Regional Disparities in Education: An Analysis of Rural and Urban Areas of Pakistan

by

Hafiz Muhammad Adeel

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supervisor

Dr. Usman Mustafa

Prof/Head

Department of Business Studies

Department of Economics

Pakistan Institute of Development Economics (PIDE) Islamabad

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Abstract

Pakistan is suffering from severe educational disparities among provinces as well as within the provinces. Most of the educated people belong to federal capital and the capitals of four provinces. There are huge differences in rural and urban literacy rates of all provinces. The concept of Gini Coefficient is used to know the intensity of educational disparity in this study. Gini Coefficient of education is calculated on the basis of educational attainment data for rural and urban areas of all provinces of Pakistan from the year 2001-02 to 2014-15. Prior to Multiple Linear Regression, with the help of Two-way ANOVA (split Plot Design) and Least Significant Difference (LSD), significance of levels (regions and sub-regions) and possible determinants of Gini Coefficient was checked. Gini Coefficient of education was significantly different among the provinces and within the province. Study finds significantly higher disparities in rural areas than that of urban areas in all provinces. Overall disparity shows decreasing trend but disparity between rural and urban areas are not decreasing over the time. The gap between rural and urban disparity is lesser in the province of KPK and Baluchistan and higher in the province of Punjab and Sind. The results of Multiple Linear Regression reveal that Gini Coefficient of education is positively related to poverty status and unemployment rate while it is negatively related to gender parity and number of institutions. Higher return on education, easy access to educational institutions and a lower discrimination between male and female are the tools to remove the educational disparity from Pakistan.

Key Words: Gini Coefficient, Educational Disparity, Regional Disparity

CHAPTER I

Introduction

Process of receiving or giving systematic instruction, especially at a school or university is known as education (Dictionary Oxford, 2012). The importance of education in the world of today can hardly be overemphasized where new technologies are emerging from nowhere to push the old ones into the obsolescence. Job markets are in constant flux, demand for customary skills long cherished is waning overnight, and new, unheeded of skills are assuming center stage (Filiztekin and Karahasan, 2015). To survive in and stay abreast in such a world, entities and realms are striving to stay at steep of learning curve- and education is the only way of learning.

According to The Education for All (EFA) movement and The Millennium Development Goals (MDG) 2000, as well as Sustainable Development Goals (SDGs) 2015, it was committed that a quality primary education would be certain for all individuals without any discrimination of cast, color, creed and region (UNESCO, 2015). EFA movement first launched in 1990 to endorse an expanded vision of learning and pledged to universalize primary education and to massively reduce illiteracy by the end of the decade. Ten years later, with many countries far from this goal, international community met again in DAKAR, Senegal, and affirmed their commitment to achieving Education for All by the year 2015.

According to UNESCO Institute for Statistics 2015 the global literacy rate of all people aged 15 and above is 86.3% (UNESCO, 2015). But there is a vast range of literacy rates among the countries of the world (Fritz and Koch, 2016). Some countries have almost 100% literacy like Ukraine, Russia and Slovenia, and some countries are having literacy rate less than 30%,

like Burkina Faso, South Sudan and Afghanistan (Salmi, 2015). This significant difference in the literacy rates or education systems can be called as educational disparity (Ferreira and Gignoux, 2011).

Parity refers to the right of different groups of people to have a similar social position and receive the same treatment regardless of their apparent differences (Oxford Dictionary, 2012). Parity, therefore, refers to equality between Men and Women, Boys and Girls, Rural and Urban and between regions and countries. The word disparity refers to lack of parity or equality among different groups. So, there must be some comparable things to be able to talk about parity or disparity. Therefore disparity can be defined as the difference between two or more comparable things. Educational disparity can be discussed at different levels, such as disparity between Male and Female education, disparity between Rural and Urban education and difference between qualities of education.

The main reason for most of the children never attend the school is poverty (Castello and Domenech, 2002). Around 124 million children and adolescents have never started school or dropped out before completing primary education despite the international community's promise to provide universal primary education by 2015 (UNESCO, 2015). The world's poorest children are four time more likely not to go to school than world's richest children, and five times more likely not to complete the primary education (Choi, 2016). In many countries even with high initial enrollment rates, only a much smaller proportion actually complete five or six years of primary education (Bauer and Riphahn, 2006). Furthermore, according to global report on out of school children, completion rates are typically lower for girls, for children in poor households and for those who are living in rural areas (Smith, 2015).

According to UNESCO Report 2015, out of 124 million children and adolescents who have never started school or dropped out without completing primary education, nearly 87% lived in three areas as mentioned below:

- Sub-Saharan Africa
- South and West Asia
- Arab States and North Africa

Sub-Saharan Africa is the region having largest cluster of illiterate people (UNESCO, 2007).There is a severe threat of educational disparity in this region (Eger, 2016). For example, the literacy rate of some countries is above 80% like Zambia, Botswana and Lesotho, and some countries have literacy rate less than 30% like Burkina Faso, Chad and Niger (Salmi, 2015). Furthermore, over the time these disparities are not decreasing significantly (Roby et al., 2016). The main reason for this situation is the negligence of many countries towards pre-primary education (Hayward, 2015). More than ten countries have pre-primary gross enrollment ratios less than 5%. Moreover, there are imbalances in the education systems, so educational disparities are created and reinforced in this region (Ansell, 2015).

South and West Asia is the 2nd most concentrated region by out of school children having 10.3 million children out of school (UNESCO, 2015). Since 2000, region's countries have made important progress, yet the level of participation remains limited and unequal in many countries (Garrett, 2016). There are 400 million adults who are affected by low literacy levels, most of them are women; gender disparities were abridged considerably, yet full equality remains elusive (Blackmore, 2015). Enrollment performance of the country is positively related to budgetary allocations to education (Mustafa, 2016). Most of the children are not in the school

because they face challenges allied with income disparity, gender disparity, lingual disparity and regional disparity (Untherhalter, 2015). Often, not just one category of disparity keeps a child out of school but a collaboration of multiple disparities (Hasman and Novotny, 2015).

Arab States are the region where educational disparities depict vividly. One can easily find a vast range of income groups and literacy rates. It was estimated that gender parity in the Arab world stood at 0.69 in 2004, one of the lowest rates in the world except for south and west Asia (Hassine, 2015). Although progress has been made during the last two decades towards bringing all girls into school, yet gender parity is not achieved.

By discussing a brief story of education around the world, it is revealed that most of the world is facing the problem of educational disparity. In some countries intensity of educational disparity is less than others (Ansell, 2015). Alarmingly, the countries which are confronting with problems, like, low literacy rate, low primary enrollment ratios, high dropout rate and low adult literacy rate, are also facing severe disparity problem (Choi, 2016). Pakistan is one of those countries which are gravely wounded by educational disparity (Tagar and Shah, 2015).

In Pakistan, there are great disparities among four provinces; plus there is a vast range of literacy rates within the provinces (Quayes and Ramsey, 2015). National and provincial capitals are concentrated with most of the literate population of the country (Roof, 2015). The areas with low quality education and low literacy rates are also backward in terms of economic development (Hussain et al., 2003). Punjab is the most populated province and has largest number of schools, while Baluchistan hosts the smallest number (Mushtaq and Soharwardy, 2014). Moreover, education status across the province is not identical. Overall 54% women cannot read and write, but when it comes to rural areas the number is quite higher than 54%

(Khan et al., 2015). For example, in rural Punjab 62% women are illiterate and in rural Sind 69% women cannot read and write (Hamid et al., 2013). One can easily feel the intensity of disparity when confronts with 82% literacy rate among males in urban Sind and 13% literacy rate among females in Baluchistan (UNESCO, 2015).

Literacy rate ranges from 96% in Islamabad to 28% in Kohlu district (Mushtaq and Soharwardy, 2014) shows the real threat of educational disparity in Pakistan. Education score varies from 86% to 55% between capital and Baluchistan (Quayes and Ramsey, 2015). Gender Parity Index reaches to 95% in Punjab but in FATA it lingers at 59% (Qureshi, 2004). There is a wide gap in learning scores between rural areas and urban areas (Khan and Rehman, 2012). Enrollment score has versatility as it ranges from 94% in Punjab to 59% in Baluchistan (Akhtar, 2008).

Pakistan is suffering from severe educational disparities between the provinces as well as within a province (Roof, 2015). Punjab is the most populated and educated province in the Pakistan but it has only six districts (Jhelum, Lahore, Chakwal, Rawalpindi, Rahim yar Khan and Gujranwala) which have literacy rate above 70% (Khan et al., 2015). In Sind, literacy rate is below 50% in rural areas, but Karachi has literacy rate above 80% (Jerrard, 2016). In KPK, one can easily find the difference between Peshawar and other major cities such as Mansahra, Mardan and Mingora which are still poor in proper education (Jamal, 2015). In Baluchistan literacy rate varies from 70% in Quetta to below 30% in Kohlu. Moreover, DeraBugti has 5% enrollment rate for urban women in primary education (Khan and Rehman, 2012).

By the facts presented above, it is revealed that Pakistan is suffering from severe educational disparities at every level of distribution. These are the major types of educational disparities in Pakistan:

- Gender Disparities
- Provincial Disparities
- Rural and Urban Disparities

These three types of disparities are quite obvious in case of Pakistan, but the intensity and over time trend of these disparities yet to be addressed more precisely to find the reasons. The concept of Gini coefficient of education has been used in many studies to find the intensity of educational disparity (Thomas et al., 2001, Lin, 2007, Barro and Lee, 2013, Sauer and Zagler, 2014). In this study to find the educational disparity among provinces and between rural and urban areas, the concept of Gini coefficient on the basis of educational attainment is used. After finding the Gini coefficient of education, it is regressed on possible independent variables to find the determinants or reasons for the educational disparities in case of rural and urban areas of all provinces of Pakistan.

1.1 Objectives of Study

Education is the key to success for Pakistan and disparity is the major hindrance in the way of education. Owing to severe threat of disparity, objectives of the study are:

- To measure the intensity and trend of educational disparity in Pakistan.
- To investigate the reasons for regional disparities in education.
- To formulize policy recommendation for the removal of educational disparity in Pakistan.

1.2 Research Questions

To achieve the objectives of the study, following are the questions which will be answered with the help of empirical analysis:

- What is the intensity of educational disparity between rural and urban areas of Pakistan and what trend this disparity has over the years 2001-02 to 2014-15?
- What are the determinants of educational disparity in Pakistan?

1.3 Significance of the Study

Measurement of educational disparity is necessary to overcome the problem of disparity in education. When disparity will be calculated policy makers will find it easy to recommend different policies for different regions on the basis of intensity of disparity. For the measurement of educational disparity the concept of Gini coefficient on the basis of educational attainment data have been used in many studies (Ram, 1990, O'Neil, 1995, Thomas et al., 2001, Lin, 2007, Barro and Lee, 2013). But in case of Pakistan, the concept of Gini coefficient has not been used to find the intensity of educational disparity among provinces and between rural and urban areas. It is the uniqueness of the study that it empirically elaborates the intensity and trend of Gini coefficient of education on the basis of educational attainment in rural and urban areas of all provinces of Pakistan, from the year 2001-02 to 2014-15. It is the need of hour to know the reasons for educational disparity to tackle the problem. Multiple Linear Regression analysis is used to find the determinants of educational disparity in this study.

CHAPTER II

Literature Review

Educational disparities are found in many countries around the world, irrespective to their wealth or stage of development. The inequity of access to, the quality of, and the outcomes of education, combined with their complex association with other factors such as financial, gender and ethnicity issues are among many factors causing these disparities. Various studies revealing the issue of educational disparity can be found around the globe since 1980.

2.1 Measurement of Educational Disparity, the Concept of Gini Coefficient

To measure the educational inequality, Maas and Criel (1982) used the distribution of primary school enrollment of Eastern African countries. Gini coefficients based on enrollment were estimated for sixteen Eastern African countries and the study concluded that the enrollment Gini coefficient is different immensely across countries. Moreover, authors found that average enrollment is negatively related to the Gini coefficient. After Maas and Criel (1982) Ram (1990) calculated educational standard deviations for about 100 countries and found that when the average level of schooling increases educational disparity first rises, and after attaining a peak, jerks to decline. Seven years of education is the turning point, suggested by Ram. Standard deviation of schooling measures only the dispersion of schooling in absolute terms, so to measure the relative disparity of schooling distribution, developing an indicator of educational disparity is necessary, Thomas et al., (2001).

O'Neil (1995) determined the convergence among the developed countries in education levels which has caused reduction in income dispersion. Study found that for the world as a

whole, income have diverged even with the significant convergence in education levels, by using variance of income and that of human and physical capitals. Lopez et al. (1998) estimated Gini coefficients of 12 countries based on educational attainment and found that the parity of education improves the levels of income as well as growth.

Birdsall and Londono (1997) used a traditional growth model for cross country analysis controlled for capital accumulation, education levels and initial income. The study explores the strong negative impact of educational disparity on economic growth and income growth of the poorest. Inter-America Development Bank (1999) illuminated the fact that income inequality is positively related standard deviation of education by using the methodology of regression. Strauss and Thomas (1998) used wage as indicator of efficiency and found the evidence for the causal relation among income, health and education.

Thomas et al. (2000) measured educational disparity by drawing Lorenz Curve and then developing Gini coefficients of education for 85 countries from 1960 to 1990. Study explored the negative relationship between per capita GDP and educational inequality. Thomas et al. (2001) used the Deaton's (1997) formula as direct method of calculating Gini coefficient and found that gender gaps were clearly related to the educational disparity. Moreover, countries with a higher educational attainment level are more likely to achieve better educational parity than those with lesser attainment levels, Barro and Lee (2013).

Castello and Domenech (2002) provided new measure of human capital by using the cross country regression on the data during the period of 1960 to 2000 and explained the effect of human capital on economic growth. The study explored that growth of the country and the human capital inequality were negatively related to each other. Then Gregorio and Lee (2002)

found the negative relationship between education and income inequality by using the method of seemingly unrelated regression (SUR). Moreover the study found that the equal distribution of education plays a key role in reducing income inequality of a country.

Tegegn (2002) developed the indicators for measurement of educational disparities at different levels. Study comprised techniques for examining, rural and urban disparity, gender disparity and disparity between the regions. Siddhanta and Nandy (2003) found that gender gaps, standard deviations of schooling, average years of schooling and illiteracy rates are positively correlated with prosperity in rural areas. By developing the indicators for educational parity and investigating its relation to human capital Galor and Moav (2004) found that education has foremost important towards accumulation of human capital.

Connolly (2004) used the panel data from 1880 to 1950 to find the convergence pattern of human capital across the states. By using the ordinary least square method study found that the state's income level and growth rate was dependent upon the human capital. Zhang and Zhang (2005) examined the effects of increasing longevity on education, fertility and growth during the period of 1960 to 1990 for 75 countries. By using the overlapping generation model study found the positive relationship between life expectancy and secondary school enrollment. Lin (2007) used the concept of Gini coefficient of education to measure educational disparity of Taiwan for the time period of 1973 to 2003. Study found the negative relationship between average years of schooling and educational inequality.

To find the intensity of educational inequality in Philippine's 16 regions and 78 provinces; Mesa (2007) used the data on educational attainment for the time period of 1960 to 2000. Study analyzed that overall disparity in education was declined but the disparity at

regional and province level was rather increased. Rodriguez and Tselios (2009) investigated the relationship between inequalities in education and inequalities in income by using the three different models of regression such as spatial, non- spatial and dynamic models for the period of 1995 to 2000 for 102 regions of EU. Study found a high level of disparity in education was associated with the high level of inequality in income level of masses.

Digdowiseiso (2010) established Gini coefficients of education for 23 provinces of Indonesia and calculated the educational disparity among provinces. Study explored that there was a decrease in Gini coefficient through the period of time but rural areas has higher disparity than urban areas. Ismail and Yousaf (2010) explored the role of human capital and gender inequality in education on inequality in income of Malaysia. The study was based on 4003 households' data and the results of the study strengthen the argument of negative relationship between gender equality and income inequality.

Ferreira and Gignoux (2011) proposed two measures of educational inequality for educational achievement and opportunity for education. It was examined by the author that inequality of opportunity caused 35 percent of all disparities in educational attainment. Moreover it was revealed that the unequal opportunity was uncorrelated with average educational attainment. Abdelbaki (2012) revealed the causal link between disparity in education and inequality in income in Bahrain during the time period of 1980 to 2007 by using the data from income and household expenditure survey. The study concluded that income inequality was the reason behind the educational gap between different income classes.

Sauer and Zagler (2014) calculate Gini index for 134 countries by using the dataset of Barro and Lee (2013) at seven different levels of educational attainment. Study explored that the

countries of South Asia achieved impressive progress towards the goal of EFA but still there exist large educational disparities in this region. Kanwal and Munir (2015) found significant difference in poor and non-poor households with respect to education and health. Filiztekin and Karahasan (2015) suggested compulsory schooling for the improvement of educational parity in the region. Study explored positive effect of an increase in compulsory education on average years of schooling in case of Turkey.

Tan et al. (2016) investigated both within and between group inequalities, besides inferring educational inequality among individuals based on a case study in Sabah, Malaysia. Study examined the educational inequality through analysis of standard public examination results and found that the inequality in urban areas was less than that of rural areas. To evaluate the impact of china's financial investment in education Zhou et al. (2016) studied the trend of adequacy and equality in education for the time period of 1993 to 2012. The study revealed that after getting the target of 4% of fiscal expenditure on education China still has to improve the budget of education to find the equality.

Devkota and Upadhyay (2016) measured the inequality in education and examined how socioeconomic factors affect educational disparity in Albania and Nepal by using large household survey data sets. Study found significant educational inequality in both the countries. Income, urbanization and distance to school were the factors affecting the educational disparity. Mohanty (2016) proved education a key factor in building better human skills and hence largely affects the earning ability of an individual. Study explored the role of educational parity as an intervening instrument for bringing about socioeconomic transformation.

It is revealed through the literature that measurement of educational disparity has been an important subject for the social scientists since 1980. At first, educational disparity was examined by the absolute dispersion and standard deviation of schooling. Afterwards concept of Gini coefficient was used to calculate and compare the educational disparity. Now Gini coefficient is considered the most important indicator of inequality of education. Policy makers treat different regions differently on the basis of intensity of educational disparity to ensure equal education for all people of their country.

2.2 Educational Disparity in Pakistan

In Pakistan educational disparity can be observed on the basis of gender, region, quality, enrollment and adult literacy rates. Despite the significance decrease in gender disparity since 2005 a severe threat of gender disparity can be found at every level of distribution in Pakistan. Pakistan is one of the ten countries of the world having largest gender disparity in school enrollment (UNESCO, 2015). Here are the some studies which have been done to explore the intensity of educational disparity in Pakistan.

2.3 Gender Disparity in Pakistan

According to UNICEF Report (2006) gender gaps were widening in the countries like Egypt, Niger, India and Pakistan. Moreover study found that female adult literacy had positive and significant impact on educational parity. Sabir and Abdullah (2002) examined gender differences in the sensitivity of primary school enrollment to the cost of post primary schooling in Pakistan. Income of the household, adult literacy rate and distance from primary school was the statistically significant variables for the female education in Pakistan. Then Qureshi (2004) explored the Gender disparity in Pakistan by using the PIHS datasets for the year 2000. Study

warned that the gender gap was widening through the time and share of women in literacy rate was decreasing.

Filmer (2005) used international comparable household data sets to explore that how the relationship between gender and wealth interact to generate within country inequalities in educational enrollment and attainment. The paper illuminated that the girls were at e great educational disadvantage in the region of South Asia particularly in Pakistan. Das et al. (2006) measured the quality of education of primary public and private schools in Pakistan through a survey by examining the test score. Study found the significance gap in the learning score on the basis of gender, language and income. They explored the five times higher gapes between the children having literate mothers and illiterate mothers than good and bad government schools.

Lloyd et al. (2007) throws light on the constraints of policy and culture for rural girls of Pakistan and illuminated the low enrollment of rural girls in primary education. Probability of enrolling in primary school for boys was higher than girls in rural areas of Pakistan. Andrabi et al. (2008) explored the importance of private schooling for the removal of educational disparity in Pakistan and found that the success of private school is dependent on local female teaching staff. Chaudhry and Rehman (2009) showed the positive relationship between rural poverty and educational inequality through gender lens.

Raza and Shoaib (2010) provided the descriptive analysis of socio-demographic bases of gender gap in Pakistan on the basis of secondary data published in the country. The study found the significant socio-demographic and regional factors due to which gender gap persist in Pakistan. Moreover paper provided the cultural analysis of gender inequalities. Halai (2011) focused on gender awareness issues through the study of gender disparity in education of

Pakistan. The paper explored that beyond access there were many factors that compromise gender equality and raised the problem of low literacy for females. Gender disparity negatively related to the income of household for the middle income households, Hamid et al. (2013).

Mushtaq and Soharwardi (2013) reinforced the issue of gender disparity in education through a district level study of regional Punjab and pledged that the disparity was high in districts of lower Punjab than districts of upper Punjab. Sohail (2014) proved the desire of self-supremacy of man by asking the questions about women empowerment in Pakistan. The results showed that most of the rural men want their dominancy over the women, so that they did not prefer women education.

Quayes and Ramsey (2015) examined the determinants of school enrollment in Pakistan and likelihood of school enrollment was estimated through separate logistic regression models for three different age groups. Study empirically pointed the existence of severe gender disparity in school enrollment across all age groups. Tagar and Shah (2015) explored the gender disparity in Sind by using the gender parity index and suggested that more incentives will increase the girls' enrollment in rural and urban Sind.

Jamal (2015) investigated the man's perception about woman's role and girls education among Pashtun tribes of Pakistan. Study found the higher gender disparities among the rural areas than that of urban areas because of rigid religious and cultural practices. In 2015 Ashraf et al. reviewed the situation of rural women in Pakistan and described the severe threat of gender disparity in Pakistan and suggested affirmative efforts to improve women literacy.

On gender disparity and women empowerment Meraj and Sadaqat (2016) goes further to investigate the set of main socio economic and political determinants of women's empowerment

in Pakistan. A cumulative index of women's empowerment showed that only 10 percent of women have a high level of empowerment. Instead of measuring women's empowerment, Ahmad and Khan (2016) calculated women's disempowerment index to investigate the women's control over income, production, recourses and decision making. The study showed the disempowerment of women is higher than men in every aspect of society.

By viewing the literature it is explored that Pakistan is facing real threat of gender disparity. The intensity of gender disparity is more in rural areas than that of urban areas of Pakistan. Probability of enrolling in primary education is lower than boys for rural girls. Cultural constraints, low adult literacy rate and thorny access to education are the main reasons for gender disparity in Pakistan.

2.4 Rural and Urban Disparity in Pakistan

Rural and urban disparities are often known as regional disparities. This is one of the major types of disparities that exist in Pakistan. The difference of quality of education, enrollment rate, literacy rate and expenditure on education between rural and urban areas can be called as regional disparity. Social structure, income inequality, low adult literacy rate and gender disparity are the basis for rural and urban disparity in education, Aslam et al. (2016). Here are the some studies exploring rural and urban disparity in Pakistan.

Sabir and Abdullah (2002) investigated disaggregate benefit incidence, through data on enrollment in public schools and income of households and concluded that the relative disadvantage of females was higher in rural areas to access to education than in urban areas. Furthermore, Alderman et al. (2003) studied the difference in outcome of private schooling in rural and urban areas of Baluchistan and found that the outcome of urban schooling is higher

than the rural schooling. Availability of teachers, better supply of children and parental education were the basic reasons for the difference of rural and urban education.

Saeed and Fatima (2014) focused on the inequality of education in rural and urban Sind through computing education Gini Index and examined the changes in disparity during 2004 to 2011. There was a clear view of disparity among districts of Sind and also between the rural and urban areas. Then to investigate the difference in expenditure on education between rural and urban areas and male and female Aslam and Kingdon (2008) found a higher biasness toward males in rural areas than in urban areas of Pakistan.

Chaudhry and Rehman (2009) investigated the relationship of rural poverty and gender inequality in Pakistan. They found the female-male ratio have a strong positive correlation with probability of poverty in rural areas of Pakistan. In 2012 Study of Khan and Rehman provided a descriptive analysis of human capital at different levels of distribution and showed visible disparity in human capital between rural and urban areas of Pakistan.

Study of Khan et al. (2014) explored the relationship among poverty, growth and inequality by principal component analysis. The study found that the rural development and national income were negatively correlated with poverty and income inequality. In 2015 Ashraf et al. reviewed the education status of rural women in Pakistan and found a real threat of gender disparity in rural areas of Pakistan.

Jerrard (2016) throws light on the quality of education in the schools of rural Sind and perceptions of school benefits. The study found the crisis in quality of education and a low score in global monitoring report for rural Sind. Furthermore toward MDGs and quality of education, Farooq (2016) explored the comparative difference in quality of education in case of Pakistan at

primary level. The study threatened with a widening gap between rural and urban education in Pakistan.

Regional disparities are vivid in case of Pakistan. A vast literature is there on the issue of rural and urban disparity. Funds are given on the basis of population density in Pakistan. So having greater areas and lower density of population in rural Pakistan is the main reason for regional disparity. Infrastructure, income inequality and dependency ratio are the issues to be handled for the removal of educational disparity.

2.5 Quality of Education

On the basis of cognitive skills of the students, basic structure of the school, teaching efficiency of the teachers and syllabus offered for the students, quality of education can be compared. Seemingly there are large differences in the quality of rural education and urban education in case of Pakistan. To know the issue more accurately, here are some studies which have been done to explore the intensity and reasons for this type of disparity.

Ray (2000) used the data of Pakistan and Peru on child labor, child schooling and poverty and found that adult education is positively related child welfare. The reason for Pakistan's lower enrollment rate was the lack of good schools compared with Peru. Arif and Saqib (2003) tested the performance of students in public, private and NGO schools in Pakistan through a comprehensive survey of 50 public, private and NGO schools located in different districts by a general test of Mathematics, General Knowledge and Urdu. Study confronted with a clear difference in the performance of public, private and NGO schools. Private schools were the highest ranked in cognitive skills where NGO and public schools were almost same in performance.

Difference in quality of education emerges from the difference in expenditures on education. In searching for the willingness to pay for primary education Us Saqib (2004) found that the opportunity cost of the poor for primary education is higher than the rich by using discrete choice random utility maximizing model of household. Nasir and Nazli (2010) investigated the earning differences caused by the difference in education by using PIHS datasets and found that each year of education brought 7 percent increase in wages. Moreover, higher earnings were associated with higher levels of education.

Hamid et al. (2013) provided a glance over intra provincial educational disparities in Pakistan. Study described that difference in educational quality and opportunities lead to inequality of economic outcomes. By using the data on enrollment ratios, no of schools and poverty study found the significant difference in quality of education among provinces. In case of tertiary education Qazi et al. (2014) confirmed the valid positive relation between higher education commission and the quality of higher education in Pakistan. Then in 2015 Hussain et al. investigated the technical efficiency of public schools in Pakistan. Study found that the public schools were less efficient than private schools at technical end.

Khowaja and Munshi (2016) examined the program given for the quality of education in various five year plans at secondary school level. The study found that the quality of education was averagely well in some urban areas but overall situation was not accomplishing. Then Sardar et al. (2016) investigated the gap between student's expectations and the actual quality of education provided by the institutions. The research found the 7.6% overall gap between expectations and actual quality.

Quality of education cannot be measured like distance or speed. Researchers use indicators, like structure, teachers' education and students' learning for the comparison or measurement of educational quality. Disparity in quality of education has been investigated on the basis of these indicators and it can be said that Pakistan has a diverse education system for rich and poor.

2.6 Education and Income Inequality

Education and income inequality has a strong negative relationship in all over the world Thomas et al. (2001). Afzal et al. (2012) strengthen this argument through investigating the relationship between education and poverty in case of Pakistan. By using Toda-Yamamoto Augmented Granger Causality (TYAGC) model study confirmed the bi-directional causality between education and poverty. Then Asghar et al. (2012) explored the positive relationship between human capital and economic growth with the help of co integration and causality analysis. Study also found that economic growth leads to poverty reduction and poverty reduction enhance educational parity.

Roof (2015) analyzed the shaping of education in Pakistan and suggested that education in Pakistan must become a matter of common interest. Study investigated that income equality cannot be achieved without getting equality in education. Khan and Rehman (2015) explored the positive relationship between the level of education and income equality. By using Pakistan's data study found the areas with high poverty were also the areas with low education.

Kanwal and Munir (2015) revealed the impact of educational inequality on income inequality for the South Asian countries by using Gini coefficient as an indicator of educational disparity. Authors detected a positive relationship between educational and income disparities

and negative relationship between average years of schooling and inequality in education. Qazi et al. (2016) investigated the impact of development in the higher education sector on the income inequality in Pakistan. By using the annual time series data from 1973 to 2012 the study found the long run positive relationship between higher education and income equality.

With the help of literature it is revealed that educational disparity and income inequality has positive relationship in case of Pakistan. Rural areas having low literacy rates and high poverty are the most affected areas. An increase in average years of schooling decreases educational inequality and a decrease in educational inequality decreases the income inequality.

2.7 Literature Gap

By inspecting international and national studies on educational disparity it is exposed that ample work has been done in this field. Internationally, exact measures of educational disparity are introduced and policies are being made based on these differences in educational attainments (Lin, 2007, Digdowiseiso, 2010 and Ferriera and Gignoux, 2011). But in Pakistan, the intensity of educational disparity is not exactly measured. Plenty of work can be found on gender and regional disparity but when it comes to measurement, literature shows a gap. What is the exact intensity of educational disparity between rural and urban areas of Pakistan on the basis of educational attainment and what trend these regional disparities have over the time are the questions which are needed to be addressed more accurately.

CHAPTER III

Data and Methodology

3.1 Measures for Educational Disparity

First objective of this study is to measure the disparity in education and trend of this disparity to know the intensity of the problem. Many studies can be found which used enrollment ratios, for the measurement of educational disparity (Barro, 1991, Mankiw et al., 1992, Levine and Renelt, 1992, Levine and Zervos, 1993). One problem of this approach is that enrollment ratio only measures the flow of education or access to education and it does not reflect the stock of human capital. There is a small but growing literature on the educational inequality in which standard deviations have been used to measure the dispersion schooling (Birdsall and Londono 1997, Ram and Rati 1997). But standard deviation of schooling only measures the dispersion of schooling distribution in absolute terms. So, to measure the relative inequality of education developing an indicator for educational disparity was necessary.

3.2 Gini Coefficient on the Basis of Enrollment Data

On the glob many studies have been done for the measurement of educational disparity by using the Gini coefficient as an indicator of inequality. Financing, enrollment and attainment data were used by Ter (1975), Maas and Criel (1982) and Lopez et al. (1998) respectively, to calculate Gini coefficient of education. By using data on educational attainment, Thomas et al. (2001) calculated Gini index of education for 85 countries. The concept of educational Gini coefficient is also used by Lin (2007) to measure the educational disparity in Taiwan. Digdowiseiso (2010) calculated the Gini coefficient of education for the Indonesia at provincial

level by using the formula of Thomas et al. (2001). Sauer and Zaglar (2014) computed the educational Gini index for 134 countries by using the educational attainment data set of Barro and Lee (2013).

3.3 Measurement and Levels of Gini Coefficient of Education

On the basis of vast literature this study also used the concept of Gini coefficient for the measurement of educational disparity. The Gini coefficient of education of Pakistan and all provinces is calculated on the basis of rural and urban areas by using educational attainment data from the year 2001-02 to 2014-15. For this the percentage of population aged from 10 and above for each attainment level of education is used. The attainment level of education is divided into seven groups i.e. no schooling, below primary, primary, middle, secondary, higher secondary and graduation and above (Thomas et al., 2001, Barro and Lee, 2013, Saeed and Fatima, 2014, Kanwal and Munir, 2015). The data for educational attainment is collected from Pakistan Labor Force Survey 2001-02 to 2014-15

Standard deviation of years of schooling has been used to measure the absolute dispersion of educational distribution. It measures the dispersion of schooling distribution in absolute terms. To measure the relative disparity of schooling distribution Thomas et al. (2001) developed an indicator for educational Gini coefficient through a formula. In this study the same formula is used to calculate the Gini coefficient of education for Pakistan at province level separately for rural and urban areas. Formula for the Gini of education is as follows:

$$\mathrm{E_L} = \left(\frac{1}{\mu}\right)\sum_{i=2}^{n}\sum_{j=1}^{i-1} p_i|y_i - y_j|p_j$$

Where:

E_L is the educational Gini coefficient based on educational attainment;

μ is the average years of schooling for the concerned population;

P_i and P_j stand for the proportions of population with certain levels of schooling;

Y_i and Y_j are the years of schooling at different educational attainment levels;

n is the number of levels in attainment data, and n=7 in this study.

The detailed summation process for the educational Gini coefficient formula is as follows:

$$E_L = (1/\mu)\,[p_2\,(y_2-y_1)\,p_1$$
$$+p_3\,(y_3-y_1)\,p_1 + p_3\,(y_3-y_2)\,p_2$$
$$+\ldots\ldots..$$
$$+P_7\,(y_7-y_1)\,p_1 + p_7\,(y_7-y_2)\,p_2 + p_7\,(y_7-y_3)\,p_3 + p_7\,(y_7-y_4)\,p_4 + p_7\,(y_7-y_5)\,p_5 + p_7\,(y_7-y_6)\,p_6]$$

Where:

P_1 is the proportion of population with no schooling;

P_2 is the proportion of population with below primary education;

……

P_7 is the proportion of population with level of education graduation and above.

Y_1 is the years of schooling for an individual with no schooling, $y_1=0$

Y_2 is years of schooling for an individual with below primary education;

……

Y_7 is years of schooling for an individual with level of education graduation and above.

Years of schooling at seven levels of education is calculated as follow:

No Schooling $y1 = 0$

Below primary $y2 = y1 + 0.5Cp = 2.5 \approx 3$

Primary $y3 = y1 + Cp = 5$

Middle $y4 = y3 + 0.5Cs = 8$

Secondary $y5 = y3 + Cs = 10$

Higher Secondary $y6 = y5 + 0.5C_{HS} = 12$

Graduation and above $y7 = y5 + C_G = 16$

Where:

C_P is the cycle of Primary education = 5 Years

C_S is the cycle of the Secondary education = 5 Years

C_{HS} is the cycle of High Secondary education = 2 Years

C_G is the cycle of Graduation and above = 4 Years

People who receive partial education are assumed to get half of the schooling cycle in their years of schooling (Thomas et al., 2001, Saeed and Fatima, 2014, Kanwal and Munir, 2015).

The average years of schooling is calculated by the formula given below: (Thomas et al., 2001, Saeed and Fatima, 2014, Kanwal and Munir, 2015).

$$\mu = \sum_{i=0}^{n} p_i Y_i$$

Where:

P_i is the proportion of population with certain level of schooling;

Y_i is the years of schooling at different education attainment levels; and

n is the number of levels in attainment data which is = 7 in this study.

Gini coefficient of education from the year 2001-02 to the year 2014-15 is calculated by the same formula at country and province levels separately for rural and urban areas to find whether the educational disparity has increased, decreased or constant over the time in Pakistan.

3.4 Determinants of Educational Gini Coefficient

After measuring the intensity of educational disparity, investigation of the reasons for this disparity is necessary. To find the reasons for regional disparity in education study finds the determinants of Gini coefficient of education. Gender disparity and income inequality are the major causes of educational disparity (Thomas et al., 2001, Digdowiseiso, 2010, Barro and Lee, 2013, Kanwal and Munir, 2015). An increase in unemployment rate is positively associated with educational disparity (Mushtaq and Soharwardy, 2013). Inequality in access to education has a key role in determining the literacy rate of a region (Roof, 2015). The significance of gender parity (difference between male and female literacy rate proportional to male literacy rate), Poverty Status (Percentage of population in the first quintile of income), Unemployment rate and the Number of Institutions as an indicator of access to education is explored to determining the Gini coefficient of education in case of Pakistan and all provinces through Multiple Linear Regression.

3.5 Statistical Methods and Techniques

Statistics is the technique of learning from data. It offers essential insight in determining which data and conclusions are trustworthy. When the principles of this science are correctly applied, analyses tend to produce accurate results. Here are the statistical techniques used in this study:

3.6 Descriptive Stats for Gini Coefficient

After calculating the Gini coefficient for rural and urban areas of Pakistan and all provinces, descriptive stats (Mean, Median, Range, Quartiles, SE and CV) is shown in the table to find a quick view on the situation of disparity through the time and region. Box and Whisker graphs of mean and median are drawn for the regions and sub-regions over the time to explore the intensity and trend of the disparity. For descriptive stats study used the statistical package STATISTICA (1.2).

3.7 Two-Way ANOVA (Split plot Design)

To check the significance among levels and their sub levels Two Way Analysis of Variance (ANOVA) technique is applied in a split plot design by using Statistix 8.1. In this design a main level is considered as a main factor. In this study Pakistan, Punjab, Sind, KPK, Baluchistan is the main factors. Each main factor (region) is further divided into two sub factors (sub-regions) i.e. rural and urban. So there are five factors (plots), each with two Sub Factors (sub plots). Specialty of the split plot design over the common two way analysis is that in this design two errors are calculated separately. One belongs to main factor and the other to sub factor and is used independently to calculate mean square respectively. These two different types of errors assure the precision of calculation of MS of factor and sub factor. While in common techniques only one error variance is used. Least Significant Difference (LSD) is noted further after the analysis at regional and sub regional level to explore the actual reason of significance.

3.8 Multiple Linear Regression

To find the determinants of Gini coefficient of education Multiple Linear Regression model is used in which Gini coefficient behaves as dependent variable, gender parity, poverty

status, unemployment rate and number of institutions are independent variables. Prior to Multiple Regression analysis Pearson's Correlation, Variance Inflation Factor (VIF) and Tolerance test was performed using software package SPSS 16.0.

3.9 Econometric Model

Here is the econometric model used to find the dependence of Educational Gini coefficient:

$$EL = f(GP, NOI, PS, UR)$$

$$EL = \beta 0 + \beta 1PS + \beta 2GP + \beta 3NOI + \beta 4UR + \mu$$

Where:

EL is the Gini coefficient of education for the concerned population;

PS is the poverty status (percentage of population living in the first quintile of income) of the concerned population;

GP is the gender parity (difference between male and female literacy rate as a portion of male literacy rate for 10 years and above) for the concerned population;

NOI is the number of institutions in an area;

UR is the unemployment rate for the concerned population; and

μ is the error term.

3.10 Data Sources

The data on gender parity and number of institutions is collected from the Pakistan Education Statistics (PES), unemployment rates is consulted from Pakistan Labor Force Survey and poverty status is composed from the Household Integrated Economic Survey of Pakistan (HIES) from 2001-02 to 2014-15. HIES survey is available only for the alternative years. So the

missing years' values are generated by taking the median of the values of two consecutive years' survey.

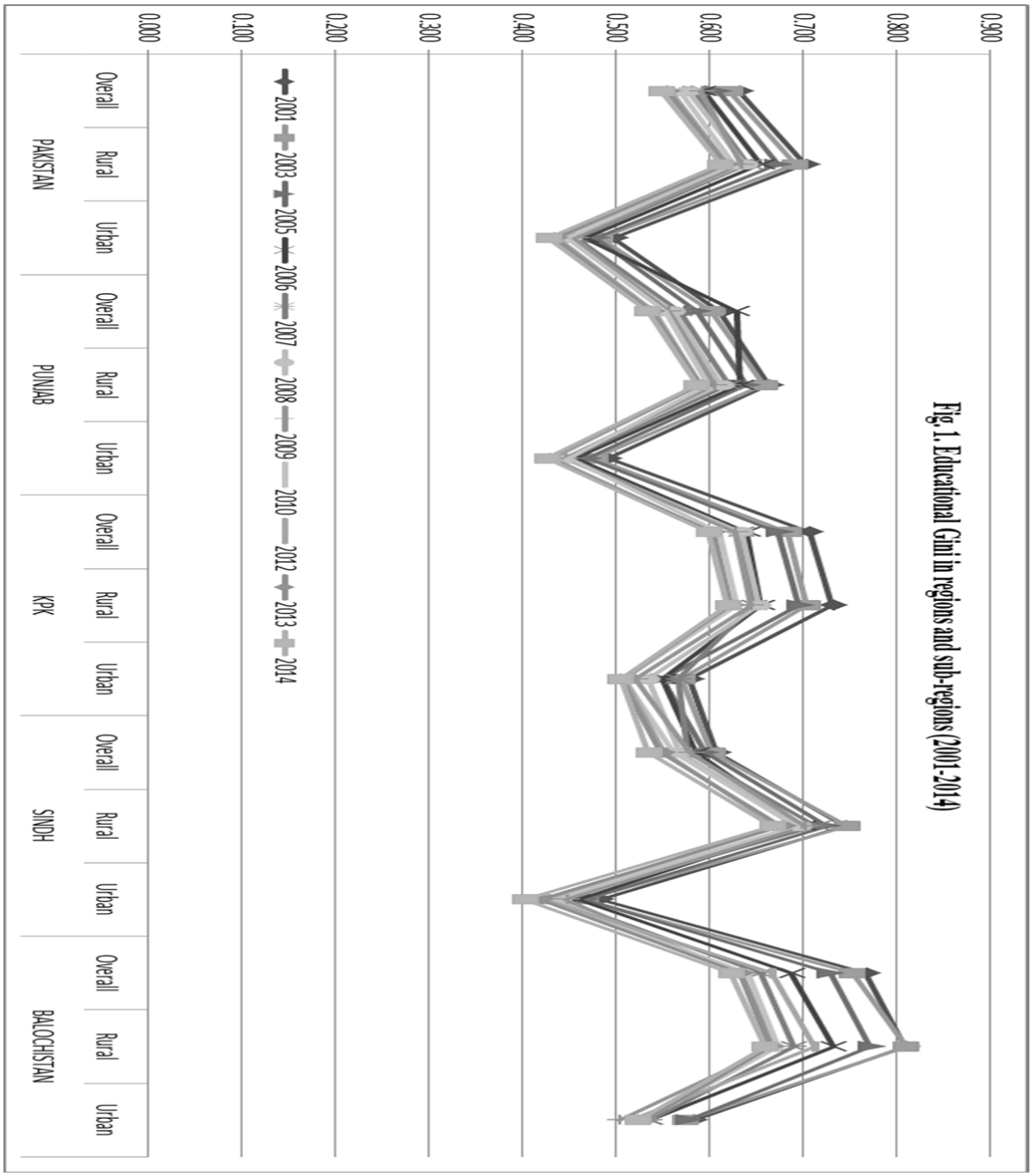
CHAPTER IV

Results and Discussion

Education crisis of Pakistan is of unprecedented proportions today. Nearly half of all children (25 million) in the country are out of school, (UNESCO, 2015). The vast majority of those children who do go to school receive an education of poor quality. 48 percent of public schools are deprived of basic facilities such as electricity, boundary walls, running water and bathrooms (Khowaja et al. 2016). Rural areas of Pakistan have poor student to teacher ratio and furthermore on any given day, 18 percent of teachers are absent from the classroom (Qazi et al., 2014). Insufficient budget allocations for education and ineffective use of funds that are available are worsening the situation.

The blow of poor facilitation and lack of awareness about the importance of education has not equal affect for all areas of Pakistan. On the bright side, Federal capital and capitals of all provinces have the literacy rate above 80 percent for ten years and above. Furthermore, all urban areas of Pakistan has an improvement in quality of education, enrollment rate and gender parity. In some urban areas like Rawalpindi, Islamabad and Karachi enrollment rates for male and females are almost equal at primary level since 2015 (Quayes and Ramsey, 2015). But on the other side, the rural areas of Pakistan have showed less increase in quality of education and enrollment rates. Most of the rural areas are lacking the basic facilities for education. At present, a wide gap between rural and urban areas of Pakistan can be seen.

Figure1 reveals the pattern of rural and urban disparities through the time (2001-02 to 2014-15) with the help of Educational Gini coefficient for Pakistan and all provinces. The crests of graph illustrate the rural areas of Pakistan while the urban areas are situated on the trough.



Kinks in graph are evidence for the difference between rural disparities and urban disparities. On the basis of educational Gini coefficient it can be said that the rural areas of Pakistan have larger disparities than urban areas. The smoother twist between rural and urban areas of KPK reveals that the difference between disparities of sub regions (Rural and Urban) is less in KPK than all other provinces. Larger gap between rural disparities and urban disparities is showing the intensity of regional disparity in Sind province.

4.1 Regional Description of Gini Coefficient

Rural areas of all the provinces have wide range and higher mean values for educational Gini coefficient (Table 1). Values of educational Gini coefficient for rural areas are ranges from 0.59 in Punjab to 0.81 in Baluchistan. Wide range of Gini coefficient in rural areas illustrates disparity among provinces. Rural Sind and rural Baluchistan are the areas facing severe threat of educational disparity. It is exposed in Table 1 that the urban areas of Pakistan have lower mean values and smaller range of educational Gini coefficient. Gini coefficient of urban areas ranges from 0.40 in Sind to 0.58 in Baluchistan. Coefficient of variation shows less variation in urban areas than in rural areas. By region wise description of Gini coefficient in Table 1, it is revealed that rural areas of Pakistan have higher disparities both among the provinces and within the province than urban areas of Pakistan.

4.2 Year Wise Description of Gini Coefficient

All the descriptive statistics of Gini coefficient show decreasing trend through the time form 2001-02 to 2014-15 (Table 2). It means that educational disparity is reducing in Pakistan over the time. Mean values illustrate the sharp decrease in the year of 2008. The year 2008 was the last year of Musharraf regime and the expenditure on education was higher in that year than

the previous years. In 2009 the government of PPP cut the educational expenditures, so a slight increase in educational Gini coefficient can be seen in this year. Overall an improvement is occurring over the time in closing the gap of educational disparity and it further taking Pakistan closer to its goal of education for all.

Table 1. Descriptive stats of GINI Coefficient (PAK: Pakistan Over all; PAK.R: Pakistan Rural; PAK.U: Pakistan Urban)

Statistic	PAK	PAK.R	PAK.U	PUN	PUN.R	PUN.U	KPK	KPK.R	KPK.U	SND	SND.R	SND.U	BAL	BAL.R	BAL.U
MIN	0.55	0.61	0.43	0.53	0.59	0.43	0.60	0.62	0.51	0.53	0.67	0.40	0.62	0.66	0.50
MAX	0.63	0.70	0.50	0.63	0.66	0.49	0.71	0.73	0.58	0.61	0.75	0.48	0.77	0.81	0.58
Range	0.08	0.09	0.07	0.09	0.08	0.07	0.11	0.11	0.07	0.07	0.08	0.08	0.14	0.15	0.08
1st Quartile	0.56	0.62	0.44	0.55	0.59	0.44	0.61	0.63	0.51	0.56	0.68	0.42	0.63	0.67	0.53
Median	0.58	0.64	0.45	0.56	0.61	0.45	0.63	0.65	0.53	0.58	0.70	0.44	0.65	0.69	0.53
3rd Quartile	0.60	0.66	0.47	0.59	0.64	0.46	0.66	0.68	0.56	0.59	0.72	0.46	0.71	0.75	0.55
Mean	0.59	0.65	0.46	0.57	0.62	0.45	0.64	0.66	0.54	0.57	0.70	0.44	0.67	0.71	0.54
σ^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
σ	0.03	0.03	0.02	0.03	0.03	0.02	0.04	0.04	0.03	0.02	0.03	0.02	0.05	0.06	0.03
CV	0.04	0.05	0.05	0.05	0.04	0.04	0.05	0.05	0.05	0.04	0.04	0.05	0.07	0.08	0.05
SE	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01
CI (-95%)	0.57	0.63	0.44	0.55	0.60	0.44	0.61	0.63	0.52	0.56	0.69	0.43	0.64	0.68	0.52
CI (95%)	0.60	0.67	0.47	0.59	0.64	0.47	0.66	0.68	0.56	0.59	0.72	0.46	0.71	0.75	0.56

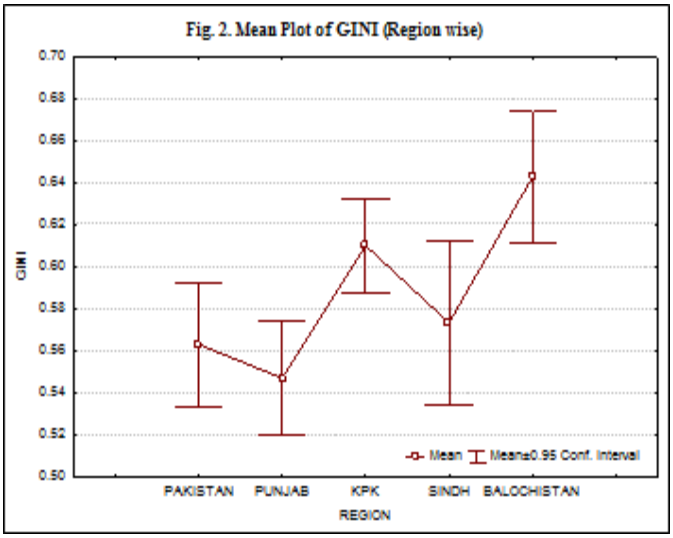
(PUN: Punjab; KPK: Khaibar Pakhtoon Khwah; SND: Sindh; BAL: Balochistan)

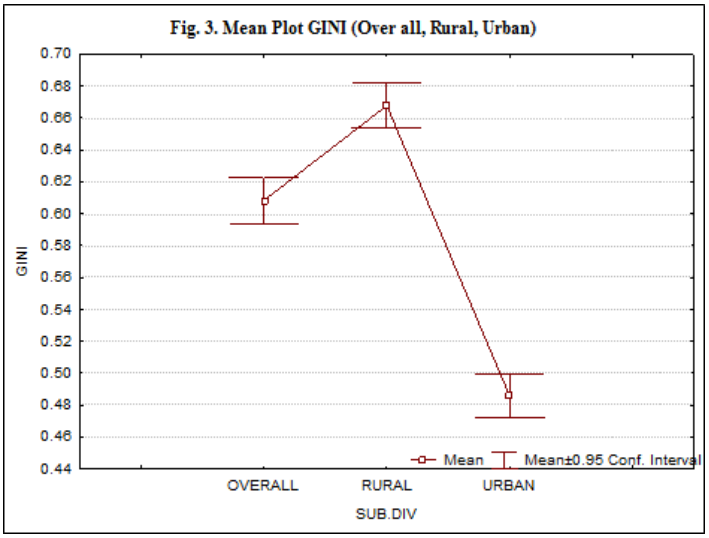
Table 2. Descriptive statistics of Gini Coefficient (Year wise)

Statistic	2001	2003	2005	2006	2007	2008	2009	2010	2012	2013	2014
MIN	0.48	0.47	0.47	0.46	0.44	0.44	0.45	0.42	0.42	0.42	0.40
MAX	0.81	0.81	0.77	0.73	0.71	0.70	0.70	0.69	0.71	0.68	0.67
Range	0.33	0.34	0.30	0.28	0.27	0.26	0.26	0.27	0.29	0.26	0.26
1st Quartile	0.58	0.57	0.56	0.54	0.55	0.53	0.51	0.52	0.51	0.52	0.51
Median	0.63	0.62	0.61	0.63	0.58	0.58	0.59	0.57	0.56	0.55	0.55
3rd Quartile	0.72	0.70	0.68	0.66	0.64	0.64	0.63	0.63	0.62	0.62	0.62
Mean	0.64	0.63	0.62	0.60	0.59	0.58	0.57	0.57	0.56	0.56	0.55
σ^2	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
σ	0.10	0.10	0.10	0.09	0.09	0.08	0.08	0.08	0.09	0.08	0.08
CV	0.16	0.16	0.15	0.14	0.14	0.14	0.14	0.14	0.15	0.14	0.15
SE	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
CI (-95%)	0.58	0.57	0.56	0.55	0.54	0.53	0.53	0.52	0.51	0.51	0.50
CI (95%)	0.70	0.69	0.67	0.65	0.63	0.62	0.62	0.61	0.61	0.60	0.60

4.3 Mean Plots of Gini Coefficient

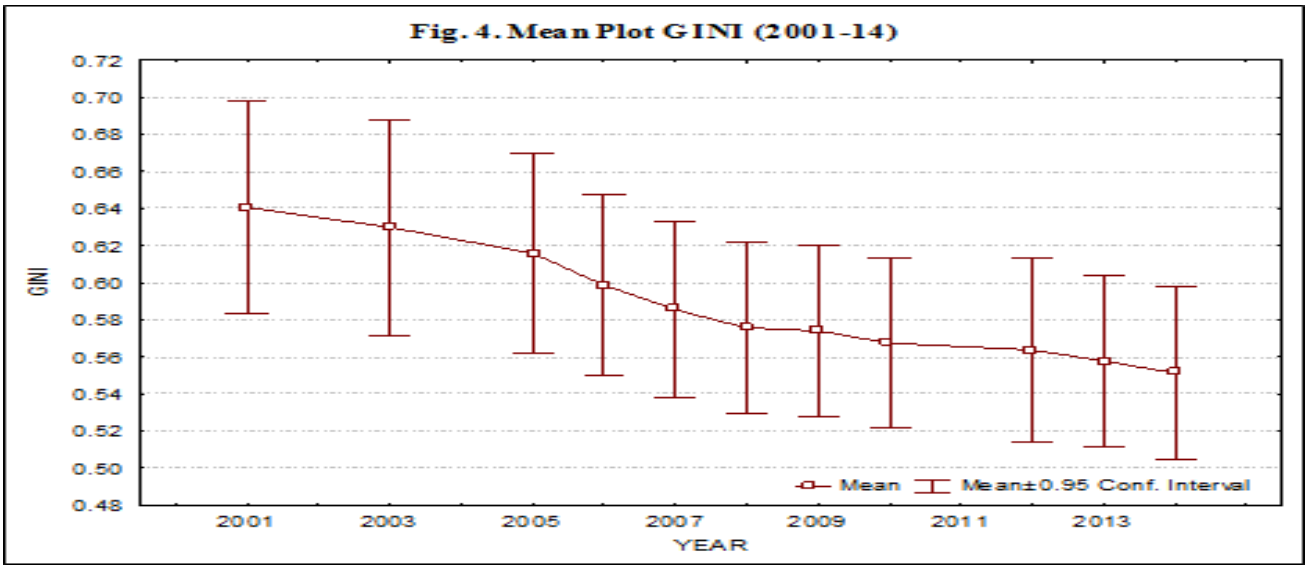
Figure 2 shows the mean plot of Gini coefficient for Pakistan and all provinces. All the provinces except Punjab have higher mean values than that of Pakistan. Province Sind and Baluchistan has larger gaps between minimum and maximum values of Gini coefficient which indicates higher disparities between rural and urban areas of these provinces. Figure 3 illustrates overall disparity between rural and urban areas of Pakistan. Mean value of Gini coefficient for rural areas of Pakistan is 0.68 which is quite high than the mean value of Gini coefficient for urban areas lingering at 0.48. Extensive gap between the mean values of rural and urban areas are exposing the panorama of regional disparities in Pakistan.

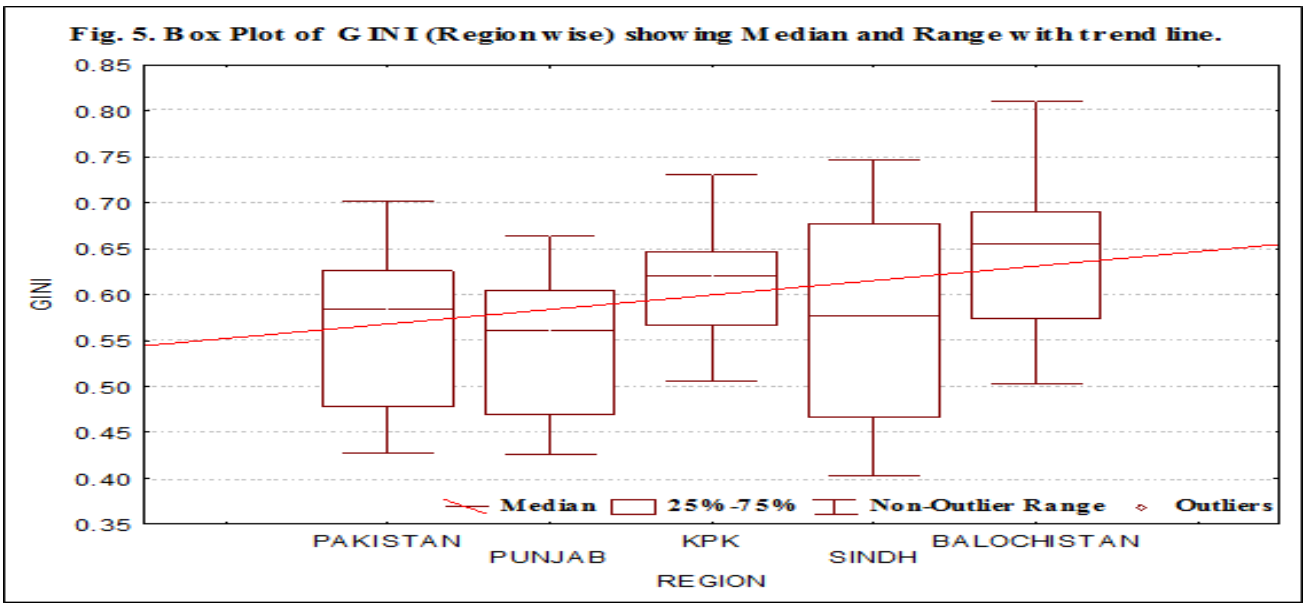


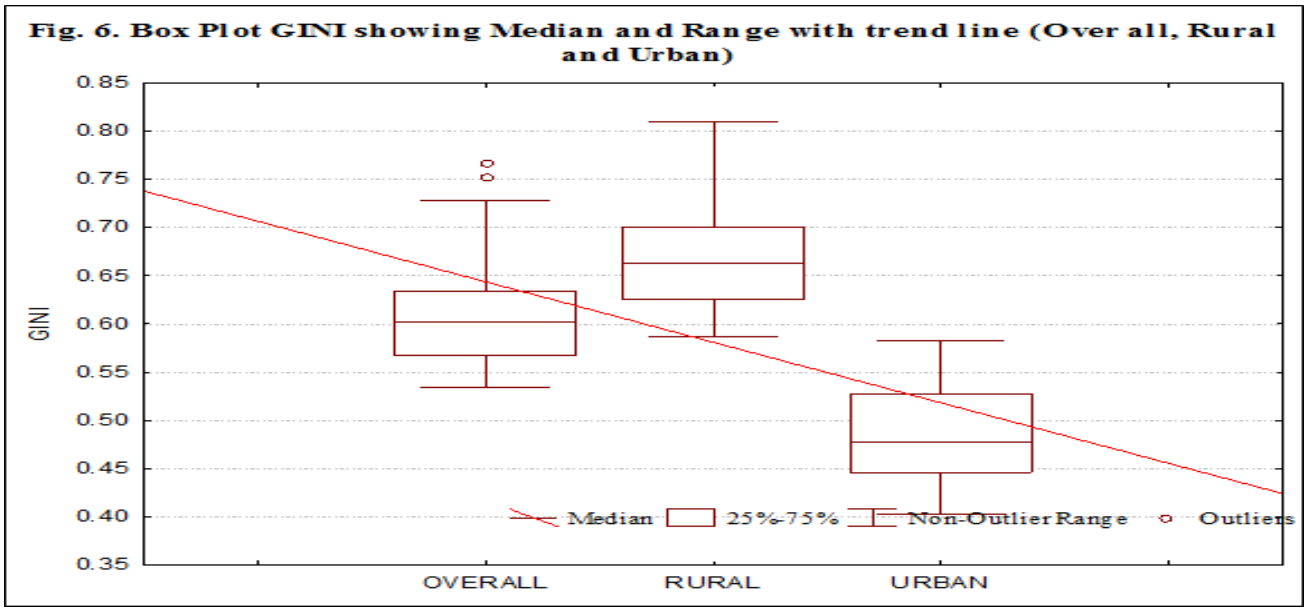


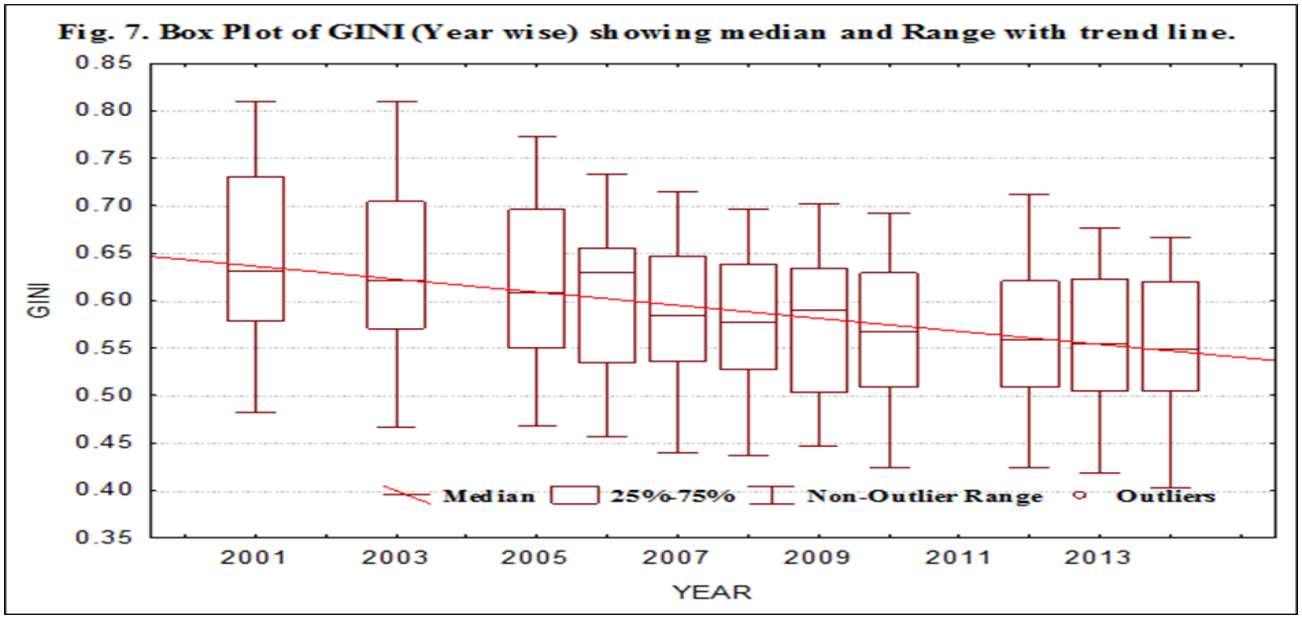
4.4 Trend of Gini Coefficient

Figure 4 and shows the trend of Gini coefficient in Pakistan over the time period 2001-02 to 2014-15. A regular decrease in the mean and values of Gini coefficient has occurred that indicates a









decreasing trend in educational disparity in Pakistan. The mean value of Gini coefficient for Pakistan has declined from 0.64 in 2001-02 to 0.56 in 2014-15. Figure 7 reveals that median has decreased through the same time period from 0.62 to 0.54. The reason for this drop off in these values is the faster improvement in urban areas. In provinces like Baluchistan and KPK where urban areas are not so improved the median values of Gini coefficient are higher than the trend line for Pakistan (Figure 5). Furthermore, the rural areas of Pakistan have their median quite high

than the trend line while urban areas have lower median values (Figure 6). By box plot of Gini coefficient it is exposed that the reason for lesser improvement in removing the educational disparity is the rural areas of Pakistan which have higher mean and median values of Gini coefficient throughout the time.

4.5 Regional Disparities within Provinces

By analyzing Gini coefficient for all levels understudy given in appendix Table 1 and Table 2, it is revealed that there is a difference between rural and urban areas of all provinces regarding educational disparity. The rural values of Gini coefficient in all provinces are higher than the urban values throughout the time. The difference between these values indicates the threat of regional disparity. In Appendix Table 1Gini coefficient for rural areas of Sind loitering between the values of 0.76 and 0.68 indicating high disparity and less improvement over the time. On the other hand Gini coefficient for urban Sind has values between 0.49 and 0.40 showing less disparity. The difference between 0.76 and 0.49 is the indication of disparity between rural and urban Sind and it is not decreasing over the time.

4.6 Constant Gap between Rural and Urban Gini Coefficient

Gini coefficients of rural and urban areas have decreasing trend but the difference between rural Gini coefficient and urban Gini coefficient is not declining over the time. Figure 8 and 9 are pointing the fact that the gap between rural and urban areas is not closing. In 2001-02 the value of Gini coefficient for rural Pakistan was 0.70 and for urban Pakistan was 0.50, having difference of 20 points between rural and urban values. After 14 years the difference between rural and urban values is 19 points as rural Gini coefficient is 0.61 and urban Gini coefficient is 0.42 in 2014-15. The gap between rural and urban values remains the same over the time. Figure

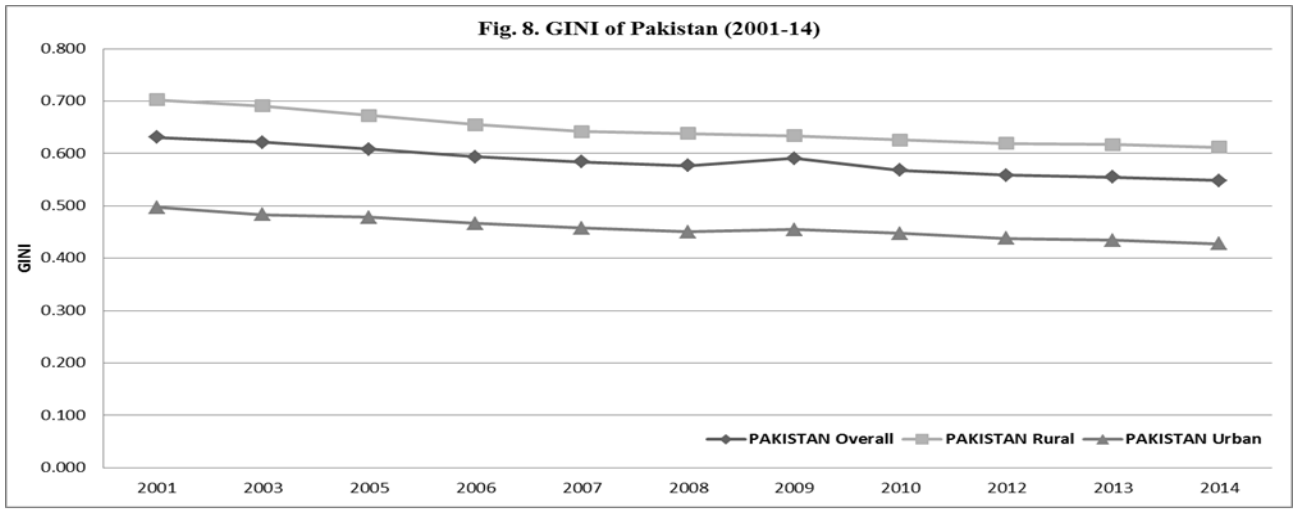


Fig. 8. GINI of Pakistan (2001-14)
GINI
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
2001
2003
2005
2006
2007
2008
2009
2010
2012
2013
2014
PAKISTAN Overall
PAKISTAN Rural
PAKISTAN Urban

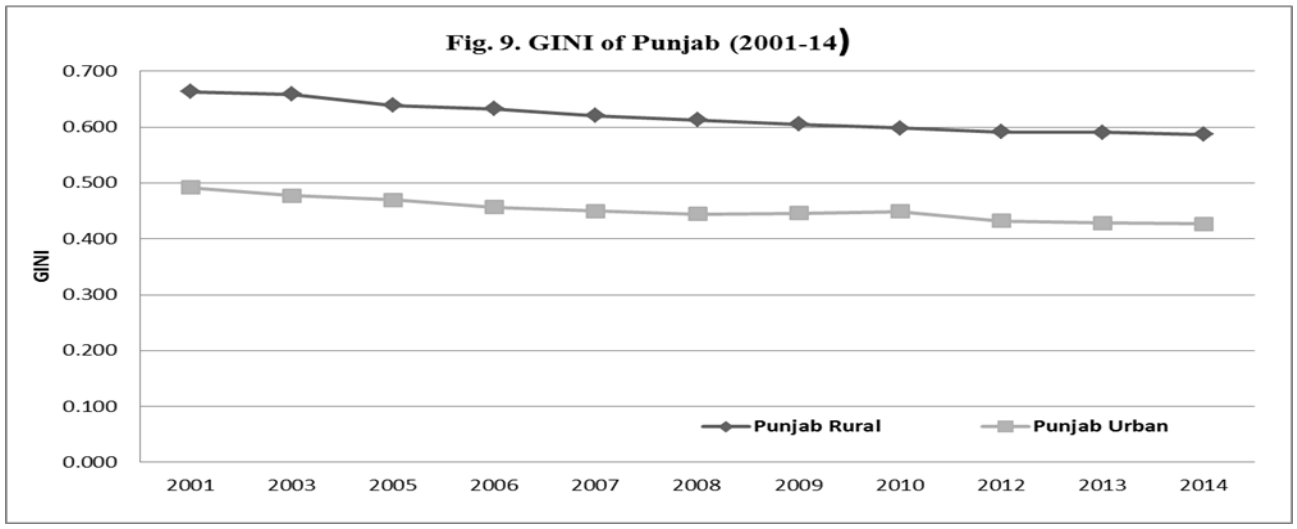


Fig. 9. GINI of Punjab (2001-14)
GINI
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
2001
2003
2005
2006
2007
2008
2009
2010
2012
2013
2014
Punjab Rural
Punjab Urban

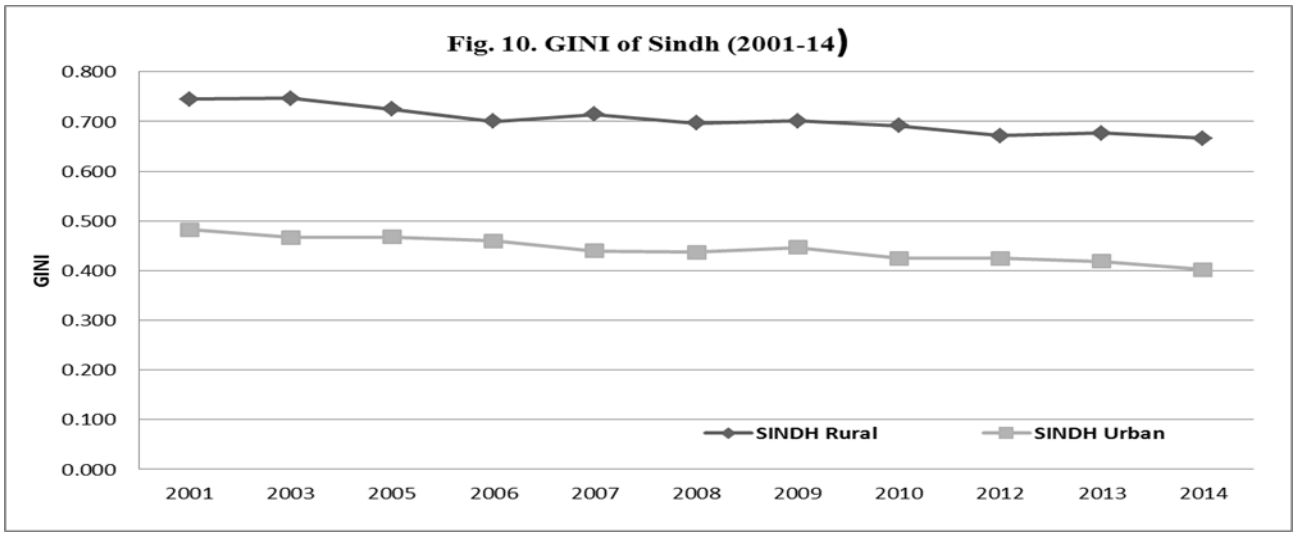


Fig. 10. GINI of Sindh (2001-14)
GINI
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
2001
2003
2005
2006
2007
2008
2009
2010
2012
2013
2014
SINDH Rural
SINDH Urban

9 shows the same case for Punjab where the values of Gini coefficient were 0.66 and 0.49 respectively for rural and urban areas in 2001-02, having the difference of 17 points between rural and urban values. Then in 2014-15 the difference remains the same as Punjab has values of Gini coefficient 0.59 and 0.43 for rural and urban areas.

4.7 Closing Gap between Rural and Urban Gini Coefficient

In case of KPK and Baluchistan the gap between rural disparity and urban disparity is closing over the time. These two provinces have larger proportion of rural areas than Punjab and Sind, so rural areas secure the larger proportions of budgetary expenditures. Development in infrastructure, increase in the number of institutions, improvement in gender parity and scholarship offers for rural students are among the reasons for sharp decline in the rural disparity. On the other hand urban areas of these provinces have not disparity as lower as urban areas of Punjab and Sind. Due to high disparity in urban areas the gap between rural and urban regions of KPK and Baluchistan is closer than that of Punjab and Sind.

Figure 11 and 12 illuminate the closing trends of educational Gini coefficient between rural and urban areas of KPK and Baluchistan. Rural areas of both the provinces experienced faster decline in educational disparity. In the year 2001-02 the value of Gini coefficient for rural KPK was 0.73 and the value of Gini coefficient for urban KPK was 0.58 showing difference of 15 points between rural and urban values. Then in 2014-15 the difference between the values of two regions of KPK declines to 10 points as rural Gini coefficient was 0.61 and urban Gini coefficient was 0.51 in that year. A decrease in the difference from 15 points to 10 points between rural and urban values is indicating the closing trend of educational disparity between the regions of KPK.

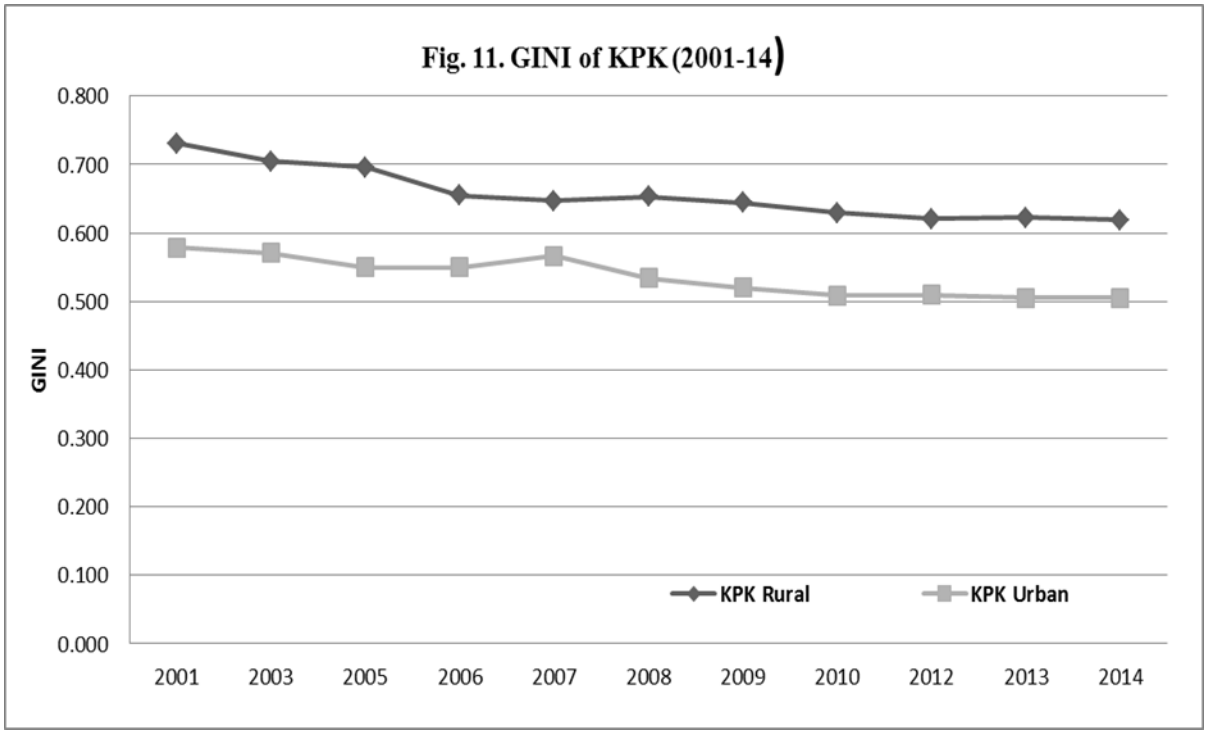


Fig. 11. GINI of KPK (2001-14)
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
GINI
KPK Rural
KPK Urban
2001
2003
2005
2006
2007
2008
2009
2010
2012
2013
2014

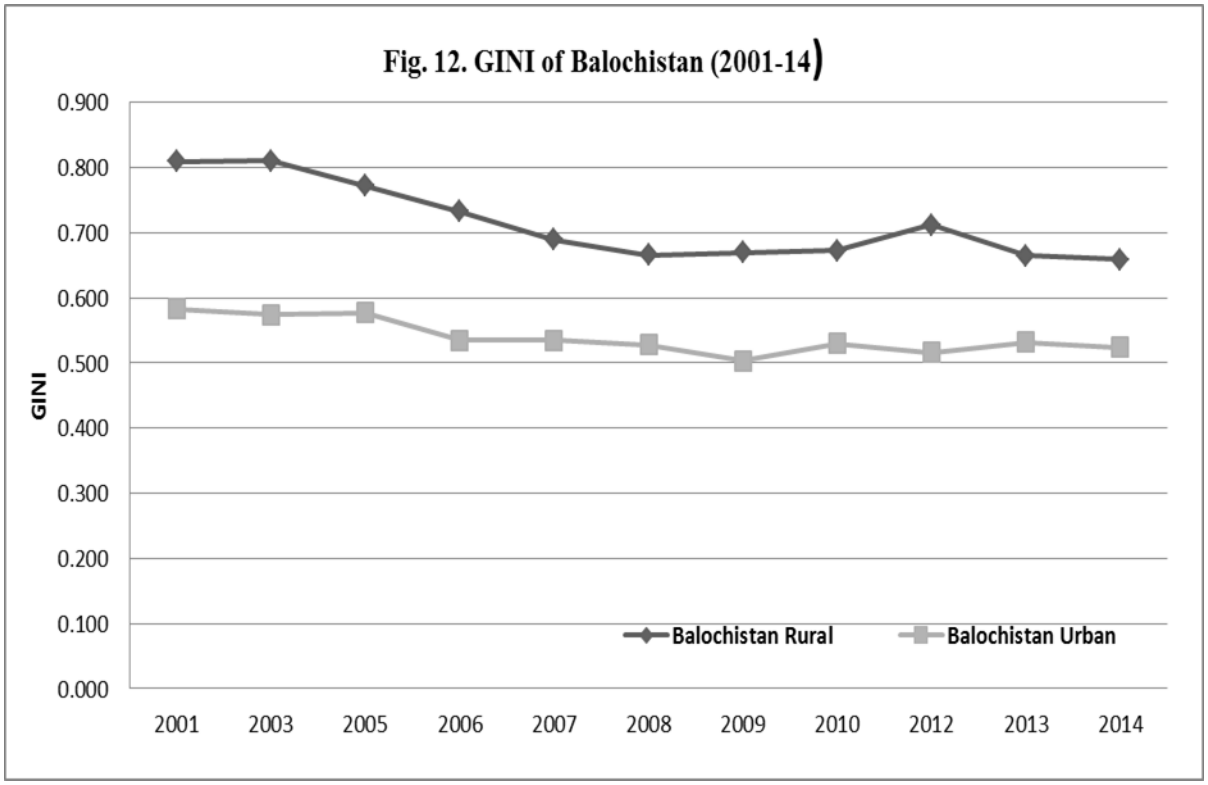


Fig. 12. GINI of Balochistan (2001-14)
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
GINI
Balochistan Rural
Balochistan Urban
2001
2003
2005
2006
2007
2008
2009
2010
2012
2013
2014

The value of Gini coefficient was 0.81 and 0.58 in 2001-02 for rural and urban Baluchistan respectively. The difference between two values was 23 points. In 2014-15 this difference shrinks to 14 points as the values for rural and urban Gini coefficients of Baluchistan were 0.66 and 0.52. Drop off in the difference of two values strengthens the argument that disparity between rural and urban areas of Baluchistan is decreasing over the time.

4.8 Two-way Analysis of Variance (Split-Plot Design)

It becomes necessary to validate the significance of levels chosen for analysis. Under split plot design analysis of variance for each variable was done. Variance was distributed across years, taken as replicates and two error terms were used to estimate three F-values. First error value was extracted from the replication (years) and region factor. So the F-value for region was calculated as the ratio of MS of region and first error value. The F-value for region was significant, indicating prominent difference in Gini coefficient across regions. The actual reason of this significance has been highlighted through Least Significant Difference (LSD) in Table 4. Based upon LSD value (0.0101) five different groups were ordered. On the basis of ANOVA results and LSD it can be said that there are huge difference among the regions of the same country.

Second error value in the ANOVA design was used for the calculation of two F-values, one for sub-regions and the other for interaction of regions and sub-regions. Three sub regions in each main region were also significantly different from each other on the basis of Gini coefficient as shown in the LSD Table. Gini coefficient of rural region was highest among the sub-regions. On the basis of three F-values, it is precisely expressed that the variation along region, sub-region and their interaction is significant. So Gini coefficient can be analyzed on these levels.

Table 3. Two-way Analysis of Variance (Split-Plot Design) of variables under study

		GINI			GP		
SOV	**df**	**MS**	**F**	**p-Value**	**MS**	**F**	**p-Value**
Year	10	0.014			230.29		
Region	4	0.050	120.57	0.000	49.77	3.78	0.0106
Error (Year*Region)	40	0.000			13.17		
Sub-Region.	2	0.474	3459.96	0.000	4456.33	1490.48	0.000
Region*Sub-Region	8	0.008	60.65	0.000	93.5	31.27	0.000
Error (Year*Region*Sub-Region)	100	0.000			2.99		
		PS			**UR**		
SOV	**df**	**MS**	**F**	**p-Value**	**MS**	**F**	**p-Value**
Year	10	37.050			24.147		
Region	4	202.910	7.01	0.0002	170.985	66.37	0.000
Error (Year*Region)	40	28.930			2.576		
Sub-Region.	2	1805.850	232.63	0.000	135.180	320.4	0.000
Region*Sub-Region	8	66.800	8.61	0.000	1.269	3.01	0.0046
Error (Year*Region*Sub-Region)	100	7.760			0.422		
		NOI					
SOV	**df**	**MS**	**F**	**p-Value**			
Year	10	1.81E+08					
Region	4	9.93E+10	2634.9	0.000			
Error (Year*Region)	40	3.77E+07					
Sub-Region.	2	6.25E+10	10583.2	0.000			
Region*Sub-Region	8	1.17E+10	1985.19	0.000			
Error (Year*Region*Sub-Region)	100	5902595					

p-value< 0.05 = significant; GP: Gender parity; PS: Poverty status; UR: Unemployment rate; NOI: Number of institutions.

Table 4. Means of variables under study lettered on the basis of least significant difference (LSD).

	GINI		**GP**		**PS**		**NOI**		**UR**	
REGIONS	Balochistan	0.6429 A	KPK	69.846 A	Balochistan	20.228 A	Pakistan	146781 A	KPK	10.162 A
	KPK	0.6102 B	Sindh	69.644 A	Sindh	16.252 B	Punjab	66341 B	Punjab	6.792 B
	Sindh	0.5733 C	Pakistan	69.079 A	Pakistan	14.658 B	Sindh	38405 C	Pakistan	6.588 B
	Pakistan	0.563 D	Punjab	68.332 AB	Punjab	14.452 B	KPK	22298 D	Balochistan	4.655 C
	Punjab	0.5469 E	Balochistan	66.814 B	KPK	14.432 B	Balochistan	8677 E	Sindh	4.543 C
	LSD	**0.0101**	**LSD**	**1.8055**	**LSD**	**2.6762**	**LSD**	**3053.9**	**LSD**	**0.7986**
SUB-REG.	Rural	0.6678 A	Urban	78.505 A	Rural	21.12 A	Overall	84772 A	Urban	8.2887 A
	Overall	0.6084 B	Overall	66.953 B	Overall	17.08 B	Rural	65523 B	Overall	6.1080 B
	Urban	0.4857 C	Rural	60.771 C	Urban	9.813 C	Urban	19206 C	Rural	5.2473 C
	LSD	**4.43E-03**	**LSD**	**0.6542**	**LSD**	**1.0541**	**LSD**	**919.16**	**LSD**	**0.2457**

First independent variable PS (poverty status) was also checked by ANOVA and LSD for all levels under study. All three F- values i.e. for region, sub-region and interaction between region and sub-region are significant. LSD confirmed two different groups for five regions. The main reason for difference in PS was Baluchistan and KPK. On the basis of LSD value 1.81 GP (gender parity) illustrate three groups in which KPK and Baluchistan was the actual reason for difference. The F-values of regions, sub-regions and interactions were significant for gender parity. Last two variables UR (unemployment rate) and NOI (number of institutions) were also significantly different at sub-regions. On the basis of LSD NOI have five different groups among regions and UR has three different groups. KPK and Sind was the actual source of significance for unemployment rate.

4.9 Pearson's Correlation (r)

After ANOVA of all variables for regions and sub-regions, the strength of linear relationship between dependent variable and independent variables is shown by the Pearson's correlation (r) in Table 5. PS has strong positive relation with dependent variable Gini coefficient as it expressed with 0.75 value of r. It means that if the poverty status of an area increases the Gini coefficient of that area will also increase (Mushtaq and Soharwardy, 2014, Ferreira and Gignoux, 2011). A strong negative correlation (-0.92) is shown between gender parity and Gini coefficient of education. It can be said on the basis of the correlation between GP and Gini coefficient that the major cause of educational disparity is the gender disparity (Kanwal and Munir, 2015, Digdowiseiso, 2010). NOI has weak positive correlation with Gini coefficient but it has significant negative relation with UR. Gender parity and poverty status has strong negative correlation (Saeed and Fatima, 2014, Hussain et al., 2003). On the basis of one tailed t test all variables has significant relation with dependent variable except NOI (Table 5)

Table 5. Pearson's Correlation (r)

	GINI	PS	GP	NOI
PS	0.75			
GP	-0.92	-0.69		
NOI	0.09	0.10	-0.24	
UR	-0.28	0.52	0.27	-0.16
PS	0.000			
GP	0.000	0.000		
NOI	0.135	0.098	0.001	
UR	0.000	0.000	0.000	0.018

Sig. (1-tailed) p-Value < 0.05

4.10 Multiple Linear Regression Analysis

To check the problem of multicollinearity Tolerance test and Variance Inflation Factor (VIF) test was performed. All the values of tolerance were greater than 0.1 which indicated no multicollinearity in the model. Furthermore, all the VIF values were less than 5 which strengthen the argument of no multicollinearity in the model. Prior to Multiple Linear Regression Analysis ANOVA was done for whole model. The model was a good fit to regression as the value of R was 0.93. A high coefficient of determination (0.88) and low estimation errors (0.032) were there and overall model was significant as p- value was .0001 (Table 6).

Table 6. Model Summary[b] with ANOVA

Model	R	R^2	Adj. R^2	SE (Estimates)	Durbin-Watson
1	.939[a]	0.882	0.879	0.031926	0.348
ANOVA					
	SS	**Df**	**MS**	**F**	**Sig.**
Regression	1.216	4	0.304	298.218	.000a
Residual	0.163	160	0.001		
Total	1.379	164			
a. Predictors: (Constant), UR, NOI, GP, PS					
b. Dependent Variable: GINI					

By plotting Gini coefficient as dependent variable, explanatory variables show the relationship with Gini after regression run through SPSS 16.0 as follow:

$$\boldsymbol{El = 1.111 + 0.003PS - 0.008GP - 0.0018NOI + 0.001UR + 0.032}$$

Table 7 shows that all independent variables are significant i.e. have a part to determine the educational Gini coefficient except unemployment rate. Standardized Coefficients to show how many standard deviations a dependent variable will change, per standard deviation increase in the predictor variables are also there in Table 7. With the help of standardized coefficients it can be seen that GP has a strong negative (-0.80) relation with Gini coefficient. NOI also have negative effect on Gini coefficient but with smaller value (-0.13) than GP. Poverty status positively affects Gini coefficient with the value of (0.22) for standardized beta. Now on the basis of regression analysis it is revealed that educational Gini coefficient is determined by three (PS, GP, NOI) variables.

Table 7. Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95% Confidence Interval for B		Collinearity Statistics	
	B	SE	Beta			Lower	Upper	Tolerance	VIF
1 (Constant)	1.111	0.038		28.961	0.000	1.035	1.186		
PS	0.003	0.001	0.222	5.11	0.000	0.002	0.004	0.392	2.548
GP	-0.008	0	-0.804	-20.43	0.000	-0.009	-0.007	0.477	2.094
NOI	-1.86E-07	0	-0.125	-4.363	0.000	0.00	0.00	0.906	1.104
UR	0.001	0.001	0.036	1.096	0.275	0	0.003	0.693	1.444

a. Dependent Variable: GINI

4.11 Poverty Status and Gini Coefficient

Price elasticity of demand for schooling varies with the income. Price elasticity of demand for school enrollment is higher for the lower income group and lower for the higher income groups (usSaqib, 2004). Opportunity cost of schooling is also very high for poor household, due to possibility of child labor present in Pakistan (Ray, 2000). On the basis of elastic demand and high opportunity cost the poor people choose child labor over the child schooling. Larger proportion of the poor people belongs to rural areas of Pakistan, so educational disparity in rural areas is higher than the urban areas of Pakistan. Study of Husaain et al. (2003) proved that as expenditure on education increases educational disparity decreases. While in Pakistan where budget allocation for education is very low educational attainment for poor becomes very difficult. Willingness to pay for education and return on education is very low for the poor, so instead of enrolling in school, poor prefer their children to go to a workshop. Therefore, on the basis of theoretical relationship and empirical results it can be confined that poverty has direct effect on educational disparity.

4.12 Gender Gap and Educational Disparity

Gender disparity is the major cause of educational disparity (Meraj et al., 2016, Ahmad et al., 2016, Kanwal and Munir, 2015, Quayesy and Ramsey, 2015). In present analysis gender gap is calculated by the difference between male literacy rate and female literacy rate as a proportion to male literacy rate. Gender parity shows a very strong negative relation with educational Gini coefficient. Women proportion in Pakistan is increasing over the time (Quayes and Ramsey, 2015). When cultural constraints and poor facilitation restrict women from education overall literacy rate will fall and also the average years of schooling for the population will decrease.

Low literacy and low average years of schooling will bring together the educational disparity. Gender parity score is less for the province KPK and Baluchistan (Roof, 2015) so they have higher disparity in education. Furthermore, rural areas of Pakistan have higher gender disparity which result in shape of higher value of Gini coefficient for rural areas. It is expressed through data that to reduce educational disparity, gender disparity must be removed from the society.

4.13 Access to Education and its Impact on Gini Coefficient

According to UNESCO Report (2015) 24 million children in Pakistan are out of school. The main reason for their absence from school is child labor and lack of access to educational institutions. Increase in number of institutions assures the access to education for the deprived ones. When there would be an institution in some village, the cultural constraint for the women of that village will be relaxed. From 2001-02 to 2014-15 a significant increase has occurred in the number of institutions, particularly in rural areas of Pakistan (Roof, 2015). Almost 3000 institutions are developed in rural Baluchistan in which adult schools and primary schools have larger proportions from the year 2001-02, which helps the educational disparity in rural Baluchistan to decrease. Same can be seen in case of all provinces that the value of Gini coefficient is decreasing with an increase in number of institutions.

4.14 Unemployment Rate and Educational Disparity

In present analysis UR has not significant relation with Gini coefficient. The reason for this irrelevance can be many factors, like an increase in total population, government policies and demographic effects**.** Though UR has not strong relation with educational Gini coefficient but it cannot be ignored in determining the educational disparity. When there would be jobs for educated people demand for education will be increased. High demand for education will result

in high literacy rate which will further decrease the value of educational Gini coefficient. Expectations of low return or in some cases no return on education is the factor that discourages people to get education. So a high employment rate can enhance the demand for education which will further decrease the educational disparity.

CHAPTER V

Summary, Conclusion and Recommendations

First objective of the study was to measure the intensity and trend of educational disparity in Pakistan. Intensity of educational disparity is measured with the help of educational Gini coefficient. The educational Gini coefficient can be considered a new indicator for the distributional dimension of human capital. It is helpful to compare the situation of education cross regions and over time. Gini coefficient of education reflects a clearer picture on the educational development of a region or a country.

To show the trend of educational disparity in Pakistan descriptive statistics techniques are used in this study. Year wise and region wise descriptions of Gini coefficient with mean, median, range, quartiles and standard errors are given in the tables. Then with the help of Box and Whisker graphs of Gini coefficient for rural and urban areas of all provinces are drawn to show regional disparities over the time. Trend of mean and median values of Gini coefficient is also expressed in graphs separately for regions and sub-regions.

After calculating Gini coefficient of education as in indicator of educational disparity, study investigates the determinants of educational disparity in case of Pakistan for the years 2001-02 to 2014-15. Multiple Linear Regression model is used to find the determinants of

educational disparity. In present study Gini coefficient is considered as dependent variable and gender parity, poverty status, number of institutions and unemployment rate are believed as independent variables.

5.1 Conclusion

It is revealed through the educational Gini coefficient that Pakistan is facing real threat of educational disparity. Low values of Gini coefficient for urban areas indicating that urban areas have less disparity in education. But on the other hand rural areas of Pakistan have high values of Gini coefficient, pointing higher disparities in rural areas. There are disparities among provinces and within the provinces of Pakistan. When we talk about overall disparity Punjab and Sind have lesser disparity than KPK and Baluchistan. But in case of disparity between rural and urban areas, both the Punjab and Sind provinces have larger gap between the values of rural and urban Gini coefficient.

Baluchistan and KPK are the provinces which have higher overall disparities but the difference between rural and urban Gini coefficients is lesser in these provinces than the province of Punjab and Sind. The overall trend of educational disparity is decreasing over the time but the disparities among provinces are not decreasing. The constant gap between rural and urban disparity indicates that rural areas are not coping with the pace of urban areas in case educational disparity.

By investigating the reasons for regional disparities study finds poverty, gender parity and access to education as determinants of educational disparity. Gender parity and number of institutions has negative relation with Gini coefficient and poverty status has positive relation with Gini coefficient of education. So the areas having high gender parity, less proportion of

population living in poverty and high number of institutions were showing the low values of Gini coefficient. Urban Sind, urban Punjab and urban KPK are the areas which can be considered in the category of low disparity. While on the other side rural areas of Pakistan, Particularly rural Baluchistan and rural Sind have higher disparities throughout the time because of high gender discrimination, high poverty rate and comparatively less number of institutions.

5.2 Recommendations

Under the Constitution of Pakistan Article 25-A, it is the responsibility of the state to provide free and compulsory education to every child between the ages of 5 and 16. To fulfill this obligation educational disparity must be removed from Pakistan. On the basis of present analysis following are the recommendations for the removal of educational disparity in Pakistan:

- Return on education must be increased to tackle the high opportunity cost of education for the poor. By this willingness to pay for education will be increased which will further increase the literacy rate. High literacy rate will reduce the educational disparity.
- Private schools and institutions should be subsidized in rural areas and taxed in urban areas to compel the entrepreneurs to the areas of high disparity. By this access to education will be easy in rural areas which will be supportive in closing the gap of regional disparity.
- In areas of high gender disparity special institutions for female education should be established at village level. A smooth access to education for women will decrease the gap between male and female literacy rate which will decrease the educational Gini coefficient.

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Appendix Table 1. Year wise GINI at all levels under study

YEAR	PAKISTAN			PUNJAB			KPK			SINDH			BALOCHISTAN		
	Overall	Rural	Urban	Overall	Rural	Urban	Overall	Rural	Urban	Overall	Rural	Urban	Overall	Rural	Urban
2001	0.631	0.702	0.497	0.611	0.663	0.492	0.707	0.731	0.579	0.607	0.745	0.483	0.767	0.809	0.583
2003	0.622	0.691	0.483	0.603	0.659	0.477	0.684	0.705	0.571	0.603	0.747	0.467	0.752	0.810	0.575
2005	0.608	0.672	0.478	0.586	0.639	0.469	0.674	0.696	0.550	0.595	0.725	0.467	0.728	0.772	0.577
2006	0.594	0.655	0.467	0.629	0.633	0.457	0.640	0.655	0.550	0.586	0.700	0.460	0.688	0.733	0.535
2007	0.584	0.642	0.457	0.568	0.621	0.450	0.634	0.647	0.567	0.577	0.715	0.440	0.655	0.690	0.535
2008	0.577	0.638	0.450	0.561	0.613	0.444	0.634	0.653	0.534	0.568	0.697	0.437	0.634	0.666	0.528
2009	0.591	0.634	0.455	0.556	0.605	0.446	0.627	0.644	0.520	0.579	0.702	0.446	0.633	0.670	0.503
2010	0.568	0.626	0.448	0.552	0.598	0.449	0.610	0.629	0.509	0.562	0.692	0.424	0.640	0.673	0.530
2012	0.559	0.619	0.438	0.541	0.591	0.432	0.603	0.621	0.509	0.552	0.672	0.424	0.667	0.712	0.516
2013	0.555	0.617	0.434	0.537	0.591	0.428	0.604	0.623	0.505	0.549	0.677	0.419	0.632	0.665	0.532
2014	0.548	0.612	0.428	0.534	0.587	0.427	0.599	0.619	0.505	0.535	0.666	0.402	0.623	0.659	0.524

Appendix: Table 2. Means with confidence intervals of studied variables at all levels.

Region	Sub-Region	GINI			PS			GP			NOI			UR			N
		Mean	-95%	95%	Mean	-95%	95%	Mean	-95%	95%	Mean	-95%	95%	Mean	-95%	95%	
PAKISTAN	OVERALL	0.59	0.22	0.95	15.64	5.41	25.88	67.46	24.57	110.35	220227	184912	255542	6.16	1.97	10.35	11
PAKISTAN	RURAL	0.65	0.28	1.01	19.68	9.45	29.92	61.20	18.30	104.09	171392	136077	206707	5.55	1.37	9.74	11
PAKISTAN	URBAN	0.46	0.09	0.82	8.65	-1.58	18.88	78.58	35.69	121.48	48725	13410	84040	8.05	3.86	12.24	11
PUNJAB	OVERALL	0.57	0.20	0.94	15.59	5.36	25.83	66.70	23.80	109.59	99540	64226	134855	6.34	2.15	10.52	11
PUNJAB	RURAL	0.62	0.25	0.98	18.56	8.33	28.80	61.36	18.47	104.26	73122	37807	108437	5.40	1.21	9.58	11
PUNJAB	URBAN	0.45	0.09	0.82	9.20	-1.04	19.43	76.94	34.04	119.83	26360	-8955	61675	8.64	4.46	12.83	11
SINDH	OVERALL	0.57	0.21	0.94	16.24	6.01	26.48	69.85	26.96	112.75	57632	22317	92946	4.42	0.23	8.60	11
SINDH	RURAL	0.70	0.34	1.07	25.59	15.35	35.82	57.72	14.83	100.61	42651	7336	77966	2.64	-1.54	6.83	11
SINDH	URBAN	0.44	0.08	0.81	6.93	-3.31	17.16	81.36	38.46	124.25	14933	-20382	50248	6.57	2.38	10.76	11
KPK	OVERALL	0.64	0.27	1.00	15.66	5.42	25.89	67.67	24.77	110.56	33448	-1867	68763	9.61	5.42	13.80	11
KPK	RURAL	0.66	0.29	1.02	16.62	6.39	26.86	65.81	22.91	108.70	29472	-5843	64787	9.18	4.99	13.36	11
KPK	URBAN	0.54	0.17	0.90	11.02	0.78	21.25	76.07	33.17	118.96	3976	-31339	39291	11.70	7.51	15.89	11
BALOCHISTAN	OVERALL	0.67	0.31	1.04	22.27	12.03	32.50	63.09	20.19	105.98	13015	-22300	48330	4.02	-0.17	8.20	11
BALOCHISTAN	RURAL	0.71	0.35	1.08	25.14	14.91	35.38	57.77	14.88	100.66	10979	-24336	46294	3.47	-0.72	7.65	11
BALOCHISTAN	URBAN	0.54	0.17	0.91	13.27	3.04	23.51	79.58	36.69	122.48	2036	-33279	37351	6.48	2.29	10.67	11
SUB.REG.	OVERALL	0.61	0.44	0.77	17.08	12.50	21.66	66.95	47.77	86.14	84772	68979	100566	6.11	4.24	7.98	55
	RURAL	0.67	0.50	0.83	21.12	16.54	25.70	60.77	41.59	79.95	65523	49730	81317	5.25	3.37	7.12	55
	URBAN	0.49	0.32	0.65	9.81	5.24	14.39	78.50	59.32	97.69	19206	3413	34999	8.29	6.42	10.16	55
REGION	PAKISTAN	0.56	0.35	0.77	14.66	8.75	20.57	69.08	44.31	93.84	146781	126392	167171	6.59	4.17	9.01	33
	PUNJAB	0.55	0.34	0.76	14.45	8.54	20.36	68.33	43.57	93.10	66341	45952	86730	6.79	4.37	9.21	33
	SINDH	0.57	0.36	0.78	16.25	10.34	22.16	69.64	44.88	94.41	38405	18016	58794	4.54	2.13	6.96	33
	KPK	0.61	0.40	0.82	14.43	8.52	20.34	69.85	45.08	94.61	22298	1909	42688	10.16	7.74	12.58	33
	BALOCHISTAN	0.64	0.43	0.85	20.23	14.32	26.14	66.81	42.05	91.58	8677	-11713	29066	4.65	2.24	7.07	33