

**INTERGENERATIONAL EDUCATIONAL MOBILITY: EVIDENCE FROM
PAKISTAN PANEL HOUSEHOLD SURVEY**



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CERTIFICATE

This is to certify that this thesis entitled: "Intergenerational Educational Mobility: Evidence from Pakistan Panel Household Survey" submitted by Ms. Naila Baig is accepted in its present form by the Department of Economics, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfillment of the degree of **Master of Philosophy in Economics**.

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ABSTRACT

This dissertation addresses the question of intergenerational educational mobility in Pakistan. There is broad consensus in the literature on the positive effects of paternal social background and educational achievement for both developed and developing countries but this phenomenon has acquired less attention in the context of Pakistan especially when it comes to the direct/causal link between them. Hence, the objective of our study is to scrutinize the extent and pattern of the direct link between father-son educational trajectories. It uses two related methodologies to measure mobility; instrumental variable approach and transition matrix, using Pakistan Panel Household Survey, 2010. To appraise educational mobility across different dimensions of inequality in the country, separate analysis is executed across gender, rural-urban settings and provinces. The results show a despairing situation where father's educational level highly determines the educational portfolio of children and points significant difference in the extent and pattern of mobility across gender, urban-rural settings, and provinces. This shows worsening long-run inequality of opportunities in these social groups and widening the gap between haves and have-nots. Female, rural children and Baluchistan province are found to be the most vulnerable and main fatalities of pronounced inequality in educational outcomes.

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CHAPTER 1

INTRODUCTION

1.1 Background of the Study

For every generation, there is no fresh beginning. Life is analogous to a relay race in which parents pass the baton to their children. Addressing social justice problems from such standpoint, we have to admit at least two imperative repercussions. First, policy interventions in this domain should target at “*leveling the playing field*” instead of reallocating resources from winners to losers; secondly, we must consent that social mobility can be a much more precise measure of social justice than inequality. The latter emphasizes only on the finish line: it overlooks what happens in the middle of the race.

Interestingly, the argument concerning social justice in developing countries centers mainly on inequality of opportunities.¹ This is significant since we can argue that if social mobility had been given added attention, policies would have been different: more concerned with the equal provision of opportunities rather than compensating the marginalized (Inter-American Development Bank, 1998). However, the negligence of social mobility is not utterly a matter of principle. We can mention at least two reasons of why social mobility is much more challenging to gauge than the distribution of income. Firstly, we do not have any clear method to gauge social mobility; secondly, most exercises involve longitudinal data sets requiring data on

¹ See Banerjee and Duflo (2003), Mookherjee and Ray (2003) Barro (2000), Benabou (2000), Bertola, et al (2006), Castello and Domenech (2002).

consecutive generations. These problems, to some extent, explain why social mobility is overlooked in the studies concerning social justice in emerging nations.

Social mobility is assessed by looking at the association of the socioeconomic standing of parents and their children. These correlations reckon the rate of transmission of interpersonal inequity from one generation to the next and are often inferred as a measure of society's failure to deliver equitable opportunities to individuals from different family backgrounds². Though many studies of intergenerational status persistence or contrary to it 'status mobility' are available for the United States and Europe, our understanding of the drifts in this indicator is far from complete regarding emerging nations.

An important issue in any intergenerational study remains to be the measurement of economic status. Numerous studies proxy economic status by labor market features such as earnings, occupation, and educational attainment. Former studies mainly concentrate on income and earnings in investigating intergenerational mobility; however, it is extensively emphasized in the literature that education has second round impact on other social indicators like income, health, and occupation etc., (see Black and Devereux, 2011). Hence improving our understanding of the association between child's education and family's educational background is imperative.

The educational tie amid cohorts is significant in shrinking social injustice. Supplementing studies on intergenerational mobility in monetary terms, measure of intergenerational mobility, built on education, can be a reasonable proxy for mobility in overall economic status. In this facet, Goldberger (1989) notifies that, confining attention to the

²The authenticity of this explanation has been challenged by Jencks and Tach (2005, page 2), who reason that "the size of the link amid the economic position of parent-child is not a good gauge of how close a society has advanced to equalizing opportunity.

economic measures, the literature on social mobility may lessen the impact of background characteristics of the family on inequity.

The conventional approach to analyzing intergenerational educational mobility assesses the parent-progeny link in the attainment of education.³ Undeniably, parental educational background is one of the utmost essential predictors of a child's educational trajectory (Maitra and Sharma, 2009). The common view is that children's opportunities and decision processes can be upgraded by a background provided by educated parents. In an intransigent society with perseverance, parent's educational profile utterly defines the education of child. In other words, other socio-economic aspects being constant: which possibly affects educational qualification of a child, the greater is the impact of paternal education, lesser is the degree of mobility.

Prominence of parent's education can be evident from a number of studies: Pal (2004) examines data on child education for Peruvian families and demonstrates positive impact of parent's education on child's educational outcome; Singh (1992) analyzes key economic characteristics of educational demand for Brazilian rural families and learns that the parental education significantly influences household's educational demand for their children, with maternal education demonstrating larger effect than paternal; Maitra (2003) reports an analogous result for Bangladesh; Dreze and Kingdon (2001) uses data on schooling, studying the impact of quality of school on involvement of children. They find that probability of participation increases with parental education.

Unfortunately, few studies have comprehensively delineated the causal link between parental background and child educational attainment. Notable works on this subject include

³ Black and Devereux (2010), Bjorklund and Salvanes (2010) studies are on developed countries, and Hertz et al. (2009) provides evidence for developing countries.

Lillard and Willis (1994), unambiguously consider endogeneity using statistics from Malaysia; Dumas and Lambert (2010) for Senegal; Pushkar et al (2009) for India.

Despite the extensive literature on mobility internationally, it's not a widely measured phenomenon in Pakistan: most probable reason can be the unavailability of data. There are only a handful of studies dealing with intergenerational mobility; most of them tackle the issue of income and earning mobility. A pilot study by Havinga et al (1986) computed intergenerational mobility and variations in socioeconomic conditions of the people from one generation to another. Other major contributions include works by Shezadi et al (2006), and Javed and Irfan (2012).

We have found small number of research works that investigate the effect of parental background on education of child. Some of them include Holmes (1999), Behrman et al (1997), Alderman et al (1995; 1996), and Sathar and Lloyd (1993). None of these studies provide a comprehensive review of intergenerational educational mobility in Pakistan.

Hence, the primary goal of this dissertation is addressing the causal link of parental background with child's educational trajectory in the context of Pakistan. By parental background we mean explicitly father's educational status and income level; we lack the required data for mothers. To achieve the motive, we evaluate the levels and patterns of the impact that parent's background has on child's educational outcome using PPHS cross-sectional data.

We focus on sample of adult children above 10 years of age due to censoring problem with greater emphasis on possible gender, rural-urban settings and inter-provincial variations. Other than some exceptions, preceding studies emphasize almost entirely on father-son intergenerational association. However, in this thesis, we investigate the intergenerational

correlation of both sons and daughters using two approaches; one is instrumental variable approach that deals with the problem of endogeneity for both background variable (education and income), while the other deliberates the patterns of intergenerational mobility across generation, employing mobility matrices.

1.2 Objective of the Study

The purpose of this dissertation is to deliver robust evidence on the extent and pattern of intergenerational educational mobility and the part played by gender, regional and provincial differences in Pakistan. Hence the objectives of our dissertation can be listed as:

- To analyze the extent and pattern of intergenerational educational mobility in Pakistan.
 - We carry out instrumental variable and mobility matrix approach in our analysis.
- To appraise the mobility study across different dimensions of inequality.
 - Separate analysis is done for gender, rural/urban settings and for the four provinces of Pakistan.
- To drop policy guidelines

1.3 Significance and Scope of the Study

We are interested in analyzing the pattern and level of intergenerational educational mobility in Pakistan, which acquires little attention as compare to other economic status proxies of mobility. Though a small number of studies examine intergenerational educational mobility but there is a lack of comprehensive study in this area of study. Moreover, none of the studies deal with the causal linkage between parental background and child educational outcome.

Thus this thesis, aims at providing new empirical evidence on the intergenerational linkage between generations by dealing with the endogeneity problem for both parental background variables. Not only the extent of mobility is under consideration but the pattern of mobility between generations is also provided using transition matrix.

From a policy standpoint, considering the issue of causal impact, this thesis offers an insight on the transmission of inequalities in education across generations. Compensating inequities that derive from variations in socio-economic backgrounds is not a straightforward task and the chance of doing so rest highly on the underlying mechanisms. School being a policy tool is comparatively simple to control for a government but attaining a clear understanding on, to what extent it might be exploited for this resolution, is valuable. Hence, the outcomes from such examination are useful in designing an expedient policy to enhance the quality of human capital of children.

Additionally this dissertation offers outcomes on the extent of intergenerational mobility in educational outcomes which can improve the understanding of policymakers mandated to operationalize Article 25-A of the Constitution, which pertains to a child's right to education; and help them target their efforts better.

1.4 Structure of thesis

The rest of the thesis is organized as follow: This section is followed by section two that bestows a brief review of the literature. Section three delivers the empirical illustrations while results and discussion are presented in section four. Section five concludes the study.

CHAPTER 2

LITERATURE REVIEW

In numerous studies hitherto, people socio-economic status is associated with that of their predecessors. The earliest and most primitive contribution in this area of study is by Gary Becker (1964) in economics while a noticeable work from sociological point of view is presented by James Coleman (1966). Since then Economists and social scientists have dedicated their attention to intergenerational mobility, and documented a large amount of studies in this area of research. Yet these studies are limited to estimating intergenerational mobility by means of income or earning. However, it is unanimously agreed in the literature that education has a second round effect on other indicators of economic growth and plays an important role in curtailing poverty and economic inequality, Orazem and King (2008) and Strauss and Thomas (1995). Thus reckoning economic status discretely by educational background, offers a strong measure of intergenerational mobility though relatively difficult to interpret.

Intergenerational educational mobility is normally estimated by intergenerational correlation and elasticity. Using these measures a notable assessment of intergenerational educational mobility for 42 countries is provided by Hertz et al. (2007) wherein highest correlation is found for South America while the lowest for the Nordic countries. Studies on other developing countries, like Brazil and Mexico, include Lam and Schoeni (1993) and Woodruff and Binder (1999) respectively, estimating relationship between family background and child's educational outcome.

This approach (intergenerational correlation and elasticity) is widely been used by researchers for many years; however since Gary Solon (1999)⁴, the literature turns in a different direction. While securitizing exact estimates of elasticity and correlations, it gives considerable importance to the causal impact underling this relationship.⁵ Primarily the emphasis of the literature is to straighten out the factors owing to inheritance and those that relates to childhood environment. The prevailing understanding is that, to some degree the correlation between two generations is explained by the genetic variations across families, whereas the exact impact of nature and nurture on child's outcome is still an open debate.⁶

In recent times, the emphasis of researcher is gone ahead of nature/nurture discussion; they rather start establishing the actual impact of various parental characteristics on child's background. There are different methodological approaches, in use, to delineate the mechanism and causes underlying the relationship between parental background and child's future outcome.

To isolate the impact of parental education, two broad approaches are in use in the existing literature. First one makes use of the data on siblings (identical twins, adopted children) and their respective children, to remove family fixed effects. Second is the instrumental variable approach. Both strategies try to segregate the influence of parent's education from the other unobservable characteristics of parents that can pass on from parents to children affecting their educational outcome, like cognitive and non-cognitive skills. We reflect on each of these methods one after another.

In point of fact, twins being the most alike personalities are considered in studying mobility; belonging to the same family, experiencing same lifetime events, and sharing the same genes especially in the case of monozygotic twins. The study of intergenerational transference

⁴ In the Handbook of Labor Economics

⁵Unfortunately, the literature shows very inconsistent results. There is need to carry out further research in this area.

⁶See Sacerdote (2008) provides an overview of nature/nurture literature.

of education using twin pairs is based on the schooling of their children. Their children (i.e. cousins) inherit, to a greater extent, the ability and other family features from their parents. This helps in identification of the parental educational portfolio by comparing whether the educational background of child belonging to the more educated twin is strong as compare to the child of the less qualified twin. One of the pioneers of such study is Behrman and Rosenzweig (2002), wherein no association is found between educational level of mother and child using female monozygotic pairs of twins; while on the contrary, executing the same fixed effect exercise on male twin sample, provides the evidence of intergenerational mobility of education from father to child.

To eliminate the bias, or at least reduce it, a sample of adopted children is also used in the assessment of the intergenerational transference of education. Though there is no hereditary transfer of ability amid the adoptive parent-child but the connection between child and parent education would tell a direct link between the two. In addition, by comparing the estimates attained from adopted children with that of own-born children, significance of the impact of unobservable characteristic of family is revealed. Dearden, *et al* (1997), Sacerdote (2002), and Plug (2004) are one of the few studies to use data sets of adopted children to identify transmissible effects of parental education. They evaluate the influence of parental qualification on adopted children's and compare it with non-adoptee or own-born children of other individuals.

All of the studies show a significant coefficient of father's education for both own-born children and adoptees, nevertheless the effect on adopted children falls slightly lower than effect on own-born children. In the similar way, Björklund *et al* (2006) use Swedish adopted children born between the years of 1962 and 1966. Their estimates show a positive impact of adoptive

fathers' education on their adopted child's educational trajectory; however it falls to one-fifth of effect on own-born children when dealing with the sample of adoptive mothers'.

The other method that is employed to identify the direct link of parent-child education is '*instrumental variable approach*'. This technique involves identifying the changes in parents' education, which perhaps not linked to other parental features, is further use to isolate the influence of parent's education on the consequences of children. This approach is much more extensively used in literature to look for causation between parents' and child's education. Two types of instruments are used in this approach; one is to make use of some external changes i.e. natural or random experiments; other is to use variables that are specific to household but do not directly associated with child's education.

Applying this method using 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. 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.

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 set⁷. But due to unavailability of appropriate data on twins and adoptees we are constrained to the use of instrumental variable approach only.

⁷The recent papers by Holmlund, Lindahl and Plug (2008) and Hægeland, Kirkebøen, Raaum and Salvanes (2010) illustrate the findings across methodologies by using many complete cohorts of parents and children for Norway and Sweden and comparing methodologies across the same data sets.

2.1 In context of Pakistan

The link amid parent and child educational background is less inquired and far less demonstrative in prior studies of Pakistan. Although Holmes (1999) concludes that child's education (both girls and boys) is significantly determined by paternal and maternal education in Pakistan but 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.

Father's education being a strong predictor of son's education is also evident in Javed and Irfan (2012) work, wherein they descriptively analyzed the father-son relation using transition matrix. A vicious cycle trap is very much evident in their analysis, which shows a high probability of transmission of father's education status to his son.

All and all, none of the above literature deals with the causal link between parental and child education, thus this thesis would be an important contribution to the literature of intergenerational educational mobility in the context of Pakistan.

CHAPTER 3

DATA AND METHODOLOGY

3.1 Data

Generally, panel survey datasets are rarely conducted in Pakistan, owing to their complex nature and expensive to execute. One such accessible longitudinal survey is led by International Food Policy Research Institute (IFPRI), which took this initiative in, 1986. This survey is conducted periodically over a period of five years till 1991, collecting data from 800 rural household.

After an extensive period of 10 years, Pakistan institute of development economics (PIDE) took a major step with the financial support of the World Bank to revisit IFPRI panel households. In its first round of survey in 2001, sample is expanded from four to sixteen districts, representing all four provinces of Pakistan. Since the sample is comprised only of rural households, it is given the name of Pakistan Rural Household Survey (PRHS).

The second round of PRHS is carried out in 2004, tracking households of Punjab and Sindh only.⁸ While the third round not only is successful in covering all four provinces but to add urban sample to the existing survey design of PRHS. This led the Survey to be renamed as the Pakistan Panel Household Survey (PPHS).⁹

The data we use for our thesis are from the third round of PPHS, which provides us the desired sample from both urban and rural demographics. As mentioned above, first two rounds of PPHS do not cover the urban demographics, limiting us to the use of the third round of PPHS

⁸ KPK and Balochistan household could not be tracked due to security problems.

⁹ Arif, G. M. (2014), provides an overview of PPHS data and its dynamics.

only. In PPHS-2010, the total rural households interviewed in four provinces are 2800, out of which 2198 are panel households while the remaining 602 are split households. With the addition of 1342 urban households, the total sample size of the PPHS 2010 accounts for a total of 4142 households.

For our purpose in this paper, one of the important leads of using this survey is to track the dynamics of education and income more precisely for fathers and children. Another major advantage is the availability of appropriate instruments for our empirical study. PPHS 2010 dataset is comprised of information on three generations of individuals (grandparent, father and children) which is not available in any other household data source. Our analysis uses sample of children above the age of 10 who are supposed to complete their education at the time of the survey.

3.1.1 Descriptive statistic

Children who are not yet been enrolled in school but they will in future, the information regarding final level of education of the child becomes left-censored. To handle the difficulty arising from such data, we exclude the children below 10 years of age and assume that those children above 10 years of age who are still not been enrolled will never do so in future.¹⁰ Furthermore, as our decision focuses on final level of education of children, among the sample of 18,678 children, we have information on 79.23% of children regarding their final level while the rest 20.77% are still enrolled (Table 1). Thus the information regarding total schooling is right-censored, which is more of an issue and cannot be avoided.

¹⁰ Holmes (1999)

Table 1: Educational Status of Children

Has been to school	79.23%
Currently enrolled	20.77%

Moreover, amongst the whole sample, 46.58% children are never been to school while 53.52% does have (Table 2).¹¹ These numbers hide the variations within gender and spatial distributions. Hence it's worthwhile to unveil the variations which are presented in Table 2.

A large discrepancy is found between urban and rural regions, 23.74% of children who never been to school reside in urban areas while remaining 76.26% belong to rural areas. However the number is 35.69% and 64.31% respectively for children who acquire some education. Table 2 also shows the underling difference with respect to gender. Among the children who have some schooling, 64.42% are male whereas 35.58% are female. When considering children who are not educated, 36.5% are male and rest 63.50% are female.

Hence our male sample constitutes a higher educational status than female. While analyzing the data with respect to children, it becomes important to have a descriptive comparison between child and father's educational level which is in fact the main point to examine in our dissertation.

¹¹ This number is somehow consistent with the overall literacy rate of 55% reported by Huebler *et al* (2013).

Table 2: Distribution of Educational Status by Gender and Region

Has been to school	53.42%
urban areas	35.69%
rural areas	64.31%
Male	65.42%
Female	35.58%
Never been to school	46.58%
In urban areas	23.74%
In rural areas	76.26%
Male	36.50%
Female	63.50%

Table 3 and table 4 are presented for the same purpose. Table 3 shows the percent of current generation who have no schooling at all is 46.58%, while this number is greater for the father generation (63.67%). The same pattern is observed for other levels of education, showing overall improvement in educational attainment in the present generation. Another fact that is prevalent is an upward trend in child educational attainment when sorted by father's educational qualification, (table 4).

Although not surprising, the table 4 shows that the impact of father education on their off spring's educational attainment increases markedly with increase in father's educational level. 60% of children whose father have no schooling have been to school while this percent increases to 84%, whose parents have post-graduation degree. This nevertheless shows the strong tie between the educational levels of the two generations which marks high persistency or lower educational mobility in society which is further confirmed by our core analysis.

Table 3: Levels of Education for Father and Children

Level	Child	Father
No schooling	46.58 %	63.67%
Up to primary	16.51%	12.34%
Middle	12.91%	7.23%
Matriculation	13.05 %	9.12%
Graduation	8.95 %	5.88%
Post-graduation	2.00%	1.76%

Table 4: Proportion of Children having been to School, given the Education Levels of the Parents

Parental education	Proportion of children
No schooling	60.02%
Up to primary	68.38%
Middle	78.79%
Matriculation	83.74%
Graduation	84.79%
Post-graduation	87.63%

3.2 Methodology

In terms of social processes a great deal of work is done on current inequality, while social mobility also matters. Education is commonly thought of as one of the apparatuses that plays a vital part in intergenerational social mobility processes (Behrman *et al*, 1999; Behrman, 1999). Hence, this thesis intends to contribute to the literature of social mobility by scrutinizing the issue of intergenerational educational mobility. Since the fathers' economic background is an important input in determining educational attainment of their off-springs (Chevalier et al 2005), this dissertation also encompasses the study of the impact of the father's income as well.

Indeed, while most studies on education demand demonstrate a strong link of parent's educational background on children's education, but Cogneau and Maurin (2001) argue that the positive relation might not necessarily be causal. Using data of Madagascar, they produce that, once correctly instrumented; the causal effect of parental education on the likelihood of school enrollment vanishes. Thus, we are interested in realizing the strength of the tie between parental background and child education in context of Pakistan, by dealing with the endogeneity problem of both background variables under study.

There is nevertheless an extensive body of articles and methods addressing the issue of endogeneity.¹² These methods can be illustrated into two broad categories. The first category includes methods that are contingent on the use of data, comprising of information on siblings (twins and adoptees) and their corresponding children. It is argued that by differentiating between children of siblings (cousins), family fixed effects can be excised. Such type of exercise in general introduces a stark limitation on the unobservable, because it undertakes that differentiating between siblings can certainly stamp out a household effect on the outcomes of their respective children; taking the household fixed effect as the only factor causing endogeneity.

The second approach of dealing endogeneity is to instrument parental background variables by means of some extrinsic variations, (natural or random experiments) that are not directly linked to child's education status. For this purpose, various studies use educational reforms; particularly, changes in the length of compulsory schooling to proxy parental educational status. One of the shortcomings of using this approach is that, it only addresses the sub-sample of individuals who are directly influenced by the reform.

¹² Blow et al (2005) provides a review of econometric techniques that deal with endogeneity.

Other studies use instruments that are associated with household characteristics. Such application, which is the one we exercise in this dissertation, is rarely use in literature since it is difficult to find legitimate and appropriate instruments. We are in a position of being able to do so, convincingly, using original instruments for paternal background that are hardly available in household surveys. We are therefore able to unravel both paternal education and income effects and provide reliable causative estimates for each of them.

In addition to carrying out an econometric analysis, we are using descriptive technique that will report the pattern of educational mobility in Pakistan by means of ‘mobility matrices’. Such an approach gives a clear sense of the strength and the direction of the link between parent-child educational qualifications, nevertheless it does not allow for the identification of causal impact.

3.2.1 Educational Mobility Matrix

One can explore the way in which the nature of the mobility process is altering by looking at transition matrices, which is a descriptive tool that shows where child-parent pairs are moving across the distribution of economic status, but they do not deal with the causal relationship. These matrices allow us to address asymmetries and other non-linearities¹³ ; though, it brings up the issue of reducing such a probability matrix to a scalar that characterizes the extent of mobility. The dynamics of this statistical measure can be find in the works of Shorrocks (1978) and Dardanoni (1992), and the studies that use transition matrix intergenerational educational mobility analysis include Behrman et al (2001), Cogneau and Gignoux (2005) and Checchi et al (1999) among all.

¹³For example, transition matrices easily may catch a condition in which the probabilities of moving in a big jump from the bottommost of the schooling distribution to the topmost may be larger than the probability of moving from the top to the bottom, with the difference balanced out by differences in the probability of moving to the middle.

This analysis is done in our dissertation as well, to investigate for movements among divisions of the distribution between the two generations. For further comprehensive examination, separate matrices are constructed for subgroups of the data under study, disintegrated on the basis of region, gender and provinces. The model of our transition matrix is an $m \times m$ probability matrix where m refers to the number of divisions. For the purpose of our analysis years of schooling of both father and child are grouped into six categories: no schooling, up to primary level, middle, matriculation, graduation and post-graduation: with father education apprehended in rows and child education in columns.¹⁴ Each element in the matrix would describe the child's likelihood of reaching a given level of education depending on paternal educational status. In general the sum of percentage points in each row must be one, however, sum of the points in each column do not need to be one except if the categories have equal numbers in them and there is relative or exchange mobility so that distribution does not change between generations (Behrman, 2000).

If there is no genetic transmission of ability from parent to child and there is equitable distribution of educational opportunities independent of parental background, then the child's and father's outcomes would be unrelated. The probability of attaining a high level of education would be same for children of highly and less qualified parents. On the other hand if ability is transferable we would anticipate a transition matrix with larger entries on the main diagonal than in other cells.

3.2.2 Econometric Model

By virtue of the nature of construction of a mobility matrix, it is inclined to be more rigid at the top and bottom ends. As Atkinson et al (1983) points out that the non-linearity in pattern

¹⁴ This categorization is taken from Javed and Irfan (2014)

of probability movements, to some degree, reflects ceilings and floors effect at the highest and lowest distribution of the matrix: upward mobility and downward mobility is not possible for those at the top and bottom respectively. Consequently the level of immobility at the top and bottom is overstated. Such vulnerability of transition mobility matrix leads to regression analysis which is not subject to this limitation.

The final outcome of education of a child is a product of previous schooling decisions and achievements or failures encountered by the child in the path of his/her education. We are dealing neither with the decision process nor the education production function; rather, we choose to focus on a reduced form model where the part played by father's background in determining education of his child is dealt with.

Two facets of father's background are treated here: father's education and father's income. Since other observable variables (gender and spatial variable) that contribute in defining educational outcomes are not important to the point we want to deliberate; hence they are detailed in the model below. We write the final level of education of child as:

$$E_{cht} = \alpha Y_{ht-1} + \beta E_{ht-1} + X_{cht}\Gamma + \mu_{cht}$$

where E_{cht} is a measure of educational achievement of child c in household h , living in generation t ; Y_{ht-1} is income of his father in household h belonging to generation $t-1$; E_{ht-1} is the educational qualification of his father; X_{cht} is a set of other determinants of the child's education that are variables representing gender and spatial differences. The last expression represents the relevant variables that cannot be observed but influence child's educational outcome. This term encompasses two kinds of effects: First is the child specific effect that can be thought of components like abilities, talent and personal preferences of the child, which cannot be associated with observed or explanatory variables of our model. Second effect is the

household effect, which is generation-dependent and involves components common to all siblings. This effect is more of a problem in estimating our model.

Paternal education and income may be linked to unobservable features of household, for instance, cognitive ability or family's inclination towards education that affect educational decisions of the children. This may reflect the transmission of preferences or capacities from one generation to the next.

In order to discuss in detail, the difficulties that need to be overcome to identify the above model, we need to fully specify the path that defines the educational accomplishment of a given child. This is brought about by enlarging the above model by adding two equations that describe father's educational outcome and income. The father's educational level is supposed to be predicted in a similar fashion as that of child's educational achievement; Whereas Father's income is presumed to be dependent on his schooling outcomes and some unobservable. Hence, the full model is:

$$E_{cht} = \alpha Y_{ht-1} + \beta E_{ht-1} + X_{cht}\Gamma + \mu_{cht} \quad (1)$$

$$Y_{ht-1} = \delta E_{ht-1} + X_{ht-1}B + \zeta_{fht-1} \quad (2)$$

$$E_{ht-1} = \alpha Y_{ht-2} + \beta E_{ht-2} + X_{ht-1}\Gamma_{t-1} + \mu_{ht-1} \quad (3)$$

Prior to choosing an estimation technique for the above model, it is important to consider the assumptions that we make about the correlation between the various residuals. At this point of time, we deliberate the possible correlations amid the residuals that result in serious endogeneity problems which need not to be assumed away.

Transmission effect: If the inclination towards education is transmitted across generation, then it does not merely affect father's educational status but also derives child's educational outcome.

Hence, same unobservable variable is linked to both independent (father's education) and dependent variable (child's education) which means μ_{ht-1} is correlated with μ_{cht} .

Parent's ability: This source of endogeneity is another type of transmission effect wherein more able parents, (regarding academics) as compare to their siblings, are supposed to be more supportive and helpful in their children schooling affairs. It differs from preferences in the sense that it is specific to parent's ability while preferences transmit across generation of same the dynasty. This again result in correlation between μ_{ht-1} and μ_{cht} .

Parent's productivity: Similarly if the unobservable affecting parental income (ζ_{fht-1}) are interrelated with that of household effect in child educational outcome equation, the correlation between these two error terms may result from the impact of unobservable at household level e.g. ownership of productive assets or due to individual capacities.

Measurement error: Measurement error on the part of parental education can cause endogeneity in the model. Such measurement inaccuracies would be caught by the error term μ_{ht-1} and cause it to be associated with μ_{cht} ¹⁵.

Therefore the model as presented above cannot be estimated directly. The method of instrumental variables does provide solution to deal with the endogenous explanatory variable. To use this method we require some observable variables to instrument father's education and father's income which should not be present in equation. There are two conditions for an observable variable to be valid. Firstly it must be uncorrelated with the error term; secondly the instrument should be partially correlated to the endogenous valuables once the other explanatory variables are netted out. It is important to mention that the former condition cannot be validated

¹⁵see Greene (1997)

as the error term is not observable whereas the latter can be validated by computing a test after OLS estimation.

Finally “structural” equations for parents are substituted by the resultant reduced form equations in first stage of estimations. The “reduced form” terminology involves a linear projection of endogenous variables on all the explanatory variables; hence the complete model is then

$$E_{ht-1} = X_{ht-1}\hat{\Gamma}_{t-1} + \mu_{ht-1}$$

$$Y_{ht-1} = X_{ht-1}\hat{B} + \xi_{ht-1}$$

$$E_{cht} = \alpha Y_{ht-1} + \beta E_{ht-1} + X_{cht}\Gamma_t + \mu_{cht}$$

As mentioned above, the data we are dealing is right censored which discards the possibility of using the standard 2SLS regression, so instead of performing OLS estimation in the second stage of regression,¹⁶ we follow Wooldridge (2002) and Smith and Blundell (1986) to carry out estimation of censored dependent variable when certain predictor variables are suspected to be endogenous.

The model that is applicable, when dependent variable is right or left-censored, is called *tobit* model or censored regression model which is intended to estimate the linear relationship when the latent variable is censored from above or below. In our case the children who are still enrolled in school at the time of the survey; their final educational level is not known. We only know is that, the final level will be greater than the observed educational level at the time of survey; censoring change with observations in the dependent variable. In such case the model is often called as censored normal regression which is another type of *tobit model* where E_{cht} it is determined as follows:

$$E^* = \alpha Y_{ht-1} + \beta E_{ht-1} + X_{cht}\Gamma_t + \mu_{cht}$$

¹⁶ See Long (1997, chapter 7)

$$E_{cht} \begin{cases} = E_{cht}^* & \text{if child } c \text{ has completed his/her schooling} \\ < E_{cht}^* & \text{if child } c \text{ is still enrolled in school} \end{cases}$$

As a result, in the second stage of IV estimation, censored normal regression is performed where the estimation is done by maximum likelihood.¹⁷

Endogeneity test is conducted following Smith and Blundell (1986) and Wooldridge (2002) through two-step estimation in the equation of interest by introducing error-term of the instrumentation equation. The significance of the coefficient associated to the residual informs whether exogeneity of the variable can be rejected (if coefficient significantly different from zero or not.)

3.2.3 Choice of Instruments

To examine the influence of father's background on that of the child, we are faced by endogeneity problem stemming from the correlation of father's background variables with some of the unobserved predictors of child's education. Failure to eliminate this problem would surely result in biased estimates. To find a legitimate and proper instrument is no less a challenge. For instruments to be valid, they should be strongly correlated with father's background variables with no link with unobserved determinants of child's educational level.

We wish to have data on the place of residence and the existence of infrastructure in the environmental setting where their parent grew up. This is likely to be a valid instrument, substantially influencing the educational attainment of the father, while not being associated with the child's educational attainment.¹⁸ Unfortunately, this statistic does not exist in our dataset. Nevertheless one of the strength of our data under study is the availability of information on

¹⁷ Tobit coefficients are interpreted as OLS coefficients. The linear effect is on the uncensored latent variable, not the observed outcome, McDonald and Moffitt (1980).

¹⁸ Dumas and Lambert (2010) and Card (1995) find these instruments to be valid, considerably determine variation in father's education.

educational attainment of three generations within the family which makes it possible to use grandfather's education as the applicable instrument. Lillard and Willis (1994) maintain that this specific variable is likely to be strongly correlated with the educational attainment of the parents but not directly correlated with that of the grandchild. However according to (Maitra and Sharma, 2009) there are several problems with this variable; the difficulty to dispute that this variable is uncorrelated with the educational accomplishment of the index child being the most prominent. This is possible in two ways; First, more qualified grandparents are expected to be related to wealthier households, which can lessen substantially monetary constraints within the family. The financial constraints were adversely affecting child schooling, so an easing of financial constraints within the household would increase educational attainment of the index child; Second, more qualified grandparents would usually impart a culture of education within the household; thus bring about more education in following generations. In spite of these limitations, grandparent's education is the best available variable to be used as an instrument for parent's education in our research. Furthermore, we can assume that public investments in schooling vary over time, the year of birth of the parent capture that effect. This variable can only affect the child's educational attainment indirectly, through the effect on parental educational attainment. We have therefore considered the year of birth of father as an instrument for parent's educational outcome¹⁹.

Likewise we are also required to overcome this endogeneity problem for parental income. One of the potential instruments that our data provides to proxy father's income is father's employment status and type of industry. This instrument has been used in Shea (2000) and Chevalier et al (2005) to isolate the effect of parental income. Though the former does not find income effect on child's outcomes, the latter finds that the permanent income matters in

¹⁹Similar location based instruments have been used by Maitra and Sharma (2009) and Schultz (2002).

children's educational attainment. Although these two instruments are found not to be successful in identifying father's income precisely but due to shortage of data we are restricted to use these as best available instruments.

For these instruments to be valid, we must assume that there is no choice involved in employment status, and there is no transmission of abilities across generations for the instrument to be valid. Finally the choice of instruments is validated using Wald test which reports the joint significance of the instrument used.

3.2.4 Variables Specification

The variables under study need to be stated here. Whereas detailed information on mean and standard deviation of variables is given in Table A4. Following is the description of dependent variable, endogenous variables, explanatory variables and instruments.

Dependent Variable

The first decision would be regarding the final level of education that children attained. This variable is constructed by the information given in section 2 (Education) of PPHS questionnaire. As discussed earlier, to evade the problem linked to censoring, we restrict this variable above 10 years of age. The completed years of education, including information on school going children is recorded as 17 discrete variables from 0 (no schooling) to 17(post graduate level). The last category includes degree of law, degree in medicine, degree in engineering, degree in agriculture, M.Ed., M Phil, and Ph.D.

Explanatory Variables

The independent variables or predictor variables in our model includes, father's education, father's income, gender and region. The first two variables are endogenous while the latter two are exogenous. We specify each of them one by one.

Endogenous Variables: There are numerous ways to select from to describe parental background which are our endogenous variable. We could either treat the education level as continuous or as asset of dummies. We have chosen to treat father's education as discrete variable as was the case with our dependent variable.

The information on father's income is recorded from section three, where the income from the main employment is recorded for the last three years separately. We have constructed father's income by taking the average of last three years of earning from the main employment and constructed as continuous variable.

Exogenous Variable: The other determinants of our model include gender (male vs. female) and spatial differences (rural vs. urban) which are treated as dummy variables.

Instruments

One of the instruments of father's education is grandfather's education. This information is reported in part 2 of section 4(Education) of PPHS questionnaire. We have chosen to construct this variable in the same way as father's and child's education. While the other instrument of father's education (father's age) is treated as continuous variable (section 1 household roster).

Employment status in occupation and type of industry of father in which they are employed, that used to proxy the impact of father's income on child education are reported in section 3 (employment). The former variable originally coded into 11 categories. We chose to use the original coding in our analysis except we merge the last two categories into one. These categories are: regular paid employee, casual paid employee, paid worker, paid non-family apprentice, employer, own account worker, owner cultivator, share cropper, contract cultivator, and unpaid family worker/others. The other instrument that is type of industry is also reported in

the same section. Originally coded into 36 categories, we have recoded them into 5 groups, which are Primary, Extractive, Manufacturing, Service and Construction industry.

CHAPTER 4

RESULTS

The main empirical results of our dissertation are elucidated in this chapter. The impact of father's background on final level of child's education is investigated. It focuses more specifically on intergenerational educational mobility. Two empirical methods have been employed; one is descriptive technique that reports the pattern of educational mobility in Pakistan by means of mobility matrices, other is the regression analysis that estimates the causal impact of father's educational and income level on child's educational trajectory.

4.1 Transition Matrix

First, we exhibit the results of mobility matrices. We consider only the educational background of father, in which we show the likelihood of a child to attain a given level of education conditional on father's education. Additionally, to perceive the pattern of mobility across different subgroups of the sample under study, the analysis is decomposed on the basis of region, gender, and provinces. Initially, we report the result of mobility matrix for the sample as a whole in table 5, later we extend the analysis presented in table 6, 7, and 8: for region, gender and provinces respectively.

The results in table 5, hint at the presence of substantial level of persistency in educational trajectory in each level of father's educational status. Each entry in the matrix presents the approximation of child's non-conditional probability of being in an educational level given his/her father's maximum education. Moreover, the diagonal elements in the matrix estimate the conditional likelihood of a child ending up in the same educational level; whereas, the entries off

the diagonal show a different phenomenon. The entries in the upper triangle of the matrix show the probabilities of a child achieving a higher degree than their parents while the lower triangle exhibit the opposite.

The pattern of probability terms in table 5 shows larger entries in the main diagonal than the other cells. For example, the probability of a descendant of a father having no education is 60% to end up in the same level, which is highly greater than the probability of holding a post graduate (1%) or a graduate degree (5%) or any other. Whereas chance of having a graduation degree for descendants of graduated fathers is greater (25%) than the chances of not attaining education at all (13%).

Moreover one percent of people moved from having no education to post graduate level in one generation while 13% moved in opposite way. This nevertheless suggests that the upward mobility from the bottom of the distribution is quiet low than the downward mobile children from the top. These asymmetries confirm the robust intergenerational tie between educational level of child and father in the full sample. To add to the understanding of mobility regarding regions, we extend our analysis of non-conditional transition matrices for urban and rural settings.

Table 5: Children Education against their Father's Educations (%)

Full Sample	Child's Education						N%
	Father's Education	Never Attended School	Up to Primary	Middle	Matriculation	Graduation	
Never attended school	59.98	14.13	9.49	9.60	5.59	1.21	11892
Up to Primary	32.62	35.88	13.19	10.76	6.68	0.87	2305
Up to Primary	22.21	16.58	31.75	17.25	9.84	2.37	1351
Matriculation	17.26	11.86	17.44	33.65	16.85	2.94	1703
Graduation	16.21	10.47	18.67	16.76	33.97	3.92	1098
Post-Graduation	13.37	10.64	14.59	17.63	18.24	25.53	329

We observe different pattern of mobility in both settings i.e. rural vs. urban (table 6). As in the case of full sample, the population in the urban region is not far from the principle diagonal of the matrix which implies a strong correlation between father and child educational trajectory. For example children whose fathers have never attended school have a probability of 52% (highest) for being in the same level while 2% (lowest) for holding a post graduate degree. Likewise, there is greater chance that a child of post graduated father holds a post graduate degree (26%) than attaining any other level. Henceforth children of highly educated fathers are in more advantage.

On the other hand, the movements of probabilities among the segments of distributions between the generations are slightly different for rural sample (table 6). Though, the percentage points of the matrix elements on the diagonal describe a considerable level of immobility or persistency but the entries below the main diagonal refer to downward mobility, which seems to be greater and problematic as compared to urban settings.

Table 6: Children's Education against their Father's Educations (%) on regional basis

Father's education	Child's Education						
	never Attended school	Upto Primary	Middle	Matriculation	Graduation	Post Graduation	N%
	Urban						
Never attended school	52.23	14.47	11.33	12.32	7.40	2.25	3027
Up to Primary	24.37	35.21	15.35	14.37	9.01	1.69	710
Middle	19.96	15.70	34.50	16.86	9.88	3.10	516
Matriculation	15.38	9.38	17.08	36.15	17.08	4.92	650
Graduation	16.07	7.94	14.68	18.85	37.30	5.16	504
Post-Graduation	12.73	6.36	15.00	18.64	21.36	25.91	220
	Rural						
Never attended school	62.63	14.01	8.86	8.67	4.97	0.86	8865
Up to Primary	36.30	36.18	12.23	9.15	5.64	0.50	1595
Middle	23.59	17.13	30.06	17.49	9.82	1.92	835
Matriculation	18.42	13.39	17.66	32.10	16.71	1.71	1053
Graduation	16.33	12.63	22.05	14.98	31.14	2.86	594
Post-Graduation	14.68	19.27	13.76	15.60	11.93	24.77	109

Now that we unveiled the disparity by region, differentiating with respect to gender, also gets an equal importance. Hence table 7 presents the mobility matrices separately for male and female. A huge discrepancy is found in the movements of probability between generations among male and female sample. The result displays an important role of father's educational profile on the final educational level of their sons. The likelihood of son to qualify a graduate degree is highest for children of graduated father's and it descends as father's educational level falls. Same is the case for male children, whose fathers have low educational profile, their chances to persist at the same level is higher than attaining education beyond that of their fathers'.

In contrast, a problematic scenario is beheld by the transition matrix regarding female children. The added percentage points below the principle diagonal are larger than points above the diagonal. This means that, the chances of female children to attain education lower than their fathers', is higher than studying beyond or reaching the same level of their fathers. This phenomenon is called descending/downward mobility. Additionally, a probability of as high as 70% is witnessed in the lowest segment of distribution. This may be due to a problem in data but nevertheless it illustrates the patriarchal system of Pakistan where male children are more likely to attend school than their female counterparts.

Table 7: Children's Education against their Father's Educations (%) on Gender Basis.

Father's education	Child's education						N%
	never Attended school	Up to Primary	Middle	Matriculation	Graduation	Post Graduation	
	Male						
Never attended school	48.59	16.72	12.80	13.15	7.36	1.38	5812
Up to Primary	16.26	45.88	15.97	12.36	8.53	1.01	1384
Middle	7.91	14.32	45.48	17.46	12.56	2.26	796
Matriculation	4.10	9.66	18.38	45.27	19.12	3.47	592
Graduation	2.75	8.78	17.21	18.24	48.36	4.65	581
Post-Graduation	5.06	9.55	14.04	16.85	15.17	39.33	178

	Female						
Never attended school	70.87	11.64	6.32	6.22	3.90	1.05	6080
Up to Primary	57.22	20.85	9.01	8.36	3.91	0.65	921
Middle	42.70	19.82	12.07	16.94	5.95	2.52	555
Matriculation	33.95	14.65	16.25	18.91	13.98	2.26	751
Graduation	31.33	12.38	20.31	15.09	17.79	3.09	517
Post-Graduation	23.18	11.92	15.23	18.54	21.85	9.27	151

As the above result demonstrates a significant gender disparity, the inter-provincial imbalance in access to education in Pakistan has led us to investigate the educational transition matrix at provincial level. Table 8 endows the educational transitional matrix for the four provinces of Pakistan. The reliance or the persistency of educational status between the generations is very much visible in the case of Punjab and KPK.

There are greater chances that the educational status of father's will pass on to the children in the respected provinces. Those whose fathers have never been enrolled to school have 54% probability in Punjab and 44% probability in KPK to remain uneducated while the probability diminishes with increasing educational level of fathers'. For instance, there is only 2 percent probability for children whose fathers never been to school, to reach post graduate level in both of the provinces.

Furthermore the larger percentage points on the main diagonal also illustrates the correspondence of education between father and his child. The mobility matrix of KPK shows a better picture as compared to Punjab province, for instance the added percentage points above the diagonal indicates a higher probability of upward mobility in the former region.

The situation that is portrayed in the transition matrices of Sindh and Baluchistan is relatively different. There does not seem to be an asymmetric pattern of movement of probabilities between child and father's educational status as were presented by KPK and Punjab. A high persistency has been found in the lowest segment of distribution in both provinces. Furthermore, it is clearly discernible that the probability of downward mobility is

greater than the probability of upward mobility in both samples whereas Baluchistan undoubtedly shows the worst situation.

Table 8: Children's Education against their Father's Educations (%) on Provincial Basis.

Father's education	Child's education						N%
	never Attended school	Upto Primary	Middle	Matriculation	Graduation	Post Graduation	
Punjab							
Never attended school	54.12	18.48	10.61	10.27	4.84	1.67	4420
Up to Primary	28.36	39.13	14.53	11.96	4.74	1.28	1012
Middle	19.10	19.50	33.60	16.34	8.17	3.29	759
Matriculation	11.35	13.42	18.06	37.29	15.74	4.13	775
Graduation	10.88	6.32	16.84	22.81	37.54	5.61	285
Post-Graduation	10.79	7.19	10.79	17.27	17.27	36.69	139
Sindh							
Never attended school	68.90	15.08	6.10	5.49	3.65	0.78	3588
Up to Primary	37.84	35.59	10.99	7.42	7.51	0.66	1065
Middle	32.69	17.79	25.96	12.50	10.10	0.96	208
Matriculation	32.75	19.65	13.10	24.02	10.04	0.44	229
Graduation	23.10	17.41	13.92	10.44	30.38	4.75	316
Post-Graduation	13.79	12.93	18.97	18.10	18.97	17.24	116
KPK							
Never attended school	43.80	7.32	15.17	18.63	13.22	1.85	2050
Up to Primary	18.99	22.15	22.15	24.68	12.03	0.00	158
Middle	21.07	9.20	29.97	24.04	14.24	1.48	337
Matriculation	15.22	6.06	18.69	34.78	22.49	2.77	578
Graduation	12.34	7.09	24.67	18.64	35.17	2.10	381
Post-Graduation	9.09	6.82	18.18	20.45	20.45	25.00	44
Baluchistan							
Never attended school	74.75	9.38	7.03	5.94	2.67	0.22	1834
Up to Primary	45.71	24.29	7.14	12.86	10.00	0.00	70
Middle	34.04	17.02	40.43	4.26	4.26	0.00	47
Matriculation	35.54	14.88	15.70	23.14	9.92	0.83	121
Graduation	23.28	12.93	16.38	12.93	31.03	3.45	116
Post-Graduation	30.00	23.33	10.00	13.33	16.67	6.67	30

4.2 Regression Analysis

Transition matrix is appropriate to reveal the non-linearity between educational level attained by child and father. However one of the shortcomings which are widely mentioned in literature is the floor and ceiling effect reflected by the non-linear pattern. This drawback however does not exist in regression analysis. While transition matrix reports the movement of probability along

the distributions of educational level, regression analysis informs the extent of movement between the generations.

We have carried an out an econometric analysis to estimate the linear relationship between father's background characteristic and child educational outcome in which endogeneity of father's background is dealt with using instrumental variable approach to identify the causal link. Notably we have used the original instruments for father's education and income level which are usually rarely available in household surveys. Regression is undertaken for the sample as a whole and on the subgroups as well, disintegrated on the basis of gender, region and province.

As mentioned in methodology section, we are dealing with data-censoring problem regarding dependent variable, thus censored normal regression model, also called *tobit* model, is employed, wherein censoring points change with observation,. *Tobit* model coefficients are obtained by maximum likelihood and are interpreted in the same way as OLS coefficients.

Though the OLS estimates of the parameters are not supposed to be consistent concerning censored data analysis but it is worthwhile to compare both estimates here. Hence Table 9 details the estimates of the full sample wherein the first column offers estimates using OLS against father's education and father's income while the second column employs estimates of *tobit model* against the instrumented background variables. This comparison is only done for the full sample.

Table 9 shows that prior to instrumentation, an increase by 1 in father education raises by 0.39, the educational level of the child. While taking endogeneity into account, the estimated impact of father education increases. For one unit increase in father education, there is 0.43 unit increase in predicted value of child education which is statistically significant at 1% of confidence interval. This corresponds to real differences in chances for two children whose

background differs. The impact of father's income is found to be consistent with and without instrumentation. The line titled father's education exogeneity and father's income exogeneity provides p-values of exogeneity test for respected variables. They are found to be statistically significant from zero at 10% level, rendering them to be endogenous variables. At the bottom of the table, we provide the p value of F-stat using Wald test that validates the joint significance of instruments.

Table 9: Impact of Parental Background on Educational Outcome of Child (Full Sample)

	OLS	IV
Educational level of child		
Father's education	0.395 (0.007)***	0.435 (0.035)***
Father's income	0.103 (0.028)**	0.108 (0.062)*
Father's edu. Exogeneity		0.061*
Father's inc. Exogeneity		0.075(0.058)
Constant	1.851 (0.834)	1.694 (0.172)**
Pseudo-R ²		0.029
R-squared	0.229	
Instrumented variables		
Father's education	No	Yes
Father's income	No	Yes
Instruments(Wald-test)		
F-stat Father's education	None	Both
F-stat Father's income		0.000
		0.000

Note: estimation is executed by maximum likelihood. Coefficients reported are the marginal effects. In brackets, given are the standard errors. ***, ** and * mean, respectively, that the coefficient is significantly different from 0 at the 1, 5 and 10% level. Pseudo-R² is Macfadden R². Results of first stage instrumentation is given in table A2.

We pursue the same estimations for urban/rural and male/female in table 10. As before, the exogeneity of explanatory variable is rejected and validity of instruments is confirmed by the p-value of F-statistic. A wide deviation in marginal effects between rural and urban, and male and female is exemplified by the results. Surprisingly, the influence of father education on child's education is greater in urban region (74%) than its counterpart (35%) while the point estimates in male sample is substantially greater (59%) from its female counterpart (30%).

It can be concluded that origin matters and influence the educational level attained vis-à-vis urban and male sample which is consistent with what we find in mobility matrices. On the other the lower persistency or high mobility in female and rural sample is debunked by the respected mobility displaying increasing probability of downward mobility than upward mobility especially in the case of female sample. The impact of income on educational level of children is found to be statistically significant only in urban and female sample, though the impact is less than that of education.

Table 10: Impact of Parental Background on Educational Outcome of Child (on basis of Region and Gender)

	Urban	Rural	Male	Female
Educational level of child				
Father's education	0.738 (0.054) ***	0.351(0.047) ***	0.595 (0.049) ***	0.300 (0.050) ***
Father's income	0.571 (0.126) ***	0.046 (0.069)	0.018 (0.090)	0.204 (0.084) **
Father's edu. Exogeneity	0.078	0.053	0.054	0.600
Father's inc. Exogeneity	0.066	0.056	0.081	0.071
Constant	1.321 (0.367) **	2.367 (0.196)	4.471 (0.247)	1.595 (0.232)
Pseudo-R ²	0.0124	0.018	0.005	0.114
Instrumented variables				
Father's education	Yes	Yes	Yes	Yes
Father's income	Yes	Yes	Yes	Yes
Instruments (Wald-test)				
F-stat Father's education	0.000	0.000	0.000	0.000
F-stat Father's income	0.000	0.000	0.000	0.000

Note: estimation is executed by maximum likelihood. Coefficients reported are the marginal effects. In brackets, given are the standard errors. ***, ** and * mean, respectively, that the coefficient is significantly different from 0 at the 1, 5 and 10% level. Pseudo-R² Macfadden R². Results of first stage instrumentation is given in table A2.

An important part of our core result is presented in table 11 where we pursue estimating the extent of the crucial role of father's in determining their descendant's fate regarding educational status along the provinces. The same estimation exercise is conducted for the four provinces of Pakistan. An interesting finding is revealed regarding the degree and variation of mobility amid provinces.

Again we reject the exogeneity of the explanatory variables of parental background and acquired p-value of F-stat that confirms the validity of the instruments used for these two variables. A one unit increase in father's educational level is associated with 0.72, 0.70, 0.43 and 0.54 unit increase in the educational level of children in Punjab, Sindh, KPK and Baluchistan respectively. This indicates a huge disparity and an overall problematic situation in terms of equality where children are not on the equal footing in attaining a given grade among provinces, though a better picture is drawn by the result of KPK.

All and all, the educational profile of father strongly determines the fate of their children educational background. Nonetheless we have also found statistically significant values of coefficient of income except in Sindh hence economic background of father also determines the level of child's education at in Punjab, KPK and Baluchistan.

Table 11: Impact of Parental Background on Educational Outcome of Child (on the basis of Province)

	Punjab	Sindh	KPK	Baluchistan
Educational level of child				
Father's education	0.724 (0.063)***	0.705(0.050)***	0.427 (0.558)***	0.539 (0.070)***
Father's income	0.501(0.101)***	0.107 (0.106)	0.259(0.136)***	0.381(0.166)**
Father's edu. Exogeneity	0.098	0.069	0.077	0.068
Father's inc. Exogeneity	0.122	0.091	0.065	0.088
Constant	0.129 (0.288)*	0.086 (0.282)*	2.603(0.353)**	-0.864 (0.510)
Pseudo-R ²	0.022	0.034	0.028	0.032
No of observations	7390	5522	3548	2218
Instrumented variables				
Father's education	Yes	Yes	Yes	Yes
Father's income	Yes	Yes	Yes	Yes
Instruments (Wald-test)				
F-stat Father's education	0.000	0.000	0.000	0.000
F-stat Father's income	0.000	0.000	0.000	0.000

Note: estimation is executed by maximum likelihood. Coefficients reported are the marginal effects. In brackets, given are the standard errors. ***, ** and * mean, respectively, that the coefficient is significantly different from 0 at the 1, 5 and 10% level. Pseudo-R² Macfadden R². Results of first stage instrumentation is given in table A2.

4.3 Summary

The purpose of this dissertation is to deliver evidence on extent and pattern of intergenerational educational mobility in Pakistan with special emphasis on gender, urban/rural and spatial aspect. In this section we try to first pass the understanding of facts delineated in the previous section. It is worthwhile to mention here that the discussion presented in this section is a small stride in major research program that needs to be carried out to understand the nature of intergenerational educational mobility in Pakistan. The facts presented by our analysis highlight the ground situation where the inequality in educational outcomes stubbornly persists between generations, enduring low enrolment rate, low educational level, high literacy and substantial disparity.

Chapter 5

CONCLUSION AND RECOMMENDATIONS

Educational inequality is one of the major and widespread problems being faced by countries around the globe, to which Pakistan is no exception. As there are deep divisions on the basis of different socio-economic lines in Pakistan, the fragmentation regarding education have also augmented concurrently. Pakistan's educational system is disjointed on the basis of geography, gender, cost of education, wealth, class etc. that results in differentials of access and quality of education that is being provided.

Intergenerational educational persistency is another important factor that promotes disparity and inequality, which is analyzed in our dissertation. This phenomenon however has acquired less attention in the context of Pakistan especially when it comes to the direct/causal link between father-son educational backgrounds. Thus, we are interested in realizing the causal link between parental education and child education.

Furthermore, the most obvious indirect channel through which father's education can impact child education is household income. To avoid any biasness we also have estimated the causal impact of father's income on child's educational profile however the more emphasis is given to the impact of father's education.

Two methodologies have been used to accomplish our objective; one is the econometric estimation of the extent/level of intergenerational mobility through IV estimation where endogeneity in background variables is accounted for. Other is the exploration of the strength and pattern of the link by means of a descriptive tool termed as transition matrices.

Both descriptive and empirical analysis underlines the fact that the origin (father's education) highly influences the chance of attaining a given educational level. Such strong association reveals children not being on the equal footing, children who have strong paternal background are in advantage resulting in persistency in educational inequality.

Similar result is projected in Hertz et al. (2007) where they have estimated parent-child schooling correlation of 46% and intergenerational mobility coefficient of 1.00 for Pakistan. These numbers however does not account for the causal link between father and child education and the data used is from 'living standards measurement survey' for the year 1991. On the other hand India presents a scenario contrary to Pakistan, where the total effect of parental education becomes insignificant when dealt with endogeneity problem indicating an increase in intergenerational educational mobility (Maitra and Sharma, 2009).

The present analysis also appraises intergenerational mobility in various dimensions which points significant difference in the extent and pattern of mobility across, gender, urban rural settings and provinces. This shows worsening long-run inequality of opportunities in these social groups and widening gap between haves and have-nots.

Female, rural children and Baluchistan province are found to be the most vulnerable groups who are mainly the fatalities of pronounced inequality in educational outcomes. Such lopsided educational distribution indicates an underutilization of human capital which cannot progress and develops in the line of the needs of the country, subsequently harming the society's welfare (Thomas et al., 2001).

Neglecting rural areas and provision of uneven educational opportunities in education amid the provinces, aggravates the economic and cultural disparities among these areas, detrimental to the whole country. Furthermore no country has progressed without involving

women in education as educating girls have a high return than any other investment in developing country (World Bank, 2011). Gender discrimination has negative effect on numerous development goals, for instance; it hampers the efforts towards poverty alleviation, reduction in child mortality and fertility and the expansion of education etc. Evidence also suggests that benefits from girls' education may actually start even earlier than when they have children of their own. Hence a greater equity in the distribution of educational opportunities enables female to capture a larger share of the benefits of economic growth, and in turn contributes to higher growth rates.

The overall level of intergenerational persistency in educational outcome, which is 43 percent, reveals the crucial causal role of father's education, strongly determining child's educational trajectory in Pakistan. The high persistency is also beheld in mobility matrix approach which is suggestive that the children are not on an equal footing with regard to attaining a given grade; children of father's having high educational profile are in advantage.

Hence in Pakistan child educational background is very much influenced by father's educational profile.

Our results confirm that the impact of paternal education does not essentially drive through human capital production function rather it has a direct effect on decision of child's final educational level. This direct effect may comprehend various mechanisms. The most obvious one is the impact of education on information and expectations on return to education that shapes up parent's preferences towards education of their offspring's. This phenomenon is called pure preference effect in Boudon(1973) wherein he stresses that education of parents play one of the main roles in shaping up preferences and expectations in choosing educational trajectories of their children.

After achieving an overall picture of intergenerational educational mobility in Pakistan, separate analysis with respect to gender and region confirms biasness regarding educational prospects towards male and urban settings. According to Human Development Report (2010), Pakistan's loss due to inequality measured through *adjusted human development index* (IHDI) is 46.5% due to educational inequality. Such educational inequality is demonstrated in our empirical analysis too.

The educational persistency for male and urban sample is found to be substantially high showing greater dependency on father's educational background and persistent transfer of educational inequality. Although their counterparts show comparatively little evidence of the impact of father's education but transition matrices unveils the real picture underlining such low persistency level.

The transition matrices of female and rural sample discloses the fact that the low persistency is not due to ascending mobility rather it is because of descending probability movements of child educational outcomes. Children belonging to these sub-groups are so left behind that there is higher probability of ending up at an educational level even lower than their fathers. This demonstrates that Pakistan is suffering a high incidence of inequality of opportunities in these two dimensions.

This might not be surprising for a country like Pakistan where the literacy rate for women is 46% as compare to 69% of male literacy, which is even worse in case of rural areas where 33% of women and 63% male are literate (Hamid et al, 2013). One of the reasons for such profound gender disparity is the unequal access to education between girls and boys in Pakistan. According to a report (UNESCO, 2010), Pakistan has 146,691 primary schools, among which 44% of schools are for boys, 31% belong to girls and the remaining 25% are school with mix

enrollment. Additionally, cultural norms where women and girls have less freedom of movement, early marriages of girls, cultural preference of male children, lack of female teachers and the gender division of labor are some of the other major reasons why females are left behind in education.

Considering the rural and urban settings, the evidence we provide is very much consistent with the ground situation of Pakistan, where the people residing in rural areas are significantly lagging behind in terms of educational attainment. Almost 60% and 75% of girls are not attending primary and secondary school respectively in rural areas while enrollment rate of boys is only 7% point higher in both primary and secondary level (Aziz et al, 2014). This could be because of the limited access to education, poor infrastructure and quality, restriction on girls to participate in education and lack of female teachers which discourages students to take part in education in rural areas. On the other hand, urban areas are more developed with greater access to education, better infrastructure and quality, and less gender disparity.

The inter-provincial disparity is also vivid in our results especially in the transition matrix approach. A huge intergenerational persistency in education is found in Punjab and Sindh while the lowest level is revealed in KPK followed by Baluchistan. As in the case of rural and female sample, this lower percent in Baluchistan sample masks the downward educational mobility in the region which is demonstrated by respected mobility matrix. This can be expected from a region which is the least literate province in Pakistan. This is mainly because of the level of the poverty (70% of people are in midst of poverty), security issues, lack of motivation and political will and small amount of teacher particularly women in rural areas. Even though, 40 per cent of

Baluchistan education budget devoted to the maintenance and development of schools, out of 12,600 primary and secondary schools 2000 are non-functional.²⁰

Moreover, none of the provinces show a satisfactory situation, wherein father's educational background substantially determines their children educational trajectory. There is less probability for the children in each province to move beyond their father educational level. For the purpose of comparison, KPK presents a better picture as compare to rest of the regions. Same provincial scenario in terms of inequality in education is presented in Jamal et al (2005) study wherein district educational index is calculated to depict the inter-provincial and intra-provincial disparities in education.

Altogether, results indicate a high level of persistency of educational inequality due to father's background which is further intensified by inequitable distribution of educational opportunities across social dimensions that are gender, regional and spatial. Nevertheless the most vulnerable groups are female, children residing in rural areas and the province of Baluchistan.

In spite of such a depressed scenario, Pakistan is hard pressed to improve these indicators. In the presence of the long-standing problems of access, quality and equal opportunity in every educational level, there is a long way to go to eradicate persistent intergenerational inequality in Pakistan.

In the light of the above analysis, major steps should be taken for promotion of education for the present generation which would have lifelong effects on the generations to come. Hence, some subtle initiatives need to be taken that might affect the preferences, expectations and knowledge of the importance of education of parents. Moreover, some educational inputs should be driven in the educational system that will compensate for lack of education of parents and

²⁰ Public financing of education in Pakistan"; "State of human rights" (2013)

minimize educational disparities across social groups, which will eventually help in increasing mobility.

First and foremost, government should invest heavily on infrastructure and quality of schools in every part of the country, to provide access and quality in low cost. Recent literature has emphasized greatly the importance of schooling expansion in determining educational mobility. Community participation and ownership of such schooling expansion programs can also resolve problems relating to quality of infrastructure, environment and teacher absenteeism especially in rural areas.

To encourage parents to send their children to attend school, financial incentives can be provided. Free text books, uniform and transport will encourage parents especially in rural areas or low income families to get their child education. Community based literacy projects, education campaigns and counseling should be incorporated in community development activities and can play an important role in structuring parent's preferences. Additionally functional literacy programs can be introduced especially targeting sidelined individuals especially in rural areas and for female children, who can then serve as advocates for the awareness of importance of education. Finally, flexible school hours can be provided for children who work to support their family or girls who are engaged in household work.

5.1 Limitations

One of the major challenges in using instrumental variable approach is finding strong and legitimate instruments for endogenous variables. Because of the limited data on father's background we are not been able to find strong instruments that can best explain the variations endogenous variables. Though not strong but we use the best available information to determine the variations in father's background variables. Again, because of the lack of data on mother's

background we are not being able to consider the impact of mother's education on child's educational trajectory, which is extensively evaluated in international literature. Finally, it is important to mention that our analysis and result may depend on the data and methodology we have used. There is need to further scrutinize and compare the phenomenon of educational mobility using other methodologies and data sources.

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.
- Alderman, Harold, Jere Behrman, Shahrukh Khan, David Ross, and Richard Sabot (1995) "Public Schooling Expenditures in Rural Pakistan: Efficiently Targeting Girls and a Lagging Region" in *Public Spending and the Poor: Theory and evidence. Johns Hopkins University Press for the World Bank.*
- Arif, G. M. (2014). Pakistan panel household survey: sample size and attrition. *Pakistan Development Review*, 53(2), 223-238.
- Atkinson, A.B., Bourgingong, F. and Morrison, C. (1992), *Empirical Studies of Earnings Mobility*, Harwood Academic Publishers, London.
- Aziz, M., Bloom, D. E., Humair, S., Jimenez, E., Rosenberg, L., & Sathar, Z. (2014). Education system reform in Pakistan: why, when, and how? (No. 76). IZA Policy Paper.
- Banerjee, A. V., and E. Duflo. (2003). "Inequality and growth: What can the data say?" *Journal of Economic Growth* 8, 267-299.
- Barro, R. (2001). Human capital and growth. *American Economic Review*, 12-17
- Barro, R. J. (2000). "Inequality and growth in a panel of countries", *Journal of Economic Growth* 5, 5-32.
- Becker, Gary. (1964). *Human Capital. A Theoretical and Empirical Analysis, with Special Reference to Education. NBER: Chicago.*
- 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.*
- Behrman, Jere, Shahrukh Khan, David Ross, and Richard Sabot (1997). "School Quality and Cognitive Achievement Production: A Case Study for Rural Pakistan. " *Economics of Education Review* 16(2):127-142.

- Behrman, J., N. Birdsall, and M. Székely (2000). Intergenerational Mobility in Latin America: Deeper Markets and Better Schools Make a Difference, pp. 135-167. *Washington DC: Brookings Institution*.
- Behrman, J. R., Gaviria, A., & Székely, M. (2001). Intergenerational Mobility in Latin America. *Economia*, 2(1), 1-31.
- Behrman, Jere R. and Mark R. Rosenzweig. (2002). "Does Increasing Women's Schooling Raise the Schooling of the Next Generation?" *American Economic Review*, 91(1), pp. 323-334.
- Benabou, R. (2000) "Unequal societies: Income distribution and the social contract", *American Economic Review* 90, 96-129.
- Bertola, G., R. Foellmi and J. Zweimüller (2006). *Income distribution in macroeconomic models*, Princeton University Press, Princeton, N.J., Oxford.
- Björklund A, Lindahl M, Plug E (2006). "The origins of intergenerational associations: lessons from Swedish data". *Q J Econ* 121(3):999–1028
- Black SE, Devereux PJ, Salvanes KG (2005). Why the apple doesn't fall far: understanding intergenerational transmission of human capital. *Am Econ Rev* 95(1):437–449
- Black, S., and P. Devereux. (2011). Recent Developments in Intergenerational Mobility." *Handbook of Labor Economics*, 4(B), Ch-16, 1487- 1541.
- Blow, L., Goodman, A., Kaplan, G., Walker, I., Windmeijer, F., 2005. How important is income in determining outcomes? A methodology review of econometric approaches.
- Boudon, R. (1973). *L'inégalité des chances: la mobilité sociale dans les sociétés industrielles*.
- Burney, Nadeem and Mohammad Irfan (1991). "Parental Characteristics, Supply of Schools, and Child School Enrolment in Pakistan" *The Pakistan Development Review*, 30:1
- Card, D. (1995) 'Using geographic variation in college proximity to estimate the return to schooling', in L. Christofides, E. Grant and R. Swidinsky (eds), *Aspects of Labor Market Behaviour: Essays in Honour of John Vanderkamp*. Toronto: University of Toronto Press.
- Carneiro, Pedro, Costas Meghir and M. Parey. (2007). "Maternal Education, Home Environment and the Development of Children and Adolescents". *IZA Discussion Paper Series no. 3072*.
- Castello, A. and R. Domenech (2002). "Human capital inequality and economic growth: Some new evidence", *Economic Journal* 112, C187-C200.

- Celhay, P., Sanhueza, C., & Zubizarreta, J. R. (2010). Intergenerational Mobility of Income and Schooling: Chile 1996-2006. *Revista de Análisis Económico-Economic Analysis Review*, 25(2).
- Cecchi, D., Ichino, A., & Rustichini, A. (1999). More equal but less mobile? Education financing and intergenerational mobility in Italy and in the US. *Journal of public economics*, 74(3), 351-393.
- Chevalier, Arnaud (2004). "Parental Education and Child's Education: A Natural Experiment", *IZA Discussion Paper no. 1153*.
- Chevalier, A., Harmon, C. P., O'Sullivan, V., & Walker, I. (2005). The impact of parental income and education on the schooling of their children.
- Cogneau, D., & Gignoux, J. (2005). Earnings Inequality and Educational Mobility in Brazil over Two Decades. Paris: DIAL. Processed.
- Cogneau, D., Maurin, E., (2001). Parental income and school attendance in a low-income country: A semiparametric analysis. *Working Paper 16, DIAL*.
- Coleman, James. S. et al. (1966). Equality of Educational Opportunity. *US GPO: Washington DC*.
- Dardanoni, V. (1993). Measuring social mobility. *Journal of Economic Theory*, 61(2), 372-394.
- Dearden, L and S. Machin, and H. Reed (1997), "Intergenerational Mobility in Britain", *Economic Journal, January, pp.47-66*.
- Dreze, J. and G. Kingdon (2001). "School Participation in Rural India". *Review of Development Economics* 5 (1), 1-24.
- Dumas, C., & Lambert, S. (2005). Patterns of intergenerational transmission of education: The case of Senegal. Centre of Economic Performance.
- Goldberger, A. (1989), 'Economic and mechanical models of intergenerational transmission', *American Economic Review*, 79, 504-513.
- Hamid, A., Akram, N., & Shafiq, M. (2013). Inter and Intra Provincial Educational Disparities in Pakistan. *Pakistan Journal of Social Sciences (PJSS)*, 33(2), 447-462.
- Havinga IVO C., Mohammad Faiz and Cohen Suleiman I. (1986), Intergenerational Mobility and Long Term Socioeconomic Change in Pakistan, *The Pakistan Development Review*, 25(4).

Hertz Tom, Tamara Jayasundera, Patrizio Piraino, Sibel Selcuk, Nicole Smith and Alina Veraschagina. (2007). "The Inheritance of Educational Inequality: International Comparisons and Fifty-Year Trends". *The B.E. Journal of Economic Analysis and Policy (Advances)*, 7(2), Article 10.

Holmes, J. (2003). "The determinants of completed schooling in Pakistan: Analysis of censoring and selection bias". *Economics of Education Review* 22, 249- 264.

Huebler, F., & Lu, W. (2013). *Adult and Youth Literacy: National, Regional and Global Trends, 1985-2015*

Inter-American Development Bank, (1998). "Facing up to Inequality in Latin America". *Washington D.C.: John Hopkins University Press.*

Jamal, H., & Khan, A. J. (2005). *The knowledge divide: Education inequality in Pakistan.*

Javaeria Qureshi, (2012), "Additional Returns to Investing in Girls' Education: Impact on Younger Sibling Human Capital", Working paper

Javed and Irfan (2012), *Intergenerational Mobility: Evidence from Pakistan Household Survey*, Pakistan Institute of Development Economics, Islamabad. (Poverty and Social Dynamics Paper Series, PSDPS-1).

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.*

Lam, David and Robert F. Schoeni, (1993), "Effects of Family Background on Earnings and Returns to Schooling: Evidence from Brazil," *Journal of Political Economy*, 101, 710-40.

Lillard, L. and R. J. Willis (1994). Intergenerational educational mobility: Effects of family and state in Malaysia. *Journal of Human Resources* 29 (4), 1126{1167

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). "Parents and children: Education across generations in India". In *5th annual conference on economic growth and development, ISI Delhi, Delhi.*

Maurin, E. (2002). The impact of parental income on early schooling transitions: A re-examination using data over three generations. *Journal of public Economics*, 85(3), 301-332.

Orazem, P and E. King (2008). "Schooling in Developing Countries: The Roles of Supply, Demand and Government Policy" Chapter 55 in T. P. Schultz and John Strauss, eds. *Handbook of development Economics*, 2008. Amsterdam: North Holland.

Oreopoulos, Philip, Marianne E. Page, and Ann Huff Stevens, (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.

Plug E (2004). "Estimating the effect of mother's schooling on children's education using a sample of adoptees". *Am Econ Rev* 94(1):358-368

Rivers, D., Vuong, Q., (1988). "Limited information estimators and exogeneity tests for simultaneous probit model". *Journal of Econometrics* 39, 347-366.

Sacerdote, Bruce (2002). "The Nature and Nurture of Economic Outcomes." *American Economic Review*, 92(2), pp 344-348.

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.

Shea, J. (2000). Does parents' money matter? *Journal of public Economics*, 77(2), 155-184.

Shehzadi et.al. (2006), Intergenerational Mobility and Its Impact on Child Development: A Case Study of Faisalabad (Pakistan), *Journal of Agriculture and Social Sciences*, 1813-2235/02-2-72-74 9.

Shorrocks, A. F. (1978). The measurement of mobility. *Econometrica: Journal of the Econometric Society*, 1013-1024.

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

Smith, R., Blundell, R., (1986). "An exogeneity test for a simultaneous equation tobit model with an application to labor supply". *Econometrica* 54, 679-685.

Strauss, John and Thomas, Duncan, (1995). "Human resources: Empirical modeling of household and family decisions," *Handbook of Development Economics, in: Hollis Chenery† & T.N. Srinivasan (ed.), Handbook of Development Economics, edition 1, volume 3, chapter 34, pages 1883-2023 Elsevier.*

Thomas, V., Wang, Y., Fan, X. (2001). *Measuring education inequality: Gini coefficients of education. In: Policy Research Working Paper Series 2525. The World Bank.*

Woodruff, C. and Melissa Binder, (1999), "Intergenerational Mobility in Educational Attainment in Mexico," Unpublished Manuscript.

Wooldridge, J., (2002). *Econometric Analysis of cross section and panel data. MIT Press.*

APPENDIX A

Table 4: Sample Statistics

Variable	Sample Size	Mean	SD
Child educational level	18678	4.31	0.03
Father's educational level	18678	3.01	0.03
Father's income	18678	161736	388140
Region	18678	0.30	0.003
Gender	18678	0.52	0.004
Father's employment status	18678	3.37	0.022
Father's industry type	18678	1.92	0.016
Father's age	18678	50.35	0.08
Grandfather's education	18678	1.41	0.02

Table 12: Instrumentation of Endogenous Variables

Father's education	Full sample	Urban	Rural	Male	Female	Punjab	Sindh	KPK	Baluchistan
Grandfather's education	0.30 ^{***}	0.38 ^{***}	0.23 ^{***}	0.35 ^{***}	0.25 ^{***}	0.29 ^{***}	0.35 ^{***}	0.32 ^{***}	0.44 ^{***}
Age of Father	-0.06 ^{***}	-0.05 ^{**}	-0.06 ^{**}	-0.05 ^{**}	-0.07 ^{***}	-0.03 ^{**}	-0.06 ^{**}	-0.17 ^{**}	-0.03 ^{**}
R ²	0.28	0.22	0.28	0.21	0.31	0.22	0.29	0.25	0.25
Father's income									
Father's employment status	0.18 ^{***}	0.16 ^{***}	0.19 ^{***}	0.18 ^{***}	0.18 ^{***}	0.18 ^{***}	0.16 ^{***}	0.23 ^{***}	0.19 ^{***}
Father's industry type	0.17 ^{***}	0.18 ^{***}	0.17 ^{***}	0.18 ^{***}	0.16 ^{***}	0.13 ^{***}	0.18 ^{***}	0.22 ^{***}	0.14 ^{***}
R ²	0.36	0.34	0.34	0.30	0.39	0.31	0.31	0.33	0.34

These are the coefficients produced in the first stage wherein the instrumentation of father's education and income is done using ordinary least square estimates. ^{***}, ^{**} and ^{*} mean, respectively, that the coefficient is significantly different from 0 at the 1, 5 and 10% level.