The Human and non-human Capital Determinants of Earnings of the Pakistani Labor Force

Mohammad Farooq*

Abstract

The objective of this study was to estimate and determine the impact of human and some other non-human capital variables on the earnings of the workers in Pakistan based on Pakistan Social and Living Standard Measurement (PSLM) survey 2004-05 of the Federal Bureau of Statistics (FBS) Islamabad, Pakistan. The study highlighted that education and experience of the workers were the two most important human capital variables that impacted more the monthly earnings of the workers in Pakistan. The impact of experience was greater than schooling of the workers. Secondly the rates of return to B.A/B.Sc and M.A/M.Sc were high as compared to other levels of education. Regarding professional educational fields of study, workers with degree in medicine (MBBS) received greater returns as compared to other professional fields of education. The urban dummy (UR) also paid high to the workers working in urban areas as compared to the workers in rural areas of Pakistan. An interesting outcome of this study was that contrary to the world-wide pattern of returns, where returns are high for primary education, returns to this level of schooling in Pakistan were the lowest.

Keywords: Human Capital, Non-human Capital, Determinants, Labor Force, Earnings, Pakistan

Introduction

It is unanimously agreed that human being is the active factor of production in the productive process as well as the beneficiary of production. Numerous theoretical and empirical examples suggest that an acceptable level of literacy and education is necessary for economic growth and development. Among a number of third world countries such as South Korea, Taiwan, Singapore, Malaysia and Brazil, both high rates of literacy and improving human resources have preceded their

* Dr. Mohammad Farooq, Lecturer of Economics, Sheikh Zayed Islamic Center, University of Peshawar

development to the point that they have now acquired the status of newly developed countries.[1]

Earlier to the present day development, economists and development researchers were of the opinion that investment in physical capital is the main engine of economic growth and development. However, with the passage of time when investment in physical capital could not yield the same percentage of growth and development, emphasis was shifted to the development of human capital. It was pointed out in the decade of sixties that human resources are equally important factor in the growth and development especially in the underdeveloped countries of the world. It was realized that lack of investment in human capital is responsible for the slow economic growth of the developing countries. The prime factors which enhance the human capital of a country are regarded as education and training. Education contributes to economic growth through the productive labor force. Therefore, it can be safely said that education and earnings are closely related. The objective of the study was to estimate and calculate the rates of return to different levels of education and some other non-human factors on the earnings of the Pakistani labor force.

Literature Review

Education is now widely accepted as the crucial factor for growth and development of a nation. Both theoretical and empirical studies on the contribution of factors of production to growth and development have shown that human capital accounts for a larger share of growth of output. This is the difference in human resources between developed and the developing countries which accounts for the differences in per capita incomes. At the individual level more education is found to be associated with more income. Education has also been shown to exert a positive effect on fertility reduction, increase in life expectancy, social cohesion, increase in productivity, crop yield and farm productivity.[2] These studies suggest that without large investment in human beings it is not possible to enjoy the benefits of modern agriculture and industry.

According to the available theoretical and empirical works on the relationship between the levels of education and income, educated worker earns more income than others because the knowledge and skill they have acquired has made them more productive. Aristotle was of the opinion that educated people differ from the uneducated as much as the living from the dead.[3]

The studies and researches on the rates of return to education in various developing countries show contradictory results. Some of the studies found low rates of return to schooling while some others found

high rates. For instance, Gaag and Vijverberg found high rates of return in Cote d' Ivoire.[4] Nielsen and Westergard-Nielsen and also their recent study in 2001 found very low rates of return to education in Zambia. The rate of return to primary education in urban area in Zambia is near to zero whereas it is larger than zero in rural areas.[5] Moock also found low rate of return to education in Vietnam.[6] On the other hand, the rates are high in Singapore as estimated by Toh and Wong.[7] Denny, found that the rates of return to education are high in some advanced countries like UK, Northern Ireland and the republic of Ireland and low in other nations like Netherlands, Norway, Austria, Germany and Sweden.[8] The study conducted by Dearden also shows high rates of return to schooling in Britain.[9]

In the case of Pakistan, previous studies and researches, for instance, several studies have estimated rates of return to education. They found low returns as compared to other developing countries.[10] The latest study by Nasir and Nazli have used the PIHS (1995-96) survey data, estimated the Mincerian earnings functions for the labor force in Pakistan.[11] All these studies, due to data constraints, ignored the different organizations, various industrial groups, and various professional educational fields of study in their regression equations. The present study took all these excluded/ignored variables into the Mincerian earnings functions and estimated their impact on monthly earnings of the workers in Pakistan.

Data and Methodology

In order to estimate the impact of human and non-human capital variables on the earnings of the labor force, the study used the Pakistan Social and Living Standard Measurement (PSLM) survey for the year 2004-05 of the Federal Bureau of Statistics (FBS) Islamabad.[12] Almost all the relevant information regarding education, age, experience, jobs, occupations and different organizations where workers were working are given in this survey. The survey covers 91,319 individuals both male and female from all over Pakistan. More than fifty percent (51.6%) of the survey consists of male while 48.4 percent of the respondents were female.

The mean monthly earnings (the dependent variable) of the labor force according to their schooling levels is given in table 1.

Table 1 Monthly earnings (mean) of the workers according to their schooling levels

Level of Schooling	Mean	Median	N	Std. Deviation

No Schooling	3829.779	3000	8532	733.4807
Less than 1 class	2992.472	2716	53	178.9392
Primary (PRIM)	4671.947	3100	3648	1497.9804
Middle (MID)	4805.349	3850	2443	474.9745
Matric (MAT)	6318.652	4500	3462	1568.8198
FA/F.Sc (HSSC)	7666.063	5300	1005	1063.8837
BA/B.Sc (GRA)	9620.839	6418.5	1378	1363.0462
Engineering (ENGG)	18908.99	15000	74	2440.2956
Medical (MBBS)	16198.8	12000	144	1778.7005
Computer Science (COMP)	10333.78	5000	18	1290.621
Agriculture (AGR)	11128.75	9800	20	4029.8497
MA/MSc (PGRA)	13065.98	9500	505	1272.1321
MPhil/Ph.D (MPL/PHD)	27430.56	20000	12	3926.7482
Other (OTH)	10315.89	7000	73	1108.2379

Source: PSLM (2004-5)

It is very obvious from the table that as the level of education increases earnings of the worker concerned also rises which shows a close association between education and income of the worker.

To estimate the rates of return to education and other determinant factors the study followed the Mincerian earnings method (1974). The basic Mincerian earnings function (MEF) used:

$$\ln Y = \beta_0 + \beta_1 S_i + \beta_2 Exp + \beta_3 Exp^2 + U \text{.....(1)}$$

where

$Y =$ monthly earnings of the workers

$S_i =$ years of education or schooling of the workers

$Exp =$ the total experience of the workers in years

$Exp^2 =$ shows that whether due to experience income of the worker increases with an increasing rate or with a diminishing rate.

It is to clarify here that the study used age of the worker as a proxy for experience because experience (age-school-6) as suggested by Mincer

especially for America was not possible to be used and estimated in the case of Pakistan. Therefore, the study divided the workers into different age groups in order to find out the impact of age/experience on their monthly earnings. Table 2 shows the division of workers into different age groups.

Table 2 Monthly incomes of the workers in different age-groups

Age -Groups	Mean	Median	N	Std. Deviation
11 - 17	2021.24	1500	1116	258.65
18 - 19	2663.53	2000	892	334.748
20 - 24	3606.87	2800	2410	591.158
25 - 29	5226.96	3500	2275	1472.552
30 - 34	5921.02	4500	1968	1412.197
35 - 39	6427.3	5000	2131	1062.927
40 - 44	7528.91	5000	1828	2259.208
45 - 49	7131.31	5160	1552	731.687
50 - 54	7696.37	5000	1180	995.657
55 - 59	7232.26	4500	767	1296.505
60 & above	5911.9	3275	910	884.202

Source: PSLM 2004-05

The Mincerian equation 1 above becomes:

$$InY = \beta_0 + \beta_1 S_i + \beta_2 Age + \beta_3 Age^2 + U \text{.....(2)}$$

The variable schooling was divided into various levels/stages for example primary (PRIM), middle (MID), matric (MAT), FA/FSc (HSSC), BA/BSc (GRA), MA/MSc (PGRA), M.Phil (MPL) and Ph.D (PHD). Moreover, some professional educational fields of study were also included like degree holders in agriculture (AGR), computer science (COMP), degree in engineering (ENGG) and degree in medicine (MBBS). It was also assumed that differences in occupations as well as different types of industries where workers are working also influences earnings of the workers, therefore, different occupations and types of industries were introduced in the regression models.

Results and Discussion

The distributive statistics of the sample reveals that average monthly earnings of the workers were Rs. 5,441.8, while the mean age of the worker was 36.26 years, as shown in table 3.

Table 3 Means and standard deviations of the dependent and explanatory variables

Variables	Mean	Std. Deviation	N
Monthly Earnings	5441.8079	603.94497	21367
Years of Schooling	8.52	3.531	21367
Age in years	36.26	4.042	21367

N = Number of observations

Table 3 also shows that the average years of schooling received by the labor force in the sample was 8.52 years.

The estimated results of equation 2 for the complete sample are given in Table 4. Equation 2 included only schooling and age (a proxy for experience) of the worker as explanatory variables and this is the standard Mincerian model.

Table 4 Estimated Mincerian Earnings Function

Variables	Coefficients	t-values
Constant	7.591*	9.068
Schooling	0.054*	16.32
Age	0.078*	8.718
Age^2	-0.00026*	-5.828
R^2	0.47	
F-statistics	209.743	
N	21367	

N = Number of observations

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

The results show that both schooling and experience of the workers have a greater influence on earnings of the workers. The table indicates that the coefficient of age (a proxy for experience) was greater even than the schooling coefficient for the sample. The coefficient of education indicates that earnings of the worker increased by 5.54 percent, if

schooling of the worker increased by 1 additional year.[13] While the coefficient of experience (proxy by years of age) shows that earnings of the worker increased by 8.11 percent if experience of the worker rose by one additional year in work experience. The values of R-square and F-statistics show that the model specification was good and the explanatory variables included in the Mincerian Earnings Function were appropriate. The value of R^2 shows that the variables included in the model explained 47 percent of the impact on monthly earnings of the labor force, while 53 percent of the impact remained unexplained or determined by other factors. However, it still shows that human capital variables played an important role in the determination of the monthly earnings of labor force. Further, the concavity of the experience-earnings profile was more evident from the negative and significant coefficient of the age-squared and the results were consistent with the human capital theory.

Further, schooling was divided into twelve levels in equation 3, starting from primary schooling, in order to estimate their separate impact on the earnings of the labor force. Table 5 contains the results of equation 3, 4, 5, and equation 6, extended Mincerian model for the labor force.

The results show that human capital variables explained a substantial part of the variations in earnings of the labor force. The coefficients of education as well as that of experience were positive and statistically significant for all the levels of schooling in almost all the four equations. In equation 3, primary education raised the earnings of a worker by 4.18 percent. As the level of education attainted by the worker increased, earnings increased. The premiums for middle (MID), matric or secondary school certificate (SSC), intermediate or higher secondary school certificate (HSSC), B.A/B.Sc (GRA), M.A/M.Sc (PGRA), and M.Phil/Ph.D, were 4.2 percent, 9.5 percent, 7.6 percent, 12.9 percent, 12.4 percent, and 3.3 percent respectively in equation 3. The impact of professional education such as engineering (ENGG), medical (MBBS), agriculture (AGR), and computer science (COMP) on the earnings of a worker were 7.8 percent, 8.7 percent, 1.9 percent, and 1.7 percent respectively. The effect of agriculture and computer science degree on earnings of the worker was small. The reasons may be that although Pakistan is an agricultural country, still very little attention has been given to the agriculture sector by the successive governments in the past, secondly, the whole infrastructure of Pakistan economy is not conducive for the people who have graduated especially in the subject of computer science.

The high returns to B.A/B.Sc (GRA) and M.A/M.Sc (PGRA) shows that the demand for the labor force having the same education

levels was greater than the available workers having the same level of schooling in the labor market of Pakistan. Secondly, the coefficients for both levels were almost the same, shows that both the workers (GRA and PGRA degree holders) can apply or can be employed on the same posts or jobs. Moreover, there was a direct relationship between the level of education and the returns.

The estimated coefficients of age and its squared term are also statistically significant with expected signs indicating increase in earnings with age or experience. Again the values of R^2 and F-statistics indicate that the model was good and the variables included in the model were appropriate.

Table 5 Regression results of equation 3, 4, 5, and 6

	Equation 3		Equation 4		Equation 5		Equation 6	
Variables	Coefficients	t-values	Coefficients	t-values	Coefficients	t-values	Coefficients	t-values
Constant	6.7564*	7.793	6.124*	5.64	4.87*	5.716	5.66*	5.624
PRIM	0.041*	5.699	0.028*	3.792	0.029*	3.865	0.029*	3.858
MID	0.042*	5.829	0.025*	3.485	0.025*	3.347	0.024*	3.322
MAT	0.091*	12.481	0.069*	9.073	0.07*	9.081	0.069*	8.955
HSEC	0.074*	10.789	0.057*	7.99	0.059*	8.161	0.058*	8.057
GRA	0.122*	17.554	0.097*	12.822	0.1*	13.054	0.099*	12.845
ENGG	0.076*	11.387	0.06*	8.941	0.06*	8.938	0.06*	8.925
PGRA	0.117*	17.294	0.096*	13.274	0.099*	13.631	0.099*	13.418
MBBS	0.084*	12.654	0.076*	11.199	0.078*	11.398	0.078*	11.364
AGR	0.019**	2.822	0.011**	1.663	0.012**	1.803	0.012**	1.78
COMP	0.017**	2.614	0.015**	2.226	0.014**	2.193	0.015**	2.234
MPH	0.046*	6.913	0.039*	5.888	0.04*	6.028	0.04*	6.021
PHD	0.033*	4.962	0.027*	4.029	0.028*	4.148	0.028*	4.186
AGE	0.0414*	12.809	0.0385*	11.929	0.0386*	11.93	0.0383*	11.743
AGE^2	-0.000313*	-9.671	-0.000297*	-9.204	-0.000298*	-9.228	-0.000296*	-9.107
SOM	-	-	0.096*	9.118	0.103*	9.541	0.098*	8.357
PROF	-	-	0.031**	2.317	0.049*	3.464	0.041**	2.652
TAP	-	-	0.033**	2.856	0.047*	3.883	0.041*	3.082
CL	-	-	0.007	0.587	0.006	0.522	0	-0.011
SSSW	-	-	0.06**	2.295	0.078**	2.813	0.062**	2.021
SAF	-	-	0.044**	1.86	0.07**	2.396	0.056**	1.74
CTW	-	-	0.019**	1.547	0.031**	2.412	0.024**	1.712
PMO	-	-	0.016	1.231	0.024**	1.796	0.017	1.099
EO	-	-	0.027	1.209	0.053**	2.231	0.039	1.459
								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	-	-	-	-	-0.024	-1.348	-0.025	-1.386
MQ	-	-	-	-	-0.004	-0.541	-0.003	-0.499
MF	-	-	-	-	-0.015**	-1.735	-0.015**	-1.742
ELC	-	-	-	-	-0.006	-0.874	-0.006	-0.923
CON	-	-	-	-	-0.014**	-1.585	-0.014**	-1.571
WRT	-	-	-	-	0.005	0.455	0.004**	0.335
REI	-	-	-	-	0.001	0.206	0.001	0.184
SPS	-	-	-	-	-0.047*	-4.372	-0.047*	-4.423
GOVT	-	-	-	-	-	-	0.015	1.108
PBUS	-	-	-	-	-	-	0.015	1.158
NGO	-	-	-	-	-	-	-0.005	-0.722
SIND	-	-	-	-	-	-	-0.004	-0.549
KPK	-	-	-	-	-	-	-0.012**	-1.713
BAL	-	-	-	-	-	-	0.014**	1.912
FEM	-	-	-	-	-0.055*	-7.811	-	-
MAL	-	-	-	-	-	-	-	-
UR	-	-	-	-	0.051*	6.771	0.051*	6.766
R^2	0.59		0.74		0.75		0.75	
F-Statistics	95.587		60.543		48.117		44.483	
N	21367		21367		21367		21367	

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

Further, as we included other explanatory variables in equation 4, 5, and equation 6, the impact of both schooling and experience decreases as is evident from table 5. The estimated coefficients of PRIM, MID, MAT, HSSC, GRA, ENGG, PGRA, MBBS, AGR, COMP, MPH, and PHD decreases to 2.94, 2.42, 7.14, 5.97, 10.4, 6.18, 10.4, 8.11, 1.21, 1.51, 4.08, and 2.83 percent respectively. The cause of the reduction in the rates of return to different levels of schooling may be because years of schooling may have picked up the impact of left out explanatory variables in the basic Mincerian Model (equation 2). The coefficient of age/experience decreases from 0.041 in equation 3 to 0.038 in equation 6.

In equation 4, we introduced different categories of occupations in the model. Most of these occupations were statistically significant. These categories show positive and significant contribution to the earnings of the labor force. The premium for the Senior officials and managers (SOM) workers was the highest—10.07 percent followed by service, shop, sales workers (SSSW) and skilled agriculture, fishery (AFF) category with a coefficient 0.044 (4.49 percent). The results show that the workers who adopted these occupations earned high returns. Other occupational categories such as CTW, PMO, and EO are structurally low paid and therefore these occupations did not pay significantly to the workers. The estimated results for professionals (PROF) were higher as reported by other studies.[14] When we included different categories of industrial groups in equation 5, the impact of most of the occupations increases even further. The coefficients of SOM,

PROF, TAP, SSSW, SAF, CTW, PMO, and EO increases to 0.103, 0.049, 0.047, 0.078, 0.07, 0.031, 0.024, and 0.053 respectively.

The results reveal that the earnings of the workers in social and personal services (SPS) were lower than all other industrial classification followed by agriculture, forestry, and fishery (AFF). Similarly, the earnings were higher in whole retail trade (WRT) followed by real estate and insurance (REI) industrial group. Further, the negative coefficient for the female (FEM) dummy shows that female worker earned less than male counterpart in the labor market of Pakistan. The coefficient for the dummy urban (UR) suggests that a worker in urban areas earned greater than a worker in rural areas. Secondly, according to PSLM (2004-05) more than 60 percent of the labor force belongs to the rural areas engaged in agriculture-related activities. Due to the nature and structure of this sector, earnings were low and uncertain as well. The value of R^2 improves from 0.59 in equation 3 to 0.74 in equation 4 and further to 0.75 in equation 5 respectively.

Different organizations/institutions also influence earnings of the workers; therefore, we introduced in equation 6 different organizations or institutions where the labor force was employed. The government (GOVT) and personal business (PBUS) categories influenced the earnings almost equally, while the worker in non-governmental organizations (NGOs) got lower income as compared to GOVT and PBUS sectors. Furthermore, dummies for all the four provinces were also included in this model, which indicates a significant inter-provincial differences in earnings of the labor force. These differences in earnings may be the result of the difference in job opportunities in these provinces.

Conclusion and Policy Recommendations

The empirical findings showed that education/schooling and experience of the labor force increased the monthly earnings potential of the Pakistani labor force. This finding supported the human capital theory. The study also confirmed the positive role of schooling as each additional year of schooling brought more and more returns to worker. The study indicated that higher earnings were associated with higher level of education. It means that there is a direct relationship between earnings of the worker and his/her educational level.

The empirical findings based on the basic Mincerian earnings function indicated that additional year of schooling raised the monthly earnings of the worker by 5.5 percent, while earnings increased by 8.1 percent due to additional year of experience of the labor force in the

labor market. This shows that impact of job experience on the earnings in the labor market was greater than the effect of schooling.

Most of the occupations were statistically significant. These occupations showed positive and significant contribution in earnings of the workers. So, the selection of occupation was also an important determinant of the monthly earnings for the workers in the labor market of Pakistan. It was found that the premium for the senior officials and managers (SOM) workers was the highest followed by service, shop, and sales workers (SSSW).

It was also observed that different organizations/institutions impact the earnings of the individual worker. According to the regression results, the government (GOVT) and the personal business (PBUS) categories paid more to the workers. The regional location was also found to be an important factor. Workers working in urban areas were enjoying high earnings as compared to workers working in rural areas.

Further, there was a significant inter-provincial difference in earnings of the workers. The regression results showed that the earnings were high in the province of Balochistan as compared to other provinces of Pakistan.

We should also keep in mind that proper attention and weight should also be given to the non-economic/non-monetary benefits of schooling, as we can not depend only on monetary returns/benefits for an optimal allocation of resources.

On the basis of the above stated empirical results, following are some of the important policy recommendations and implications:

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. This is just opposite to the observed rates of return pattern world-wide. The low return to primary and middle schooling suggests an excess supply of workers at these levels of schooling while high rates of return to bachelor and master degrees suggest a shortage of workers having the same education level. Such a market ranks private incentives in favor of further education. So individuals from relatively high income families can realize the high rates of return on more education. It could exert more market pressure on the existing higher educational facilities. Therefore, there must be a shift in the finance of higher education direct costs from the government to the individual level; provided that poor and low income families may not be affected. Furthermore, the rates were higher for bachelor and master levels of education of the worker. This does not mean that all the resources should be directed towards higher education and the funds for primary and middle standard education are to be curtailed. The returns to primary and

middle standard education also include the benefits that it permits access to further levels of education and schooling. So, it should be given its due importance and resources as well in order to provide solid base for further levels of schooling.

Regarding professional educational fields of study, rate of return to medicine degree holders (MBBS) was high as compared to other professional fields of study indicating shortage of doctors in Pakistan. It also shows better prospects for students to choose this professional field as their career in future. The high rate of return to MBBS suggests that more and more facilities and opportunity should be provided in this field of knowledge.

The results also confirm a significant effect of education on earnings in urban areas 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 be promoted in rural areas. Moreover, agro-based and cottage industries should be encouraged and established in these rural areas of Pakistan.

Rates of return to education are not the only basis for investment in education. There are many non-monetary benefits and externalities of education due to which investment in education is crucial for every nation. For example, the impact of education on fertility rate, child mortality rate, democratic behavior, impact on health, the impact of mother's education on her children, knowing rights as well as obligations, and other demonstration effects and so on. Therefore, investment in education should not be linked to financial rates only.

End Notes:

[1] G. M Hanif. "The Human Resources Path to Development: A Challenge to Muslims". Islamic Studies, Islamabad, 29 Number. 2 (1990): pp. 131-142.
[2] See for example R A. Azhar. "Education and Technical Efficiency during the Green Revolution in Pakistan". Economic Development and Cultural Change, 39 Number. 3 (1991): pp. 651-665; M. Gradstien, and M .Justman. "Education, Social Cohesion and Economic Growth". American Economic Review 92 Number. 4 (2002); pp. 1192-1204; N. Hicks. "Economic Growth and Human Resources". World Bank Staff Working Paper No. 408, The World Bank Washington D.C, USA (1980); Lockheed, L Marlene, D.T.Jamison, and L.J. Lau, "Farmer Education and Farmer Efficiency: A Survey". Economic Development and Cultural Change, 29 Number. 1 (1980): pp. 37-76; Phillips, M. Joseph "Farmer Education and Farmer Efficiency: A meta-analysis". Economic Development and Cultural Change, 43 Number. 1 (1994): pp. 149-165; T. W Schultz. "Reflections on Investment in Man". Journal Political Economy, 70 Supplement, (1962): pp. 01-08.
[3] Mahboob-ul Haq, and Khadija Haq. Human Development in South Asia. The Human Development Centre, Islamabad, Pakistan, (Oxford University Press. 1998).
[4] Gaag, V. Jacques, and W. Vijverberg. "Wage Determinants in Cote'd Ivoire: Experience, Credentials and Human Capital". Economic Development and Cultural Change, 37 Number 2 (1998) pp. 371-382.
[5] H.S.Nielsen, and N.Westergard-Nielsen. "Returns to Schooling in LDCs: New Evidence from Zambia". Centre for Labor Market and Social Research, Working Paper No. 98-10. (1998)
[6] Moock, R Peter H.A Patrinos, and M. Venkataraman. "Education and Earnings in a Transition Economy: The Case of Vietnam". Economics of Education Review. 22 (2003) pp. 503-510.
[7] Toh, Mun Heng and Wong, Chai Shing (1999) Rates of Return to Education in Singapore. Education Economics, 7 (3), pp. 235-252.
[8] Revin Denny, P.Harmon, Colm and Reamonn Lydon, Cross-Country Evidence on the Returns to Education: Patterns and Explanations [Online] [Accessed 12 March, 2007] Available from World Wide Web: http://www.papers.ssrn.com/sol3/PIP_journal_cfm?pip_jrnl=223793
[9] L.Dearden, "Ability, Families, Education and Earnings in Britain". The Institute for Fiscal Studies, Working Paper No. 18/14. (1998)
[10] K.A.Hamdani. "Education and the Income Differential: An Estimation for Rawalpindi City". The Pakistan Development Review 26 Number 2 (1977): pp. 144-164; Nadeemul Haque, "Economic Analysis of Personal Earnings in Rawalpindi City". The Pakistan Development Review, 26 Number 4 (1977): pp. 687-696; Sharukh Rafi Khan, and M Irfan, "Rate of Returns to Education and the Determinants of Earnings in Pakistan". The Pakistan Development Review, 24 Number. 3 & 4 (1985): pp. 671-680; T. Shabbir, "Mincerian Earnings Function for Pakistan". The Pakistan Development Review 33 Number 4 (1994): pp. 1-18; T.Shabbir, and A.H.Khan, "Mincerian Earnings Functions for

Pakistan: A Regional Analysis". Pakistan Economic and Social Review. 24 (1991): pp. 99-111; R Siddiqui, "A decomposition of Male-Female Earnings Differential". The Pakistan Development Review, 37 Number 4 (1998): pp. 885-896.

[11] Z.M. Nasir, and H.Nazli, Education and Earnings in Pakistan. Research Report No. 177, Islamabad, (Pakistan Institute of Development Economics. 2000)

[12] Pakistan Social and Living Standards Measurement Survey (2004-05), Government of Pakistan, Islamabad, Federal Bureau of Statistics.

[13] The rates of return to schooling are calculated by taking the anti-log of the estimated coefficient of education of the labor force and subtract 1 from the value. To find the value in percentage, multiply the derived value by 100 – Damodar N.Gujarati, Basic Econometrics, (McGraw-Hill Inc. 1995)

[14] Sharukh Rafi Khan, and M Irfan, "Rate of Returns to Education and the Determinants of Earnings in Pakistan". The Pakistan Development Review, 24 Number 3 & 4 (1985): pp. 671-680: Z.M.Nasir, and H. Nazli, Education and Earnings in Pakistan. Research Report No. 177, (Islamabad, Pakistan Institute of Development Economics 2000); R Siddiqui, and R Siddiqui. "A decomposition of Male-Female Earnings Differential". The Pakistan Development Review, 37 Number 4 part-2 (1998): pp. 885-896.