The Returns to Education for Male and Female Workers in Pakistan

The Returns to Education for Male and Female Workers in Pakistan: A New Look at the Evidence

Mohammad Farooq[*]

Abstract

The main objective of this study was to estimate and determine the factors that determine the monthly earnings of the male and female workers in Pakistan. Separate regressions for male and female workers were obtained based on Pakistan Social and Living Standard Measurement (PSLM) survey (2004-05) of the federal bureau of statistics Islamabad. While schooling was found to be a significant determinant of monthly earnings of both male and female worker, experience played a greater role in male's monthly earnings. Schooling on the other hand, played a greater role in female's monthly income than experience which shows frequent intervals in job experience of female worker. The returns to primary and middle standard education of both the male and female workers were lower as compared to higher levels of education. Regarding the different types of professional educational fields of study such as medical, engineering, agriculture and computer science, the returns to medical (MBBS) were higher (28.2%) for female than other categories. Both male and female workers with computer science degree earned about equal returns. However, degree in agriculture increased the income of female worker by 5.8 percent while in the case of a male worker it was only 1.7 percent. In terms of location, both male and female worker received higher income in the urban areas as compared to rural areas, although the male worker received higher return than female worker in urban areas. An analysis by provinces shows that female worker earned higher rates of returns in all the provinces indicating better prospects for female workers.

Keywords: Education, Labor Force, Pakistan

Introduction

It is generally believed that education is the key to the national progress and development as there is a positive relationship between education

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and development. The more education the people receive, the more rapid would be national progress and development. Todaro[1] perceived human resources as the ultimate source in determining the economic and social development of a country. Human resources provide the strongest foundation for the prosperity and material progress of any nation. Human resources unlike physical capital and natural resources (passive factors of production) are the active factors; they not only put all other resources to the best use but also contribute to the national development.[2] A country virtually lives on its skilled manpower; otherwise it lags behind and suffers from poor economic growth and development.

It is now a well-established fact that education, a human capital variable, plays a crucial role in contributing to the economic growth and development of a country. Economists are of the view that countries with higher level of education are those countries with higher income. Education contributes to economic growth through the productive labor force in the markets. It is a general agreement that education and earnings are closely related. It is generally believed that individuals with more education will earn higher average income than those persons with less education even they are employed in the same occupation in the same industry.[3] According to Blaug,[4] modern social sciences have proved this generalization beyond any doubt in both the capitalist and socialist economies.

The estimates of the private rates of return to different levels of schooling provide net pecuniary benefits from these different levels of education. All the information about monetary benefits of schooling can be used for understanding the decisions of private individuals and workers about their inclination that whether to attend higher levels of education. The paper focuses on the private rates of return to different levels of schooling and also to some professional educational fields of study like medical, engineering and agriculture. Moreover, different occupations, industrial groups, different organizations have also been taken into consideration separately for male and female workers.

Literature Review

The importance of education for economic growth and development and its expected returns to individuals, as well as the society at large, attracted great interest in literature in both developed and developing nations. The growth in both theoretical and empirical literature on education in the last more than four decades is not unconnected with the increasing importance being attached to education in the process of economic growth and development.

There are numerous theoretical and empirical studies on the relationship between education and earnings. Psacharopoulos[5] surveyed and estimated the rate of return for many countries and regions. According to Psacharopoulos,[6] the returns to all the three levels of education (primary, secondary and higher) are highest in Africa (social rates: 26 percent for primary education, 17 percent for secondary education and 13 percent for higher education while the private returns are 45 percent for primary, 26 percent for secondary and 32 percent for higher) and lowest in highly advanced countries. This, according to Psacharopoulos,[7] is explained by the relative scarcity of human to physical capital within each group of countries. In another survey of 17 countries by Psacharopoulos[8], he found an average social return of 25 percent to primary education. These returns range from 6.6 percent in Singapore (1966) to 82 percent in Venezuela (1957). In one of his surveys (Psacharopoulos)[9], of the rates of return to education of 78 countries, returns to primary education ranging from 42 percent per annum in Botswana to only 3.3 percent per annum in former Yugoslavia and 2 percent per annum in Yemen. The highest return to secondary education was 47.6 percent per annum in Zimbabwe, decreasing to just 2.3 percent per annum in former Yugoslavia. The range for tertiary education was somewhat narrower, between – 4.3 percent per annum in Zimbabwe and 24 percent in Yemen.

Byron and Manaloto[10] estimated the rates of return to education in China using the Mincerian model. The results showed that experience was more important variable than education. The results revealed that an individual with five years of experience earns 31 percent more as compared to workers with no experience. Education reduces the gap of income inequality among people. Both Kuznet[11] and Mincer[12] argue that the distribution of income becomes more equalized as an economy reaches higher level of income per capita. The higher the average level of schooling of a nation higher will be the earnings and as a result the distribution of income will become more equalized. So, the equal distribution of education may lead to a more equal distribution of income.[13]

It is generally believed that the economics of human capital or specifically, the economics of education has been developed recently by Schultz and Becker in 1950s and 1960s.[14] But actually the theory of human capital had been in the economic and statistical literature for more than 300 years before as the floodgates were opened by Schultz[15] and Becker.[16] Sir William Petty was the first person who made the first estimate of a nation's stock of human capital around 1676.[17] After a hundred years in 1776, Adam Smith published his book "An Inquiry into the Nature and Causes of the Wealth of Nations", or simply the Wealth

of Nations, in which he was quite clear about the role of human capital. He writes:

> "*By educating its people, the state derives no inconsiderable advantage from their instruction. The more they are instructed, the less they are liable to the delusions of enthusiasm and superstition, which, among ignorant nations, frequently occasion the most dreadful disorders. An instructed and intelligent people, besides, are always more decent and orderly than an ignorant and stupid one. They feel themselves, each individually; more respectable, and more likely to obtain respect of their lawful superiors, and they are therefore more disposed to respect those superiors. They are more disposed to examine, and more capable of seeing through, the instructed complaints of faction and sedition and they are, upon that account, less apt to be misled into any wanton or unnecessary opposition to the measures of government. In free countries, where the safety of government depends very much upon the favorable judgment which people may form of its conduct, it must surely be of the highest importance that they should not be disposed to judge rashly or capriciously concerning it*."[18]

Human capital contributes more than physical capital in the US economy. Dougherty and Jorgenson[19] investigated various researches about the highest real per capita output in the US economy which show that the real US economy has maintained its superiority in real per capita output through both physical and human capital accumulation. The work by these economists underscore the importance of incentives for investment in physical assets and human capital and the use of private sector competition to improve the efficiency of activities traditionally carried on by the government sector. Kendrick[20] also conducted a research (from 1929-1990) on the US economy. He calculated the returns on physical capital. The returns remain quite constant between the ranges of 7 percent to 7.5 percent except for 1981 when recovery from the recession was incomplete. The average return on human capital, according to him, was higher than non-human. It increased from 12.5 percent in 1929 to 14.5 percent in 1948, but then gradually decreased to around 10 percent in 1990. He further elaborates that since most of the non-tangible capital is embodied in people, human capital contributes 63 percent compared with 37 percent of the non-human capital.

In Pakistan, as reported by Psacharopoulos,[21] a study was conducted by Hamdani[22] concerning both the private and social rates of return using the IRR technique. This study is confined to male workers only in Rawalpindi city. A similar study was done by Haque,[23] however, it was also about males in Rawalpindi city, and therefore, the findings of both these studies can not be generalized. Khan and Irfan,[24] Shabbir,[25] Ashraf and Ashraf[26] and Shabbir[27] estimated the earnings functions using the data of PLMS (1979) survey limited to male workers only. Due to data limitations, they ignored the impact of different organizations, various categories of professional education like engineering, medical, agriculture and computer science, industrial groups, and different occupations on the earnings of the labor force.

Nasir[28] has used the data of the labor force survey (1993-94), however, he also, due to data constraints, paid no attention to the impact of different organizations, provinces and various categories of professional education in his research study. Like-wise the study by Siddiqui and Siddiqui[29] excluded different organizations, different levels of schooling and professional education. The latest study by Nasir and Nazli[30] have used the PIHS (1995-96) data, estimated the earnings functions for the labor force in Pakistan. Again different organizations, various industrial groups, different occupations and various professional education fields were not included in the regression equations. All these excluded categories of variables in these mentioned research studies have been taken into account in the present study in order to fill the knowledge gap.

Data and Methodology

The paper has used data from the Pakistan social and living standard measurement (PSLM) survey[31] for the year 2004-05 of the federal bureau of statistics (FBS) Islamabad, Pakistan which contains basic information regarding monthly earnings, age, schooling, and occupations etc of the male and female workers in Pakistan. The number of households interviewed was 91,319 in which 51.6 percent were male while 48.4 percent were female workers.

To estimate the private rates of return, the study used the Mincerian model of earnings.[32] Mincerian method is the framework used to estimate returns to education, returns to schooling quality and to measure the impact of work experience on male-female wag gap.[33]

The standard Mincerian regression equation used:

$$\ln Y_i = \alpha + \beta S_i + \beta_0 Exp_i + \beta_1 Exp^2 + \varepsilon_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where Y_i = monthly earnings of the worker

S_i = schooling of the worker

Exp_i = years of work experience in the labor market
Exp^2 = shows that whether due to experience monthly earnings of the worker increases with an increasing rate or with a diminishing rate.
ε_i = error term

Since, we have no data available on experience of the workers, so the study used age of the worker as a proxy for experience, therefore, equation1 becomes:

$$InY_i = \alpha + \beta S_i + \beta_0 Age_i + \beta_1 Age_i^2 + \varepsilon_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

The study estimated the above regression equation (2) for male and female workers separately. Regression results are given in table 2. Further, the Mincerian earnings equation 2 is then extended and included other factors like different levels of schooling, different occupations, industrial groups, urban/rural divide, different organizations etc. Separate regression results for male and female workers are given in table 4 and 5 respectively.

Results and Discussion

The following section discusses the Mincerian Earnings Functions based on separate male and female regression equations. Before presenting the results, the descriptive statistics are given in table 1.

Table: 1. Some important descriptive statistics of male and female samples

Variables	Male Sample			Female Sample		
	Mean	Std Deviation	N	Mean	Std Deviation	N
Average Monthly Earnings	6658.4431	399.57263	11965	4515.813	633.29167	870
Years of Schooling	8.42	3.476	11965	9.96	3.941	870
Age in years	34.67	3.011	11965	29.1	1.004	870
Age Square	1371.0938	101.07963	11965	946.9	65.70303	870

N = Number of observations

From table1, it is clear that the monthly mean earnings of male worker were greater than female average monthly earnings. Male worker earned Rs. 6,658.5 per month while female worker earned Rs. 4,515.8. Mean years of schooling shows that average years of schooling of the female sample were higher than male worker. Female workers have 9.96 years of schooling on average while male workers have 8.42 years of schooling. Further, the female labor force was younger than male labor force. The average age of female labor force was 29.1 years while that of male labor force was 34.67 years. The results of the basic Mincerian Earnings Functions without considering the different levels of schooling are given in table 2.

Table 2 Estimated Basic Mincerian Models

Variables	Male Workers		Female Workers	
	Coefficients	t-values	Coefficients	t-values
Constant	7.142*	8.603	6.984	0.957
Schooling	0.053*	15.592	0.081*	12.624
Age	0.078*	8.437	0.028**	1.714
Age-Square	-0.0008*	-5.842	-0.0002*	-3.288
R^2	0.44		0.25	
F-statistics	185.043		96.288	
N	11965		870	
N = Number of observations				

** Significant at 99 percent level, ** Significant at 95 percent level*

The Mincerian model shows that both schooling and experience played an important role in determining the earnings of a male and female worker. The contribution of experience was even greater than schooling especially in male's earnings. The coefficient for schooling increased the earnings of male worker by 5.4 percent, if education of male worker increased by 1 additional year while earnings of the male worker increased by 8.11 percent[34] for an additional year of experience in the labor market. The impact of an additional year in job experience on earnings of female worker was 2.8 percent. The impact of an additional year of schooling was 8.4 percent greater than experience in the case of female workers as shown in table 2. Due to intervals in job experience of female worker, the role of experience was less as compared to her male counterpart. The negative sign of the experience square shows that earnings functions are concave as Mincer[35] predicts. The earnings

increased with age/experience of worker reached its maximum level and then declined which confirmed the concave age-earnings relationship. The value of R^2 shows that 44 percent of the variations were explained by the model while 56 percent of the variations were unexplained or determined by other factors for male labor force. On the other hand, only 25 percent of the impact on earnings was explained by the factors included in the model for the female regression. Although both the values of R^2 were relatively low, however, still it shows that human capital variables were important for the earnings of labor force.

Male workers earned maximum income at the age group (50-54) and then declined, confirming the concavity of the age-earnings relationship for male workers separately as shown in the table 3 below.

Table 3 Mean earnings of the male and female workers by age groups

Age in complete years-grouped	Male Workers			Female Workers		
	Mean	Median	N	Mean	Median	N
11 – 17	2149.84	1800	910	1453.14	1000	206
18 – 19	2793.6	2200	789	1667.2	1200	103
20 – 24	3795.28	3000	2126	2196.4	1500	284
25 – 29	5355.24	3500	2043	4097.31	2700	232
30 – 34	6271.21	4500	1737	3287.8	1800	231
35 – 39	6725.3	5000	1911	3838.7	1800	220
40 – 44	7904.13	5250	1669	3590.3	1500	159
45 – 49	7375.89	5500	1429	4289.79	1667	123
50 – 54	7955.32	5000	1107	4001.11	1500	73
55 – 59	7445.34	5000	721	3637.61	1500	46
60 & above	6187.02	3500	853	1794.68	1200	57

N = Number of observations
Source: PSLM (2004-05)

There was a positive relationship between age/experience and earnings for the female workers too. However, the profile of female workers reached its maximum level (45-49) earlier than male workers as shown in table 3. The monthly earnings of female workers reached its maximum amount of Rs. 4,289.79 at age group (45-49) earlier than male workers. It is noted that the earnings were lower for female workers as compared to male workers for all the different age groups as well as different levels of

education presented in table 3. These male and female monthly earnings differences and trends are also shown in figure 1.

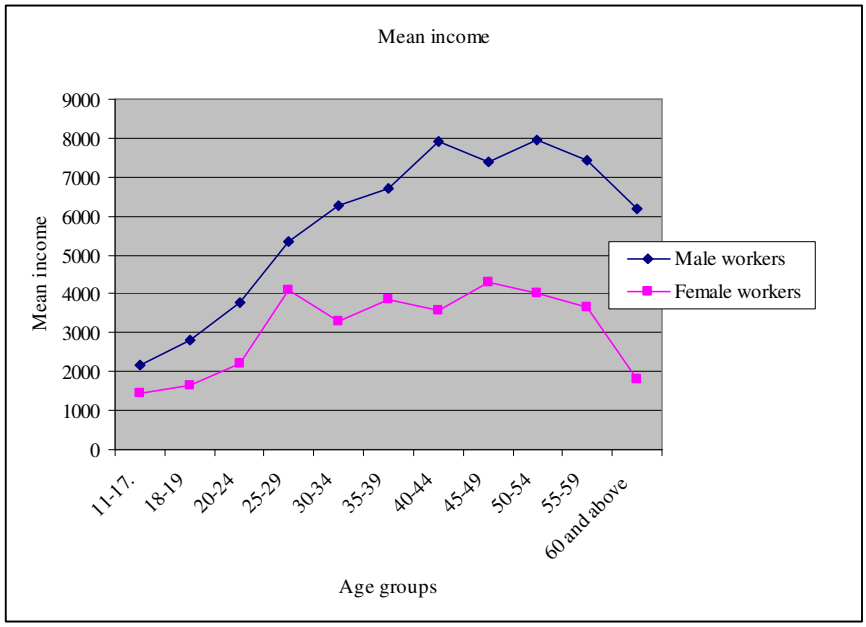

Figure 1 Mean monthly earnings of the labor force in Pakistan by gender

Figure 1 shows a gap in monthly earnings of male and female worker even within the same age-groups. Male worker earned higher earnings at the age group (50-54). However, female workers earned higher earnings at a lower age group of (45-49) as compared to male labor force. These findings suggest that female workers in the Pakistani labor market were given lower wages as compared to their male counterparts.

Further, schooling was divided into thirteen levels. Results of equations 3, 4, 5, and 6 are given in table 4 for the male labor force, while table 5 contains the results of these regression equations for the female labor force. The regression results in equation 3 shows that the impact of schooling on the earnings of male worker decreased. Primary schooling raised the earnings of male workers by 3.5 percent. On the other hand, the impact of schooling on the earnings of female workers decreased even greater than male workers. For instance, the impact of primary schooling was 1.9 percent. As the level of schooling of the labor force increased, earnings of the workers increased as well and there was a great earnings differential between male and female workers. The rates of return to middle, matric, intermediate, bachelor, master, M.Phil and PhD levels were 3.5 percent, 8.7 percent, 7.3 percent, 12.5 percent, 11.4

percent, 4.7 percent, and 3.2 percent respectively. The regression results for female were 2.6 percent to middle standard education, 10.5 percent to matric, 14.4 percent to intermediate level, 27.1 percent to bachelor degree, 46.2 percent to master level education and 3.4 percent to PhD degree holders respectively. It should be noted that there were no M.Phil degree holders in the female labor force. Results show that experience paid off more to male workers than to female, and the returns to experience declined more rapidly as age increased, supported the concavity of the age-earnings profile.

Table 4 Regression results of equation 3, 4, 5, and 6 for the male workers

	Equation 3		Equation 4		Equation 5		Equation 6	
Variables	Coefficients	t-values	Coefficients	t-values	Coefficients	t-values	Coefficients	t-values
Constant	6.671*	7.088	6.923*	6.063	6.452*	6	6.265*	5.981
PRIM	0.035*	4.47	0.03*	3.773	0.03*	3.818	0.03*	3.838
MID	0.035*	4.551	0.027*	3.516	0.026*	3.367	0.026*	3.37
MAT	0.085*	10.868	0.07*	8.723	0.071*	8.706	0.071*	8.667
HSEC	0.071*	9.791	0.057*	7.526	0.058*	7.655	0.058*	7.636
GRA	0.118*	16.012	0.095*	11.964	0.098*	12.164	0.098*	12.078
ENGG	0.074*	10.597	0.059*	8.305	0.059*	8.288	0.059*	8.297
PGRA	0.108*	15.17	0.086*	11.361	0.089*	11.696	0.09*	11.618
MBBS	0.08*	11.422	0.072*	9.995	0.073*	10.194	0.073*	10.197
AGR	0.017**	2.429	0.01	1.375	0.011	1.514	0.011**	1.525
COMP	0.017**	2.484	0.015**	2.159	0.015**	2.093	0.015**	2.116
MPH	0.046*	6.537	0.039*	5.585	0.04*	5.718	0.04*	5.732
PHD	0.032*	4.586	0.027*	3.76	0.027*	3.852	0.027*	3.894
AGE	0.0426*	12.36	0.041*	11.91	0.041*	11.9	0.0411*	11.797
AGE^2	-0.000332*	-9.636	-0.000321*	-9.332	-0.000322*	-9.352	-0.000323*	-9.301
SOM	-	-	0.104*	8.168	0.11*	8.485	0.105*	7.608
PROF	-	-	0.043*	2.763	0.058*	3.577	0.051*	2.961
TAP	-	-	0.045*	3.184	0.057*	3.92	0.052*	3.305
CL	-	-	0.003	0.211	0.014	1.007	0.009	0.597
SSSW	-	-	0.09**	2.695	0.104*	2.965	0.089**	2.342
SAF	-	-	0.073**	2.371	0.098*	2.72	0.083**	2.166
CTW	-	-	0.03**	2.084	0.041*	2.68	0.034**	2.102
PMO	-	-	0.031**	1.827	0.037**	2.165	0.029**	1.568
EO	-	-	0.052**	1.828	0.072**	2.478	0.059**	1.862
								Continued

Table 4 continued								
	Equation 3		Equation 4		Equation 5		Equation 6	
Variables	Coefficients	t-values	Coefficients	t-values	Coefficients	t-values	Coefficients	t-values
AFF	-	-	-	-	-0.026	-1.313	-0.027**	-1.377
MQ	-	-	-	-	-0.03	-0.467	-0.003	-0.448
MF	-	-	-	-	-0.015**	-1.643	-0.016**	-1.709
ELC	-	-	-	-	-0.007	-0.952	-0.007	-0.966
CON	-	-	-	-	-0.013	-1.364	-0.013**	-1.421
WRT	-	-	-	-	0.004	0.379	0.002	0.165
REI	-	-	-	-	0	0.053	0	0.009
SPS	-	-	-	-	-0.044*	-4.013	-0.044*	-3.994
GOVT	-	-	-	-	-	-	0.01	0.703
PBUS	-	-	-	-	-	-	0.016	1.135
NGO	-	-	-	-	-	-	-0.005	-0.662
SIND	-	-	-	-	-	-	-0.005	-0.58
KPK	-	-	-	-	-	-	-0.014**	-1.753
BAL	-	-	-	-	-	-	0.013**	1.664
UR	-	-	-	-	0.054*	6.787	0.054*	6.755
R^2	0.55		0.66		0.67		0.67	
F-Statistics	79.871		50.358		39.717		36.642	
N	19283		19283		19283		19283	

**Significant at 99 percent level, ** Significant at 95 percent level.*

Table 5 Regression results of equation 3, 4, 5, and 6 for the female workers								
	Equation 3		Equation 4		Equation 5		Equation 6	
Variables	Coefficients	t-values	Coefficients	t-values	Coefficients	t-values	Coefficients	t-values
Constant	5.725	0.94	5.647**	1.462	5.936	1.372	5.599	0.755
PRIM	0.019	0.952	0.022	1.137	0.022	1.134	0.021	1.077
MID	0.026	1.356	0.021	1.085	0.018	0.955	0.014	0.75
MAT	0.1*	5.101	0.071*	3.259	0.069*	3.139	0.04**	1.727
HSEC	0.135*	7.032	0.099*	4.72	0.099*	4.683	0.075*	3.448
GRA	0.24*	12.416	0.187*	8.155	0.183*	7.856	0.15*	6.218
ENGG	0.104*	5.548	0.097*	5.149	0.098*	5.22	0.093*	4.976
PGRA	0.385*	20.086	0.348*	15.754	0.349*	15.733	0.318*	13.877
MBBS	0.249*	13.174	0.225*	11.158	0.224*	11.124	0.212*	10.492
AGR	0.057*	3.04	0.052*	2.791	0.052*	2.828	0.047**	2.548
COMP	0.015	0.81	0.008	0.455	0.01	0.525	0.008	0.397
MPH	-	-	-	-	-	-	-	-
PHD	0.034**	1.803	0.031**	1.652	0.032**	1.75	0.03**	1.642
AGE	0.0239**	2.717	0.0218**	2.501	0.0209**	2.398	0.0162**	1.855
AGE^2	-0.000138**	-1.567	-0.000127**	-1.465	-0.000119	-1.362	-0.00084	-0.97
SOM	-	-	0.159*	7.547	0.171*	7.513	0.149*	5.691
PROF	-	-	0.062**	1.832	0.132*	3.165	0.089**	1.786
TAP	-	-	0.019	0.77	0.064**	2.176	0.042	1.245
CL	-	-	0.006	0.288	0.028	1.229	0.006	0.239
SSSW	-	-	0.051**	1.414	0.133**	2.824	0.092**	1.587
SAF	-	-	0.022	0.65	0.107**	2.041	0.079	1.248
CTW	-	-	-0.003	-0.109	0.039	1.118	0.018	0.434
PMO	-	-	0.009	0.476	0.022	1.071	0.017	0.797
EO	-	-	0.033	0.931	0.119**	2.468	0.086	1.39
								Continued

Table 5 continued								
Variables	Equation 3		Equation 4		Equation 5		Equation 6	
	Coefficients	t-values	Coefficients	t-values	Coefficients	t-values	Coefficients	t-values
AFF	-	-	-	-	-0.096**	-2.112	-0.089**	-1.968
MQ	-	-	-	-	0.003	0.168	0.004	0.222
MF	-	-	-	-	-0.04	-1.309	-0.036	-1.156
ELC	-	-	-	-	0	0.023	-0.004	-0.209
CON	-	-	-	-	-0.015	-0.726	-0.01	-0.497
WRT	-	-	-	-	-0.027	-1.166	-0.02	-0.872
REI	-	-	-	-	0.042**	2.198	0.045**	2.385
SPS	-	-	-	-	-0.118*	-2.954	-0.123*	-3.077
GOVT	-	-	-	-	-	-	0.145*	3.335
PBUS	-	-	-	-	-	-	0.026	0.588
NGO	-	-	-	-	-	-	-0.001	-0.054
SIND	-	-	-	-	0.027	1.371	0.03	1.484
KPK	-	-	-	-	0.048**	2.466	0.037**	1.863
BAL	-	-	-	-	0.079*	4.156	0.065*	3.369
UR	-	-	-	-	0.017	0.752	0.029	1.317
R^2	0.271		0.301		0.307		0.316	
F-Statistics	59.279		34.099		26.694		25.503	
N	2084		2084		2084		2084	

**Significant at 99 percent level, **Significant at 95 percent level*

The return to education was greater for female than male up to intermediate level and this shows that demand for female worker was higher than male worker in the labor market of Pakistan. Female workers with degree in engineering earned greater than her male counterpart. Results show that the earnings of female workers increased by 10.9 percent while that of male workers increased by 7.6 percent only. This is perhaps due to the smaller number of female workers with degrees in the field of engineering. Data shows that there were only 4 female workers compared to 70 males with engineering degrees. Similarly, the degree in medical sciences (MBBS) also increased the earnings of female worker more than male, perhaps demonstrating that there is still a greater demand for female doctors. The medical degree increased the earnings of the female worker by 28.2 percent as compared to 8.3 percent for the male.

There was no difference in the percentage influence of degree in computer science on the earnings of male and female worker. However, degree in agriculture raised the earnings of female worker more than her male counterpart. The earnings increased by 5.8 percent of female worker while that of male worker with a degree in agriculture increased by 1.7 percent only. The cause of this greater percentage increase in earnings of female worker may be that there was only one female worker in the sample with a degree in the field of agriculture.

In order to estimate the effect of different occupations on the earnings, various occupational categories were introduced in equation 4. The regression results indicate that in Pakistan's labor market occupational choice was also more important in the determination of earnings of both male and female labor force. The estimates for female workers show that senior officials and managerial responsibilities earned them the highest rate of return as compared to other occupational categories. The percentage increase was 17.2 percent in the earnings of female workers while for male workers the impact was 10.4 percent.

The rate of return to professional (PROF) category was also high for female worker as compared to male. The impact of this category was 6.3 percent for the wages of female workers and 4.3 percent for male workers respectively. It is to be noted that a small percentage of female workers was working in the first two occupational categories i.e. senior officials and managers (SOM) and professionals (PROF). The low percentage of female workers in these high paid occupational categories reflects the difficulty for female workers to enter these high earnings occupations.

Majority of female labor force was working in service, shop and sales workers (SSSW), craft and trade workers (CTW), a very small percentage in plant and machinery operators (PMO) which is a male dominant occupation. These occupations did not significantly affect the earnings of female workers. The R-square improved in both the regressions for both male and female workers. It improved from 0.55 in the third equation to 0.66 for male while for female labor force it increased from 0.27 in the third equation to 0.30 in the fourth regression equation. The impact of both male and female samples was greater when the results were compared with complete model. It is noted that with the introduction of new additional explanatory variables in the model, the impact of both education and experience declined. The impact of experience decreased from 2.4 percent in the third equation to 2 percent in the fourth regression equation. Secondly, the negative sign of the age square and positive effect of experience confirmed the concavity of the age-earnings profile.

In equation 5, different industrial groups were included in the regression. The regression results revealed that the earnings of male and female workers were lower in social and personal services (SPS) than all other industrial groups followed by mining and quarrying (MQ) for male and the agriculture, forestry and fishery (AFF) for female workers. It should be noted that majority of female workers were working in these two industrial groups—AFF and SPS, both were low paid groups in the industrial classification. The earnings were high only in real estate and

insurance (REI) group. However, the number of female workers in this group was small, only three out of 105 workers. The coefficient for dummy urban (UR) confirmed that a worker (male or female) in urban areas earned greater than a worker working in rural areas. However, the impact was greater for male worker as compared to female counterpart.

Estimates of the effect of different organizations/institutions on monthly earnings of male and female labor force were obtained from equation 6. With the introduction of these different organizations, the impact of both schooling and experience decreased further to a great extent as shown in table 4 and table 5 respectively. Results show that females in the government (GOVT) sector earned highest rate of return than the males followed by those in the personal business (PBUS) group. The male workers' earnings in personal business gave them high return followed by the government sector. The model also indicated significant inter-provincial differences in earnings for both male and female workers. The coefficients for all the provinces except Balochistan were negative, showing that the earnings were lower for male workers.

The coefficients for all the provinces were positive and statistically significant for female sample, which reveal that female workers earned high rates of return as compared to male workers. It shows that the job opportunities are greater in all the provinces for female population of the country. Province-wise, the opportunity is greater for female in the province of Balochistan, followed by Khyber Pakhtunkhwa (KP) and Sindh respectively. Again in urban areas relative to rural areas, the earnings for male and female worker were higher. However, the coefficient for urban areas was greater for male worker than female worker shows gender discrimination. According to the estimated coefficients, male worker earned 5.5 percent more while female worker earned 2.9 percent more in urban areas. Some of the reasons for greater earnings may be the high cost of living standard and better job opportunities in these urban areas of Pakistan.

With the inclusion of more explanatory variables in the model, the value of R-square in both male and female models further improved. It increased from 0.27 in equation 3 for female sample to 0.30 in equation 6, while in the case of male workers, it increased from 0.55 in equation 3 to 0.67 in equation 6. The significant coefficients (βs) of schooling and experience endorsed the applicability of human capital theory for both male and female labor force in Pakistan.

An International Comparison

When the rates of return to education in Pakistan were compared with the average returns in Africa, Asia, Latin American countries and advanced

countries of the world, the rates of return to schooling in Pakistan were quite lower. Africa has the highest rates of return to all the three levels of education followed by Latin America and then Asian countries as shown in table 6.

Table 6 Average rates of return to schooling by country (percent)

Region	Primary	Secondary	Higher
Africa	45	26	32
Asia	31	15	18
Latin America	32	23	23
Advanced Countries	N.A	12	12

Source: Psacharopoulos (1985)

The rates of return to different levels of education in Pakistan are given in table 7 for comparative analysis.

Table 7 Rates of return to different levels of education in Pakistan by gender.

Models/Sex	Primary	Middle (LS)	Matric (Sec)	F.A/F.Sc (UP)	Higher
Male Workers:					
Equation-3	3.5	3.5	8.8	7.3	12.5
Equation-6	3	2.6	7.3	5.9	10.2
Female Workers:					
Equation-3	1.9	2.6	10.5	14.4	27.1
Equation-6	2.1	1.4	4	7.7	16.1

** LS shows Lower Secondary education, Sec indicates Secondary education, and UP shows Upper Secondary education.*

Table 6 shows that rates of return to primary schooling are greater than secondary and higher education in all the regions. However, in the case of Pakistan, the rates of return to primary schooling are lower as compared to the rates of return to other levels of schooling, as shown in tables 6 and 7 respectively. Rates of return to higher education (B.A/B.Sc) are high in Pakistan, but they are far below the average rates in Asia, Africa, and Latin America. However, they are equal to the average rates in advanced countries.

By comparison, the rates of return to education are lower in Pakistan when compared with selected Asian and African countries as shown in table 8.

Table 8 Rates of return to schooling in some of the selected Asian countries.

Country	Study	Primary	Lower Secondary	Secondary	Upper Secondary	Higher
Guinea	McGavin (1991)	37.2	41.6	-	37.6	23
Hong - Kong	Hung (1982)	-	-	18.5	-	25.2
India	Tilak (1988)	-	-	19.8	-	13.2
Korea	Park (1976)	22.8	15.3	-	12.4	9.9
Malaysia	Hoerr (1970)	12.9	18.9	-	15.6	11.6
	Lee (1980)	-	-	32.6	-	34.5
Nepal	USAID (1988)	-	-	15	-	21.7
Philippines	Tan & Paqueo(1989)	12.2	10.2	-	13.8	14
Singapore	Clark & Fong (1970)*	-	16.1	-	20	25.4
Taiwan	Gamicott (1972)	50	-	12.7	-	15.8
Thailand	Blaug (1971)	27	-	11	-	11
Source: Bennell (1998)						
* These rates of return show the averages of male and female samples						

The rates of return to higher education in Pakistan are comparable to the rates of return to higher education in India, Malaysia and Thailand. However, the rates to higher education for the female labor force (model 3) in Pakistan are greater than most of these countries. But when other factors were added in the regression equation, rates declined to 16.1 percent from as high as 27.1 percent to higher education in Pakistan as shown in table 7.

The lower rates of return to primary education and higher rates of return to secondary and tertiary education for both male and female workers are at odd with the conventional world-wide rates of return to schooling pattern where returns are high for primary schooling while lower for higher levels of education.[36] One possible explanation for the low rates of return to primary schooling may be the low quality of primary education given to the children in Pakistan. Most of the children, especially in rural areas do not attend schools regularly and even drop earlier. The children who complete primary schooling are not capable of reading and writing. Parents also do not take care of schooling of their children due to various reasons. As a result, children may not learn quite enough and sufficiently in primary schools. Second, this may indicate an excess supply of workers with primary schooling in Pakistani labor

market. Third, there are no specific jobs openings for primary educated people nor primary schooling provide any specific skills or training to children fit for any specific jobs in the labor market. The same pattern of return can also be observed for India in the study conducted by Kingdon.[37] The rates of return to different levels of schooling in different African countries are high when compared with the rates in Pakistan. Table 9 shows rates of return to education in some of the African countries.

Table 9 Rates of return to different levels of education in some of the selected African countries.

Country/Reference year	Primary	Secondary	Higher
Botswana (1983)	99	76	38
Cote d'Ivoire (1984)	25.7	30.7	25.1
Ghana (1967)	24.5	17	37
Lesotho (1980)	15.5	26.7	36.5
Liberia (1983)	99	30.5	17
Malawi (1982)	15.7	16.8	46.6
Nigeria (1966)	30	14	34
Senegal (1985)	33.7	21.3	-
Somalia (1983)	59.9	13	33.2
Zimbabwe (1987)	16.6	48.5	5.1

Source: Psacharopoulos (1994, table A1).

The rates of return to different levels of education in Pakistan were lower when compared to the rates of return to schooling in these African countries, except the rates to higher education in Liberia and Zimbabwe in the case of female workers.

Summary and Policy Implications

To sum-up, this study supported the theory of human capital, that earnings have direct relationship with capital accumulation. Interestingly the rates of return to education found in this study have not the same pattern as found by Psacharopoulos,[38] Bennell[39] and others. The regression estimates of all the equations and models in this study indicate that male workers were better off in terms of earnings as compared to female labor force. The estimate of earnings differentials between male and female workers is consistent with the studies of other developing countries.

One of the most important policy implications of the results of this study is that greater emphasis should be diverted to the schooling of females in Pakistan. Female's education is an important tool for the development of a society. About the importance of female's education, Quaid-e-Azam Mohammad Ali Jinnah, the founder of Pakistan advised the nation to educate and allow the females to participate in every walk of life because they can bring up the children properly avoiding the corrupt practices of the western society.[40]

The empirical results indicate that return to lower levels of schooling were low while the rates of return to bachelor and master levels of education were high for both the male and female workers. This is opposite to the observed rates of return pattern globally. Primary education is the base for secondary and tertiary education. There are no specific jobs openings for the work force with just a primary education. Primary schooling does not provide any specific skills or training for a specific job in the labor market. It is probably for this reason that the rates of return to this level of schooling may be low as compared to higher levels of education.

A low return to primary and middle education may also suggest an excess supply of workers with these levels of schooling while high rates of return to bachelor and master degrees suggest shortage of workers. Such a market gives much incentive in favor of higher education. This is an advantage to individuals from relatively higher income families to pursue higher education for future gains. The result would be the demand for higher education could exert more market pressure on the existing higher educational facilities. The burden of higher education financing could be shared by the individual without the poor and low income families deprived of the opportunities through other mechanisms of support.

According to the empirical results of this study returns to the degree in the field of medicine (MBBS) were high for male and female both as compared to other professional categories of education. It shows that there is still a need for male and female to join this profession indicating better prospects for them. The results suggest that both public and private sector should provide more facilities in the field of medicine in order to fill the gap between the supply and demand for workers with degrees in the field of medicine.

The results also confirm a significant effect of education on earnings in urban areas which suggests ways to reduce the disparities in income between urban and rural areas as well as province-wise. In order to reduce the urban-rural earnings differentials, it is suggested that the occupations other than agriculture should be promoted in rural areas.

Besides the encouragement of agro-based and cottage industries, it is suggested that medium and large scale industries should be setup in rural areas for the raw material which are produced in these rural areas in abundance.

One of the important determinants of the earnings of worker was the choice of occupation. This choice of occupation brings to light the very important issue of available employment opportunities in the labor market of Pakistan. The statistically significant earnings differentials reflect uneven distribution of employment opportunities for both male and female worker. There is a need to develop rural economy and to ensure an even distribution of all resources and employment opportunities across regions and provinces.

The rates of return to education in Pakistan were low when compared to the rates of return in other developing countries of the world. It indicates several weaknesses in education system on the one hand, while on the other hand and most important, also suggest that the economic environment is not conducive in Pakistan. Because high returns to investment in human capital needs, among other things, a balance between sound economic policies and investment in human capital.[41] This complementarity between sound economic policies and investment in human resources actually produces various opportunities for employment, growth and better living standard for the population.

The study also found that both male and female worker earned higher earnings with bachelor and master degrees. This makes higher level of education very valuable investment for both male and female worker. Thus, the government of Pakistan should give more attention to the costs recovery spent on the provision of higher education to its population. The shift from public to people (users of the higher educational facilities) may help the government of Pakistan, to some extent, to finance quantitative expansion of the educational facilities. This shift may be resisted in Pakistan. However, the funds saved by this way are then to be used to increase selective higher educational subsidies for the poor students only. Similarly, Pakistan should introduce student loan schemes, like Malaysia, which will have a positive distributional impact. Presently, in Pakistan, students from rich families are benefited more from education subsidies. The introduction of loan schemes for students could therefore make government funds available for the expansion of primary and elementary education in Pakistan.

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