

Research Article

An Analysis of the Gender Earning Differentials in Pakistan

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Abstract: The objective of this study is to examine the determinants of income and income gap for male and female workers in Pakistan. We have used province, literacy, education, occupation, industry, status of job, age, marital status and region as explanatory variables to estimate earning functions separately for males and females by applying the OLS method using HIES 2010-11 data. The earnings gap between males and females has also been analyzed by using the Blinder-Oaxaca decomposition method. Results shows that return to education rises with level of education for workers of both sexes however, they are significantly higher for female workers as compared to male workers. Both males and females working as senior professionals, managers and technicians have been emerged as the highest earners. Male paid employees earn less and female paid employees earn more than their employers & self employed counter parts. Married male workers earn more and married female workers earn less than the singles. We find individual characteristics like education, occupation, job status and marital status as the major determinants of income gap between male and female workers in Pakistan.

Keywords: Earning functions, HIES, income, Mincerian model, Oaxaca-blinder decomposition

INTRODUCTION

Pakistan is a developing country having total population of 177.10 million in 2011 out of which 51.06% were male and 48.94% were female (Economic Survey of Pakistan, 2011-12). The differences between earnings of male and female workers are common in both developed and developing countries like Pakistan. These differences are found in various socio-economic aspects such as labor force participation rate, employment and unemployment, enrolment and literacy rates, life expectancy and most importantly income of the male and female workers. For example, the total civilian labor force in Pakistan was 45.69% of the total population comprising 35.08% of male and 10.60% of female. The overall employed labor force was 42.97% while for male and female it was recorded at 33.30 and 9.66%, respectively. (38.33, 35.73 and 43.07%, respectively) of the females were not in the civilian labor force in Pakistan and its rural and urban areas as compared to 15.98, 15.21 and 17.39% of males, respectively. The labor force participation rate for male, female and both sexes of 10 years and older were 70.39, 13.72 and 42.80% in 1999-2000 and 68.70, 21.67 and 45.69% in 2010-11. The unemployment rate for male and female increased from 1.87 and 1.06% in 2008-09 to 2.22 and 1.18% in 2010-11, respectively (Labor Force Survey, 2011-12).

Literacy rate for male and female of 10 years and older was 69 and 46% respectively during 2010-11. The Gross Enrolment Rate (GER) was 100% for male as compared to 83% for female whereas as Net Enrolment Rate (NER) was 60 and 53% for male and female respectively (PSLM, 2010-11). The life expectancy for male and female was 64.3 and 66.1 years during 2011-12, respectively (Economic Survey, 2010-11, chapter 12). The dominant majority of the females i.e., 75.4% were employed in agriculture sector followed by 11.5 and 10.9% who were working in the private services and manufacturing sectors respectively (Labor Force Survey, 2011-12).

Average monthly income for workers of both sexes during 2010-11 was Rs.8539.76 (US \$¹ 99.88) while for male and female workers it was Rs.10046.48 (US \$ 117.50) and Rs.2152.33 (US \$ 25.17), respectively (Household Integrated Economic Survey, 2010-11). The worsening law and order conditions, increase in rate of inflation, growing crises of energy tied with decreasing growth rate of economy may have an unfavorable effect on employment opportunities and generation of income and its distribution both for male and female workers in Pakistan. Keeping in view the aforementioned conditions, it is essential to have a study on analysis of earning gap for male and female workers in Pakistan. The focus of this study is to analyze the gender earning differentials in Pakistan. In this study a micro econometric analysis has been

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carried out on latest data provided by Household Integrated Economic Survey (HIES) (2010-11). The decomposition method suggested by Blinder-Oaxaca has been used to analyze the determinants of income and its gap between male and female workers.

LITERATURE REVIEW

According to human capital approach, skills and productive capacity of individuals is enhanced by number of years of formal education or schooling. Therefore, wages of workers are directly linked with their productivity which in turn is enhanced by time spent in school or on the job. Mincer (1974) introduced the earnings functions to capture the effect of an extra school year on earnings. In the Mincerian earnings function higher earnings are associated with increased productivity due to skills generated by schooling and experience. According to Mincer (1974), one third of inequality in earnings is attributable to years of schooling and to variations of post school investment². The earnings function provides reasonably accurate estimates on return to education in the labor markets of developing as well as developed countries (Psacharopoulos, 1985). Higher levels of education and experience are linked with higher wages of workers (Weiss, 1995).

Weichselbaumer and Winter-Ebmer (2003) presented a review of empirical literature on discrimination in gender wages while focusing on differences in sources of data, methodological framework, time periods and countries. They found that gap in gender wages is significantly affected by data restrictions. They also investigated the effects of misspecification of the wage equation on the calculated gender wage gap. They noted a substantial fall in the raw wage differentials across the world due to increase in the labor market productivity of females.

Smith (2007) offered empirical results showing factors affecting the income distribution of Soviet Union. He concluded that position of a household in the distribution of income at national level is affected by demographic factors and human capital. He found that a household standing higher in distribution of income was more likely to have a well educated, healthy, married male in middle age group as its main earner. Occupation was emerged as less important factor for distribution of income as compared to self-employment in Soviet Union. According to his findings wider differences in income of household exist between those having married couples as their head and those having a single individual as their head in the Soviet Union.

According to Afonso *et al.* (2008) income distribution is determined by performance of public redistributive spending and education. They also found that a strong performance in education enhances both effectiveness and efficiency of public sector's social spending.

Zhang *et al.* (2008) analyzed variations in the earnings gap by gender for urban areas in China for the

period 1988-2004. They observed a decline in the average earning ratios from 86.3 to 76.2% for female and male workers due to increases in returns to both unobserved and observed skills. They noted a narrowing gap in gender earnings for observed skills like education and widening gap in unobserved skills at the bottom part of the earnings distribution.

Based on data from Rural Investment Climate Survey (2005) and using method of generalized least squares, Aikaeli (2010) found that income of rural household is determined by labor force size, ownership of non-form enterprises, land usage in acres and education level of head of household in Tanzania (2005). He further concluded that income in male headed households was considerably greater than in female headed households. He also observed that income in rural areas at community level is enhanced by more use of telecommunications and improvements in physical infrastructure such as roads.

In Pakistan most of the studies, which estimated rates of return to education, used the earnings function with dummies for different levels of education mainly due to data limitations. Hamdani (1977) used age as a proxy for experience and education dummies for Primary, Secondary and Post Secondary levels to calculate the rate of returns for 1541 male workers of Rawalpindi city only. He concluded that income differential emerge with the initial year of work and maintain over the life cycle for all completed educational levels and private returns to education vary between 7 and 27%. He also found that degree of income inequality declines by educational level. Khan and Irfan (1985) estimated earning functions from a sample of 2593 employees drawn from Population, Labor force and Migration (PLM) Survey. They used age as a proxy for experience and dummy variables for Primary, Secondary and Higher education to calculate the rates of returns using indirect method³ from earning functions.

Ashraf and Ashraf (1993, 1996) also used schooling dummies and age as proxy for experience to calculate the returns to education across various levels of education and for different sectors both for male and female workers. They concluded that male-female earnings differentials had dropped sharply in Pakistan between 1979 and 1985-86.

Siddiqui and Siddiqui (1998) estimated earnings functions separately for males and females using schooling, age, province and industry and employment status as independent variables. Using Oaxaca (1973) and Cotton (1988) methodology, they decomposed the earning differential between males and females due to differences in productivity as well as discrimination in labor markets.

Nasir (1999) using PIHS 1995-96 data with 4916 graduates of public schools and 338 of private schools concluded that private school attendees receive higher earnings in the labor market compared to government-run schools. Nasir (2002) with a sample of 4828 regular

wage and salaried employees found that only the matric certificate and B.A/B.Sc degree play as a role of screening device for male and female workers. He used the data of completed years of education to estimate the returns to education⁴. Hyder and Reilly (2005) used the data from labor force survey to investigate the gap in pay in public and private sectors. They calculated rates of returns to educational qualifications using dummies and age as an alternative for experience due to data limitations. Their estimates show that worker in private sector earn more than those in public sector at all educational levels except at Matric level where the latter earn more.

Ali (2007) followed Mincerian approach to human capital to discern the returns to education in Pakistan using data from PSLM and PIHS Surveys. His results shows that private returns to education rise with level of education irrespective of employment status, nature of enterprise, type of school, sex and region and concluded that education is a productivity-enhancing device and not just a screening device. He also noted that employers and self-employed individuals earn more than paid employees and urban employees earn more than the rural employees. His results also show that returns to education for graduates of private schools and female worker were higher than the graduates of public schools and male workers at the same level of education respectively.

Awan (2007) noticed that income gaps in Pakistan are characterized by differences in education level. He also observed an increasing gap in income between educated and uneducated workers with increase in experience. However, the rate varies both by education level as well as from individual to individual.

Using data from PSLM Survey and Gini-Coefficient method, Farooq (2010) presented impact of inequality in education on differences in income. He observed significant income difference in income between males and females and also found greater differences in income among male workers as compared to female workers. According to his findings income inequality in urban areas was higher as compared to rural areas. He also observed positive impact of education on distribution of income.

Ali *et al.* (2013) examined the income determinants as well as gap in incomes for urban-rural Pakistan by using observable characteristics at individual level for the HIES 2010-11 data. They applied OLS method to estimate Mincerian earning functions. They also analyzed income gap between urban and rural Pakistan using decomposition method developed by Blinder-Oaxaca. They found occupation, education and literacy as major income determinants in Pakistan. They also observed high returns for higher levels of education in urban areas and lower levels of education in rural areas. They also found various characteristics at individual level such as marital status, occupation, education and literacy as the main factors responsible for income gap.

In sum, all of these studies noted positive association between the levels of education and earnings. There is a need to have fresh estimates of earnings functions for men and women using latest available data. The reason is that the economy of Pakistan has gone through many changes particularly due to its active role in the war against terror, worsening law and order situation and energy crises. Further, the rapid technological developments taking place around the globe have also changed the human capital requirements of the economy. This study attempts to ascertain the role of individual level observable characteristics such as region, marital status, occupation, age, industry, literacy and education on both in the determination of income of males and females as well as gender income gap in Pakistan. Further, this study is based on data provided by a household survey conducted in four provinces of Pakistan enabling us to present the most up-to-date information about the state of gender earnings differentials in Pakistan.

METHODOLOGICAL FRAMEWORK, DATA SOURCES AND DESCRIPTIVE STATISTICS

Methodology:

Theoretical and econometric model of the study:

This study builds on the human capital approach which states that productive capacity and skills of individuals are enhanced by number of years of schooling. This study relies on analytical framework introduced by Becker (1962) for analysis of different aspects of human capital and investment in education. According to this framework investment in education by household and individuals is made in order to build human capital with the objective of obtaining benefits from it in the shape of higher earnings, improved social status etc. However, following the principle of diminishing returns, these benefits decrease per unit of extra investment. Apart from education other factors such as province, literacy, region, occupation, industry, job status and marital status may also have a direct link with the earnings of individuals. The modified form of the theoretical framework used by Ali *et al.* (2013) is presented in the Fig. 1.

The theoretical relationship presented in the Fig. 1 can also be articulated in an econometric relationship. The model used by Su and Heshmati (2013) and Ali *et al.* (2013) has been followed with slight changes to estimate the earnings functions for male and female workers in Pakistan. The effects of individual level attributes on yearly income of male and female workers of Pakistan living in Baluchistan, KPK, Sindh and Punjab provinces has been analyzed using OLS method for the micro data from a household survey. The standard model followed by Su and Heshmati (2013) and Ali *et al.* (2013), based on Mincerian earning function is described as under:

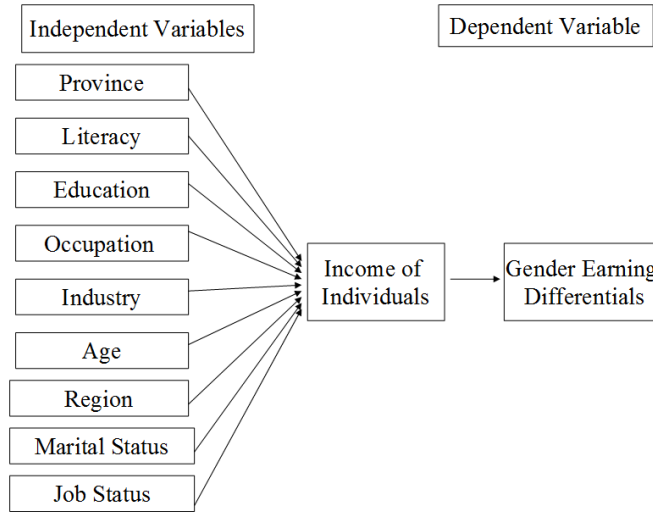


Fig. 1: The theoretical framework

$$\ln \text{INC}_i = X_i \beta + \varepsilon_i \quad (1)$$

where,

$\ln \text{INC}_i$: The natural logarithm of the yearly income for individual i

X_i : A vector comprising of attributes at individual level including marital status, province of residence, region, age, industry, occupation, education, status of job and a measure of literacy

β : The vector of estimated parameters using method of OLS

ε_i : An error term supposed to have constant variance and zero mean (Su and Heshmati, 2013)

Analysis of the composition of earnings gap between male and female workers is another objective of this paper. According to Oaxaca (1973) and Blinder (1973) decomposition method, also followed by Su and Heshmati (2013), the gap in income is divided into two parts. The observable differences in productive characteristics of individuals generate the first part of the income gap whereas the remaining gap is due to differences in the returns to individual level attributes (Su and Heshmati, 2013; Ali *et al.*, 2013).

Specifically, the overall gap in income between male and female workers is equal to:

$$D = \frac{\text{INC}_m}{\text{INC}_f} - 1 \quad (2)$$

where, $\text{INC}_m/\text{INC}_f$ is the ratio of male to female income. Logarithm of Eq. (2) along with combination of estimated result in Eq. (1) yields the overall male-female gap in income as under:

$$\ln D = \ln \overline{\text{INC}}_m - \ln \overline{\text{INC}}_f = \bar{X}_m \hat{\beta}_m - \bar{X}_f \hat{\beta}_f \quad (3)$$

where,

$\ln \overline{\text{INC}}_m$ and $\ln \overline{\text{INC}}_f$: Average values of log yearly income of males and females

\bar{X}_m and \bar{X}_f : Average values of productive attributes of the males and females

$\hat{\beta}_m$ and $\hat{\beta}_f$: Vectors of estimated coefficients obtained from separate regressions for males and females

Following Su and Heshmati (2013) and Oaxaca (1973) the Eq. (3) can be expressed for purpose of decomposition as under:

$$\ln D = (\bar{X}_m - \bar{X}_f) [\Omega \hat{\beta}_m + (1 - \Omega) \hat{\beta}_f] + [\bar{X}_m (1 - \Omega) + \bar{X}_f \Omega] (\hat{\beta}_m - \hat{\beta}_f) \quad (4)$$

where, I stands for an identity matrix and Ω stands for sloping matrix of weights. In Eq. (4), the average difference in log yearly income is divided into two parts. The first term on the right hand side shows the gap in income attributable to differences in mean productive attributes of male and female workers. The difference in mean attributes has been multiplied by the estimated coefficient obtained from separate male and female regressions. The structure of individual level income is explained by these coefficients. The second term on the right depicts the gap in income which can be attributed to variations regression coefficients of male and female workers. Stated differently, this is the difference in returns to male and female worker for same productive attribute. Hence this component is treated as mutual effect of omitted variables and discrimination (Su and Heshmati, 2013; Ali *et al.*, 2013).

Following method used by Su and Heshmati (2013) and Ali *et al.* (2013) where $\Omega = 0.5I$ and I represent matrix of identity, the gap in income in Eq. (4) is becomes:

Table 1: Province-wise coverage of the HIES 2010-11

Province	Sample PSUs			Sample SSUs		
	Total	Rural	Urban	Total	Rural	Urban
Sindh	296	144	152	4098	2296	1802
KPK	208	120	88	2954	1913	1041
Balochistan	164	96	68	2335	1524	811
Punjab	512	256	256	6954	4019	2935
Total	1180	616	564	16341	9752	6589

Copied from HIES (2010-11)

$$\ln D = 0.5(\bar{X}_m - \bar{X}_f)(\hat{\beta}_m + \hat{\beta}_f) + 0.5(\bar{X}_m + \bar{X}_f)(\hat{\beta}_m - \hat{\beta}_f) \quad (5)$$

Data source and descriptive statistics: The Pakistan Bureau of Statistics (PBS) compiles, analyze and disseminate data on variety of socio-economic indicators such as education, health, price, trade, labor force, gross domestic product, per capita income, employment, income and expenditure in Pakistan. This study uses the data from Household Integrated Economic Survey (HIES) (2010-11) conducted by PBS. HIES was conducted first time in 1963 by PBS. Since then, PBS has been conducted HIES however with some irregular breaks. In order to meet the requirements imposed by new accounting system, the HIES questionnaire was revised in 1990 which was used to conduct four succeeding rounds of HIES (Awan, 2007). In 1998-99, a newly started survey known as Pakistan Integrated Household Survey (PIHS) was merged with HIES which is known as Pakistan Social and Living standards Measurement (PSLM) Survey (2010-11). PSLM surveys supply data on a number of socio-economic indicators in interchange years for monitoring the progress of different indicators under Millennium Development Goals (MDG). HIES provide information on consumption expenditure, savings and income and its pattern for urban and rural households at national and provincial level. Information is also provided separately for males and females in number of indicators (HIES, 2010-11).

This study uses the most recent data taken from HIES 2010-11. HIES 2010-11 was based on 1180 Primary Sampling Units (PSUs); 564 urban and 616 rural and 16341 Secondary Sampling Units (SSUs); 6589 urban and 9752 rural (Table 1). PSUs and SSUs were selected from all over Pakistan having reasonable depiction from urban and rural areas. The detail of coverage of HIES 2010-11 is presented Table 1.

The PSUs covered in Sindh, KPK, Baluchistan and Punjab provinces stands at 296, 208, 164 and 512 as compared to SSUs which stands at 4098, 2954, 2335 and 6954 respectively (Table 1). PSUs as well as SSUs in Sindh, KPK, Baluchistan and Punjab provinces stands at 25, 18, 14 and 43% of total⁵ sample size, respectively.

Stratification plan:

Urban area: The big cities located in urban areas having population of 5 hundred thousand and above are

treated as different stratum which are then divided into high, middle and low income categories. The remaining towns and cities in each division of the provinces were grouped together to form an independent stratum (Household Integrated Economic Survey (HIES), 2010-11).

Rural area: According to Household Integrated Economic Survey HIES (2010-11), the district-wise population of KPK, Sindh and Punjab provinces was measured as stratum except Balochistan province where each Division was considered as an independent stratum.

Sample design: A two stage stratified random sampling technique was adopted for the survey. In the first stage, method of probability proportional to size was used to select both villages in rural areas as well as enumeration blocks urban areas. The number of households was used as a measure of size. In the stage two, systematic sampling method was used with a random start to select 12 households in urban PSUs and 16 in rural PSUs (Household Integrated Economic Survey (HIES), 2010-11).

Descriptive statistics: The variables used in Mincerian earning functions have been described in Table 2. Both descriptive and empirical analysis has been carried out only for KPK, Sindh, Baluchistan and Punjab provinces of Pakistan excluding FATA⁶, AJK⁷, GB⁸ due to restrictions imposed by data availability. In this study, province of Sindh has been used as a reference category. The overall literacy⁹ rate in Pakistan and four provinces namely Baluchistan, Sindh, KPK and Punjab stands at 58, 41, 59, 50 and 60%, during 2010-11, respectively (PSLM). In a Pakistan like developing country, literacy is considered as an important variable from social as well as economic points of view therefore it has been used as an explanatory variable in the model.

Household Integrated Economic Survey (HIES) 2010-11, provided information about 109181 persons out of which 39.5% (43120) belong to urban areas and 60.5% (66061) belong to rural areas. According to Household Integrated Economic Survey (HIES) (2010-11), the number of persons covered in Sindh, KPK, Baluchistan and Punjab provinces were 27265 (25%), 21708 (19.9%), 17119 (15.7%) and 43089 (39.5%),

Table 2: Definitions of variables

Name of variables	Description	
Ln income	Logarithm of the total income	
Province:	Punjab	
	Sindh	Reference group
	KPK	
	Baluchistan	
Literacy:		
Lit1	Can read and write in any language with understanding	Reference group
	Cannot read and write in any language with understanding	
Lit2	Can solve simple arithmetic questions	Reference group
	Cannot solve simple arithmetic questions	
Education:		
Edu0	None	Received no education; reference group
Edu1	Primary	Received 5 years of education
Edu2	Middle school	Received 8 years of education
Edu3	Secondary school	Received 10 years of education
Edu4	Higher Secondary school	Received 12 years of education
Edu5	Bachelor's degree	Received 14 years of education
Edu6	MA, M.SC, MCS, M.Phil/PhD	Received 16 or 16+ years of education
Edu7	Professional degree	Received in agriculture, law, engineering, etc
Occupation:		
Occu1	Legislators, senior professionals, professionals, managers	
Occu2	Technicians and associate professionals	
Occu3	Clerks and service workers and shop and market sales workers	Reference group
Occu4	Skilled agricultural and fishery workers	
Occu5	Craft and related trades workers	
Occu6	Plant and machine operators and assemblers	
Occu7	Elementary occupations	
Industry:		
Ind1	Agriculture, hunting, forestry, logging and fishing	
Ind2	Mining and quarrying	
Ind3	Manufacturing	
Ind4	Electricity, gas, steam and hot water supply	
Ind5	Construction	
Ind6	Wholesale & retail trade and restaurants & hotels	Reference group
Ind7	Transport, storage and communication	
Ind8	Financing, insurance, real estate and other services	
Status of job:		
Job1	Employers, self employed	Reference group
Job2	Paid employees	
Job3	Cultivators, share croppers, live stock	
Age:	Age in completed years	
Age squared:	Age squared	Age*age
Marital status:	Never married/nikkah ¹³	Reference group
	Currently married	
	Widow/widower and divorced	
Region:	Rural	Reference group
	Urban	

Ali *et al.* (2013)

respectively. The number of male and female persons were 55713 (51%) and 53468 (49%), respectively. However, due to data limitations, final analysis was restricted to 22165 persons of 10 years of age and older. All persons of 10 years of age and older are enquired about their income and employment from primary and secondary occupations in the survey. They are also asked about all other incomes received from any other work in kind or cash including pensions. Therefore, all persons of 10 years of age and older have been included in both descriptive as well as empirical analysis in this study (Table 2).

In our final sample 27, 16, 14 and 43% were residents of Sindh, KPK, Baluchistan and Punjab provinces respectively (Table 3). For male workers, 27.3, 16.8, 15.5 and 40.4% were living in Sindh, KPK,

Baluchistan and Punjab provinces as compared to 23.9, 10.2, 3.6 and 62.3% of female workers respectively. 62.8, 65.6 and 43.7% workers of both sexes, male and female were found to have ability to write and read with understanding in any language respectively as compared to 87% in all three cases who could solve simple arithmetic sums (Table 3). In the overall sample 36% individuals received no formal education as compared to 33.6% of male workers and 55.6% of female workers. Only 17.9% of male respondents received college education as compared to 21.6% of females. Majority of both male and female workers i.e., 43% were employed in elementary occupation which are generally considered as low paid. For males, the second main occupation was service and sale workers and clerks (22%) which also represent reference

Table 3: Percentage distribution of variables

Variables	Both sexes	Male	Female
Sindh	26.9	27.3	23.9
KPK	16.0	16.8	10.2
Baluchistan	14.0	15.5	3.6
Punjab	43.1	40.4	62.3
Lit1	62.8	65.6	43.7
Lit2	87.5	87.6	87.1
Edu0	36.2	33.6	55.6
Edu1	16.3	17.0	9.3
Edu2	12.0	13.0	5.0
Edu3	17.2	18.5	8.5
Edu4	7.0	7.2	5.7
Edu5	6.3	6.0	8.6
Edu6	3.6	3.2	6.2
Edu7	1.4	1.5	1.1
Occu1	8.2	7.0	16.9
Occu2	5.3	5.1	7.0
Occu3	20.6	22.1	10.2
Occu4	4.8	4.3	8.6
Occu5	10.3	9.8	13.9
Occu6	7.9	9.0	0.5
Occu7	42.8	42.7	42.9
Ind1	15	13.6	26.5
Ind2	0.9	1.0	0.1
Ind3	10.9	10.7	12.3
Ind4	1.4	1.5	0.2
Ind5	15.2	16.9	1.1
Ind6	18.2	20.2	2.7
Ind7	9.1	10.1	1.4
Ind8	29.3	25.9	55.7
Job1	16.1	17.2	7.4
Job2	79.9	79.4	83.4
Job3	4.1	3.5	9.2
Age			
10-30	42.2	41.9	44.7
31-50	41.9	41.9	41.7
51-65	13.5	13.8	11.5
66 and above	2.4	2.4	2.2
Unmarried/nikkah	28.2	27.9	30.0
Married	68.5	70.1	56.7
widow/divorced	3.7	2.2	14.4
Urban	46.8	47.0	44.9
Rural	53.2	53.0	55.1

HIES (2010-11) and Author's calculations

category in this study (Table 3). (25.9%) of male and 55.7% of female workers were engaged in financing, insurance, real estate and other services. Agriculture, hunting, forestry, logging and fishing has been emerged as the second largest industry for female workers (26.5%) as compared to the construction (16.09%) and wholesale and retail trade (20.2%), where majority of the workers were males. (17.2 and 7.4%) male and female workers were found to employers/self-employed¹⁰ against the paid employees which were 79.4 and 83.4%, respectively. In the final sample, 41.9, 42, 13.8 and 2.4% of males and 44.7, 41.7, 11.5 and 2.2% of females were in the age groups 10-30, 31-50, 51-65 and 66 and above respectively (Table 3). 70.1% of male workers were found to be currently married against 56.7% of females. Conversely, 14.4% of female workers were widowed or divorces against 2.2% of males. Forty seven percent of male workers were living in the urban areas as compared to 44.9% of females (Table 3).

Average yearly earnings of workers by gender are given in the Table 4. In the last column of the table female to male earnings ratio has been shown. A higher value of this ratio depicts lower gap between earnings of males and females and vice versa. According to results female to male earnings ratio is minimum in Punjab province (0.36) followed by Sindh (0.43), KPK (0.80) and Baluchistan (0.82). The earnings gap between male and females having reading and writing ability (Lit1) is lower (Rs. 47459) with female to male ratio 0.67 as compared to those unable to read and write (Rs. 58860) having F/M ratio as 0.27. Similarly, the gender earnings gap is lower for individuals having ability to solve simple arithmetic sums (Lit2) as compared to those who do not have this ability. The gap between earnings of males and females declines with rise in the level of education. For example, F/M ratio for individuals with no formal education is 0.27 and same rises to 0.73 and 0.97 for individuals having master's degree (Edu6) and professional degrees (Edu7), respectively. From the perspective of occupation, the highest earnings gap between male and female workers exist in Occu4 (Agricultural and Fishery Workers) with F/M ratio stands at 0.15 and minimum in Occu1 (0.51), Occu2 (0.52) and Occu6 (0.49). The gap between earnings of males and females is highest in Ind4 (Electricity, gas, steam and hot water supply) having F/M ratio as 0.16. Surprisingly, average earnings of female workers in the variable Ind2 are higher than the male workers having F/M ratio 1.43 because there were only three female in that group all having post graduate education and professional degrees. The gender earnings gap for paid employees is smaller than employers and self employed (Table 4). The gender earnings gap is lowest for the age group 10 to 30 years and highest for age group 31 to 50 years. The F/M ratio for unmarried workers is 0.69 depicting lowest gap in earnings as compared to the married workers for whom it is 0.39. The gap in the earnings of male and female workers is wider in rural areas as compared to the urban areas having F/M ratios 0.31 and 0.56, respectively (Table 4).

The mean income of male and female workers was Rs. 121602 and 54162 as compared to the overall average of Rs. 113205 (Table 5). The mean log income for male workers is 11.38 as compared to the 10.04 for the females. The mean years of education for male workers were found to be 6.01 as compared to 4.69 for females¹¹. Similarly, the mean age for male workers was recorded as 36.2 years against 34.8 years for female workers (Table 5).

EMPIRICAL ANALYSIS

OLS estimation: We have used natural log of yearly income (\ln_INC_i) as dependent variable in the estimation of earnings functions. Definitions of relevant

Table 4: Average yearly earnings of workers by gender

Variables		Both sexes	Male (M)	Female (F)	Gap (M-F)	F/M
Province	Sindh	107518	114707	49719	64988	0.43
	KPK	114269	116070	93383	22687	0.80
	Balochistan	121919	122613	101094	21519	0.82
	Punjab	113528	128182	46700	81482	0.36
Lit1	No	69764	80864	22004	58860	0.27
	Yes	138884	142996	95537	47459	0.67
Lit2	No	77030	84351	27642	56709	0.33
	Yes	118360	126879	58101	68778	0.46
Levels of education	Edu0	70016	81348	21964	59384	0.27
	Edu1	84332	88811	27581	61230	0.31
	Edu2	98319	101678	36281	65397	0.36
	Edu3	125891	129829	65810	64019	0.51
	Edu4	167774	176780	87063	89717	0.49
	Edu5	218583	241004	117594	123410	0.49
	Edu6	275259	292225	213965	78260	0.73
	Edu7	336132	336793	327850	8943	0.97
Nature of occupation	Occu1	258659	296244	150089	146155	0.51
	Occu2	189801	205828	106912	98916	0.52
	Occu3	145874	152346	47137	105209	0.31
	Occu4	46541	57424	8452	48972	0.15
	Occu5	94013	107088	28977	78111	0.27
	Occu6	111006	111493	54293	57200	0.49
	Occu7	72541	79085	26739	52346	0.34
Type of industry	Ind1	54433	63924	16454	47470	0.26
	Ind2	103297	102615	146767	-44152	1.43
	Ind3	113467	126132	26884	99248	0.21
	Ind4	178110	180748	28280	152468	0.16
	Ind5	81319	81550	53292	28258	0.65
	Ind6	141660	143018	61662	81356	0.43
	Ind7	119074	119892	73682	46210	0.61
	Ind8	133807	152635	72136	80499	0.47
Status of job	Job1	189856	197288	55444	141844	0.28
	Job2	104802	110259	64126	46133	0.58
	Job3	53609	67897	20415	47482	0.30
Age in complete years	10-30	75178	80282	41556	38726	0.52
	31-50	139855	150791	62473	88318	0.41
	51-65	149503	158632	72440	86192	0.46
	66 and above	112398	119429	57325	62104	0.48
Marital status	Unmarried	68820	71731	49752	21979	0.69
	Married	132965	141818	55963	85855	0.39
	Widow	85207	111965	57893	54072	0.52
	Divorced	62590	76455	45952	30503	0.60
	Nikkah	56324	62965	24071	38894	0.38
Region	Urban	143170	151140	84486	66654	0.56
	Rural	86862	95359	29423	65936	0.31

HIES (2010-11) and Author's calculations

Table 5: Mean of important variables

Variables	Both sexes	Male (M)	Female (F)	Gap (M-F)	F/M
Yearly income	113205	121602	54162	67440	0.45
ln_y	11.22	11.383	10.040	1.343	0.88
Years of edu	6	6.011	4.693	1.318	0.78
Age in complete years	36.06	36.244	34.788	1.456	0.96

HIES (2010-11) and Author's calculations

variables are presented in Table 2. As an explanatory variable, education is specified in two distinct ways i.e., first as completed years of schooling (Edu_Yrs) and second as dummies representing different education levels (Edu1, Edu2, Edu3, Edu4, Edu5, Edu6 and Edu7). No education (Edu0) has been used as reference group in estimation of model with dummy variables.

The estimated results of OLS model using Eq. (1) for overall sample as well as for male and female sub-samples for years of education and levels of education are given in Table 6. Adjusted R² for complete sample

and for male and female sub-samples with years of education as a predictor has been found as 0.44, 0.48 and 0.54 correspondingly. In this study R² values are on higher side in comparison to other studies for example Ashraf and Ashraf (1993) and Siddiqui and Siddiqui (1998). In Mincerian model, R² is usually low because:

- Individual income is more scattered due to which marginal effects of variables are hardly captured in regressions.
- Some time researchers fail to capture unobserved effects such as ability using selected variables (Su and Heshmati, 2013).

However, according to Afonso *et al.* (2008), a significant increase in adjusted R² is observed if educational achievement is included as an explanatory variable. In contrast, educational spending usually has a minor effect on income distribution.

Table 6: Earnings functions by gender

Variables	Overall sample		Male		Female	
	Coefficients (years)	Coefficients (levels)	Coefficients (years)	Coefficients (levels)	Coefficients (years)	Coefficients (levels)
	(a)	(b)	(c)	(d)	(e)	(f)
(Constant)	9.613*	9.608*	9.857*	9.862*	8.320*	8.345*
Pun	-0.154*	-0.157*	-0.028**	-0.025**	-0.410*	-0.412*
KPK	-0.049*	-0.052*	-0.069*	-0.067*	-0.110	-0.110
Bal	0.262*	0.258*	0.178*	0.175*	0.318*	0.335*
Lit1	0.020	0.093**	-0.164*	0.055***	-0.354*	0.015
Lit2	-0.123*	-0.120*	-0.068*	-0.059*	-0.027	-0.019
Edu_Yrs	0.057*		0.052*		0.116*	
Edu1		0.221*		0.048		0.287
Edu2		0.344*		0.135*		0.351***
Edu3		0.451*		0.237*		0.689*
Edu4		0.568*		0.376*		0.836*
Edu5		0.711*		0.562*		1.102*
Edu6		0.944*		0.718*		1.643*
Edu7		1.002*		0.717*		2.017*
Occu1	0.149*	0.109*	0.333*	0.285*	0.311*	0.321*
Occu2	0.092*	0.085*	0.214*	0.199*	0.212**	0.291*
Occu4	-0.317*	-0.318*	-0.224*	-0.217*	-0.415*	-0.418*
Occu5	-0.306*	-0.309*	-0.155*	-0.150*	-0.081	-0.081
Occu6	-0.120*	-0.122*	-0.117*	-0.110*	0.282	0.311
Occu7	-0.442*	-0.448*	-0.318*	-0.320*	-0.223*	-0.236*
Ind1	0.079*	0.071*	0.043**	0.034***	0.003	-0.004
Ind2	0.418*	0.408*	0.227*	0.216*	-0.109	-0.163
Ind3	0.223*	0.224*	0.157*	0.157*	-0.003	-0.003
Ind4	0.339*	0.337*	0.294*	0.291*	-1.017**	-0.977**
Ind5	0.454*	0.451*	0.205*	0.203*	0.935*	0.945*
Ind7	0.286*	0.285*	0.160*	0.157*	0.321**	0.316**
Ind8	0.385*	0.376*	0.297*	0.281*	0.766*	0.683*
Job2	-0.185*	-0.187*	-0.243*	-0.246*	0.218*	0.206*
Job3	-1.178*	-1.177*	-1.058*	-1.059*	-0.446*	-0.460*
Age in complete years	0.069*	0.070*	0.071*	0.071*	0.059*	0.058*
Age_sq	0.000*	-0.001*	0.000*	-0.001*	0.000*	0.000*
Married	0.147*	0.146*	0.202*	0.202*	-0.072	-0.080
Widow_divorced	-0.310*	-0.308*	-0.073**	-0.071**	0.231*	0.231*
Urban	0.161*	0.160*	0.114*	0.111*	0.335*	0.336*
Adjusted R ²	0.442	0.443	0.480	0.481	0.542	0.546
No. of observations	22165	22165	19405	19405	2759	2759
F-stat	675.470	550.976	688.786	563.367	126.407	104.772

Dependent variable: \ln_y ; *, **, ***: Significance at 1, 5 and 10% levels, respectively; Author's calculations

Among the important variables used for empirical estimation of earning functions, education is one of them. Workers without a formal education are treated as reference group and seven more groups have also been defined following system of education in Pakistan. In Table 6, results for years of schooling (Edu_Yrs) are presented in columns (a), (c) and (e) whereas findings for various levels of education are reported in columns (b), (d) and (f). The important element of interest is the estimated coefficient Edu_Yrs which is treated as rate of return to an extra school year. The rate of return to an additional year of education for overall sample and for males and females stands at 5.7, 5.2 and 11.6%, respectively¹². The return to an extra year of schooling is approximately double for female workers as compared to male workers in Pakistan. This finding shows that there exists a significant and large gender earning differentials in returns to education in Pakistan. All three coefficients are significant at 1% level.

Findings for various levels of education are reported in columns (b), (d) and (f) of Table 6. In this specification, we relaxed the supposition of linearity of education implied in columns (a), (c) and (e). Some remarkable results appear. First, the coefficients on all the levels of education are positive and gradually increasing along with rise in education level for workers of both sexes, demonstrating a curved association between earnings and education. Second, the coefficients at various levels of education are considerably greater for women than for men. The estimated coefficients of school year at different levels (Table 6) depicts that returns to education for female worker are greater than returns to male workers. This result corroborates with the findings of Ashraf and Ashraf (1993), Siddiqui and Siddiqui (1998), Ali (2007) and Awan (2007). Return to education increases for both males and females with rise in level of education but less for men than for men. Third, a sharp increase in

the coefficients with level of education is observed for females than for males, indicating more convexity of earnings profile for women than for men. Lastly, a premium in returns at all levels of education is noticed for female workers where estimated coefficients raise from 0.28 to 2.02. However, increase in returns for male workers is significantly smaller where coefficients increase from 0.05 to 0.72 only (Table 6). The coefficients of all education dummies are significant except Edu1 for both males and females.

The coefficients for Punjab and KPK provinces have been emerged as negative indicating that these provinces lag behind in earnings functions of both years as well as levels specifications as compared to reference category i.e., province of Sind (Table 6). The coefficients for Baluchistan province are positive and significant in years as well as levels specification for both genders indicating higher returns as compared to the reference group.

Other than the education, we have also included literacy as a separate explanatory variable in the estimation of the earning functions to evaluate its share of human capital towards distribution of income. The reading and writing abilities in any language (Lit1) and numeracy skills (Lit2) have been used as measures of literacy. Lit1 is positive and significant in levels specification in overall sample as well as for males. However, it is positive but not significant for female workers in that specification. Lit2 is negative for both genders but insignificant for females (Table 6).

Occupational returns have been presented in (Table 6). The earnings of workers engaged at senior and leading positions (Occu1) and their immediate subordinates (Occu2), are notably higher than those working sales men and clerks (Occu3; the reference category) in complete sample and both for males and females. Agricultural and fishery (Occu4) is significant in all categories however it has emerged as the least earning profession for female workers. Both male and female workers involved in activities linked to trade and craft (Occu5) earn much less than worker in the reference group. However, Occu5 is not significant for females. Occu6 i.e., plant and machine operators and assemblers (Occu6) is insignificant for female workers. Those working in low paid occupation (Occu7) earn much less as compared with those of the reference group (Table 6). This group of workers has been found as the lowest income earner in overall sample and males among all occupational categories.

Industry has also been included as an explanatory variable in the estimation of earning functions for males and females. All the workers have been divided into 8 industry groups where wholesale and retail trade and restaurants and hotels have been used as a reference category. Agriculture related activities such as forestry, hunting, logging and fishing (Ind1), Mining (Ind2) and Manufacturing (Ind3) have been found as insignificant industries for female workers. Females working in

electricity, gas, steam and hot water supply (Ind4) are the least earners in contrast to those employed in construction (Ind5) and financing, insurance, real estate and other services (Ind8) where their earnings are highest. For males Ind4 and Ind8 have been emerged as the highest earning industries. Inter industry comparison exhibits a wide variation in the earning of females between approximately -1 to +1 as compared to males showing a much smaller variation from 0.03 to 0.29 (Table 6).

We have also included status of job as an independent variable in the estimation of earning functions by using three variables namely employers and self employed (Job1), paid employees (Job2) and cultivators, share croppers, live stock (Job3). We have used Job1 as the reference category. According to results the estimated coefficients for Job2 and Job3 are highly significant at 1% level in both forms of earning functions for males as well as for females. Male paid employees (Job2) earn significantly less than the male employers and self-employed (Job1) in contrast to female paid employees whose earnings are greater than their employers and self-employed counterparts. The earnings of both male and female workers employed as cultivators, share croppers, live stock (Job3) are significantly less than those employed as employers and self-employed (Table 6). Similarly, age and age² variables have also been emerged as highly significant at 1% level of confidence for workers of both sexes and for males and females, depicting a non linear relationship between age and earnings (Table 6).

Marital status has also been used in the category of explanatory variables. Married male workers earn more as compared to singles. In contrast singles female workers earn more as compared to married workers. The widow/divorced workers in overall sample, as well as sub-samples of males and females less than those who never married by -31, -7 and 23%, respectively. The variables linked with marital status of persons are significant in all three categories i.e., overall sample, male and female except for married females (Table 6). The earnings of workers in urban areas are higher than those in the rural areas by 16, 11 and 34% in overall sample and in for male and female workers respectively (Table 6).

Decomposition of income gap: According to Table 7, the log income difference of 1.343 exists between male and female Pakistani workers during 2010-11. The difference in log income between males and females has been further decomposed into education, occupation, literacy, industry, province, job status, marital status and region. Punjab province has been emerged as the major contributor towards the gap in gender income. Literacy skills both reading and writing and numeracy have found to be insignificant contributor towards the income gap between men and

Table 7: Decomposition of gender income gap

Variables	Attributable to differences in characteristics 2010-11
Log income difference	1.343
Province:	19.480
Pun	0.247
KPK	0.000
Bal	0.015
Literacy:	-0.416
Lit1	0.030
Lit2	-0.035
Education:	-15.241
Edu1	-0.019
Edu2	0.000
Edu3	-0.015
Edu4	-0.020
Edu5	-0.063
Edu6	-0.080
Edu7	-0.008
Occupation:	-5.119
Occu1	-0.034
Occu2	-0.010
Occu4	0.026
Occu5	-0.004
Occu6	-0.012
Occu7	-0.035
Industry	4.927
Ind1	0.005
Ind2	0.002
Ind3	0.017
Ind4	0.006
Ind5	0.024
Ind7	0.011
Ind8	0.000
Status of job:	-24.894
Job2	-0.336
Job3	0.002
Age:	3.900
Age_sq	0.534
Age_sq	-0.481
Marital status:	11.800
Married	0.187
Widow_divorced	-0.029
Region	-7.363
Urban	-0.099
Total explained	1.251
Total explained (%)	93.139

Author's calculations

women. Education has also emerged as one of the major contributor towards income gap between Pakistani males and females and its share stands at 15% during 2010-11. The results for all education levels are negative except Edu2 which suggest that education in principle reduces the gender income gap (Su and Heshmati, 2013). But, primary (Edu1), secondary (Edu3) and higher secondary (Edu4) levels of education have little role in the reduction of gender income gap. Only higher levels of education such as Bachelors (Edu5) and Master (Edu6) have been emerged as major contributor in reducing the income gap between male and female workers (Table 7). This result advocates the need for promotion of higher education both in terms of quantity and quality as a policy instrument to reduce the gender income gap in Pakistan.

The contribution of occupation in the income gap between men and women stands at minus 5.1%. The

occupations offering senior level positions such as (Occu1) and minor occupations like (Occu7) have been found as having the negative share in income gap between males and females in Pakistan as compared to, agricultural and fishery workers (Occu4) whose contribution is positive (Table 7).

The contribution of industry towards explaining the gender income gap is 5%. Manufacturing (Ind3) and construction (Ind5) contributes positively in the gap between incomes of males and females. The contribution of the rest of the industries in the gender income gap has found to be insignificant during 2010-11 in Pakistan. Status of job has been emerged as the leading source of income gap between male and female workers with contribution of minus 25%. Paid employment (Job2) has found to be one of the major factors which can be used to reduce the gap in income between men and women in Pakistan (Table 7).

The contribution of age has been emerged as positive (4%) in income gap between Pakistani males and females (Table 7). The contribution of marital status towards income gap between males and females is positive and significant (12%). Marriage acts as a positive contributory factor in income gap (Table 7). Region contributes about 7% in the overall gender income gap whereas urban areas share is negative (Table 7).

In addition, most of the gap in gender income is explained by individual attributes in Pakistan. 93% of the gap in income between male and female worker has been explained by method of decomposition followed in this study. Seven percent of the gap in income left unexplained which is usually considered as either the discrimination or due to absence of complete controls for all related factors of job attributes and particular expertise of individuals (Su and Heshmati, 2013).

CONCLUSION AND RECOMMENDATIONS

The gender income gap has been a common area of research both in developed as well as Pakistan like developing countries. This study was aimed at to analyze gender income difference by using most recent household survey data in Pakistan. In this study both determinants of income for males and females as well as decomposition analysis for the gender differences in income were conducted. Findings suggest occupation, education, industry and status of job as the main determining factors of income and its gap between males and females in Pakistan. Literacy skills such as reading and writing and numeracy have been found as significant factors in determinants of income for males but not for females. All levels of education from middle to masters and professional degrees have been emerged as significant income determinants except for primary both for men and women.

Results suggest that female workers have greater incentives to invest in education as compared to male workers. The return to an extra year of schooling is approximately double for female workers (11.6%) as

compared to male workers (5.2%) in Pakistan. Further, estimated coefficients on various levels of education are positive and increasing with rise in education level for both sexes but are significantly higher for women than for men. The estimated coefficients for female workers increase at increasing rate with rise in level of education. However, for male workers increase in coefficients is steady. The estimated coefficients range between 0.28 and 2.02 for females and between 0.05 and 0.72 for males. In the decomposition analysis, the results for all education levels are negative except for middle which suggests that role of education is positive in reducing the gender income gap. Nevertheless, education at lower levels such as primary, secondary and higher secondary have little role to play in the reduction of gap in income. Education higher levels such as Bachelors and Master have been found as main contributory factors in reducing the gap in income gap between male and female workers. This result advocates the need for promotion of higher education both in terms of quantity and quality as a policy instrument to reduce the gender income gap in Pakistan.

Both males and females working as senior professionals, managers and technicians have been emerged as the highest earners as compared to the males engaged in elementary occupations and females serving as agriculture and fishery workers who have been found as the least earners. The agriculture, forestry and fishing, mining and quarrying and manufacturing have been emerged as insignificant industries for female workers as compared to construction and financing, insurance, real estate and other services which have found to be the leading earning sectors for female workers. The earning of the male workers are lesser in the agriculture sector and are higher in the electricity and gas and financing and insurance sectors. Male paid employees earn less than male employers and self employed in contrast to female paid employees who earn more than their employers and self employed counter parts. Married male workers earn more than the singles whereas married female workers earn less than the singles. Further, urban workers of both sexes earn more as compared to those in the rural workers however; the earning gap for female workers is much wider as compared to the male workers. Further, personal level attributes such as job status, marital status, education and occupation have been emerged as the main factors responsible for income gap between male and female workers in Pakistan.

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- For example, according to Economic Survey of Pakistan (2011-12), the proportions of Sindh, KPK, Baluchistan and Punjab provinces in overall population are 23.82 %, 13.42%, 5.12% and 54.52% respectively.
- 6 It is stands for Federally Administered Tribal Areas comprised of six frontier regions and seven tribal agencies. These areas are situated along Afghanistan border in northwestern Pakistan. Six frontier regions are Dera Ismail Khan, Tank, Lakki Marwat, Bannu, Kohat and Peshawar. Seven tribal areas includes South Waziristan, North Waziristan, Kurram, Orakzai, Khyber, Bajaur, Mohmand agencies. Source: http://en.wikipedia.org/wiki/Federally_Administered_Tribal_Areas.
- 7 It is stands for Azad Jammu and Kashmir.
- 8 These areas were formerly known as Northern Areas but now have been given the name of Gilgit Baltistan (GB).
- 9 Literacy is defined in HIES as an ability of a person to read and write in any language with understanding and to solve simple arithmetic sums.
- 10 The couples who are formally married but have not started living together. There were 103 individuals under this category during 2010-11 (HIES, 2010-11).
- 11 According to Labor Force Survey (2010-11), 1.8, 40.5, 17.3 and 40.4% of male workers were employers, self employed, unpaid family helpers and employees as compared to 0.1, 15.6, 63.4 and 20.9% of female workers respectively. Similarly, 71.1% of the non-agriculture female workers were engaged in informal sector during 2010-11. According to HIES 2010-11, in the employed persons of 10 years & above 80.91% were male as compared to 19.09% of females. Among the literate employed persons (57.56%) only 5.58% of the female workers were literate as compared to the 51.98% of males. 42.44% of employed persons were illiterate out of which 28.93 and 13.51% were male and female respectively. 0.35% of employed persons received no education having male and female shares of 0.31 and 0.04% respectively. The percentage of male and female employed persons who received less than primary and primary education were 3.40, 0.49, 13.93, 1.66%, respectively. Employed males having middle and matric levels of education were 10.20 and 12.78% as compared to the female workers who were only 0.63 and 0.88% respectively. The percentage of male and female workers having intermediate level of education was 5.64 and 0.55% whereas it was 3.91 and 0.83% for workers having BA/B.Sc or graduate degree respectively. Among the employed persons having MA/M.Sc degree, 1.59% were male as compared to 0.49% of female workers respectively (HIES 2010-11, Table 2).
- 12 Education facilities for females are less as compared to males in Pakistan. For example, total number of primary, middle and high schools for males were 93.6 thousand, 22.1thousand and 14.3 thousand as compared to 61 thousand, 20.5 thousand and 11.5 thousand for females during 2011-12 respectively. Total secondary and vocational institutions in Pakistan during 2011-12 were 3271 out of which 2559 were for females whereas out of 3561 arts and science colleges 2011 were for female. Out of 1733 professional colleges 969 were for females. Out of 1015206 and 1413478 number of students in professional colleges and universities 48822 and 701769 were females respectively (Economic Survey, 2010-11, table 10.1, 10.2).
- 13 According to Siddiqui and Siddiqui (1998), the rate of return to schooling was 8.9% for females and 5.6% for males.

End notes:

- 1 The exchanges rate of Rs. 85.5 = 1 US \$ during 2010-11 reported in table 8.10 of Economic Survey of Pakistan, 2011-12, has been used.
- 2 The remainder contains individual differences in post school investment, in quality of schooling, in ability and in other "transitory income variations.
- 3 Under these method rates of returns for two different levels of educations are calculated by dividing the difference of the coefficients of two levels by the time duration it takes to earn a higher-level degree.
- 4 Nasir (2002) calculated the returns to education by taking the anti-log of estimated coefficient of completed years of schooling and subtracting from 1.
- 5 The representation of provinces in both PSUs and SSUs is approximately equal to their shares in the overall population.