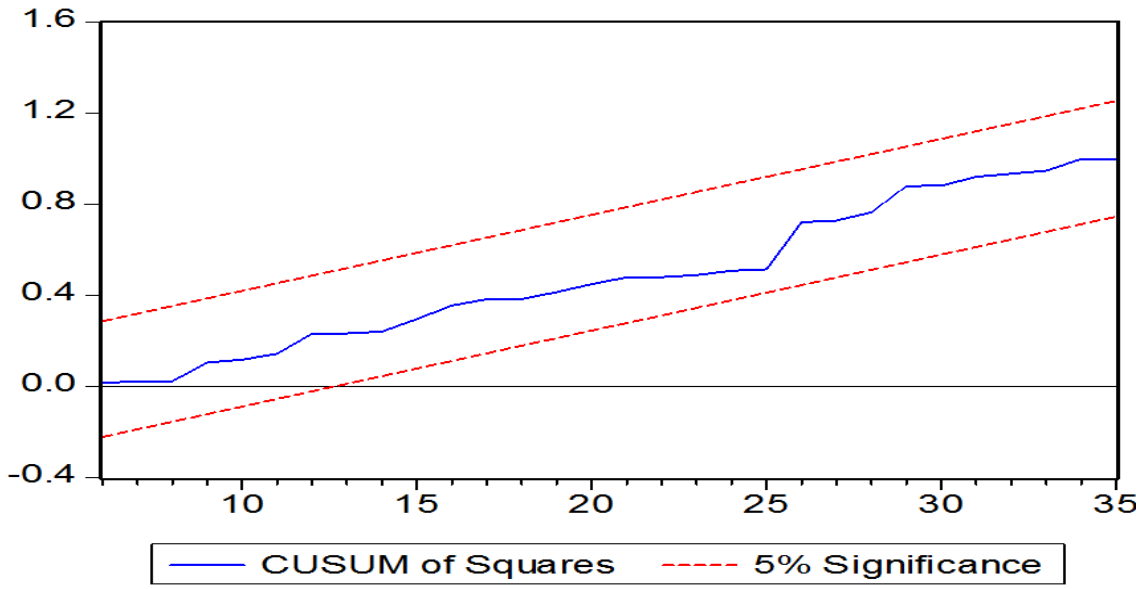
Source: Author's Calculation

The results of these tests indicate that the residual is normally distributed and there is also no problem of serial correlation and autoregressive conditional heteroskedasticity.



The straight lines represent critical bounds at 5% Significance level.

Figure 4.3: Plot of Cumulative Sum of Recursive Residuals



The straight lines represent critical bounds at 5% Significance level.

Figure 4.4: Plot of Cumulative Sum of Squares of Recursive Residuals

To analyze the stability of the coefficients together the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMsq) are applied. The graphical representation of (CUSUM) and (CUSUMsq) are shown in figure 4.3 and 4.4. If the plot of these statistics remains within critical boundaries of the five percent significance level, the null hypothesis stating that the regression equation is correctly specified cannot be rejected. The results of the figure 4.3 and 4.4 indicate that the plots of both statistics (CUSUM) and (CUSUMsq) are within the boundaries, so it is clear that our model is correctly specified.

CHAPTER 5

CONCLUSIONS AND POLICY IMPLICATIONS

This study calculated HDI, NIHDI, EI, HI and INI and examined the current status of human development and human development disparities across the districts of Punjab. The study also investigated some socio-economic determinants of HDI and NIHDI across the districts. Among the vast range of determinants of HDI and NIHDI, the study focused on some socio-economic determinants of differences in HDI and NIHDI. Thirty-five districts were considered for this purpose and cross section data was used.

The results of HDI indicated that there were high human development disparities in terms of HDI. The results of HDI revealed that the performance of Punjab in terms of HDI was not comparable with high HDI ranked nations. According to UNDP categorization twenty six districts had medium and nine districts had low human development status and also there were massive human development disparities among the districts. The analysis revealed that some districts achieved high level of human development with high literacy rate, high combined enrollment rate, high immunization rate, high child survival rate and high level of real GDP per capita such as Rawalpindi and Lahore. On the other hand some other districts were lagging behind in human development with low literacy rate, low combined enrollment rate, low immunization rate, low child survival rate and low level of real GDP per capita such as Layyah, Vehari, Muzaffar Garh, Sargodha, D.G Khan, Pakpatten, Bahawalnager, Lodhran, Bahawalpur and Rajanpur, most of that districts belonged to the south region of Punjab.

The results of NIHDI concluded that non-income human development disparities were also existed among the districts of Punjab. The comparison of NIHDI and INI revealed that the public provision of social services had not been remained in favored of south region districts. The four districts (Narowal, Gujranwala, Gujrat and Mandi Bahuddin) had low ranked positions in terms of INI but they had high ranked positions in terms of NIHDI. Similarly some south region districts like Layyah, Vehari, Muzaffar Garh, D.G Khan, Bahawalpur and Rajanpur had high ranked positions in terms of INI but they shifted in low ranked positions in terms of NIHDI. The upward shifting of Narowal, Gujranwala, Gujrat and Mandi Bahuddin in HDI ranking was due to high ranked positions NIHDI and downward shifting of (Layyah, Vehari, Muzaffar Garh, D.G Khan, Bahawalpur and Rajanpur) in HDI ranking was due to low ranked positions in NIHDI.

Education disparities had observed across the districts from the values of EI and there were health inequalities among the districts in terms of HI. There were also high income inequalities among the districts in terms of INI.

The results of HDI, NIHDI, EI, HI and INI revealed that there was high variation in human development across the districts. The differences in these indices indicate that may there is need to take some suitable steps at district level in Punjab. The improvement can be in terms of education facilities, health facilities and tap water or sanitation facilities to improve the human development status of the districts especially in the districts of south region in Punjab. Out of nine districts which were categorized in low human development category, 7 districts belonged to the south region of Punjab.

The first null hypothesis describing that social infrastructure did not affect HDI across the districts of Punjab was rejected against the alternative hypothesis that social infrastructure positively affected the HDI. The second null hypothesis showing that social infrastructure did not affect NIHDI was rejected against the alternative hypothesis that social infrastructure positively affected the NIHDI. The government of Punjab can provide optimally (according to the need of the region) human empowerment and opportunities through education, health, water and sanitation facilities that widen the people's horizon and capabilities to participate, negotiate and influence accountable institutions which are responsible for the provision of social services and economic incentives for the development. To improve human development and to reduce human development disparities government of Punjab and non-government organizations can expand social infrastructure among the districts because it has positive and significant impact on the HDI and NIHDI. More focus should be on those districts which have low social infrastructure (education institutions and health institutions) like Layyah, Vehari, Muzaffar Garh, D.G Khan, Pakpatten, Bahawalnager, Lodhran, Bahawalpur and Rajanpur) as compare to other districts.

The third null hypothesis describing that industrialization did not affect HDI was rejected against the alternative hypothesis that industrialization positively affected the HDI. The fourth null hypothesis stating that industrialization did not affect NIHDI was rejected against the alternative hypothesis that industrialization positively affected the NIHDI. The development at sectoral level (agriculture, industrial and services) plays an important role to increase human development. To improve sectoral development government can make policies which are not only pro-people development, but create the income and welfare enhancing opportunities needed to promote human development at district level. The results show that

industrialization has positive impact on HDI and NIHDI across the districts of Punjab, so government should give incentives and provide basic facilities like infrastructure to investors to increase industrialization especially in those districts which have low degree of industrialization like Layyah, Vehari, Muzaffar Garh, D.G Khan, Pakpatten, Bahawalnager, Lodhran, Bahawalpur, Rajanpur, Sahiwal, Narowal, Okara, Chakwal, Bhakhar, Hafizabad, Jhang, Mianwali, Mandi Bahuddin and Khanewal.

The fifth null hypothesis showing that remittances did not affect HDI was rejected against the alternative hypothesis that remittances positively affected the HDI. The sixth null hypothesis stating that the remittances did not affect NIHDI was rejected against the alternative hypothesis that remittances positively affected the NIHDI. The results indicate that remittances (abroad plus domestic) also have positive impact on HDI and NIHDI across the districts of Punjab. The government can build labor skills development and technical training institutes according to the international demand for labor. The government and private organizations can also create job opportunities in education, health, agriculture, industrial and other sectors at regional level especially in south region of Punjab because the people of one district can easily move to nearer district for earning. The literature on remittances provides some examples of governments that have implementing business counseling, information and training programs to assist return migrants and remitters to get the required information and knowledge for investment. Although in Pakistan the Overseas Pakistanis Foundation (OPF) is offering investment advisory services to return migrants but there is needed to expand its benefits among those districts which have low remittances. The foundation can help to increase investment projects in low HDI districts, especially among south region districts. The government of Korea launched an experimental training program in 1986 for retraining return migrants in new skills so that they can move to other industries or establish their own business. By mid-1986, some 4,000 workers were participating in the scheme (Athukorala, 1992). To promote remittances, government can also follow the policies of Bangladesh and the Philippines where the share of informal remittances has gone down because their banking systems have focused on speed, transfer cost reduction, and income tax relief for remitters (Amjad et al., 2013).

The seventh null hypothesis showing that population density did not affect HDI was rejected against the alternative hypothesis that population density positively affected the HDI. The eighth null hypothesis describing that population density did not affect NIHDI was accepted that population density has insignificant association with NIHDI. So, dense population can promote human development among the districts of Punjab because it has different indirect impacts on human development. First, population density can increase

productivity. Second, high population density can promote technical innovation. Third, when population density increases, there is a higher incentive for investment in human capital, because the productivity of human capital is higher in those regions where population density is high (Becker et al., 1999). The government of Punjab can enhance the empowerment of the people among the districts with the improvement in income, education, health and other social services.

There are different criterion for the allocation of development budget among the regions. Underdevelopment may also be considered as criteria for the allocation of development budget among the different regions. The government of Punjab may increase the development budget of those districts which have low level of human development like Layyah, Vehari, Muzaffar Garh, Sargodha, D.G Khan, Pakpatten, Bahawalnager, Lodhran, Bahawalpur and Rajanpur.

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APPENDIX

Table A-1: Data

Districts	Immunization Rate	Child Survival Rate	Literacy Rate	Combined Enrollment Rate	Real GDP (PPP$) Per Capita
PUNJAB	86	89.6	60	38	2634.1808
Attock	87	91.2	64	41	2504.4565
Bahawalnager	81	87.6	49	36	1395.4506
Bahawalpur	68	87.0	47	24	1580.7853
Bhakhar	84	88.3	49	42	3623.2667
Chakwal	99	92.6	78	42	2034.3803
Dera Gazi Khan	74	87.6	43	34	2734.9187
Faisalabad	89	89.7	66	30	4506.9670
Gujranwala	85	91.5	74	56	1492.0792
Gujrat	96	93.2	71	50	1482.0789
Hafizabad	95	84.6	58	35	2239.8282
Jhelum	86	92.8	75	23	3178.9586
Jhang	88	89.1	52	78	2547.9992
Kasur	81	87.7	58	41	4608.0488
Khanewal	87	89.6	53	40	3016.3937
Khushab	88	90.0	60	38	3192.5411
Lahore	85	93.8	77	40	4541.4353
Layyah	90	90.8	55	42	1876.9645
Lodhran	88	90.3	47	27	1351.7571
Mandi Bahuddin	93	93.1	65	40	1446.8828
Mianwali	80	92.3	61	42	2736.4777
Multan	91	90.0	58	35	4231.5118
Muzaffar Garh	84	87.6	43	31	2595.8221
Nankana Sahib	96	88.5	60	56	1885.4200
Narowal	95	93.4	58	60	1302.5808
Okara	85	85.9	50	33	3356.5617
Pakpatten	79	82.7	45	31	2228.5104
Rahim Yar Khan	77	87.3	46	33	3347.5697
Rajanpur	93	89.6	34	21	1530.3877
Rawalpindi	93	94.0	79	38	4396.4713
Sahiwal	89	88.1	56	35	3046.8556
Sargodha	83	87.9	59	38	1332.5607
Sheikhupura	76	90.3	63	41	5399.6462
Sialkot	88	91.0	66	52	3561.1758
Toba Tek Singh	83	89.3	69	43	1533.0491
Vehari	90	87.5	55	39	1613.8639

Table A-2: Data

Districts	Social Infrastructure (Index)	Remittances in millions	Degree of Industrialization	Population Density
Attock	0.00341	0.2180	0.03095	0.238
Bahawalnager	0.00341	0.1480	0.07913	0.305
Bahawalpur	0.00230	0.1400	0.10497	0.138
Bhakhar	0.00348	0.1769	0.01827	0.181
Chakwal	0.00416	0.1920	0.10502	0.206
Dera Gazi Khan	0.00274	0.1400	0.04330	0.197
Faisalabad	0.00201	0.2000	0.23570	1.235
Gujranwala	0.00201	0.2176	0.23576	1.331
Gujrat	0.00292	0.2900	0.21439	0.84
Hafizabad	0.00264	0.2082	0.06165	0.467
Jhelum	0.00182	0.3240	0.07444	0.42
Jhang	0.00567	0.1693	0.08101	0.331
Kasur	0.00210	0.1680	0.18864	0.798
Khanewal	0.00274	0.1680	0.06252	0.605
Khushab	0.00334	0.2840	0.09954	0.182
Lahore	0.00134	0.3600	0.22491	4.889
Layyah	0.00342	0.2600	0.08586	0.251
Lodhran	0.00219	0.1580	0.08240	0.589
Mandi Bahuddin	0.00270	0.2629	0.06178	0.548
Mianwali	0.00337	0.3120	0.05120	0.237
Multan	0.00199	0.1680	0.10566	1.121
Muzaffar Garh	0.00187	0.1480	0.03559	0.457
Nankana Sahib	0.00298	0.1800	0.12928	0.596
Narowal	0.00382	0.2400	0.01567	0.702
Okara	0.00224	0.1384	0.02833	0.68
Pakpatten	0.00217	0.2437	0.10786	0.633
Rahim Yar Khan	0.00255	0.1400	0.04697	0.371
Rajanpur	0.00237	0.1680	0.04755	0.128
Rawalpindi	0.00261	0.2760	0.07032	0.822
Sahiwal	0.00275	0.2100	0.09643	0.708
Sargodha	0.00308	0.2520	0.10845	0.597
Sheikhupura	0.00202	0.1879	0.31691	0.897
Sialkot	0.00271	0.2760	0.22347	1.207
Toba Tek Singh	0.00330	0.1883	0.06773	0.651
Vehari	0.00227	0.2013	0.06556	0.647

Table A-3: Major and Minor Crops

Wheat	Sugarcane	Gram	Tomato	Guava
Rice	Cotton	Mash	Rapeseed	Apricot
Maiz	Sunhemp	Masoor	Garlic	Peach
Bajra	Tobacco	Moong	Mango	Dates
Jowar	Guarseed	Onion	Banana	Fodder
Barley	Chilli	Potato	Apple	