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Committee in charge:

Professor Ju-Ho LEE, Supervisor

Professor SungJoon PAIK

Professor Jinsoo LEE

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Table of Contents

A. INTRODUCTION:

I. Background:

It is extensively argued in the literature on development economics that human capital (changing quality of labor and technology) played more important role (through improved Skills & innovations) than of units of physical capital or per capita labor hours for the sustained economic growth. [Kuznets (1966) Denison (1962), T.W. Schultz (1963)].

That is why human capital attracted a lot of (due) attraction after initial contributions of Schultz (1961), Becker (1964), and Welch (1970). Human Capital can be comprised, as generally acknowledged, of Knowledge (Schooling), Skills (Trainings) and experience. Human capital is being treated like physical capital when it comes to investment by individuals, based on market returns/ private returns. Higher the returns, the higher the investment.

Education is considered the most pivotal component of Human Capital. It is widely perceived that education can play a vital role in improving human wellbeing, through increasing productivity by raising individual earnings as well as through social returns or positive externalities. Thus, could play an instrumental role to reduce the poverty (ultimate goal of public policy) level and inequality through income re-distribution mechanism. The Millennium Development Goals (MDGs) also assume that attaining basic schooling/primary, along with the other MDGs, will help achieving the goal of halving poverty of the world by 2015.

The multifaceted impact of education makes it an essential element for public policy framework. Pakistan like any other developing country has been facing the investment dilemma that how to allocate or to optimally utilize its limited resources amongst education and other sectors. This dilemma become more puzzling when it comes to allocate resources within the education sector

(different levels & types of education). It is hard decision to the political governments to invest in education, which, generally, go for short term tangible goals and targets rather to invest for the generations to come. There must be sound reasons to convince the decision makers to invest on education and that reasons comes from the labor market returns.

This study has the prime objective to update the private/financial returns to the education, based on the recent data available. The study will focus to estimate returns to different levels of education as well as different type/streams of education. It will also focus to compute returns to other attributes of human capital like Training and work experience.

Several empirical research studies, national as well as international, to estimate private returns to education in Pakistan, are available. However, most of the studies are quite old and used data (around 1999-2002) with missing information on vital variables like years of schooling, work experience etc. So, obviously these estimates could not reflect the socio-economic and demographic changes happened during the last 15 years and so. This study will use the most recent nationally representative data to update the returns to human capital in the labor market of Pakistan.

Moreover, successive governments during the last 20 odd years implemented so many education programs to expand the access as well as to improve the quality of education and special initiatives to impart technical skills. All this warrants to re-estimate the returns to education along with other important components of human capital in Pakistan. New and updated estimates could be available to compare with the old results. These results may also show that how the labor market has been behaving during all these years.

It is rare that empirical studies try to estimate returns to different streams & types of education in Pakistan, rather those studies assumed a constant returns to schooling years. This could be misleading to assume a constant rate of return to every additional year or level of education. Returns to education could be heterogeneous as different levels of education may impart different types of skills and can lead to different returns in the market. This study, therefore, intend to estimate returns at different levels of education. The results may also show the patern of education-earning profile. This may have serious policy implications, if we found that the profile has increasing trend with the higher level of education. Because, our policies are driven by the notion that expansion in primary education could be an instrumental in reducing poverty due to the higher returns to the primary education.

Due to expansion in education attainment and influx of private education in the country due to financial gains in the business, graduates are flooding into the labor market. Especially at higher education number of universities increased from 42 in 2000 to 162 in 2016 and enrollment enhanced from 100,000 to 1.355 million during the same period. It has been observed that the graduates in social sciences or humanitarian groups are outnumbering the graduates in physical sciences, IT, Commerce and Management. It is yet to be seen how much labor market (already dominated by uneducated labor) is responding to these educated youth, having educational degrees in their hands with a hope to get a white color job. The study will also try to estimate returns to different fields at graduation. The results could have some policy implications by suggesting where to (type & level of education) invest more.

To understand wage differentials in the labor market, returns to education alone may not be enough. Education and training enables the individuals to choose a better occupation to get more

earnings. So, choice of occupation and profession could further explain wage differentials in the market. Various studies provided evidence of wage differentials across occupations in Pakistan.

Labor market work experience, no doubt, is an important component of human capital. Moreover its interaction affect alongwith schooling attainment needs to be computed. This interaction effect was used by Mincer in its seminal human capital model and found it significant. However, very few studies about Pakistan used this interaction term (Nazli, Hina 2004). This study will use the interaction term with different levels of schooling.

Gender wage disparities in Pakistan is well documented. These disparities are also evodent in accumulation of human capital, especially schooling, where women are lacking far behind. This study will try to explore that how much labor market explains low investment on female schooling. The study will also try to explain either the wage disparity is just because of gender or because of human capital attributes.

Last but not the least, the state could not be able to eradicate regional imbalances in provision of social services and amenities in Pakistan. The study will also examine the regional disparities

This study may also have some policy implications. As stated above that it will provide some insights to the public policy makers to revisit, if needed, the priorities, based on the evidence, for future resource allocation in education sector

II. Education Sector and labor Market of Pakistan:

Labor Market: Pakistan is the sixth most populous country in the world[1]. 135 million are comprised of working population out of which 61 million are included in the Labor Force[2]. Labor. Labor Force Participation Rate (refined activity rate) is 45.2%. For men it is 67.8% and for women it is only 22% which is slightly improved as compared to 2012-13[3] but still in the lowest group in the world. Unemployment rate stood at 5.9% (5% for men and 9% for women). Formal sector comprised of 27.4% while the informal sector stands at 72.6%. Literacy rate among the population of age 10 years and above is 60.7%, 70.6% for men and 49.6% for women.

If we look at sectoral distribution of labor it shows that the main chunk of labor force is still engaged in low productive agriculture sector with 42.3% share while Industry captures 22.6 % and Services sector is left with 35.1%. However, share of agriculture sector has been declining while of Services Sector is increasing over the years.

60% population is between the age of 14 and 64 which is the standard working age. According to ILO Report for 2013 that 70% of population is less than 35 years. This shows that Pakistan has a very young population and this is the critical juncture for Pakistan that how to handle this population dividend to leap forward forcefully. Several interventions has been made by successive Governments.

Pakistan is a labor exporting country. Between 1971 to 2015 Pakistan has exported 8.77 million workers abroad. Data shows that between 2011 to 2015 out of total exported labor half were illiterate and unskilled while only 1.7%[4] were doing white color jobs. This shows a dismal

[1] World Bank
[2] Economic Survey of Pakistan 2016-17.
[3] Economic Survey of Pakistan 2016-17.
[4] Economic Survey of Pakistan 2016-17. Labor Survey of Pakistan 2014-15.

picture of labor market supply of Pakistan which is dominated by illiterate and unskilled workers while women participation is at the lowest. Here, a question comes to the mind that; is the labor market could be blamed for low schooling, especially for women, in Pakistan? This also suggest structural reforms in the labor market of Pakistan.

The current political government has started various interventions in 2013, for skill development for better supply of skilled labor to the labor market of Pakistan and overseas. Prime Minister's youth skill development program, Prime Minister's youth training program, various schemes for Bussiness loans and interest free loans for youth are few examles. National Technical and Vocational Training Commission (NAVTTC) was established, mandated to regulate, facilitate and provide policy direction in Vocational & Technical Training, and for establishing and promoting linkages among various stakeholders existing at national as well as international level. It is ding various projects in collaboration with foreign funding agencies for TVET reform support program. NAVTTC has revised the curriculum for technical education and vocational trainings in collaboration with the private sector and Industries. It has recently concluded the Youth Skill Development program by imparting trainings to 100,000 youth in 116 trades.

Moreover, Ministry for Overseas Pakistani & Human resource Development and National commission for human development has also taken various steps for job creations in overseas markets especially in Middle East.

In the backdrop of these initiatives, this study will also depicts the trends of returns to education and technical training by the labor market in Pakistan.

Education Sector: Education Sector in Pakistan is still looking behind even within in the South Asian Region. Pakistan couldn't achieve MDGs (universal primary education) for education and still stand at 87% of GER.

When we look back to the beginning of new millennium, it could be observed that different governments started various initiatives to improve overall education sector e.eg. Social Action Programs (II), Education Sector Reforms, Girls Primary Education Development Project, Second Science Education Project, Initiative for education for all, initiative of non-formal basic education, National Education policy 2009, other targeted initiatives like, Free Education, Incentives for Girls education, Food for Education and Tawana Pakistan[5] etc. To match the changing trends and demands of labor market due to emergence of a vibrant private sector it was needed to invest on technical education and vocational trainings so that this sector could be expanded along with improving its quality. So a good initiative was taken to establish National Vocational & Technical Training Commission (NAVTTC), with a mandate to regulate, facilitate and to provide policy direction in Vocational & Technical Training. Establishing Higher Education Commission(HEC) was also a big step in a right direction

Despite those initiatives, results are not that promising as the data shows a dismal picture. Literacy rate in 1999-2000 was 46.5% (59% M, 33.3% female) it increased to 57% in 2008-09 and now it stands at 60% (70.6% Male , 49.6% Female) which is hardly any significant improvement. Only positivity about the data is improvement in female literacy from 33% in 1999 to 50% in 2016. Gross enrollment rate (GER) has increased to 87% as compared to 71% in 1999. Higher Education in Pakistan showed some promising figures. In 2000 there were only 42 Universities (29 Public Sector) which could only enrolled 100,000 students. Now in 2016 there

[5] Economic Survey of Pakistan 2000-01, 2008-09 & 2015-16, Review of Education for all 2015. National Review Report.

are 163 Universities having enrollment of 1.355 million[6]. Higher Education Commission, after 2001 did relatively good job and in result higher education sector expands quite handsomely.

This study, therefore, intends to retest the impact of these initiatives using the latest nationally representative data by estimating the financial private returns to education along with returns to technical trainings. The study will assess the path and trends of income distribution across education levels, genders and regions.

[6] Economic Survey of Pakistan 2000-01, 2008-09 & 2015-16, Labor Force Survey of Pakistan 2001-02 & 2014-15

III. THEORETICAL BACKGROUND:

The standard approach in labor economics views human capital as set of characteristics /skills that increase worker's productivity. Human Capital could be think about marketable skills or stock of knowledge of a worker either innate or acquired, in which they invest with a expectation that it will contribute towards their productivity and ultimately raise their earnings. Besides schooling their could be variety of sources to accumulate the human capital e.g. Experience, trainings, quality education, attitudes etc. (Acemoglu 2011)

Some of alternative approaches to human capital are as follow;

Becker views human capital is directly useful in production process. Which means that the human capital increases productivity of a worker in all kinds of tasks, involve in production process.

Gardener argues that the human capital should not be considered as uni-dimensional as there could be many other skills and characteristics which contributed in accumulation of human capital e.g. Mental vs Physical abilities as different skills etc.

Schultz/Nelson-Phelps viewed human capital as the capacity to adapt. Human Capital is very effective in changing environments as it enables to adapt with changes.

Bowles-Gintis recognize human capital as the capacity to work in organizations, obey orders, or simply adapt to life in a hierarchical/capitalist society. This approach thinks schooling as a vital tool to develop or to make right approach towards the life.

Spence view: observable measures of human capital are more a signal of ability than characteristics independently useful in the production process.

An analysis of different views on human capital we can conclude that most popular view is that the human capital would be valued at market. Market will guide for alternative incentives for investment on human capital.

Based on the literature on human capital we can summarize the main **sources of differences in human capital**;

Innate ability: People may have different human capital, solely due to the innate or genetic abilities. It could be possible reason of heterogeneity in human capital as workers may have wage differentials despite same schooling years and other investments.

Schooling: The most famous source of Human Capital differential amongst researchers is schooling, despite the fact that it contributed less than expected towards differentials in returns to human capital. It attracts good chunk of investment made by individuals to accumulate human capital.

School quality & Non-schooling investment: Twin kids, lived in same initial environment and attended same level of schooling, may still have different human capital. One reason may be quality schooling if they are in different schools, but there could be more unobserved factors (other than innate ability) that can contribute towards acquiring different set of skills, even the twins attended the same school. It may be because they chose different investments to accumulate different attributes of human capital. These unobserved factors could be critical in determining wage differentials.

Training: An important part of human capital, usually acquired after schooling or during job. It is useful source of differentials in returns to human capital in the labor market.

Pre-labor market influences: It can be defined more specifically as peer group effects, the workers come across before entering the labor market. These can be sociological but it still may have investment possibilities like decision of parents that where to live can effect peer learning.

IV. Research Questions:

1. What is the current trend of returns to different levels of education in Pakistan? Is it increasing with the higher levels of education or otherwise?

2. Is there any gender based discrimination in returns to different levels of education? If yes, than what is the magnitude?

3. Do the labor market returns explain low female schooling in Pakistan?

4. What are the returns to human capital other than education i.e. Technical Training and work experience in Pakistan?

5. What is the trend of returns to education, over the years (2013-2015) in Pakistan?

LITERATURE REVIEW

It is generally perceived that education can cause raise in earning of an individual either by imparting skills or indirectly by providing better incentives and opportunities to enter in lucrative profession or occupations. So, as expected, extensive literature is available to compute returns to education throughout the world since the late 1950s (*Psacharopoulos 2004*). Increase in wage inequality observed during 1980s and 1990s motivated to renewed interest in estimating returns to schooling (*Psacharopoulos 2004*).

In Pakistan, literature on estimating private returns to education, could be found in 1970s and 1980s. However, as narrated by *Javed Ashraf (2011),* afterwards a barren period is observed in which less attention was given to estimate rates of return to education. Due to scarcity of data, especially on variables like, years of schooling, actual experience,, quality education, technical training, data on family characteristics etc. substantial work is lacking in Pakistan.

Psacharopoulos (2004) concluded that average rate of return to schooling, world wide is 10%. The study further observed that for low and middle-income countries (latin America, Sub Saharan Africa) the returns remained highest (12%), while returns remained relatively low for OECD countries (7.5%). For Asia it remained at world average (9.9%). Overall classic pattern of diminishing returns to education is maintained. The comparative analysis also revealed that during the last 12 years average returns to schooling has decreased 0.6 percentage points despite increasing in school attainment during the same period (*Psacharopoulos 2004).*

Some consistent findings could be observed from past studies in Pakistan: (i) Schooling years attainment are low when compared to developing countries (ii) returns to education increase with the level of education (Aslam Monaza 2009)

In case of Pakistan, education consistently and substantially increase wage earnings (Geeta & Soderborn 2008). An Individual's monthly income enhanced by 7.3 % corresponding to each additional year of schooling (Nasir & hina Nazli 2000). While some other studies on world comparison shows quite high returns of 15% to schooling in Pakistan as recorded in 1991 while the same study shows some previous estimation conducted in the year 1986 was surprisingly as low as 4% (*Psacharopoulos 1994).* Aslam Monaza (2009) estimated returns to schooling years in Pakistan through 04 different methods and concluded that it fluctuated between 10 to 14%.

It seems a popular argument in literature that it may be misleading that all levels of education may have yielded constant rate of returns, as it is expected that different levels of education may impart different skills and result in different level of earnings**. Van der Gaag and Vijverberg (1989), Khandker (1990),** used diff levels of edu and concluded that it has different impacts on earnings. Various studies are available on Pakistan, which estimated return to education with respect to school attainment (continues variable) and different levels of education (discrete variable) as well with special focus on gender wage differentials and discriminations by the labor market. Few are shared hereunder;

The existence of vast gender gap, in favor of men, in human capital accumulation is evidenced by various studies in Pakistan [Ashraf and Ashraf (1993a, 1993b and 1996) and Nasir (1999)]. Large chunk of the gender gap in earnings in Pakistan is not explained by differences in men's and women's productivity, like education and experience, rather by potential discrimination in the labor market (Aslam 2009).

A very good study was conducted by Aslam Monaza (2009) by applying four different statistical techniques to estimate returns to school attainment and with respect to gender. She tried to answer the question that; does labor market can explain low schooling of women in Pakistan? Nasir (2002) argued that answer to this question is probably "yes," Riboud (2006) et al. arguing otherwise, based on higher returns to female education in Pakistan. Aslam Monaza used OLS, Heckman two step Procedure to coup with the selectivity bias, IV estimation to deal with the Endogeneity bias and Household fixed Effect Model to control unobserved family characteristics.

The study concluded on basis of four different methods of estimation that returns to additional schooling year/ attainment ranges between 7% and 11% for men and between 13% and 18% for women. This means that women education is more attractive to invest than men. That also indicates that labor market in Pakistan is not responsible for low female schooling. However, **total earnings are much higher in favor of men than the women**. β_{IV} is greater than β_{OLS}. FE Model also supported in favor of female (14%) as compared to male (6%). The research paper further concluded that regardless of methods of computation, **returns to each level of education (Primary to Masters) increases with higher level, for both men and women**. Again returns are higher for women at each level as compared to women. **This also confirm convex education-earning profile in Pakistan** against the conventional theoretical concavity.

Most of the studies used waged- employed data to estimate returns to education in Pakistan, which seems irrational as hardly 50% labor market is consisted of waged-employed in Pakistan. There is big chunk of labor force belongs to self employed and to Agriculture sector. Geeta Kingdon and Måns Söderbom (2007) calculated returns of labor market to education across

different occupations, gender and age groups. Returns to schooling and level of educations has been computed amongst three main occupation groups like waged-employed, self-employed and agriculture. The studies also addressed issues of selectivity bias (heckman Procedure) and Endogeneity bias (HH Fixed Effect Model). They also used quadratic term for education to examine the patterns of returns to education. The study also compared results at two different points in time.

Results are quite similar to other studies. It was concluded that education plays a vital role in occupational outcomes, however, it differs widely amongst genders. It was also elaborated that education is critically important in increasing earnings, conditional to occupations, but, again it varies among gender. Returns to education for women are handsomely higher as compared to men across all occupations. Again, the study shows the historical pattern of higher overall earnings for men than women. The study again predicted convex nature of education-earning profile by showing considerable high returns at higher level of education for both men and women. This result may have a serious policy implication which is based on conventional understanding of diminishing returns to education.

A recent study (Tazeen Fasih, 2008) conducted for World Bank, again reconfirm the trend that returns to education attainment is higher for women as compared to men and returns increases with the level of education, across the ocupations, again in favor of women. The report shares few important results by using data from Pakistan and Ghana. It stated that education has positive and strong impact on Individual's wellbeing either indirectly through enabling to enter or to choose a lucrative job /occupation or directly by increasing the earnings. Another outcome of the report was concavity of education earning profile, revealing higher returns to higher level of education, means to rethink about allocation of resources within the education sector. As,

popular policy motto remained subsidizing the primary education in developing world. Which is also emphasized in MDGs to reduce poverty by enhancing primary education base in a country.

Nazli, Hina (2004) used different dummies (Professionals, Technicians, Services and labour) to capture the effect of four different occupation groups within the waged-employed in Pakistan. The study concluded that choice of occupation is critical to determine income earning of an individual. She found a significant difference of wage earnings across the occupations. High salary is linked to better paying professions. The study overall concluded that the effect of occupational choice is stronger than the effect of education and the effect of education is stronger than the effect of experience.

Different professions/occupations required different kind of skills. So, post schooling trainings can play an effective role in determining earnings. Returns to technical training are nearly 9 percent (Nazli, Hina, 2004).

Javed Ashraf (2011), update the returns to education in Pakistan using the latest data availale. His findings reconfirm the traditional and historical trend as returns to education level increases with the higher level. Females are earning substantially, especially at middle level, as compared to male. The study also estimated returns to different professions (09 occupations) and Industries (10) and found considerable differences in earnings across the professions and Industry, however, the author argued that due to broad definition of occupations and Industries it is hard to give much interpretation to these coefficients (Javed Ashraf 2011).

Due to Endogeneity nature of education a researcher has to be careful about omitted variable bais. To complete the picture of human capital accumulation we need to include or control a non linear variable of work experience. Moreover, an interaction effect of education with experience

make a sense to avoid overestimation. It is rare that researchers used this interaction term in case of Pakistan, mainly due to unavailability of data on actual experience.

Mincer (1974) used interaction effect of Education and work experience in his human capital model and found it significant. However some other studies e.g. (Pscharopoulos 1981) found it insignificant in case of Morroco. Pscharopoulos 1979, in case of Britain, found that the interaction term increases due to effect of either of variables.

Nazli, Hina 2004, found the interaction term (Edu & Experience) effective and statistically significant. The study results reveals that the rates of returns to education are 5 percent and returns to experience are 7 percent and Education*Experience Interaction Term caused reduction in the coefficient of education from 0.048 to 0.040. The coefficient of experience is also reduced from 0.067 to 0.060 (Nazli, Hina 2004). Effect of Interaction Term at different levels of education remained insignificant.

(Aslam, Monaza 2009) also found that the work experience has positive and significant effect, however returns are diminishing over the time.

The regional imbalances in the provision of limited available social services are more pronounced in Pakistan. Because of these differences low returns to education are observed in rural areas [Shabbir (1993 and 1994); Nasir (1999); and Nasir and Nazli (2000)]. Ashraf (2011) also concluded substantial earning differentials across all provinces of Pakistan**.**

DATA & VARIABLE SPECIFICATIONS:

The latest and nationally representative, secondary administrative data of *Labor Force Survey of Pakistan* compiled by Pakistan Bureau of Statistics (PBS), Government of Pakistan has been used. Independent Pooled Cross-sectional Data for the three years (2013-2015) has been used to increase the sample size and to compare the results for different years.

I segregated total sample into Father, Mother and children data sets. Our prime group of interest are those unmarried kids who lives with their parents. I also restrict the sample to those who falls within the age bracket (10< >60) and can participate in the labor force as wage employee. Sample has been segregated to control effect of parents age and education on child's earning. It will lead us to use mother's education as Instrumental Variable for Child's Education to assess its indirect effect on Child's earning.

So our sample reduced to 11452 adults/kids. 15% are female and remaining 85% are male. Average monthly income for our sub sample is 10485 Pakistani rupee (Rs.). average income for women is Rs.10485 as compared to male average income of Rs.10775.

Mean value of education level is 3.427. Out of total sample 17% are without formal education (Male=18% & female=9.4%), 50% are matric and below while 20% are graduates. Medicines amongst all education levels or professions is the highest average income earner with Rs.37494. On average men's average earning is higher than the female's. mean value for experience is approx..16 years.

Our dependent variable is log of monthly income of Childern who are waged-employees. Our main variable of interest is education. Mainly studies in Pakistan assumed constant rate of

returns to schooling whereas it seems illogical as it could be expected that different levels of education may impart different levels of skills and knowledge so in result the labor market is expected to behave accordingly by giving different returns to different levels of education. So, this study believe on heterogeneous returns to the education. The data provide information on different levels of education from primary to master's level. In Pakistan after completion of five years of education is equal to Primary, after primary, completion of further 3 years means Middle, than two further years of education will give certificate of Matric, after matric two years of college education is equal to intermediate. After 12 years of education students can either enter into professional 04 years degree programs e.g. Engineering, Medicine, Computer Sciences, Agriculture etc. or enter into degree programs of other subjects like social sciences, humanitarian, Arts group etc. another option is to do 2 years bachelor level and then enter into Master Degree program which means 16 years of education. Estimation of coefficients for different levels of education will show the trend of earning-education profile by showing how labor market behaves across different levels of education. Another important aspect of the study is to compare returns to different professional degrees and general degree programs.

To assess the gender based wage discrimination in the labor market of Pakistan a dummy variable for gender is included in the regression equation. To further estimate wage differentials across gender at different levels of education, joint impact of interaction term of dummy variable for gender with different levels of education would be evaluated. The interaction term is very sensitive to our analysis. It will give a picture that either the labor market is discriminating on basis of gender characteristics or it is only responding to the skills & education levels. The coefficients could be of utmost importance with regards to parent's investment in female education.

Two other major components/variables of human capital i.e. Work experience and Technical Training has also been estimated.

Due to unavailability of data on exact school starting age we just used age (10< and <60) as proxy to labor market experience. In Pakistan above the age of 10 can participate in labor market. Quadratic term for experience has been included to capture the diminishing returns to experience. Age-earning profile shows that how wage increases initially with the increase in experience and reaches its peak with certain experience and starts to fall as age goes on. As Mincerian Model uses an interaction term of education and experience and found it significant, this study will also estimate and interpret the joint co-efficient of the interaction term.

To estimate returns to training, a dummy variable is included in the model. Those who attended training program, on-job or off-job, irrespective of duration, has been included.

To capture the region wage disparities dummy variable for urban and rural population is included in the regression analysis. A dummy variable for years to capture the time effect on ernings has been included in the model.

Important Variable Specifications with mean values are as under;

S.NO	**Name of variable**	**Specification**
1.	lWage	Log of monthly individual income, in Pakistani Rupee (Rs.), of waged employees in the labor force.
2.	Edu	Aggregate effect of levels of education on individual earnings
3.	Exp	Work Experience - used age (10< and <60) as proxy.
4.	Exp2	Quadratic Term of Experience

5.	Female	Dummy variable (Female=1 & Male=0)
6.	Illit	Without formal education (Reference group)
7.	Prim	Primary education=completion of 5 years of schooling.
8.	Middle	Middle education=completion of 8 years schooling.
9.	Matric	Matric education=completion of 10 years schooling.
10.	Inter	Intermediate/college education=completion of 12 years schooling.
11.	GEngi	Graduation in Engineering (16 years education/4 years after intermediate)
12.	GMed	Graduation in Medicine (16 years education/ 4 years after intermediate)
13.	GComp	Graduation in Computer (16 years education/4 years after intermediate)
14.	GAgri	Graduation in Agriculture (16 years education/4 years after intermediate)
15.	GOther	Graduation in Other Subjects/social sciences & Arts (16 years education/4 years after intermediate/ BS Honours)
16.	MA	Master Education (16 years education)
17.	Train	Dummy variable (yes=1, No=0)
18.	Occup	Different levels (08 types) of occupations are controlled
19.	Year	Category variable for three years from 2013 t0 2015 (2013 as base year)

EMPIRICAL STRATEGY:

The study will start with basic human capital model and than add various control variables.

lnWage = β0+β1Edu+β2Xi+ui (1)

Xi= Different characteristics (controlled variables) of an individual effecting wage earning.

I start with estimation of returns to education levels by using OLS method/technique to provide basic results along with returns to other human capital attributes/characteristics like work experience and trainings. However, we expect due to the Endogeneity nature of education, that the OLS Estimates could be effected by omitted variable bias and Measurement error bias.

Classical example of omitted variable bias is correlation of schooling/education with the unobserved/innate ability included in the error term. So, this correlation between the error term and our independent variable could lead to upward or downward bias. Another probable bias is Measurement Error which is quite evident from OLS estimations.

To deal with this problem researchers use an IV methodology which provides such Instruments (variables) which must correlate with education but not with the error term (innate ability). Such Instrument can effect the individual earnings indirectly through effecting individual's school attainment. One such Instrument could be Family Background (FB) as it is believed that FB is critical in pushing for higher education or can also keep away kids from education. Moreover, FB, includes father & mother' education, is not correlated to innate ability, unless there is no intergenerational transmission of ability but it can affect children's earning through their education. If it is assumed that there is no intergenerational transmission of ability than FB could

be a good Instrument for children;s education. Our data provide information on parent's education of an individual who is unmarried and live with parents. So we will use mother's education as an Instrument Variable (IV) to estimate returns to education level of a child. We did not use father's Education as an IV with an understanding that in societies like of Pakistan, Father's Education can effect Child's earning directly, through family connections & nepotism[7]. While it has been observed that mothers are more influence on Child's education as in majority cases mothers are just house wives and stay at home so they can better motivate children for better education. So, our IV is mother's education with matric or less.

However, there are research studies which raise questions regarding assumption of no intergenerational transmission of ability like Behrman and Rosenzweig 2002, 2005; Plug and Vijverberg 2003 and more.

Using 2SLS has another advantage that it will resolve the measurement error simultaneously.

[7] Aslam monaza (2009).

EMPIRICAL RESULTS & **FINDINGS**:

OLS ESTIMATION:

Table1 shows OLS results/estimates for returns to education and other human capital attributes using different models. *Model1* is simple form of Human capital Model including returns to education levels, experience and gender.

Results shows a constant returns to each additional level of education by 7% which is significant. While returns to each additional year of work experience in the labor market is 10% which shows a strong impact of experience. It also shows diminishing returns (concavity) to experience over the years. We can further interpret that returns to experience reach its peak with 31 years of experience than it starts to decline as experience increases. The coefficient for gender is showing an obvious huge difference in earnings across gender as females are earning 53% less than male.

In ***Model#2*** we just added another component of human capital 'Technical Training". The co-efficient is also significant and reveals that workers with some kind of training, on job or off job, earns 4.4% more than the workers without any training. When we control for the variable it reduces coefficient for education (6.9 to 6.5%) and returns to experience also decreases little bit. In this model we also control for different occupations.

Model#3 include two interaction terms to evaluate the joint impact of different variables. First interaction term we used is famous interaction term from the Mincerian human capital model that is of Experience and Education. Joint coefficient of the interaction term is significant and shows joint impact on earnings. We interpret the coefficients of original variables of education and experience by taking average/mean values of both variables. For example at mean value of experience 16years, return to each additional education level comes to 2.17%. We can interpret

as with an average experience of 16 years each additional education level will increase the income by 2%.

On the other hand at a mean value of education (3.4) and at mean value of experience (16), every additional year of experience may increase wage by 6.5%. This shows that the impact of experience is much stronger than the education in the labor market of Pakistan.

The second interaction term is (Female*Edu) to estimate the returns to additional educational level across gender. The coefficients could be interpreted as on average returns to each level of education for male (7%) are more than for female (6.4%). The result shows that the labor market of Pakistan is discriminating on basis of gender as it gives less returns to female with the same level of education as compared to men. There may be some other reasons like female are mostly involved in less paying and less productive sectors. 74.2 % of working women were involved in the agricultural sector in 2010-11[8]. The other reason may less working hours as compared to men. 47% men worked 50 hours or more in a week while only 31 % women worked 29 hours or less in the week for the same year[9].

Table-1 OLS Model with Interaction terms

Dependent Variable: log wage			
	(1)	(2)	(3)
VARIABLES	Model-1	Model-2	Model-2
Edu	0.0696***	0.0656***	-0.0327**
	(0.00198)	(0.00246)	(0.0140)
Female	-0.532***	-0.547***	-0.658***
	(0.0206)	(0.0231)	(0.0514)
Age	0.101***	0.0945***	0.110***

[8] ILO 2013, Pakistan labor Market updates
[9] ILO 2013, Pakistan labor Market updates

	(0.00765)	(0.00765)	(0.0125)
Age2	-0.00111***	-0.000998***	-0.00175***
	(0.000159)	(0.000159)	(0.000310)
Train		0.0443***	0.0363**
		(0.0165)	(0.0173)
Age*edu			0.00340***
			(0.000587)
female* edu			0.0155***
			(0.00555)
MEdu			0.0283***
			(0.00331)
FEdu			0.0205***
			(0.00265)
Control for Occupations	No	Yes	Yes
Constant	7.013***	7.158***	7.119***
	(0.0880)	(0.0918)	(0.128)
Observations	11,449	11,449	9,718
R-squared	0.330	0.338	0.360

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Tabel#2 shows rsults for OLS estimates for return to education with different levels of education and also returns to different levels of education across gender. ***Model#1*** depicts coefficients for different levels of education from Primary level to Masters level with reference to the group with no formal education. The results confirm the striking pattern of some studies conducted on Pakistan and shows that with each additional level of education returns are increasing. For

example when the level increase from primary to middle and from middle to Matric returns are increasing proportionately with reference to the base group. The highest returns are to Professional education like Medicine and Engineering. This shows convex trend of earning-education profile, against the conventional thinking that it should be concave, means decreasing returns with the levels of education. These results have some serious policy implications. The policy makers have to review the policies, mainly, focused on expansion of primary education as mean of income distribution to reduce poverty level, with an assumption that earning-education profile has a concave nature by showing highest returns to primary level of education.

Marginal Returns to each additional year at different levels of education are computed as under;

Table-A Marginal returns to additional year of education at different levels

S#	Education level	% marginal returns
1	Primary	1.7
2	Middle	2.4
3	Matric	6.7
4	Intermediate	6.9
5	Graduation in Professional Sciences (16 years)	17.9
6	Graduation in other subjects (compared to intermediate) (16 years)	5.1
7	Masters (16 years) compared to Intermediate	14.4

Marginal returns are computed as; $R_k = (\beta_k - \beta_{k-1})/SK$

Bk is coefficient of current level of education, Bk-1 is previous level coefficient and SK is

total year needed to complete the current level {Used by Duraisamy (2000)}. Coefficients from Model#1 Table2 has been used to transform the values.

Table-A reveals an interesting picture. First of all it shows convexity of earning-education profile up to graduation. It also narrates that it could be misleading to assume a constant rate of return to each additional year of schooling attainment. It is obvious that different levels of education imparts different levels of skills and knowledge and the labor market rewards accordingly. So it is concluded that at each level of education different returns to additional year of schooling should be expected. It is also important to note that highest returns are to professional education as we can see that returns to each year of schooling to professionals is 18% as compared to other graduates with only 5.1%. Even Masters level of education has low returns as compared to professionals. In Pakistan due to the influx of private universities and colleges graduates in other than science subjects are overwhelmingly dominating the labor market, despite low level of earnings. This point has policy implications to promote professional education compared to other graduates. It may also be interpreted as due to high returns to higher education, especially the professional education, it may be privatized, as wealthy people can afford expensive higher education. While on the other hand targeted voucher schemes for poor talented students could be launched to make easy access of poor to the higher and professional education. While the policies for expansion of the basic and primary education should be continued as it will increase enrollment at higher level of education.

Model#2 in Table#2 shows results of interaction effect of Gender with different education levels e.g. primary to Intermediate and then Professional education of Medicines and Engineering. The results implies a serious wage differentials across the gender. Estimates of coefficients depicts

that at each level of education, except Primary and Medicine, women are earning substantially less than their counterparts with the same level of education. At primary level, women are earning 16% more than the male. This is striking that at low skilled jobs women are earning more. It may be due to women's massive participation at informal sector and at low skilled farm and without farm jobs. This cohort of women may be comprised of the dropouts from schools due to domestic and family financial burdens. On the other hand at highest professional level of education e.g. Medicine again women are strikingly earning 49% more than male doctors. It is quite expected that women doctors may earn more than male Doctors but the difference is huge. Scarcity factor is doing tricks here as Pakistan is facing shortage of female doctors especially gynecologist. Due to social norms and values women participants prefer to visit lady doctors, so, it is believed that there is high demand in the labor market for lady doctors.

It could be observed from the results that from middle level to intermediate women are earning considerably low. This trend again shows a typical characteristic of Pakistani society that at this age cohort women prefer to marry and to settle down in life. So, this period keep women busy in looking after their homes, family and child bearing, so they are left out of the active labor force. In contrast, it is observed that women with higher education, usually delays marriages or at least child bearing.

These results, again, provide a food for thought for policy makers that how to re-prioritize their policies to encourage women education through incentivizing through labor market. We can also conclude that the labor market returns provide an explanation for low level of female schooling in Pakistan. Parents may have less priority for female education based on low market private returns as compared to male. So, they prefer to invest on male kids. These results also provide evidence that wage discriminations in labor market is mainly driven by gender characteristics

rather than by skills or education. This implies that the government should think of some structural changes in labor market in order to encourage parents to invest on female education.

Table-2-OLS estimates for education levels across gender		
Dependent Variable: log wage	Model-1	Model-2
Variables	1	2
Female	-0.523***	-0.500***
	(0.0248)	(0.0327)
Age	0.0989***	0.0994***
	(0.0102)	(0.0102)
Age2	-0.00119***	-0.00120***
Primary	0.0862***	0.0782***
	(0.0202)	(0.0203)
Middle	0.111***	0.112***
	(0.0205)	(0.0205)
Matric	0.178***	0.190***
	(0.0215)	(0.0216)
Intermediate	0.316***	0.324***
	(0.0261)	(0.0262)
G.Medicine	1.145***	1.174***
	(0.0795)	(0.0800)
G.Engineer	1.558***	1.288***
	(0.0727)	(0.0892)
G.Computer	0.821***	0.803***
	(0.131)	(0.131)
G.Agri	0.618***	0.609**
	(0.239)	(0.237)
G.other subjects	0.520***	0.496***
	(0.0325)	(0.0332)
Masters	0.895***	0.863***
	(0.0411)	(0.0431)
Fem*prim		0.161*
		(0.0871)
Fem*mid		-0.0337
		(0.108)
Fem*mat		-0.180***

Fem*inter		-0.112*
		(0.0612)
Fem*med		0.493***
		(0.112)
Fem*eng		-0.796***
Father Education	0.0158***	0.0159***
	(0.00254)	(0.00254)
Mother Education	0.0173***	0.0166***
	(0.00318)	(0.00318)
Control for Occupation	Yes	Yes
Constant	7.054***	7.080***
	(0.117)	(0.118)
Observations	9,718	9,718
R-squared	0.391	0.394

Robust standard errors in parentheses

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

IV ESTIMATIONS:

OLS estimates, however, may be biased due to Endogeneity nature of education. It may also suffer due to the measurement error. To correct these problems we used mother education as Instrumental variable for child's education. We suppose that mother's education can effect, positively, attainment of education of her kids, means, educated mother can effect attainment of kid's education strongly and positively. Our data provides information on parents education, so select a subsample of those children's who are unmarried and living with their parents and their mothers are educated (at least 10 years of education). We avoided to include more educated women as it implies that more educated women, most probably, belongs to rich families (in the context of Pakistan) and rich families are obviously more effective in imparting more education.

So the sample is restricted to those children whose mothers are Matric (10 years of education) or less.

We didn't use father's education as an IV with believe that it may directly affect earnings of children's through nepotism and family connections. This may, however, face problem of sample selection bias.

Table#3 shows results of three IV models, with whole sample and with segregated models for both gender. Than it compares the estimates with OLS Estimates.

2SLS estimates have been reported in the **table#3**. First we will notice first stage coefficients for mother education. We can see that first stage coefficients of mother education for all three models shows a strong effect along with expected signs. P-values of F-tests also reveals that the instrument satisfy the relevance condition. Interesting phenomena is that mother's education is strongly effective for male kids than the female kids. However, Coefficient for female is less significant than male.

Second stage IV estimates reveals the evidence that the IV estimates for returns to education levels are higher than the OLS estimates, clearly showing that the OLS estimates are downward biased. We can observe that when we use IV, the returns to education levels increases to 8.5% as compared to 5.1% as estimated through OLS. For both male and female returns increased handsomely, especially, for women it, although less significant statistically, increased manifolds i.e. 34% as compared to 8.2% for male.

Mother's education being less significant and less strong for female children's education attainment as compared to male kid's education again shows a typical mind set of Pakistani Parents who usually think that investment on female kids is expected to less reward bearing in

long run as after marriages their returns will go to some other households. Moreover, they also expect to live their old age life with their sons not with their daughters. So, even mother's may prefer to invest in males' education rather than on females', unless they afford good education for both.

Table -3 OLS and IV Comparison						
	(1) OLS(Whole sample)	(2) IV-Whole sample	(3) Female(OLS)	(4) Female(IV)	(5) Male(OLS)	(6) Male(IV)
Education	0.051***	0.085***	0.095***	0.343**	0.049***	0.082***
	(0.003)	(0.030)	(0.008)	(0.172)	(0.003)	(0.029)
Age	0.106***	0.086***	0.056**	-0.159	0.119***	0.099***
	(0.008)	(0.020)	(0.025)	(0.140)	(0.008)	(0.020)
Age2	-0.001***	-0.001***	0.000	0.003	-0.002***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)
Train	0.010	0.006	-0.036	-0.032	0.027	0.022
	(0.018)	(0.018)	(0.063)	(0.082)	(0.017)	(0.018)
Father Edu	0.023***	0.015*		-0.002	0.016***	0.007
	(0.002)	(0.008)		(0.034)	(0.002)	(0.008)
Father Age	0.004***	0.004***	0.007	-0.000	0.003**	0.003**
	(0.001)	(0.001)	(0.005)	(0.007)	(0.001)	(0.001)
Mother Age	-0.003*	-0.002	-0.012**	-0.006	-0.001	-0.000
	(0.002)	(0.002)	(0.005)	(0.007)	(0.001)	(0.002)
year=2014	0.023	0.024	-0.021	-0.075	0.039***	0.041***
	(0.015)	(0.015)	(0.053)	(0.073)	(0.015)	(0.015)
year=2015	0.114***	0.111***	0.086	0.097	0.123***	0.120***
	(0.015)	(0.016)	(0.054)	(0.070)	(0.015)	(0.015)
Control for Occupations	Yes	Yes	Yes	Yes	Yes	Yes
Constant	6.505***	6.523***	6.600***	7.652***	6.839***	6.870***
	(0.100)	(0.101)	(0.329)	(0.817)	(0.102)	(0.106)
Mother Education		.1365		.0925		.1398
		(.0152)		(.040)		(.0163)
F-test		80.58		5.22		73.21
P-Value		0.0000		0.0225		0.0000
Observations	9277	9277	1257	1257	8020	8020

Robust standard errors in parentheses

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

We also included a category variable to capture the time effect over the years from 2013 to 2015. Our omitted category is 2013. The coefficients shows a considerable increase in wages over the years. Especially wages increases 11% in 2015 as compared to 2013. This shows some concrete interventions made by the government during this period which needs further investigation in the matter.

CONCLUSIONS:

1. Returns to education levels increases with higher level of education. Which clearly shows a convex earning-education profile in Pakistan. So, it is concluded that higher education gives more returns than the basic education levels. This could be interpreted as that parents will invest more on higher education than primary education due to higher returns. In other words, it may lead to further worsen the inequality in school attainment between rich and poor, as poor will be discouraged due to low returns of the market, so, they can abandon education for their kids.
2. Policies in developing countries are driven by the notion that by expanding primary education could be instrumental in decreasing inequality and poverty through income distribution mechanism as returns to primary education are expected to be higher than the higher education. These updated and new evidence provide a new dimension for policy makers to review the policy interventions. It doesn't mean that education policies should divert resources from primary to higher education rather they may continue expansion of primary education as it will enable people, by increasing enrollment, to earn more by achieving higher education. But at the same time demand side interventions e.g. Targeted Voucher Schemes etc. are needed to encourage poor families to attain higher education. On the other hand private sector may be incentivize to invest on higher education as its returns are higher. Richer families can afford expensive higher education. So, crux of the discussion is that public funds should be more diverted towards expansion of basic education as well as towards the targeted demand driven schemes to encourage poortalented students to achieve higher or professional education.

3. It is concluded, based on the evidence of the study that the labor market shows gender based discrimination in wage earning. Female with same level of education are being paid less than their male counterparts (except primary & Medicine), which means that wage differentials are not on the basis of productivity, skills and knowledge. So, it could be further interpreted as labor market is, somehow, responsible for low female schooling in Pakistan. Policy makers have to rethink to address this sensitive issue. Expansion in Primary education may pave a way to reduce gender based discrimination in school attainment due to higher returns to female primary education.

   However, before making any conclusions, we should also look into some other factors of this gender based wage discrimination. Like as aforementioned that female are mostly involved in less paying and less productive sectors e.g agriculture. The other reason may be less working hours as compared to men.

LIMITATIONS:

1. This study took the sample of only waged employees from overall sample. In developing countries wage employees are not the, overwhelmingly, largest group in the labor market. In Pakistan although it is the largest group in the labor market but still it constituted only 38%, as per LFS 2014-15. So, it doesn't represent the whole labor market. It could lead to selection bias.
2. The data doesn't provide information on exact date of entering into the school due to which it is hard to compute the work experience. So, this study just use age as proxy to work experience in the labor market.
3. The study used mother education as an Instrumental Variable for children's education, to address the Endogeneity issue, with an assumption that there is no intergenerational transmission of ability. While there are still probability of intergenerational transmission of ability and correlation of IV with the innate ability.

REFERENCES:

Pscharopoulos, George. "Returns to Investment in Education: A Global Update." *World Development* 22.9 (1994): 1325-43.

Psacharopoulos, George, and Harry Anthony Patrinos*. "Returns to investment in education: a further update." *Education economics* 12.2 (2004): 111-134.

Ashraf, J. (2011), New evidence on rates of return to education in Pakistan. Global Journal of Business Research, Volume 5(3), pp. 113-120.

Aslam, M., 2009. Education gender gaps in Pakistan: Is the labor market to blame? *Economic Development and Cultural Change*, *57*(4), pp.747-784.

Kingdon, G.G. and Söderbom, M., 2008. *Education, skills, and labor market outcomes: evidence from Pakistan*. World Bank.

Nazli, H. (2004). The effect of education, experience and occupation on earnings: Evidence from Pakistan. Lahore Journal of Economics, Volume 9, No.2 July-Dec, 2004.

Nasir, Zafar Mueen, and Hina Nazli. *Education and earnings in Pakistan*. Vol. 3. No. 177. Pakistan Institute of Development Economics, 2000.

Nasir, Zafar Mueen. "Returns to human capital in Pakistan: A gender disaggregated analysis." *The Pakistan Development Review* (2002): 1-28.

Van der Gaag, Jacques, and Wim Vijverberg. "Wage determinants in Cote d'Ivoire: Experience, credentials, and human capital." *Economic Development and Cultural Change* 37.2 (1989): 371-381.

Khandker, Shahidur R. *Labor market participation, returns to education, and male-female wage differences in Peru*. Vol. 461. World Bank Publications, 1990.

Ashraf, Birjees, and Javed ASHRAF. "Evidence on Gender Wage discrimination from the 1984-85 HIES: a Note." *Pakistan Journal of Applied Economics* 12.1 (1996): 85-94.

Colclough, Christopher, Geeta Kingdon, and Harry Patrinos. "The changing pattern of wage returns to education and its implications." *Development Policy Review* 28.6 (2010): 733-747.

Tazeen, Fasih. "Linking Education Policy to Labor Market Outcomes." *The World Bank, Washington, DC* (2008).

Mincer, Jacob, and Solomon Polachek. "Family investments in human capital: Earnings of women." *Journal of political Economy* 82.2, Part 2 (1974): S76-S108.

Shabbir, T., 1994. Mincerian earnings function for Pakistan. *The Pakistan Development Review*, pp.1-18.

Acemoglu, Daron, and David Autor. "Lectures in labor economics." *Manuscript. http://economics. mit. edu/files/4689* (2011): 22.

Shah, V. (2010). *Inter-industry wage differentials and returns to education in Pakistan* (Doctoral dissertation, University of Portsmouth).

Abbasa, Qaisar, and James Foreman-Peck. *Human capital and economic growth: Pakistan, 1960-2003*. No. E2007/22. Cardiff Economics Working Papers, 2007.

Schultz, T. Paul. "Education investments and returns." *Handbook of development economics* 1 (1988): 543-630. DOI: 10.1016/S1573-4471(88)01016-2