INTERGENERATIONAL EDUCATIONAL MOBILITY AND POVERTY DYNAMICS IN PAKISTAN

Submitted By

Salman Shamsi

PIDE2016FMPHILECO18

Supervised By

Dr. Karim Khan

(Associate Professor, PIDE)

Department of Economics and Econometrics

PAKISTAN INSTITUTE OF DEVELOPMENT ECONOMICS

ISLAMABAD

2020

Pakistan Institute of Development Economics

CERTIFICATE

This is to certify that this thesis entitled: **"Intergenerational Educational Mobility and Poverty Dynamics in Pakistan"** submitted by Mr. Salman Shamsi is accepted in its present form by the Department of Economics & Econometrics, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfillment of the degree of **Master of Philosophy in Economics**.

External Examiner:

Dr. Anwar Shah
Associate Professor
Quaid-i-Azam University
Islamabad

Supervisor:

Dr. Karim Khan
Associate Professor
Department of Economics
PIDE, Islamabad

Head, Department of Economics:

Dr. Karim Khan
Associate Professor/Head
Department of Economics & Econometrics
PIDE, Islamabad

DEDICATION

This piece of research is dedicated to my late mother.

May Allah bless her highest rank in Jannah.

ACKNOWLEDGEMENTS

In the name of Allah the Most Gracious, the Most Merciful.

First and foremost, I would like to thank my Creator for giving me a functioning body and mind in order to live life and learn, and particularly to work on my dissertation project, hereby completing my Master of Philosophy degree.

I must give my high, respectful gratitude to my supervisor, Dr. Karim khan and Dr. Muhammad Jahangir khan, for their guidance, supervision and help throughout this research project. I have learned a lot throughout this research project, with many challenging yet valuable experiences in order to complete this task.

I am also extremely grateful to my friends, Abid hussain and Sarwar khan who has been there all the times, helping me selflessly and sincerely in accomplishing my aspirations. I also thank my fellows; Ali Gohar, Tariq Majeed, and Mazhar Hussain, who helped me encouraging me throughout my thesis.

I would like to express my eternal appreciation towards my brothers and family who have always been there for me no matter where I am, for all unconditional supports and patience. Thank you for being ever so understanding and supportive.

Salman Shamsi
PIDE, Islamabad

ABSTRACT

By using Pakistan panel household survey (PPHS) 2010 data, we examine (1) The magnitude of education mobility and (2) The influence of education accumulation on poverty dynamics. Educational mobility has been calculated by regressing children education on their parental education while welfare mobility has been measured through Household consumption level. By observing the interrelated nature between education accumulation and welfare Mobility we control for the high endogeneity between education accumulation and welfare dynamics over time. Therefore, we are using two stages Probit least square model (2SPLS). Firstly, we estimate simple education and welfare model, and found mobility for education but not for welfare. Then, we moved to 2SPLS which showed very low welfare mobility and very high educational mobility. An additional year of education acquired by a child has not associated with welfare improvement of household because the quality of education is low which cannot improve household welfare. However, households characterized by primary educated members have higher probability for their children to improve their welfare compared to their parents. These results suggests scale effect of education on welfare and recommend to more focus on quality education especially in the era globalization.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

.

CHAPTER: 1

INTRODUCTION

Policy makers, academics, the press and the general public all agree that equality for opportunities should be adopted as a principle by the society. Intergenerational mobility in economic status provides mechanics for the spread of inequality in a society by not allowing equal opportunities for all. Race, class, gender, religion and region, all sort of such variables come into play in determining the opportunities that one generation will be presented with by the previous one. The transmission of economic status from one generation to the next, therefore becomes the interest of social science theory and practice.

There are two main channels, direct or indirect, through which investment in human capital affect welfare. Proponents of Indirect impact of education on welfare suggest that education affects decisions regarding the basic needs such as shelter, health facilities, sanitation and decisions regarding fertility and family. It makes perception regarding gender roles and societal and political structures. Education can bring change regarding choice of employment and expanding the market.in-terms of opportunities and avenues of investment. These, in turn, boost the productivity of people and increase wages. Education in developing countries is often identified as a key area where public investment can lead to poverty reduction (Appleton, 2001; Schultz, 2002). Universally this indirect connection between education and earnings is done through the rate of return analysis.

The second and relatively small literature focuses on the direct impact of education on welfare (Himaz & Aturupane, 2011; Zuluaga, 2007). However, it is obvious that both strands of research agree that education has huge impact on the welfare of individuals,

households and communities. Both lines of research, however are silent on the effects of education overtime and that how are the effects of education transferred from one generation to another.ie. The intergeneration effect of education on various social variables of economic status i.e. Intergenerational Educational Mobility.

Intergenerational social mobility shows the relationship between the socio-economic status of parents and that of their descendants when they become adults. Intergenerational mobility is an important feature of societies in the developing world. The main reason for this is the hierarchical nature of the developing societies as well as the unequal distribution of income that prevails in these countries. Intergenerational mobility shows the transmission of poverty from one generation to another. (Bardhan, 2005). Both education and poverty go *hand in hand*. Low socio economic status leads to lower investment in Education and lower education interns leads to low socio economic status by decreasing the number of opportunities that a person can avail. (Appleton, 2001). (Brown & Park, 2002). Thus, there is need to isolate the effect of education from that of low socio economic status, so the effect of accumulation of education capital can be found out over time. With the increasing number of Household surveys, panel data is becoming more and more available than before. And resultantly the number of studies regarding intergenerational educational mobility have also increased. However these studies have mostly been conducted for developed countries (Becker & Tomes, 1994; Nimubona & Vencatachellum, 2007). And therefore there have been fewer studies focusing on the developing world and Pakistan. Those studies too, have taken cross sectional data sets . (Muller, 2010; Ng, Shen, & Ho, 2009). The absence of studies focusing on Panel Data sets, therefore, makes the analysis overtime impossible and therefore this study has attempted to fill that gap.

Panel data will be used for this study. The data will be taken from Pakistan Panel House Hold Survey (Henceforth, PPHS) 2001 to 2010. This study will examine the extent of education mobility and (2) the impact of accumulation of education on dynamics of poverty. A two staged Probit Least square model will be applied in order to counter the endogeneity problem that might arise due to the circular relationship between poverty and investment in education.

1.1 Background of the Problem

Education and poverty have an intricate relationship. In the first place, low investment in education is associated with poverty while in the second place uneducated individual may find it difficult to exploit employment and income opportunities offered by the market (Appleton, 2001, Brown & Park, 2002). Bearing in mind these connections, this study will has attempted to separate the two effects; the impact of intergenerational mobility of education on poverty dynamics. Most of the poverty analysis in Pakistan have been focused on poverty trend based on cross-sectional data set while ignoring little attention being paid to dynamics. Two types of poverty have been documented. One is transitory poor and the other is chronic poor. The former is temporary fall into poverty line for a shorter period while the latter is trapped for significant period into the poverty line.

However, these measure are static in nature and ignored welfare mobility. For instance, a high mobility into or out of poverty may suggest that a higher proportion of a population experiences poverty over time than what the cross-sectional data might show. Thus, it is extremely important to analyze poverty dynamics in order to understand the well-being of population. Intergenerational poverty can be affected by

both micro and macro level of socio-economic factors[1]. A clean observation on the available data of poverty level and trends in Pakistan leads to two broad conclusion. First, poverty reduction has not been sustainable but has fluctuated remarkably; and second, a large proportion of the population has been found around the poverty line, and any micro and/or macro shock [2](positive or negative) is likely to have pushed them into poverty or to have pulled them out of it. But these poverty dynamics are generally not addressed in poverty reduction strategies of the country.

1.2 Significant of the Study

Income is used as a proxy for economic status in many studies. The current study will deviate from this trend and use education as proxy for intergenerational attainment. The scarcity of long term panel data, in Pakistani context, the measurement issues such as life cycle bias that are present in the case of earing are negligible because mostly education is completed in early twenties and finally the fact education and earing have direct relation is supported by the literature (Black and Devereux, 2011).

Pakistan is characterized by multi ethnic and multiracial social group and communities. Poverty is rampant across dynamic status. But the literature in a Pakistan lacks the use of education mobility as a tool for studying poverty and inequality in the multi ethnic and multiracial society of Pakistan. The study intends to bridge this gap through this document that can be of help to policy makers, academics, and researchers interested in field of inequality and poverty.

[1] Micro factor can be education level of household, household consumption, social security, number of children in household, occupation and economic function of family etc.
Macro factor can be economic conditions, social and political factors, cultural and environmental factors, employment etc.

[2] Any negative shock can be any disaster such as drought, war, or recession, inflation.
Positive shock can be boom,

1.3 Objectives of the Study

This study will examine:

(1) The magnitude of education mobility and

(2) The influence of education accumulation on poverty dynamics.

1.4 Research Question of the study

(1) How far educated people have educated children?

(2) did educational attainment took people out of poverty?

1.5. Organization of the Study

This study is organized into three section. Chapter one contains general introduction, background of study, objective of the study and justification of the study. Chapter two provides the literature review, chapter three concentrates on the data description and Econometric methodology, result are discussed in chapter four and finally chapter five concludes the study.

CHAPTER: 2

REVIEW OF LITERATURE

This chapter has first discussed the magnitude of education mobility. It has followed by a brief discussion on education accumulation and welfare dynamics. In the end, researcher has explored related literature particularly in the context of Pakistan.

2.1. Magnitude of Education Mobility

Parents can affect the educational outcomes of their children through a different channel. Becker & Tomes (1994) examined the transmission of consumption, assets, and incomes from parents to their offspring. This paper is grounded upon utility maximization through parents concerned regarding the children welfare. The intergenerational mobility degree or the families up and down is determined by the dealings of utility maximizing behavior with consumption and investment opportunities in diverse generations, and with different types of good fortune. It is tough for poor class families to invest in the education of their children, because their basic needs fulfill very difficultly. Such type of things lower investment in children of poorer class families. The Intergenerational mobility in income and earnings not depend on the inheritability of endowments only but it is also depend on the willingness of poorer families to invest in their children with self-finance. The intergeneration mobility degree in earnings is likewise determined in different families by the number of children. There is a negative relation between parents' income and family size, an additional number of children reduce investment in every child it also reduces intergeneration mobility.

Bauer & Riphahn (2006) while using the applied data from Switzerland, they tested the hypothesis that intergeneration education mobility is affected by the time at which

students have first segregated in attainment-related tracks in secondary school. The time of tracking significantly affects intergenerational mobility. The comparative advantage of children with more-educated parents reduces by late tracking.

Jalan and Murgai (2008) find that intergenerational mobility in education in India has improved significantly and consistently across generations and that mobility has improved across all major social groups and land classes. While educational gaps continue to persist across social groups and classes, the gap between social groups is actually quite small. The entire education gap is driven by the difference between the rich and the poor.

Pal (2004) analyses child schooling data for Peruvian households and reports that parental education positively affects child schooling at primary and secondary levels, but not at post-secondary levels.

Singh (1992) examines major economic aspects of demand of schooling of farm operators in Brazilian rural households and finds that parental education positively affects household demand for children's education with mother’s education having larger effect than that of the father. A similar result is reported by Maitra (2003) for individual and household level characteristics that affect the demand for schooling in Bangladesh. This paper examine the current enrolment status of children aged 6-12 and the highest grade attained for children aged 13-24. By estimating the standard Probit and censored ordered Probit model without gender differential grade attainment is higher for female as compare to male. An increase in the permanent income of the household is always associated with an increase in educational attainment. Parental education has a positive and statistically significant effect on the educational attainment of children, and mother's education has a stronger effect on both school enrolment and grade attainment of children compared with father's education.

Maitra and Sharma (2010) examine the issue of differences in human capital accumulation over generations, i.e., vertical (or inter-generational) mobility in educational attainment. In particular we focus on the issue of the correlation between education levels of parents and children, we examine role of parental education on two aspects of child's educational attainment i) years of schooling attained and ii) progression across different schooling levels. We find that there has been a significant increase in educational attainment of individuals which reflects the degree of equality of opportunity in a society.

There are several mechanisms through which parental education can affect human capital outcomes of their children. For example, maternal education can improve efficiency of human capital production leading to increasing returns, across generations, in parental human capital

Becker *et al*. (1990). Examine in his paper, the society where human capital is in great number, rate of return on human capital investments are high relative to rate of return on child. The societies where human capital are scarce, rate of return on human capital are low as compare to the children. Or we can say that, societies with low human capital choose large families and invest little in each number, and the societies with abundant human capital do the opposite. Investment in human capital will lead to high return in future.

Dreze and Kingdon (2001) use data on 1143 households for rural north India to analyse the impact of school quality on school participation. They find that probability of participation increases with parental education, though mother's education does not have significant effect on male school participation. There is strong inter-generational effects (i.e. children of educated parents are more likely to go to school), even after controlling for a wide range of variables. Boys' schooling is more responsive to father’s

education than to mothers, and vice-versa for girls. Maternal education has a large positive effect on a daughter's chances of completing primary school.

Holmes (2003) examine that the demand for child schooling in Pakistan, using the Pakistan Integrated Household Survey (1991). There have been few such studies for Pakistan, a country with relatively low enrolment rates and education levels, high illiteracy, and large disparity between male and female education. Find that parental education significantly increases the education of their sons.

Bratti *et al*. (2008) examined expansion role of higher education on increasing the equality opportunities of tertiary education. They examined the experience of Italy in 1990s. When changes in policy promoted the institution of higher education to deal with a widespread range of degrees and open new branches in bordering provinces. The analysis focused upon full-time non-mature students and recommends that expansion of higher education might have only limited effects with respect to decreasing existing individually specific inequality in the achievements of higher education, as it have positive significant effects on the probability of university enrollment only but not upon that of earning a degree of university.

Entwisle & Alexander (1992) examine the reading behavior and math comprehension of children in the US. They look the role of parents in their children early educational and schooling inequality and found that attending school transitional help children with the low socio-economic background. Further, they conclude that the role of parents in their children education is sessional. During school session, the parent's role is less and during vacations parent role is dominant. During vacations, the parents with high socio-economic background play the role of teacher for their children because of more attachment to school during the session they know the study level of their children.

Entwisle & Alexander (1992) in their study examine another channel of parent's expectations for their children. Their results show that the level of parent's expectation is a good predictor of children educational performance regardless of their socio-economic background. Parents with low socio-economic background have same expectation level for their children as parents with a high socio-economic background. Hertz et al. (2008) estimated 50-year of trends in the educational attainment intergenerational persistence for of 42 nations around the world. Huge regional dissimilarities of educational persistence are recognized, in which Latin America exhibiting the premier intergenerational correlations and the lowest in Nordic countries. The study also reveal that the worldwide average correlation between child and parent's schooling have held steady at about 0.4 for the previous fifty years.

Parsons et al. (1982) report that parent's expectation is more powerful than children's IQ level in predicting the educational performance of the children. Dearden et al. (1997) also found the same result while studying the intergenerational mobility in Britain.

Himaz & Aturupane (2011) the paper examine the education impact on welfare during the past two decades of Sri Lanka. The result of the analysis is; firstly, to achieve an extra year of education there is a distinct increase in the welfare of the household. Especially, certification in the qualification is more important in the labor market. Secondly, the upper quintiles individuals probably have comparatively better quality education with analytical and social skills that counterpart formal education, which lead them to a better job and in height expected returns for their employments.

2.2. Accumulation of Education and Poverty dynamics

The Solon (1992) study is based on income data of intergenerational obtained from the income dynamics (PSID) panel study of the USA. The study helps to the regression model of income of parents and income of children, and analyze the effect of the income of father on the income of children after the factor of age deducting. The study develops three econometric. Firstly, they used the indicators of father's in 1967, and the son's income in1984 as the income of father and children to examine the effect of the father's income on the children's incomes. Secondly, the average income of father from 1967 to 1971 and income of son in 1984 are taken as indicators of father's income and children's incomes to investigate intergenerational mobility. Thirdly, the variable the length of father's education is presented to explore the relationship between father's income and children's incomes. Finding of the research unveils that the coefficient of elasticity intergenerational income is 0.386 for the initial model, for the second is 0.413, and for the third is 0.526. So there is a strong transmission effect of intergenerational incomes however somewhat weak mobility.

Applying the data from Norway, Black *et al* (2005) make use of a reform during 1960s, wherein there is an amendment in the mandatory laws of education for primary and middle classes. This modification in schooling law offers deviation in parental educational variable: extrinsic to parental capacity, which allows them to examine the connection between parental education and children's schooling decisions.

Oreopoulos *et al* (2006) practice a similar procedure to study the influence of parental qualification. They also use U.S. law reforms to isolate the consequence of parents' educational attainment on children's school grade retention. They argue that the likelihood of a child to repeat a grade reduces by 2 to 7 percentage points with a rise in

parental education level of 1 year. Moreover, their instrumental variable estimates are more negative than the Ordinary Least Square estimates.

In case of Britain, Chevalier (2004) finds a robust relationship between mother's schooling and child schooling outcome while paternal education impact is found to be insignificant. He too uses variations in schooling laws that occurred in 1972 to instrument parental education. There are some studies that employed who use instruments like distance to college, math and reading scores, and grade repetition to gauge the cost of schooling. A considerable impact of parents' education is found for offspring of up to eight years of age while for children of twelve to fourteen, mother's impact fades away.

Another study includes Magnuson (2007) showing a positive and significant impact of mother's academic background on child's school readiness where he uses casual assignment into a welfare program of mother's on human capital development to proxy maternal education.

Lillard and Willis (1994) who explicitly account for this endogeneity using data from Malaysia. These data allow us to study the spread of education in much of this century by examining the educational attainment cohorts from 1910 to 1980. More significantly, we use these study the effects of parental education on the progress through elementary, secondary, and post-secondary school sequential discrete-time hazard model which allows for correlations unmeasured family and individual-specific component.

One more study that is a noteworthy is Lillard and Willis (1994); which uses data from Malaysia and explicitly deals with endogeneity problem. They use grandparent's educational portfolio being an important instrument and maintain that this specific

variable has no direct link with the grandchild's education while there is probability of strong association with parent's educational trajectory.

Otis Dudley Duncan et al. (1972) have estimated intergenerational correlations in measures of occupational prestige. Such estimates typically are larger than the existing ones for income. It has been unclear whether the estimates for occupational-status measures are higher because such measures are better indicators of long-run income than are the available income variables or because fathers and sons tend to be in similar occupational categories even when their long-run incomes are very different.

Another study, by Donald J. Treiman and Robert M. Hauser (1977), imputed intergenerational income correlations in the absence of parental income data by imposing strong assumptions in an elaborate simultaneous-equations model of income, occupational prestige, and education. The imputed correlations range from 0.15 to 0.54. Treiman and Hauser repeatedly acknowledged the obvious desirability of obtaining parental income data to enable direct estimation of intergenerational income mobility. Still other studies have estimated the overall effects of family background by measuring sibling correlations in economic status.

Solon (1992) examines intergenerational income mobility in the United States, but remarkably little empirical evidence is available. The few existing estimates of the intergenerational correlation in income have been biased downward by measurement error, unrepresentative samples, this paper indicate that the intergenerational income correlation in the United States is at least 0.4 and possibly higher, portray a much less mobile society than has been described in earlier research.

Okrasa (1999) examines that all of the major human capital variables significantly affected households' poverty and vulnerability status over time. The segment of the population that was relatively more successful in avoiding or minimizing chronic

poverty and vulnerability during 1993-96 included those living in urban areas, those headed by older and better educated people, those with few children and unemployed members, and those possessing some financial or physical assets.

Foster & Rosenzweig, (1995) The Indian study first notes that women's schooling does not contribute to increase agriculture productivity, whereas men's schooling is strongly linked to the adoption of new agricultural technologies since the 1960s and consequently to increase in rural income.

Bigsten and Kulundu (1999) looked at the effect of education on earnings of manufacturing workers in Kenya using data for 1978, 1986 and 1995. They find the Mincerian returns to primary education have fallen from 10% in 1978 to 2% in 1995; the returns to secondary schooling have fallen from 34% to 12%; the returns to university have not fallen and may have increased.

Moll (1996) reports that returns to primary education for Africans in South Africa fell from 8% in 1960 to 3% in 1975. Thereafter, they remained fairly constant. Two studies covering much shorter periods of time have not observed falls.

Tsang (1996) this paper provides a critical assessment of the impacts of the financial reform of basic education in China, focusing on issues of structure, resource mobilization, inequality, and inefficiency. It concludes that while the reform has been successful in achieving the objectives of structural change and mobilization of additional government and non-government resources, the current system is marked by notable weaknesses in terms of glaring inequalities and significant inefficiencies. Also report that many schools have increased fees to offset rising costs resulting from education decentralization.

Park and Wang (2000) find that twelve percent of informal loans to households in our sample are used to pay school fees, which implies that credit constraints may be important for some poor households.

Knight and Song (2000) use 1995 survey data to show that a wife's bargaining position, measured by the relative education level of the mother, is positively correlated with children's education, and disproportionately so for boys. They also find that boys have a higher probability of enrolment at all levels.

Hannum (1998) uses census data to demonstrate that boys are more likely to enrol than girls, and that this gap is complicated when households face resource constraints.

Findings highlighted the point that a clear picture of educational allocation is needed to place in context educational returns. The far-reaching impact of market reforms on basic education in China means that changes in educational returns across the reform period reflect not just a change in the utility of educational credentials themselves, but also a compositional shift in the social origins of students. Education may increasingly serve as a steady ticket to income and occupational attainment, but the effects of any such shift on a child's real life chances are mitigated by the fact that access to educational credentials increasingly depend on the conditions of his or her birth.

Guo & Min (2008) examined the intergenerational income mobility and education in urban China grounded on the Chinese urban household data of employment and education survey (CHUHEES) of 2004 by using the binary logistic regression and path analysis. It examined the characteristics of the intergenerational income' inheritance, mobility, and elasticity of intergenerational income. According to findings, the intergenerational mobility is very little in urban China, most of the children are still on the similar income condition as their father's income group. Education is an important instrument to upgrade children's economic status of the disadvantaged group. The

education role to encourage mobility of intergenerational income and the social equity is being paid stronger.

Lareau (1987) in his study concludes that parents adjust their socio-economic status according to their children's education level. Parents with middle-class background perceive their vigorous and dynamic role in their children's education, while parents with working-class background prefer the role of the teacher in their children education. Appleton (2001) examines that in educated households poverty declined and the living standards have grown up in that households. Education is negatively correlated with poverty in Uganda. The rates of a return appeared high and greater fall in poverty is to be expected as education increase over time.

Deolalikar & Behrman (1990) Education and poverty are interrelated and in long run, both affect each other. On one side, families with low socioeconomic status have less accumulation of education and therefore a low level of education will found more in poor as compare to their rich counterpart. On another side, low investment in human capital leads to love income status in future because of low return to lower education, the low ability of work and fewer opportunities for less educated in the labor market.

In sum, all the techniques attempt to deal with the endogeneity problem to identify the causal association between parent-child educational backgrounds. Nevertheless results vary across different methodologies and data under study. According to (Salvanes and Bjorklund, 2010), the study on adoptees measures the major effects, almost half of the correlation can be identified as the direct impact of parent's education while twin pairs of parents and instrumental approach yields weaker effect of parent's education especially in the case of mother's education. Hence one of the best strategies in studying the causality in intergenerational educational mobility is to implement and compare all the three methodologies across the same data set. But due to unavailability of

appropriate data on twins and adoptees we are constrained to the use of instrumental variable approach only.

Appleton (2001) examines that in educated households poverty declined and the living standards have grown up in that households. Education is negatively correlated with poverty in Uganda. The rates of a return appeared high and greater fall in poverty is to be expected as education increase over time.

Ng et al. (2009) study compared Singapore and US intergenerational earnings mobility by copying the sample criteria in survey of the Singapore National Youth on the income panel study dynamic of U.S. The estimated mean of earnings elasticity's are approximately the same: i.e. 0.26 of Singapore and 0.28 of the US. Which is transformed to the 0.44 and 0.47, respectively to mirror permanent position (status), the mobility in two countries are moderately lower compared to international. The conclusion of alike mobility is not shocking known that these two countries have parallel economic realities, systems of welfare, regime in education, and structures of labor. The policymakers face discouraging challenge to overcoming inequality and immobility. While keeping worldwide competitiveness.

2.3 Literature related to Pakistan

Havinga *et al.* (1986) using Pearson correlation to study intergenerational mobility and social sector changes in Pakistan. Correlation is lied between the absolute level of wealth and income vis-a-vis the son's and father's characteristics have exposed the upgrading in the economic situation of son's follows a coherent and more stable pattern than the development in fathers' economic situation. The results show upward intergenerational mobility in Pakistan but the results vary across provinces.

Although King et al (1986) somehow shows a different scenario in case of mothers' education. Employing 1979-80 Asian Marriage surveys, they find no tie between

mother's and son's education while it does have impact on girls, only in middle class. Nevertheless positive impact of paternal education is demonstrated on education of both sexes. This is consistent with other research works that use survey of International Food Policy Research Institute (IFPRI) of rural Pakistan including Alderman et al (1995; 1996) and Behrman et al (1997).

Using a different data source; Population, Labor Force, and Migration survey (1979), Burney and Irfan (1991) validate a greater influence of father's education on school enrolment than that of mother's, but overall both parents are found to be positively influencing school enrollment of their child. On other hand, Sathar and Lloyd (1993), using the Pakistan Integrated Household Survey (PIHS) 1991, present that mother being ever enrolled in school is a positive determinant of child's primary school completion while father's literacy has no link.

Javed & Irfan (2012) study three types of intergenerational mobility in Pakistan i.e. educational mobility, occupational mobility, and income mobility. Findings of the study suggest that father socio-economic background is one of the main and important determinants of their son's income position. Poor are poor because they born poor and they cannot get desired and quality education because of low investment in the child's education and unable to provide quality education in the private sector due to income constraint.

Cheema & Naseer (2013) in their study analyze the intergenerational educational attainment in district Sargodha (Pakistan) using primary data set. They found mobility in educational attainment across three generations from grandfather to father and from father to son but the value of persistence in education decline for a grandfather-father generation to father-son generation. The rate of mobility is different for different social

groups. Proprietary groups report higher mobility as compared to nonproprietary and marginalized groups.

Arif & Farooq (2014) examine the poverty dynamic in rural Pakistan. Three round of the panel household data sets (2001, 2004, and 2010) has been conducted. To examine the trend in poverty this data has been used for cross-sectional analysis. The official poverty line has been used to estimate the poverty. Two approaches have been used spell and component approach. According to spell approach in two period 9 percent of house hold remain poor. While considering the third round it decline to 4 percent.

According to these three panel datasets poverty moments shows that more than half of the rural households in Punjab and Sindh remained in poverty for at least one year. Under the component approach, in two period 16 to 18 percent of the sampled households were chronically poor while transitory poor were upto 22 to 25 percent. There is difference between these two approaches. In component approach chronic poverty indices are more than spell approach. But in multivariate analysis the outcomes were same under the both analysis.

Lohano (2009) this paper deals with poverty transition and their determinants, using longitudinal survey data for rural Sindh. Household interviewed though international food policy research institute (IFPR) during 1986-1991 and resurveyed in 2004-2005 with minimal attrition. The result shows that the ratio of households which are entering into poverty are three time more than which are getting out from the poverty. While over the quarter of that panel households were remain poor, which chronically poor.

The descendent which were newly form families had lower incomes and assets then the core panel households due to the loss of agriculture, non-farm employment and other shocks. But few household who escaped poverty. The main reasons is investment in education and also the crop diversification and nonfarm employment

2.4. Literature Gap

Vast literature is available on education and poverty dynamics but they mostly focus on the developed countries (Becker and Tomes 1986; Nimubona & Vencatachellum 2007). Due to data limitation, panel studies were ignored in developing countries, especially in Pakistan. But recently the use of panel data has attracted many scholars to investigate intergenerational mobility. Some studies of intergenerational income mobility either concentration on total household income or individual wage which both are difficult and problematic due to the presence of measurement error. The measurement error of income is important because it is biases mobility to upward. Few studies are based on cross-sectional data and suffered from upward and downward biasness (Muller, 2010; Ng et al., 2009).

The measures of Income are subjected to life cycle biases if the child income and parent income are not measured at the identical age, the individuals of high stable and permanent income might expend more time in the school and they have lower incomes compare to their peers, who opted for jobs or business when young (Black and Devereux, 2011). For these reasons, we turned to intergenerational educational mobility. Education mobility and poverty dynamics are highly correlated with intergenerational income mobility. This study underlines the analysis of the education transition and poverty dynamics of rural sectors in Pakistan, a longitudinal study. The interrelationship between educational transition and poverty dynamics in case of Pakistan is missing from the literature the present study is an attempt to bridge this gap.

CHAPTER: 3

DATA AND METHODOLOGY

In this chapter, researcher has presented theoretical framework of the study. In the next section, data and its sources have been given. In the end, we have provide the model specification for the study.

3.1 Theoretical framework

Two set of theories have been proposed by scholars to investigate the impact of investment in education or human welfare. Investment in human capital have both direct and indirect impact on education. Investment in education can have indirect impacts; like better utilization of water and sanitation, health facilities, and on women's behavior especially deciding family health fertility. All these changes can improve individual productivity and increases their wages. (Girma and Kedir, 2003). This indirect impact of education can be measured through analysis of returns associated with education. Secondly, direct impact of education on human welfare have been analyzed by many authors. (Himaz and Aturupane, 2011).

However, the two theories have not been viewed as connecting or have no information when one is interested to find the impact of education accumulation on welfare dynamics over time. Perfect educational Mobility refers to when child education level is independent of their father's education level. Perfect educational mobility is the opposite that is when child education level is the same as their parents. Educational mobility can be obtained from using child education as the dependent variable while considering parental education as independent variable. For instance Becker and Lewis (1973), have calculated educational mobility by regressing children education on their parental education. The cost and benefit accrued from education is one of the most

important determinants of investment in education. Investment in education will decrease when the cost of acquiring education is high and it will increase with rising benefits from education. (Chiswick 1988).

Educational mobility can be determined by three different types of factors. However, set of controls for parental education must be exogenous and should not be correlated with each other.

One of these is proportion of primary educated individuals in household which is shown in pal (2004). Primary education of the household is a background variable which tells us how much the household is at-least interested in education. With higher proportion of primary educated individuals lead to increase children's education level. Thus, children belongs to a household with more primary educated members can have higher chances to be educated. In most developing countries, the return of education at primary level is relatively high compared to other highly educated countries where the return of primary education are low.

Ratio of agricultural assets to total assets is another determinant of child education as discussed in Heady (2003) and kaghoma (2012). It has been observed in various developing countries that high ratio of agricultural assets to total assets can reduce the level of children's education because already have enormous job opportunities around which incentivize not to invest in children's education. Large acres of land or property are attractive and easy way of generating further capital. Consequently, children belongs to household with high ratio of agricultural assets to total assets are likely motivated to other avenues instead of getting an education.

Another demographic determinant of child education is the structure of age in the household. Structure of age such as elder, adult and young are associated with children's education. If most of the members in the household are young then it is not possible to

cover children's educational expenses. On the other hand, children belongs to household with more adults have greater chance to be educated. Consequently, a high proportion of young members in the household will decrease children's education level Kaghoma (2012). Role of gender is again an important determinant of child education. That is, household with leading by a female member are less likely to educate their children. On the other hand, male headed households are relatively more focused on children's education. Therefore, dummies 1 for male and 0 for female.

Another important determinant of investment in education is the number of children per household. There is a trade-off faced by families that as the number of children goes on, the amount of investment in each will also goes down. (Becker and Lewis 1973). It implies that, parents with limited resources can either increase the number of children compromising investment in education, or they reduce the number of children and increase quality investment in education.

Similarly household consumption has been used as an indicator of household welfare. Measured by consumption level, 'household welfare in actually the intergenerational welfare of individual from one period to another'. This variable for household welfare is binary and records value 1 if an individual shift from lowest to highest quartile across time, otherwise 0. In most of the developing societies across the world, the crucial aspect of poverty is that it can be transmitted from one generation to another. (Bhardan, 2005). In this study, poverty or welfare has been defined on the basis of consumption and according to which a poor household is one whose consumption decline below poverty line in the specific year. Moreover, we have divided welfare based on consumption into four categories or quartiles. In other words, realization of welfare dynamics is binary in nature and indicates whether an individual has gone up or down as far as social ladder is concerned.

3.2 Data

Data has been taken from the Pakistan panel household survey (PPHS) 2010. A survey administrated by Pakistan Institute of development economics (PIDE) since 2001. The PPHS, providing a very rich information on socio-economic characteristics of households, collected 4246 households' data which is divided into 2746 urban and 1500 rural units respectively. Separate modules were used for male and female to collect this data at the household level (Nayab and Arif, 2012). It based on 3 round (2001, 2004 & 2010) but we consider first and last round to construct a panel data set. It contained a different section like education, employment, agriculture, health, consumption expenditure and also non-consumption expenditure etc. It also contained a large amount of data and also contain a large set of variables which is relevant to this study.

3.3 Methodology

3.3.1 Intergenerational Educational Mobility Model

The simple model of intergenerational mobility is given as:

$$logY_{iht} = \alpha_0 + \alpha_1 logY_{ht-1} + \varepsilon_{ijt} \qquad (3.1)$$

Y_{iht} Denotes educational outcome of the ith child from household h at time t. $Y_{ht-1}$is the parental education level of household h at time $t-1$. ε_{ijt} is the error term includes all unobserved variable that affect child educational outcome. The term α_1 is the intergenerational elasticity which measures the degree of persistence in educational outcomes across generation while 1- α_1 measures the intergenerational educational mobility. The value of α_1 is between 0 and 1. Value of $\alpha_1 = 0$ means no persistence in educational outcomes and perfect educational mobility across generations, $\alpha_1 = 1$ means high persistence is educational outcomes and perfect educational immobility across generations.

Using the value of α_1 we can calculate the coefficient of intergenerational educational correlation by the following formula;

$$\rho_{edu} = \alpha_1 {}^{\sigma_{t-1}}/_{\sigma_t} \quad (3.2)$$

σ_{t-1} is the standard deviation of Y_{t-1} and σ_t is the standard deviation of Y_t.

The outcomes of education across generations are not only depending on parental education, but there are also some other individual, parental and household level characteristics that affect the mobility of education across a generation. Therefore a vector of control variables is also included in equation 1.

$$logY_{iht} = \alpha_0 + \alpha_1 logY_{ht-1} + \alpha_2 X_{ih} + \varepsilon_{ijt} \quad (3.3)$$

In equation 3, X_{ih} is the vector of control variables, include gender, age, household expenditure, and size of the family. For instance, male headed families have more economic opportunities compared to their female counterparts and can affect children's education level. In the same way, the structure of age among family members that is, a high proportion of young members in the household will decrease children's education level. Finally, high expenditure and large size of family also discourage children's education. After controlling these variables the omitted variable biasness will reduce (Javed and Irfan, 2012; Kaghoma, 2012).

Equation 3 is a log-linear model; therefore Ordinary Least Square (OLS) model has been implemented.

3.3.2 Education and Welfare Mobility Model

To analyze the impact of education on income status across generations over time, the following two equations are estimated;

$$Edu_{it} = \beta_1 Wt_{it} + \beta_2 X_1 + \beta_3 Z_1 + \mu_t \quad (3.4)$$

$$Wt_{it} = \gamma_1 Edu_{it} + \gamma_2 X_2 + \varepsilon_t \quad (3.5)$$

Where Edu_{it} is the educational attainment of the individual at time t measured as completed years of schooling, Wt_{it} is the intergenerational welfare transition of individual i from one period to other measured by consumption level. The whole sample is divided into four quartiles. Wt_{it} is a binary variable taking value 1 if individual moves from any quartile to highest quartile across time , 0 otherwise. X_i is the vector of control variables that affect both education and welfare of the individual. Z_1 is the vector of those instrument variables which only affect education. The error terms might be correlated with each other means there are some excluded variables that affect both education level and welfare. For example rate of time discount rate affects both welfare and education (Kaghoma, 2012). Therefore the problem of endogeneity will arise; hence we cannot estimate equation 4 and 5 by using simple OLS method.

In the above simultaneous equations model, one endogenous variable (education level) is a continuous variable and the other endogenous variable (welfare mobility) is a dichotomous variable taking value 1 or 0. To estimate the above model Two-Step Probit Least Squares method has been used (Maddala, 1983; Keshk, 2003; Kaghoma, 2012).

$$Edu_{it} = Edu_{it}^{*} = \beta_1 Wt_{it}^{*} + \beta_2 X_1 + \mu_t \quad (3.6)$$

$$Wt_{it}^{*} = \gamma_1 Edu_{it} + \gamma_2 X_2 + \varepsilon_t \quad (3.7)$$

Here education level (Edu_{it}) is continues variable which is completely observed while welfare mobility (Wt_{it}^{*}) is a latent dichotomous variable and given as;

$$Wt_{it} = \begin{cases} 1 \; if Wt_{it}^{*} > 0 \\ 0 \; Otherwise \end{cases}$$

The following model estimates by two-stage estimation process. In the first stage fitted values of education level and welfare, mobility is estimated by using all the exogenous variables in both equation 3.8 and 3.9.

$$Edu_{it} = \pi_1 X_1 + v_1 \quad (3.8)$$

$$Wt_{it}^{**} = \pi_2 X_2 + v_2 \quad (3.9)$$

Where X is the matrix of all exogenous variables and π_1, π_2 are the vector parameters to be estimated.

OLS technique has been implemented to estimate equation 3.8 while the equation 3.9 is estimated by probit technique as welfare mobility is a binary variable.

The predicted values $\widehat{Edu_{it}}$ and $\widehat{Wt_{it}^{**}}$ from the reduced form equations in the first stage are obtained and then used in the second stage. Thus in equation 3.6 and 3.7, the original values of endogenous variables are than replaced by their fitted values obtained from the first stage.

CHAPTER: 4

RESULTS AND DISCUSSION

4.1 Disruptive Statistic

We have plotted descriptive statistics of the selected variable in the model. The total number of observation for Expenditure2010 or children welfare is 1896 with a minimum household expenditures of 3500 and maximum household expenditures is 5078987. Whereas, Average value for Expenditure2010 or children welfare is 172322 which can be explained as, on average children welfare as measured by total expenditure on children welfare is recorded as 172322. Similarly, Expenditure2001 represent parental welfare and it can be seen from the table that, on average parental welfare is 105201 which is less than the average value of children welfare.

Table 1: Summary statistics of variables

Variables	observation	Mean	Std. Dev	Min	Max
Expenditure2010	1896	172322	257516.1	3500	5078987
Expenditure2001	1008	105201.2	218792.2	0	3040368
Household size	1896	9.31686	4.578	1	36
HHH education2010	1896	4.642	5.2225	0	20
HHH education2001	2099	3.470	4.367	0	19
Number of children	1867	3.478	2.26	0	12
Number of old people	1867	0.2093	0.5206	0	3
AgeHHH2001	1867	38.657	24.717	0	94
adultproHHHpass primary	2099	0.0403	0.0616	0	0.333

.

HHH education2001 in the table represent parental education. On average, parental education is recorded more than 5 years. It can be explained as, on average, selected parents have acquired at least education of 4th grade with a minimum of no education and maximum 20 years of education. In the same way, children education is being measured through HHH education2001. On average, selected children have acquired at least education of 5th grade with a minimum of no education and maximum of 19. On the basis of these results, it can be said that children are more educated that their parents. For household size, a total 1896 number of observation were taken out where a maximum number of household recorded is 36 and minimum of 1. On average, there are more than 9 members in every selected household. In other words, average household size for the current study is more than 9. In the same way, on average the number of children per household is more than 3 with a maximum of value of 12. In other words, the maximum number children per household in this study are 12 but the mean value is more than 3.

As far as number of old people in each household is concerned, the average value is less than 1 which means there are very few number of old people in our selected households. The minimum number of old people in any of our selected household is 0 which means no old member, and a maximum of 3 which means three old members. However, on average there is less than one member recorded in our selected household. Further, for parental age or AgeHHH2001, the minimum is recorded is 0, while the maximum age is 94. The average value of parental age is more than 38 which means on average every parent in our selected household is 38 years old.

For number of primary pass adult members, the minimum value is 0 whereas the maximum is .33. On average, each household has less than 1 adult who is at least primary educated and which one of the finest characteristics of the household

demographics. In other words, on average there is no single adult household member in the family who has acquired primary education and shows the relative importance of education in these regions.

The basic aim of providing descriptive statistics is straightforward as we can answer our research questions by looking into the descriptive statistics. For instance, as we want to see the educational mobility from parent's to their children therefore by looking into table and finding the mean values will answer the stated questions. The mean value of children education denoted by HHH education2010 is 4.6 which is greater than their parents mean value of 3.4. Indeed, there is educational mobility as the mean value of education level from parents to children is increasing. In the same way, form the same table there can be seen a welfare mobility from parents to children as the average consumption level is increasing as we move from parents (105201.2) to children(172322).

4.1.1Graphical presentation

In this section we display the graphical representation of variables. Many of the variables used in this study are constructed for the estimation purpose of this dissertation, which have presents in form graph to show the nature and behavior of variables. The graphical representation and brief explanation are given as follow.

Figure 1: Ratio of Household with different number of Children

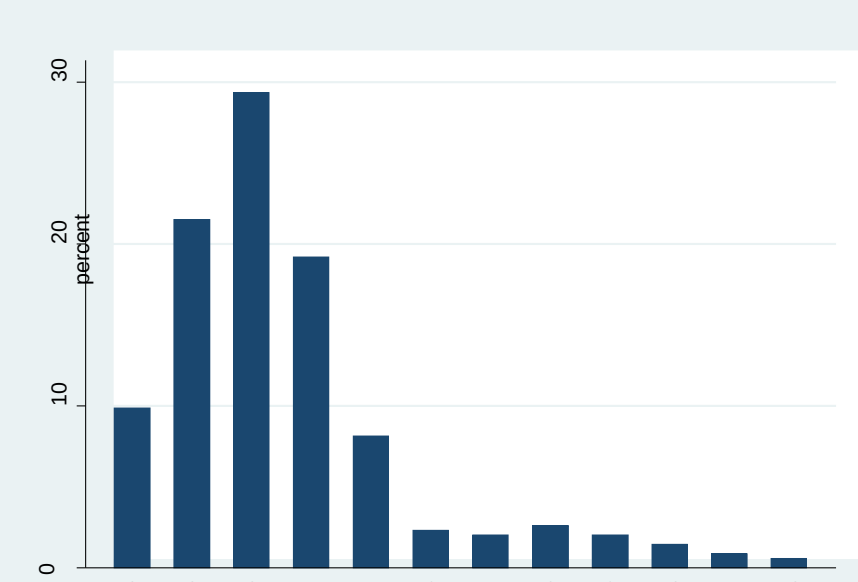


Figure represents the number of children per house hold in percentage. As we can see approximately up to 30 percent of population have three children, further the maximum percent of household have two and four children. Approximately one percent of household have 12 children, which is the lowest percentage of household throughout the sample data of this study. The whole theme of the graph shows that maximum percent of household have children in the range of zero to five.

Figure 2: Kemel density estimate

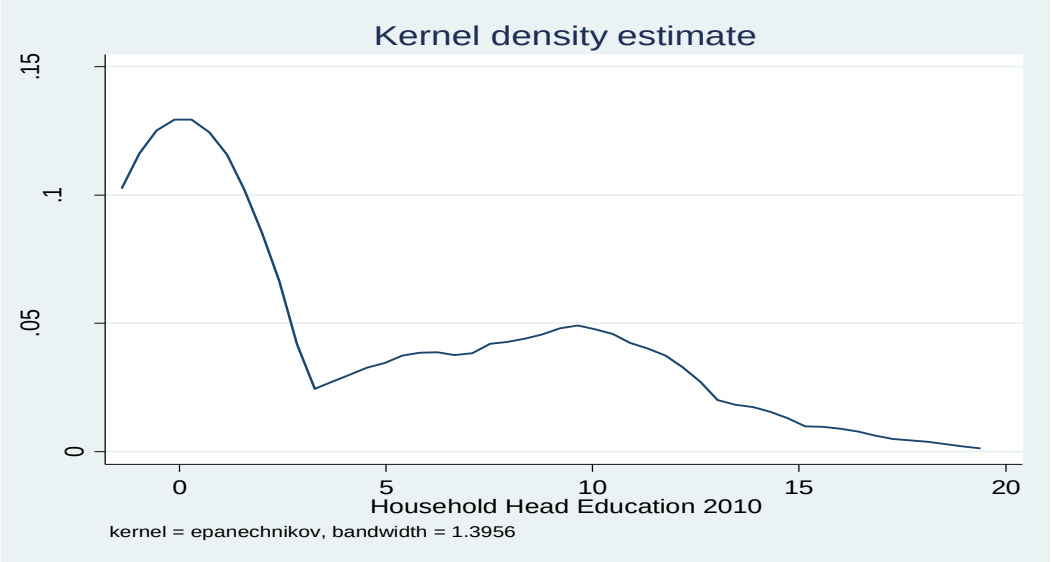


Figure 2 shows the household's head complete years of education. It is observable that most of the population lie on zero, which implies that the maximum number of household head in the sample size has never attended school or have zero year of schooling. Rest of the graph represents, matric level attended by most of the people and then in decreasing trend.

Figure 3: Kernel density estimate

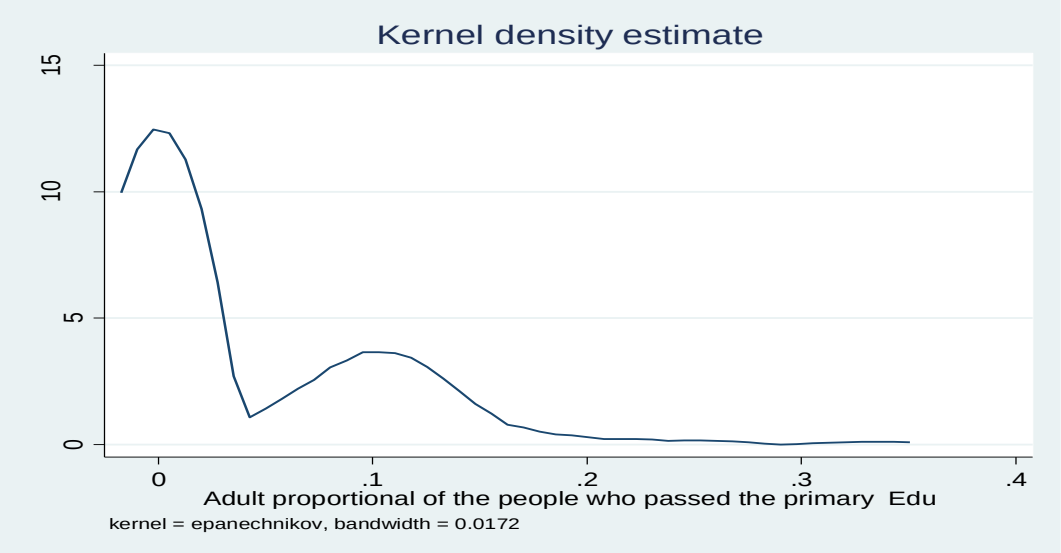


Figure 3, indicates the proportion of people in household who have passed primary education. Maximum population has no adult acquired primary education. As in the figure after zero maximum number in household is one, means one member in every family has passed primary education. Such findings with regards to education show relative importance of education in the selected regions.

Figure 4: Ratio of Household with different families size

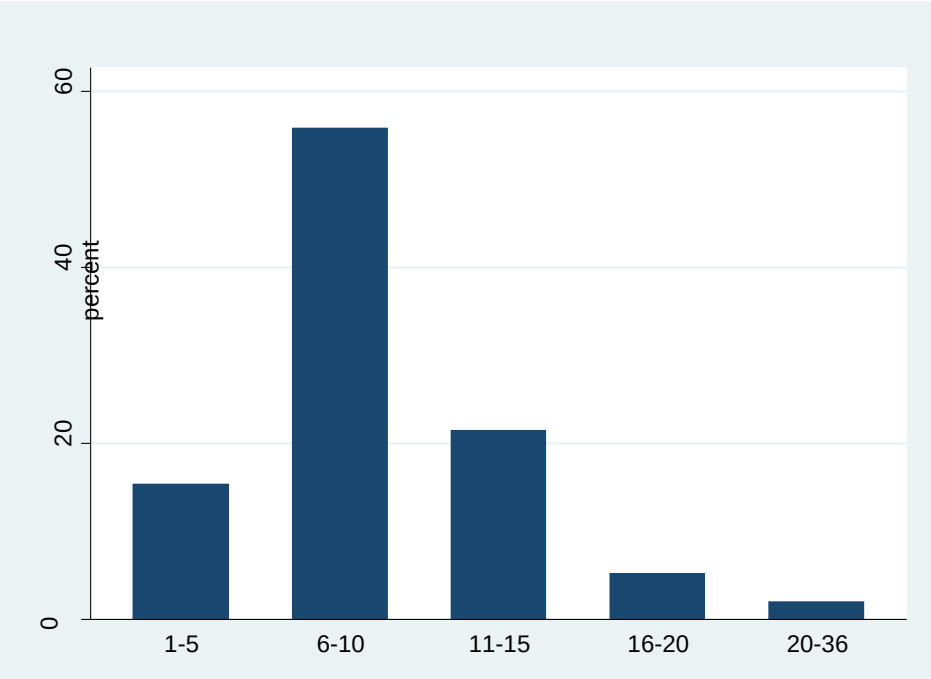


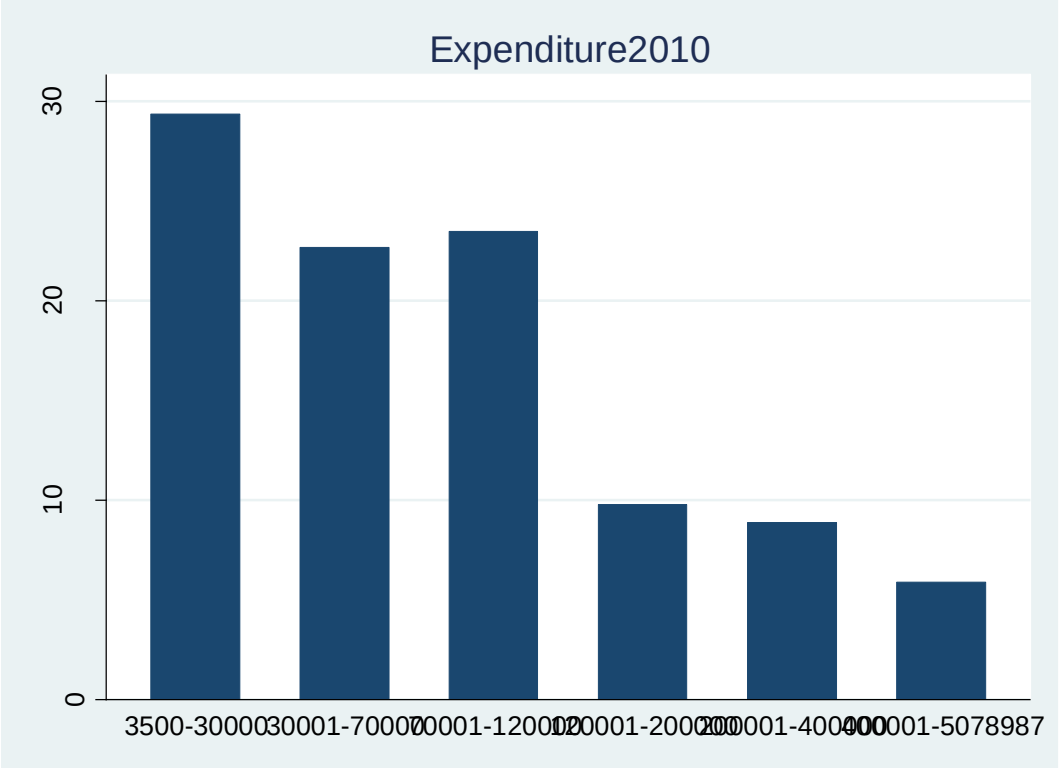
Figure 4, shows household size of a family. The data shows roughly 20 % of family own household members more than one but less than 5. Similarly, 25% of family own household members more than 11 but less than 20. But on average, for almost 60% household family size is more than 6 but less than 10. In other words, the data shows that in maximum family there is 7 or 8 members in family and then the ratio decline as the numbers increases.

Figure 5: Expenditure 2001

In figure 5 presents total expenditure of household in 2001, the minimum value is 0 and its highest value is 3040368. In 2001, 30 % total parental expenditure is in the range of 0-20000 and almost 25% total parental expenditure is in the range of 20001-50000. Similarly, more than 10% but less than 15% have total parental expenditure of more than 50000 but less than 80000. In the same way, 15% of parental expenditure lies in the range of more than three lakh. Highest portion of parents have expenditure in the

range of 0-20000 whereas lowest portion of children have expenditure in the range of 120001-200000.

Figure 6: Expenditure 2010



In figure 6, total children expenditure has been shown. Almost 30% of children have expenditure of more than 3500 but less than 30000. In the same way 25% of children total expenditure lies in the range of 30000-70000. Further 25% of total children expenditure lies in the range of 70000-120000. Only 10 % of children have total expenditure which is greater than 120000. Highest portion of children have expenditure in the range of 3500-30000 whereas lowest portion of children have expenditure in the range of 400001-500000.

Figure 7: Numbers of old Peoples

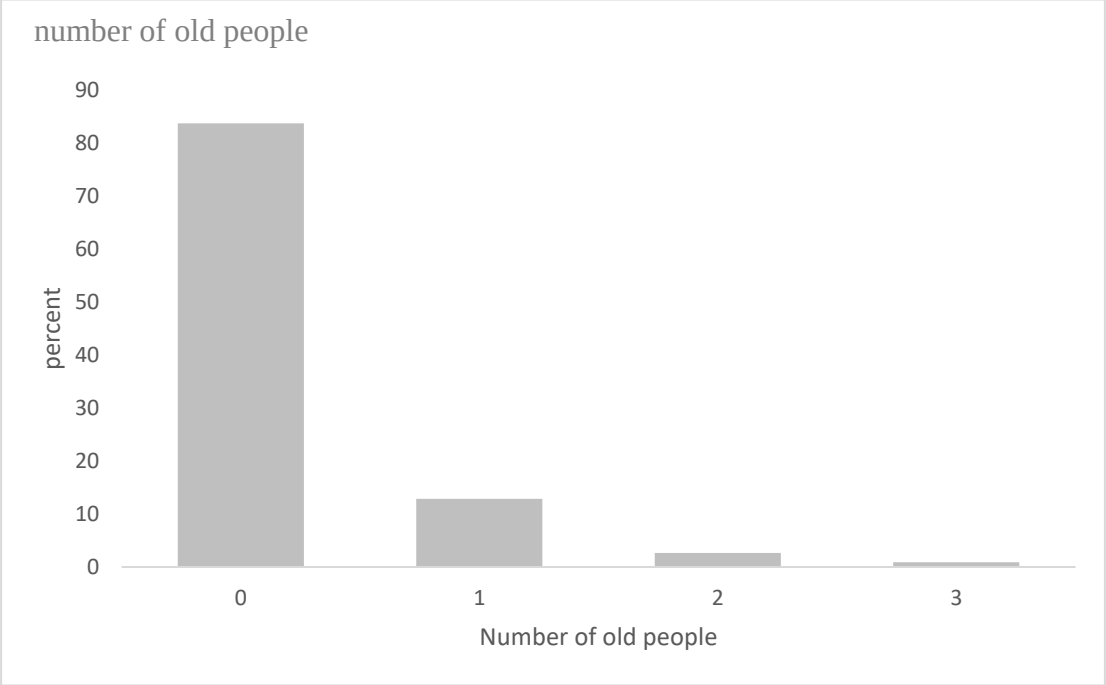


Figure 7, indicates the number of old people in a family, more than 80 percent of the whole population has no old member and then more than 10 percent of families have one old member in the family person. Maximum number of old age people are in the household is 3, which is little proportion of the whole data. In other words, such demographic shows the relative significance of education which has severe consequences for society development.

Figure 8: Household Head Age

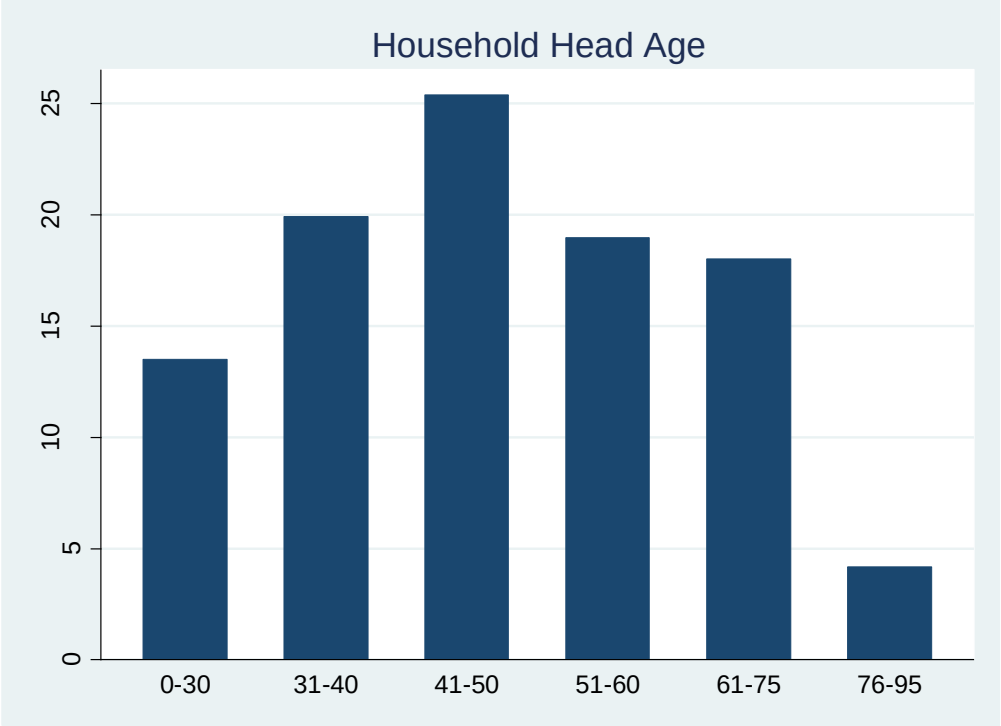


Figure 8 shows age of the household head. We simply categorize the data in six sections. It can be seen from the figure that, almost 14% of the household head are in first section which is (0-30). It implies that 14 % of household head minimum age of 0 and of maximum 30. In the same way, 20% of household head age lies in the range of 31-40 and almost 25% of household head lies in the range of 41-50. Maximum people are in the third bar which is (41-50), and minimum people lie in the last one bar.

4.2 Education Mobility Model

In this section, we have estimated our model of educational mobility. Next we have included some control set into the model as an extended educational mobility. After that, welfare measured by consumption level have been estimated. In the end, researcher has related the two, education accumulation and welfare dynamics.

Educational attainment is typically influenced by both public and private investments in education. While state policy typically drives the former, parental education is a crucial part of the latter. Definitely, one of the most important determinants for the child's education is parental education. The society, where mobility is low, educational attainment of child is completely determined by parental education. In other words, after controlling for other socio economic characteristics that highly affects educational attainment of an individual, the greater the influence of parental and maternal education, the lower is the extent of intergenerational mobility.

Firstly, we estimate education mobility separate from poverty dynamics, followed by welfare mobility before relating both.

Table 2 Education Mobility Model

VARIABLES	(1) Equation 1	(2) Equation 2	(3) Equation 3	(4) Equation 4
Log education of HHH in 2001	0.0602***	0.0793***	0.0418*	0.0163
Constant	1.017***	0.934***	0.866***	0.834***
	(0.0373)	(0.0247)	(0.0224)	(0.0277)
Observations	2,171	2,171	2,171	2,171
R-squared	0.041	0.060	0.04	0.020

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As we discuss before the value of (β) (elasticity) shows the intergenerational persistence or intergenerational immobility and alternatively, $(1-\beta)$ shows the intergenerational mobility. Its value lie between 1 and 0. The greater value shows there is high chance for a son to keep the socio-economics position same to his father. On the

other hand when ($\beta = 0$) indicates that there is no relationship between father and son's socio-economic status or complete mobility. The correlation of the coefficients is an alternative method to capture this effect. In the literature both the methods have been used.

Now the above table 1 elasticity's and correlation shows that the education of parent and their children for full sample, and then it is extended for different levels of welfare groups. The sample of house hold after regressing the full sample model, the elasticity of education is significantly different from zero, which is 0.0602. This elasticity shows highly mobility or weak persistence between parental education and their children education. In other words, when the value of coefficient is closer to zero implies that there is a high mobility or low persistence among parental education and their children's education. We have categorized welfare into three groups, for instance, welfare1 for poor household, welfare2 for middle and welfare3 for highest welfare group.

The lower welfare category has coefficient of 0.0793 with a correlation of 0.1363. Similarly, coefficient for middle welfare category is 0.0418 with a correlation of 0.0362. Comparing the lower welfare category with that of middle welfare category tell us that education mobility is higher in the latter compared to the former. Because the coefficient of lower welfare category is close to 1 compared to the middle welfare group. Finally, the highest welfare category has coefficient of 0.0163 with a correlation of 0.0304. Since the elasticity is lowest for the highest welfare group which indicates that there is a greater education mobility in the highest welfare group. It is concluded that from moving lower welfare category to higher welfare category education mobility is increasing. Our results are similar to [Okrasa, W. (1999), Christelle & Sylvie (2007), Pal (2004)].

4.3 Extended model of education mobility

It has already been mentioned that mobility of education between generations is a complicated process and there might be various other factors that can effect children's achievement, i.e. parents' education and numbers of others variables such as family background and other control variables (Haveman and Wolfe,1995). Consequently, we have opted for an augmented the simplest model via the inclusion potential explanatory variables. (Nimubona and Vencatachellum, 2007; Dumas and Lambert, 2011; Heineck and Riphanhn, 2007; Daouli et al., 2010). In addition, we have opted for those variables which are exogenous in order to avoid endogeneity. Further, all of the control variables are being grouped into individual and household level variables. Specifically, we have included the following control variables. Both age and gender of parents have been included for obvious reasons. The percentage of adults with primary education, share of agricultural assets in the total assets of households. Finally, it has provided the results obtained from the extended version model of education mobility down below.

Table 3 Extend Model of Education Mobility

	(1)	(2)	(3)	(4)
VARIABLES	**Equ 1**	**Equ 2**	**Equ 3**	**Equ 4**
Log education of HHH 2001	0.0795***	-0.0905***	0.00818	0.0841***
	(0.0149)	(0.0267)	(0.0498)	(0.0185)
Proportio of HH who pass some primery education	0.101**	0.798*	1.048***	0.0893
	(0.0493)	(0.460)	(0.344)	(0.400)
Age HH 2001	0.00467***	0.00408*	0.00205	0.00570***
	(0.00119)	(0.00216)	(0.00423)	(0.00143)
Percent Agri. In Physical Assets.	-2.19e-10	-6.04e-07	-2.52e-08	-2.84e-10
	(2.38e-10)	(4.75e-07)	(4.03e-08)	(2.36e-10)
Gender HHH 2001	0.178	-0.128	-0.227	0.265***
	(0.156)	(0.106)	(0.146)	(0.0586)
Constant	0.689***	0.939***	0.838***	0.701***
	(0.178)	(0.0266)	(0.0250)	(0.0330)
Observations	1,998	2,041	2,144	2,140
R-squared	0.023	0.019	0.007	0.030

This table 2 has been obtained from OLS regression while we have included other explanatory variables for the sake of sensitivity analysis. Since not only parental education determines their children's education but there are other factors that also explains children's education. All of the included variables are statistically significant at 5% level. It has obtained four different equations by distributing the entire sample into four categories, I.e. for full sample, poor, middle and highest income group. In the first column, the coefficient for parental education has an expected positive sign. It can be interpreted as, for every one year increase in parental education increases children education by 0.0795 %. That is parental education still explains the variation children's education and the researcher has found education mobility from parents to children. When it has separated the sample for poor, the coefficient is negative and indicates a negative relationship between parental education and children's education. That is, there is no educational mobility for poor group in the current analysis. However, again education mobility can be observed for middle and high income group. Overall, the coefficient for parental education indicates an educational mobility between parents and children.

Similarly, the percentage of household members who have received primary schooling also determines children's education level. For instance, the coefficient is 0.10 which represents that for every percentage increase in household primary education will increases children's education level by 0.10% as shown in Pal (2004). Further, the researcher has also included parental age considering it as potential factor. Both household primary education and their age are statistically significant and determines children's education level these variable also taken by Maitra and Sharma (2010).

We have included the agriculture assets as a control variable in order to identify whether 'wealth paradox' is applicable to Pakistan or not. According to wealth paradox, an

increase in the share of agriculture assets will likely to reduce education attainment especially in African countries. Since Pakistan is agricultural country therefore it is important to include share of agriculture asset as a control variable. It can be seen from the table that share of agricultural assets is negatively associated with children's education because the coefficient is negative. The coefficient is negative for all specifications and these results are consistent with Heady (2003) and kaghoma (2012). Finally, we have included gender in the model considering the capabilities of male members compared to female members. As a matter of general fact male members are much more productive than female member. Dummies have been used for gender, 1 for male and 0 for female. The coefficient is significantly different from zero and indicates that children's education level is 0.17 higher in case of male head of the family compared to children's education level in case of female head of the family. This is the situation of many developing country, our results are also consistent with Tansel (2002) and Kaghoma (2012).

4.4. Welfare mobility model

Moving to discuss the welfare mobility model of HHH and their offspring. The result of econometric regression are given in the following table. In this regression setting our dependent variable is child welfare a

Table 4 Welfare Mobility Model

VARIABLES	(1) 1	(2) 2	(3) 3	(4) 4	(5) 5
l_expsum2001	0.174***	0.109**	-0.597	0.129***	
	(0.0101)	(0.0458)	(0.878)	(0.0157)	
welfare1					2.92e-05***
					(2.33e-06)
welfare2					-1.10e-05***
					(2.47e-06)
welfare3					1.58e-10
					(3.00e-10)
Constant	9.830***	10.37***	17.63**	10.40***	11.87***
	(0.111)	(0.431)	(8.850)	(0.186)	(0.0202)
Observations	2,099	678	174	1,247	2,107
R-squared	0.125	0.008	0.003	0.052	0.071

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Before going to the dynamic model it is necessary to check the welfare mobility. In table 3 the first equation is estimated for the full sample which is significantly different from zero and is 0.109 with the correlation of 0.353. This value indicate persistence as compare to the education mobility. Or we can say the education elasticity is closer to zero. Now we divide this whole sample into three groups. Poor, middle welfare group and highest welfare group. Equation 2 and 4 are statically significant and have positive impact on dependent side. However, middle welfare group shows no such effect on the model and it has opposite sign according to expectation. If we compare the correlation of poor house hold 0.0912 and the highest welfare group 0.2271. It shows a complete immobility opposite to the case of education. Our results are supported by Kaghoma (2012).

Now to discuss further the welfare is splitting into three welfare categories to analyze the effect separately. The results are discussed to take the welfare1 as base category and

compare the remaining results. We can see that as we moving to upper welfare group the elasticities 2.92e-05 and 1.58e-10 and with their relevant correlations 0.250 and 0.020 shows lower mobility in the welfare.

Measuring these models we cannot take decision that the education and welfare are mobile or immobile. Because these are single variable models if we cannot add other variables there must be the miss-speciation problem so therefore we are moving to increase variables if we add number of variables. It may include endogenous variables. So education accumulation and welfare dynamics both combine are measured by the two stage Probit model which will discuss in the next section.

4.5 Linkage between education and welfare mobility

Table 4 is given below which represents results obtained from Two Stages Probit Least Squares. There are two equations given in the table. In Equation (1), it has provided the "extended version of education accumulation", while equation (2) has estimated the probit model in order to show individual welfare improvement from one low category to the highest category. The rest of the variables are same and have already been included in previous analysis. However, two instrumental variables have been included in the model in order to instrument the dynamics of welfare and education accumulation. Meanwhile we have already shown in the extended version that inclusion of control variable has decreased the impact of parental education on their children. Again, we have found the instrument for welfare dynamics statistically significant and resultantly choose the Two Stages Probit Least Square as an estimation strategy.

There are basically two stages in the estimation strategy. In the first stage it has conducted simple OLS regression for education assuming education accumulation as a dependent variable and noted down its predicted value. Similarly, we have employed probit regression assuming welfare dynamics as dependent variable and noted down its predicted value. In the second stage, it has treated the predicted value obtain from probit

regression as an instrument for welfare dynamics and incorporated into the simple OLS regression. Similarly, we have incorporated the predicted value obtained from simple OLS as an instrument for education accumulation into the probit regression. However, we have presented only the second stage regression in the table.

Table 5 Linkage between Education and Welfare Mobility

VARIABLES	(1) coefficient	(2) Exp(coeff)	(3) Inv(coeff)	(4) T
Instrumented welfare	0.437*** (0.182)	1.54	0.64	2.4
Log education of HHH 2001	-0.108*** (0.0412)	0.89	1.12	2.64
Number of children	-0.187*** (0.0459)	0.82	1.21	4.08
Adultprop2001	-2.302*** (0.971)	0.10	1.0	2.37
HH size	0.031*** (0.0157)	1.03	0.97	2.03
Total expenditure	-0.0002*** (0.000001)	0.99	1.01	2.32
Number of old people	-0.0002 (0.0160)	0.97	1.03	0.14
Share of non agri income	0.048*** (0.289)	1.04	0.96	0,17
Ratio of agri to total	0.00076*** (0.000031)	0.0005	2.000	2,52
Age HH 2001	0.008 (0.0031)	0.99	1.01	2,72
Constant	0.821*** (0.220)	2.27	0.44	3,72
Observations	2,099			
R-squared	0.125	0.018	0.023	0.102

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6 Second Stage of Welfare Mobility

VARIABLES	(1) coefficient	(2) Exp(coeff)	(3) Inv(coeff)	(4) Z
Instrumented education	-.772**	0.46	2.173	-1.9
	(0.405)			
Log education of HHH 2001	0.080***	1.08	0.925	2.6
	(0.031)			
HH size	-0.088***	0.91	1.09	2.9
	(0.030)			
Share of non agri income	-0.840***	0.43	2.32	-2.18
	(0.385)			
Welfare non poor	-0.20***	0.81	1.23	0.6
	(0.345)			
Highest welfare	-0.610***	1.84	0.54	2.55
	(0.2396)			
Total expenditure	-0.00011	1.01	0.990	1.56
Constant	0.430	1.53	0.653	1.36
	(0.315)			
Observations	2,099			
R-squared	0.125	0.04	0.030	0.052

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

It can be seen from the table that we have controlled the same variables as in the previous regression with an exception of instrumented education accumulation and welfare dynamics. In equation (2) coefficient for instrumented education accumulation has expected negative sign i.e. -0.77242, and its exponential form is 0.46[3]. Since exponential value of the coefficient is less than one which can be explained as, an increase in education accumulation will decreases the probability of welfare

[3] The justifications for the exponential form of coefficient are available in (1). Exponential coefficient or relative risk ratio in order to find the per unit change in independent variable. If the relative risk ratio is less than one means an increase in independent variable will decreases the probability of welfare improvement. And value of greater than one indicates that an increase in independent variable will increases the probability of welfare improvement.

improvement which is the dependent variable. In a more traditional mood, since the original coefficient has negative sign which implies simply a negative relationship between education accumulation and welfare dynamics. Again these results are consistent with Kaghoma (2012), where they have found a negative relationship between education accumulation and welfare dynamics.

The exponential coefficient only shows direction that is whether any change in independent variable increases or decreases the welfare improvement but does not tell the magnitude. Therefore, the researcher has taken an inverse of the exponential coefficient in order to explain the magnitude of the effect that independent variable has caused to dependent variable. For instance, the inverse form of exponential coefficient is 2.173, which can be interpreted as, for every one year increase in education accumulation will decreases the welfare improvement by 2.1 percent. Because there are no observable returns from children's education in the specific year. Again, these interpretation are consistent with Kaghoma (2012) where the magnitude of the coefficient was almost the same as the researcher has identified.

Similarly, the next variable is parental education which has a coefficient of 0.08, and its exponential form is greater than 1 which means parental education has positive relationship with welfare mobility. In other words, an increase in parental education can increases the welfare mobility in their children. However its magnitude is 0.92% which the researcher has derived from taking the inverse of exponential coefficient. It means for one year increase in parental education will increases their children welfare mobility by 0.92%. For other control variables, for instance parental household size the coefficient is negative as expected and its exponential value is less than one which means the higher the parental household size the lower will be the welfare mobility in

their children. Mathematically, for every one member increases in parental household size will decreases their children welfare mobility by 1.09 percent.

Other control variables are share of Non-agriculture income, parental welfare category of highest income group and parental welfare category of upper middle income group. For instance, the coefficient for non- agriculture income is negative and its exponential form is less than one indicating a negative relationship with dependent variables. More specifically, one unit increase in Non-agriculture income will decreases children welfare mobility by 2.3 %. Again, these results are consistent with literature. For instance Kaghoma (2012) has also found the same negative relationship between share of Non-agriculture income and welfare mobility with an almost same magnitude of impact as the researcher has drawn here.

As far as parental welfare category of highest income group is concerned, it is statistically significant at 5% level of significance and its coefficient has expected positive sign. Its coefficient 0.61 with an exponential function of greater than one implies positive relationship between the two variables. In other words, as parental welfare category of highest income group increases by one unit will lead to 0.54% increase in children's welfare mobility. This can be further explained as, children's belongs to highest income group have 0.54% more chances to move to into higher welfare group compared to children from lowest income group. However, parental welfare category of middle income group is not statistically significant and has negative coefficient implies a negative association between the two variables. Specifically, children's from middle income group have 1.23% more chances to migrate into higher welfare group as compared to children's who belongs to lowest income group. And finally parental expenditure sum is also statistically significant at 5% significance level. It has exponential coefficient which is greater than one implies a significant positive

relationship with the dependent variable. More specifically, children's of parents who have high parental expenditure sum have greater chances to move into higher welfare category as compared to children's belongs to a family of low parental expenditure sum.

On the basis of above results and discussion, we have concluded that, an education accumulation likely to reduce the probability of children's welfare improvement after controlling for a bunch of potential factors. In other words, it has found education mobility is not associated with welfare mobility, which also shown in several studies, such as [Singh (1992), Maitra (2003), Guo & Min (2008), (Kaghoma 2012)].

CHAPTER: 5

CONCLUSION AND RECOMENDATION

5.1 Conclusion

Educational mobility that is, parental education does determine the level of education of children after controlling for a number of potential factors. However, the impact of education mobility on welfare mobility cannot be observed in this study which is consistent with different studies conducted in African and Latin American countries.

Simple OLS results indicated a positive relationship between parental Education and Children education. By including some controls factors such as age, household size, ownership of asset, non-agriculture incomes and agriculture assets into the model to check the sensitivity of parental education with children's education and the study found it to be statistically significant. The inclusion of these control variables into the model has neither changed the coefficient of parental education nor its sign.

In the third setting intergenerational welfare mobility has been identified between parental consumption and children's consumption. However, in all specification, no intergenerational mobility was found between parental and children consumption.

The linkage between education mobility and welfare mobility is not observable in case of Pakistan which is consistent with past studies. That is, an additional year of education is likely to reduce welfare mobility by 2.1 percent particularly in lower income group. However, it has identified the impact of education accumulation on welfare mobility especially in higher income group. In other words, educational mobility can increase welfare mobility in higher income group but for lower income group it reduces welfare mobility. The basic justification for such differences is straightforward; since the supply of education is coming both from public and private sector and the quality of education is better in the latter compared to former. Children's from poor families have negative

return in case of investment on education because most of them are receiving from public sector schools and cannot afford education from private sector. Therefore, we have find no impact of education mobility on welfare dynamics. On the other hand, children's from rich families can afford quality education from private schools. The returns of education for children's coming from rich backgrounds is higher and provide incentives to continue with their education. Therefore, the researcher has find impact of education mobility on welfare mobility for higher income group.

5.2 Recommendations

1. In Pakistan, quality of education is not the same across different public and private schools and the standard of education in the former should be increase in order to fill the quality gap.
2. Most of the time, university graduates have not been able to secure employment opportunities in jobs market because either the quality of education is low or there is lack of practicality corresponding to market expectations. Therefore, government needs to focus on universities and increase quality of education.
3. In order to increase quality education in Pakistan, government should provide better training opportunities for teacher. In this regard, monitoring and evaluation programs as introduced by KP government is appreciable.
4. Still in Pakistan, forty percent of labor force is either directly or indirectly related to agriculture sector and the issue of disguised unemployment is known to everyone. Government should incentivize other sectors such as Information technology and industry in order to adjust the disguised unemployed.

5. Moreover, short term policy intervention in the form of financial assistance can also drag the poor out of poverty line.
6. For longer term, government should intervene in labor market in order to increase employment opportunities for graduates belongs to poor household.
7. It is suggested that infrastructure and social capital should be enhanced in backward regions of the country. That is, considering the demographic characteristics of backward villages, government should improve human capital opportunities and connectivity via infrastructure between urban and rural areas.

5.3 Limitation of the study

The major limitation of our research study is missing values in the data set. Data has been taken from the Pakistan panel household survey (PPHS) 2010. A survey administrated by Pakistan Institute of Development Economics (PIDE) since 2001 till 2010. The PPHS, provides very rich information on socio-economic characteristics of households, data for 4246 households is collected which is divided into 2746 urban and 1500 rural units respectively, but there is a lot of missing values in this survey and also over estimated observations for some observations. For example, one can get maximum education upto 18 or 20 years but if we can see the data carefully there is 26 and 28 number also plotted for education, which is impossible. So we consider it as outlier and we simply ignored it.

Another limitation of the study is, this data set is panel survey and conducted after every five year. But after 2010 this survey has not been conducted. So this data set is old and the situation of our country may be different now.

Due to limited data we are not able to generalize these result throughout the history of Pakistan and on other regions. The two rounds couldn't explain the phenomenon of intergenerational education mobility very well, however this is a small struggle to explore its dynamics and effects on poverty.

Time and resource constraints were also a hindrance since the data cleaning process and collection of data on variables of interest were very tedious and time consuming.

REFERENCES:

Alderman, Harold, Jere Behrman, Shahrukh Khan, David Ross, and Richard Sabot (1996). "Decomposing the Regional Gap in Cognitive Skills in Rural Pakistan". *Journal of Asian Economics* 7 (1):49-76.

Appleton, S. (2001). Education, Incomes and Poverty in Uganda in the 1990s. University of Nottingham.

Arif, G. M., & Farooq, S. (2014). Rural poverty dynamics in Pakistan: Evidence from three waves of the panel survey. Pakistan Development Review.

Bardhan, P. (2005). Theory or empirics in development economics. *Economic and Political Weekly*, 4333-4335.

Bauer, P., & Riphahn, R. T. (2006). Timing of school tracking as a determinant of intergenerational transmission of education. *Economics Letters*, *91*(1), 90-97.

Becker, G. S., & Tomes, N. (1986). Human capital and the rise and fall of families. Journal of labor economics, 4(3, Part 2), S1-S39.

Becker, G. S., Murphy, K. M., & Tamura, R. (1990). Human capital, fertility, and economic growth. *Journal of political economy*, *98*(5, Part 2), S12-S37.

Behrman, J. R., & Deolalikar, A. B. (1990). The intrahousehold demand for nutrients in rural south India: Individual estimates, fixed effects, and permanent income. *Journal of human resources*, 665-696.

Behrman, J., (1999). New markets, new opportunities? Economic and social mobility in a changing world, chap. Social mobility: Concepts and measurement in Latin America and the caribbean. *The Brookings Institution and the Carnegie Endowment for International Peace, Washington, D.C.*

Black, S. E., Devereux, P. J., & Salvanes, K. G. (2005). Why the apple doesn't fall far: Understanding intergenerational transmission of human capital. American economic review, 95(1), 437-449.

Bratti, M., Checchi, D., & De Blasio, G. (2008). Does the expansion of higher education increase the equality of educational opportunities? Evidence from Italy. *Labour*, *22*(s1), 53-88.

Brown, P. H., & Park, A. (2002). Education and poverty in rural China. Economics of education review, 21(6), 523-541.

Burney, Nadeem and Mohammad Irfan (1991). "Parental Characteristics, Supply of Schools, and Child School Enrolment in Pakistan" *The Pakistan Development Review*, 30:1

Chaaban, J., & Mansour, W. (2012, June). The impact of remittances on education in Jordan, Syria and Lebanon. Working Paper 684, Economic Research Forum.

Cheema, A. (2013). Historical Inequality and Intergenerational Educational Mobility: The Dynamics of Change in Rural Punjab Ali Cheema and Muhammad Farooq Naseer.

Chevalier, A., Harmon, C., O' Sullivan, V. et al. The impact of parental income and education on the schooling of their children. IZA J Labor Econ 2, 8 (2013) doi:10.1186/2193-8997-2-8

Christelle, D. U. M. A. S., & Sylvie, L. A. M. B. E. R. T. (2007). *Educational achievement and socioeconomic background: causality and*

mechanisms in Senegal (No. 0706). Laboratoire d'Economie Appliquee, INRA.

Daouli, J., Demoussis, M., & Giannakopoulos, N. (2010). Mothers, fathers and daughters: Intergenerational transmission of education in Greece. *Economics of Education Review*, *29*(1), 83-93.

Dearden, L., Machin, S., & Reed, H. (1997). Intergenerational mobility in Britain. *The Economic Journal*, 47-66.

Duncan, O. D. (2018). Methodological issues in the analysis of social mobility. In *Social structure and mobility in economic development* (pp. 51-97). Routledge.

Durr-e-Nayab, & Arif, G. M. (2012). Pakistan Panel Household Survey Sample Size, Attrition and Socio-demographic Dynamics. Pakistan Institute of Development Economics.

Emerson, P. M., & Souza, A. P. (2007). Child labor, school attendance, and intrahousehold gender bias in Brazil. *The World Bank Economic Review*, *21*(2), 301-316.

Entwisle, D. R., & Alexander, K. L. (1992). Summer setback: Race, poverty, school composition, and mathematics achievement in the first two years of school. American Sociological Review, 72-84.

Featherman, D. L., & Hauser, R. M. (1977). The process of stratification: Trends and analyses. *New York*.

Guo, C., & Min, W. (2008). Education and intergenerational income mobility in urban China. *Frontiers of Education in China*, *3*(1), 22-44.

Hannum, E. C. (1997). *Educational inequality: Hidden consequences of the reform era in rural China* (Doctoral dissertation).

Haveman, R., & Wolfe, B. (1995). A review of methods and findings. *Journal of economic literature*, *33*(4), 1829-1878.

Havenga, R. (1986). The Role of Non-Profit Organizations in Education and Training. *Black advancement in South African economy (London, MacMillan Press, 1987)*, 146.

Heineck, G., & Riphahn, R. T. (2009). Intergenerational transmission of educational attainment in Germany–the last five decades. *Jahrbücher für Nationalökonomie und Statistik*, *229*(1), 36-60.

Hertz, T., Jayasundera, T., Piraino, P., Selcuk, S., Smith, N., & Verashchagina, A. (2007). The inheritance of educational inequality: International comparisons and fifty-year trends. *The BE Journal of Economic Analysis & Policy*, *7*(2).

Himaz, R., & Aturupane, H. (2011). *Education and Household Welfare in Sri Lanka from 1985 to 2006*. Department of Economics, University of Oxford.Keswell, M. (2004).

Holmes, J. (2003). Measuring the determinants of school completion in Pakistan: analysis of censoring and selection bias. *Economics of Education Review*, *22*(3), 249-264.

Jalan, J., & Murgai, R. (2008). Intergenerational mobility in education in India. *Indian Statistical Institute, Delhi*.

Javed, S. A., & Irfan, M. (2014). Intergenerational Mobility: Evidence from Pakistan Panel Household Survey. The Pakistan Development Review, 175-203.

Keshk, O. M. (2003). CDSIMEQ: A program to implement two-stage probit least squares. The Stata Journal, 3(2), 1-11.

Keswell, M. (2004). NON-LINEAR EARNINGS DYNAMICS IN POST-APARTHEID SOUTH AFRICA. South African Journal of Economics, 72(5), 913-939.

King, Elizabeth, Jane R. Peterson, Sri Moertiningsih Adioetomo, Lita J. Domingo, and Sabilia Hassan Syed, (1986). "Change in the Status of Women Across Generations in Asia"*R,and Report # 3399*.

Knight, J., & Song, L. (2000, January). Differences in educational access in rural China. In American Economics Association Annual Meeting (pp. 7-9).

Lareau, A. (1987). Social class differences in family-school relationships: The importance of cultural capital. *Sociology of education*, 73-85.

Lillard, L. A., & Willis, R. J. (1994). Intergenerational educational mobility: Effects of family and state in Malaysia. Journal of Human Resources, 1126-1166.

Lohano, H. R. (2009). Agricultural Growth and Poverty Dynamics in Rural Pakistan: Evidence from Longitudinal Survey for Sindh Province (1987–88 to 2004–05) (Doctoral dissertation, PhD dissertation).

Maddala, G. S. (1983). *Limited-dependent and qualitative variables in econometrics* (No. 3). Cambridge university press.

Magnuson, Katherine. (2007). "Maternal education and children's academic achievement during middle childhood". Developmental Psychology, 43, 1497-1512.

Maitra, P. (2003). Schooling and educational attainment: evidence from Bangladesh. *Education Economics*, *11*(2), 129-153.

Maitra, P., & Sharma, A. (2009, November). Parents and children: Education across generations in India. In *5th annual conference on economic growth and development, ISI Delhi, Delhi*.

Muller, S. M. (2010). Another problem in the estimation of intergenerational income mobility. *Economics Letters*, *108*(3), 291-295.

Ng, I. Y., Shen, X., & Ho, K. W. (2009). Intergenerational earnings mobility in Singapore and the United States. *Journal of Asian Economics*, *20*(2), 110-119.

Nimubona, A. D., & Vencatachellum, D. (2007). Intergenerational education mobility of black and white South Africans. *Journal of Population Economics*, *20*(1), 149-182.

Okrasa, W. (1999). *Who Avoids and Who Escapes from Poverty during the Transition? Evidence from Polish Panel Data, 1993 96*. The World Bank.

Oreopoulos, P., Page, M. E., & Stevens, A. H. (2006). The intergenerational effects of compulsory schooling. Journal of Labor Economics, 24(4), 729-760.

Pal, S. (2004). Child schooling in Peru: Evidence from a sequential analysis of school progression. Journal of Population Economics, 17(4), 657-680.

Salvanes, K. G., &Bjorklund, A. (2010). Education and family background: Mechanisms and policies. NHH Dept. of Economics Discussion Paper, (14).

Sathar, Zeba and Cynthia Lloyd (1993). "Who Gets Primary Schooling in Pakistan: Inequalities Among and Within Families" *The Population Council Working Papers Series*- no. 52.

Schultz, T. P. (2002). Why governments should invest more to educate girls. World Development, 30(2), 207-225.

Singh, R. D. (1992). Underinvestment, low economic returns to education, and the schooling of rural children: Some evidence from Brazil. Economic Development and Cultural Change, 40(3), 645-664.

Solon, G. (1992). Intergenerational income mobility in the United States. The American Economic Review, 393-408.

Solon, G. (2004). A model of intergenerational mobility variation over time and place. Generational income mobility in North America and Europe, 38-47.

Tansel, A. (2002). Determinants of school attainment of boys and girls in Turkey: individual, household and community factors. Economics of Education Review, 21(5), 455-470.

Tsang, M. C. (1996). Financial reform of basic education in China. *Economics of Education Review*, *15*(4), 423-444.

Van der Berg, S. (2002, March). Education, poverty and inequality in South Africa. In a *paper to the Conference of the Centre for the Study of African Economies, on Economic Growth and Poverty in Africa. Oxford, March*.

Van der Berg, S., & Louw, M. (2004). Changing patterns of South African income distribution: Towards time series estimates of distribution and poverty. *South African journal of economics*, *72*(3), 546-572.

Woolard, I., & Klasen, S. (2005). Determinants of income mobility and household poverty dynamics in South Africa. *Journal of Development Studies*, *41*(5), 865-897.

Zuluaga, B. (2007). Different channels of impact of education on poverty: An analysis for Colombia. *Available at SSRN 958684*.

APPENDIX 1

FIRST STAGE REGRETION

VARIABLES	Log education of child coefficient	welfare coefficient
Log education of HHH 2001	-0.081**	0.066
	(0.045)	(0.075)
Number of children	-0.134***	-0.117*
	(0.040)	(0.068)
Adultprop2001	-2.128***	0.330***
	(0.98)	(1.550)
HH size	0.049***	0.043*
	(0.0148)	(0.028)
Total expenditure	-0.0008***	0.00060
	(0.000031)	(0.0074)
Number of old people	-0.0025	0.0009
	(0.0161)	(0.024)
Share of non agri income	-0.245	-0.680**
	(0.250)	(0.370)
Ratio of agri to total	0.00076***	0.00016
	(0.000014)	(0.00013)
Age HH 2001	0.0046*	-0.0091*
	(0.0035)	(0.005)
Welfare of non-poor	-0.0125	0.165
	(0.0444)	(0.347)
Highest welfare	0.172	0.057*
	(0.145)	(0.236)
Constant	0.851***	0.0574
	(0.220)	(0.403)
Observations	2,099	2,099
R-squared	0.215	0.104

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

For education mobility 2nd stage regretion

VARIABLES	(1) coefficient	(2) Exp(coeff)	(3) Inv(coeff)	(4) t
Instrumented welfare	0.437***	1.54	0.64	2.4
	(0.182)			
Log education of HHH 2001	-0.108***	0.89	1.12	2.64
	(0.0412)			
Number of children	-0.187***	0.82	1.21	4.08
	(0.0459)			
Adultprop2001	-2.302***	0.10	1.0	2.37
	(0.971)			
HH size	0.031***	1.03	0.97	2.03
	(0.0157)			
Total expenditure	-0.0002***	0.99	1.01	2.32
	(0.000001)			
Number of old people	-0.0002	0.97	1.03	0.14
	(0.0160)			
Share of non agri income	0.048***	1.04	0.96	0,17
	(0.289)			
Ratio of agri to total	0.00076***	0.0005	2.000	2,52
	(0.000031)			
Age HH 2001	0.008	0.99	1.01	2,72
	(0.0031)			
Constant	0.821***	2.27	0.44	3,72
	(0.220)			
Observations	2,099	678	174	1,247
R-squared	0.125	0.008	0.003	0.052

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

For welfare 2nd stage regrtion

VARIABLES	(1) coefficient	(2) Exp(coeff)	(3) Inv(coeff)	(4) z
Instrumented education	-.772**	0.46	2.173	-1.9
	(0.405)			
Log education of HHH 2001	0.080***	1.08	0.925	2.6
	(0.031)			
HH size	-0.088***	0.91	1.09	2.9
	(0.030)			
Share of non agri income	-0.840***	0.43	2.32	-2.18
	(0.385)			
Welfare non poor	-0.20***	0.81	1.23	0.6
	(0.345)			
Highest welfare	-0.610***	1.84	0.54	2.55
	(0.2396)			
Total expenditure	-0.00011	1.01	0.990	1.56
Constant	0.430	1.53	0.653	1.36
	(0.315)			
Observations	2,099			
R-squared	0.125	0.04	0.030	0.052

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1