*Research Report No. 50*

# PRIVATE RETURNS TO EDUCATION: EVIDENCE FOR PAKISTAN

SOCIAL POLICY AND DEVELOPMENT CENTRE

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The study provides estimates of the private return to education in Pakistan. A Mincerian earning function is estimated using the latest available household survey data of 2001-02. Inter-provincial, inter-sectoral and inter-regional variations in earning and educational attainment are explored. The paper also investigates the inter-temporal changes in returns using the household survey of 1990-91. The impact of quality of education on earning is also estimated. The empirical result indicates that highest private return is associated with higher secondary education. The impacts of private schooling and English as a medium of instruction are also positive and significant. The results also indicate that returns to primary education decreased during the last decade while returns to higher secondary and tertiary education increased.

## 1. INTRODUCTION

Education has long been considered a multipurpose policy tool. One of the goals customarily attached to education policy is that increased educational attainment will lead to less wage inequality. Thus, the rise in earnings inequality experienced during the 1980s and 1990s in many countries led to renewed interest in estimates of returns to schooling.

Returns to schooling are useful for policy-making in a number of ways. For instance, returns to education give an indication of which sector of the educational system the government should invest in most. If the returns to primary and secondary education are significantly different, policy-makers are able to make more efficient allocation choices by spending more resources on the level of education that yields higher returns.

An analysis of returns to education can also help evaluate broad education policies. It is, for example, well established that developing human capital is crucial to economic development. Governments should therefore, seek to adopt policies that are consistent with human capital development. To the extent that returns to education in a particular country show a declining trend, it is necessary to evaluate the causes of the decline.

Further, households evaluate schooling decisions in terms of future income benefits. If these benefits turn out to be too low, then policies advocating the use of educational services, as part of the plan for poverty alleviation may be ill conceived. Alternatively, if these rates of return are very high, this could be evidence of the fact that individuals are not able to obtain the optimal amount of education. Thus, a study on returns to education has several policy implications.

The international research on returns to investment in education, reviewed by Psacharopoulos and Patrinos (2002) concludes, "Overall, the average rate of return to another year of schooling is 10 percent. The highest returns are recorded for low and middle-income countries." They also maintain that during the last 12 years returns to schooling have declined by 0.6 percentage points. At the same time, average schooling levels have increased. Therefore, and as according to theory, everything else being the same, an increase in the supply of education has led to a slight decrease in the returns to education. Their review of international research also shows that the private returns to higher education are increasing.

In the context of Pakistan, the most recent research on education and earnings was conducted by Nasir and Nazli (2000) using household data of 1995-96. They concluded that "the analysis confirms the positive role of education as each year of education brings approximately 7 percent returns for wage earners". Their results also indicate that not only every additional year of schooling causes a significant rise in earning but also higher earnings are found to be associated with higher levels of education[1].

The basic purpose of this research is to give estimates of return to education using the latest available household survey of 2001-02. Further, inter-provincial, inter-sectoral and inter-regional differences in returns to various levels of education will be explored. To highlight effects of the expansion of access to education, during the last decade an inter-temporal comparison in returns to education will also be presented

The paper is organized as follows. The following section provides a brief outline of the education structure in Pakistan. Section 3 deals with technical details of model specification.

[1] A review of earlier but outdated research on returns to education in Pakistan is provided in Nasir and Nazli (2000).

It also provides some limitation of the theoretical model. In section 4, distribution of wage earners with their educational attainments and earnings are highlighted. Results of estimated returns are furnished in Section 5, while the last section concludes the paper.

## 2. THE STRUCTURE OF EDUCATION IN PAKISTAN

There has been a concern in Pakistan about the low literacy rate and poor quality of education. The education sector has been neglected over the years, although successive governments have repeatedly stressed the importance of education in their planning and strategy. The necessary commitment to overcome the problem of illiteracy or higher education is lacking. The public financial allocations are suppressed resulting in a mushroom growth of elite private institutions with English as the medium of instruction. On the other hand, government schools with little concern about the quality of education and having Urdu as the medium of instruction are functioning. Further, there is the existence of religious schools belonging to various sects. But the education in these schools is not treated as part of the formal education system and hence not rewarded in the labor market.

The structure of education system in Pakistan consists of primary, secondary, higher secondary and tertiary levels. Primary education lasts for five years. Secondary education is divided into two cycles: three years at middle school and two years of secondary education. On completion of the second cycle, pupils take the Secondary School Certificate or Matriculation Examination. Pupils may then study for a further two years, specializing in Science, Arts or Commerce. At the end of this period, pupils take the examination of the Intermediate Certificate or Higher Secondary School Certificate. Universities, their constituent and affiliated colleges, provide Tertiary or higher education. There are three stage of tertiary or higher education. Bachelor's Pass Degrees are normally obtained after a two-

years course and Honours Degree after a three-year course in Arts, Science, and Commerce. First degrees in Engineering take four years and in Medicine five years. A Master's Degree is obtained in two years after a Pass Degree and in one year after a Honours Degree. At the third stage, the Master of Philosophy degree is awarded after two year of the Master's degree. The PhD (Doctorate of Philosophy) is a research degree and requires three years' study beyond the master's degree.

## 3. DATA, MODEL AND LIMITATIONS

The underlying economic model used in the analysis simply follows Mincer's (1974) human capital earnings function extended to control for a number of other variables that relate to location of living, quality of education and labor market status. A semi-logarithmic framework is applied of the following form:

$$\ln W_i = f(S_i, X_i, Z_i) + \mu_i \qquad (1)$$

where $\ln W_i$ is the log of the labor market earnings[2] for an individual; $i$, $S_i$ stands for completed years of schooling, $X_i$ is a matrix of personal characteristics other than schooling, namely, labor market experience[3], experience squared, gender[4] and quality of education[5]. $Z_i$ represents a matrix of provincial and residential dummies and other labor market

[2] Monthly gross wages of workers between the age of 15 and 65 years.

[3] Labor market experience is constructed, as a function of age and schooling year (age 5 being the entrance age to primary education). Experience is defined as the age less the entrance age less the years of education completed. However, minimum age is taken as 15 to exclude child labor.

[4] Only 14 percent of wage earners are women. Therefore, estimation of a separate gender equation is not preferred

[5] To take care for quality of education, two proxies are used. It is hypothesized, although yet to be proved, that private schools provide better education than public institutions. Further, it is also believed that the labor market is more responsive, in term of wages, to workers who graduate from institutions where the medium of instruction is English. Therefore dummy variables to reflect private schooling and English as a medium of instruction are used in the return to education regressions.

characteristics, e.g., sectors. The last component, $u_i$ is a random disturbance term that captures unobserved characteristics.

Two specific functional forms are estimated. First, a linear specification of years of schooling:

$$\ln W_i = \beta_o + \beta_1 S_i + X_i \beta_x + Z_i \beta_z + \mu_i \qquad (2)$$

Second, a spline form of years of schooling is estimated to quantify returns of schooling to one additional level. $\beta_1 S_i$ is replaced with the dummy variables for various levels of education, i.e. *p* (primary, 1-5 years), *s* (secondary, 6-10 years), *hs* (higher secondary, 11-12 years), *tg* (tertiary general, 13-16 years of schooling with general subjects of Arts and Science) and *tt* (tertiary technical, 13-18 years of schooling with technical[6] education).No schooling is treated as a reference category.

$$\ln W_i = \beta_o + \beta_p S_p + \beta_s S_s + \beta_{hs} S_{hs} + \beta_{tg} S_{tg} + \beta_{tt} S_{tt} + X_i \beta_x + Z_i \beta_z + \mu_i \qquad (3)$$

The earning function approach to returns to education has a number of limitations which warrant attention. These include the following: the estimate bias arising from non-competitive labor markets where marginal products do not equal wages; the inadequacy of wages as a proxy for labor compensation; the impact of institution and norms of wage determination; and changes in relative wages for educational attainment groups (and hence relative productivity due to changes in labor market supply conditions).

[6] Tertiary technical education refers to the degree in engineering, medicine, agriculture, law, M.Phil and Ph.d.

Moreover, there are other sources of potential biases. Two common problems which are frequently cited in the literature (see for example, Stanovnik, 1997) relate to the equation specification and estimation procedure. The Mincerian earnings function typically does not include any measure of ability. Since ability and schooling are positively correlated, omitting measures of ability results in the schooling coefficients being biased upwards. Consequently, the estimated rates of returns to education are biased upward. This can be remedied by introducing an appropriate measure of ability in the equation to be estimated; these are however, frequently unavailable. The second problem relates to the sample selection bias. Since the Mincerian model is typically estimated for subpopulations with given characteristics, e.g., wage earners, this also introduces a bias in the estimates. The sample, in this case is not representative of the whole population (of wage earners). This problem can be solved and estimates with desirable asymptotic or consistent properties can be obtained using a procedure described in Heckman (1979). In some empirical research this procedure produced certain corrections of the original estimates. Nevertheless, household data often do not contain the required information to apply the Heckman procedure[7].

The data are drawn from the nationally representative Pakistan Integrated Household Surveys (PIHS). These surveys are based on a two-stage stratified random sampling approach. The first survey was conducted during 1990-91 and the forth one appeared in the year 2001-02. The latest survey comprised more than 16,000 households. To observe inter-temporal changes in returns during the decade, PIHS of 1990-91 was selected. However, this survey sampled only 4794 households.

[7] The Heckman procedure requires the estimation of a Logit model to determine the factors affecting the selection of earning career (paid employed v/s self-employed). Besides age and education, a number of other factors, which may affect the decision, are not usually available in the household surveys.

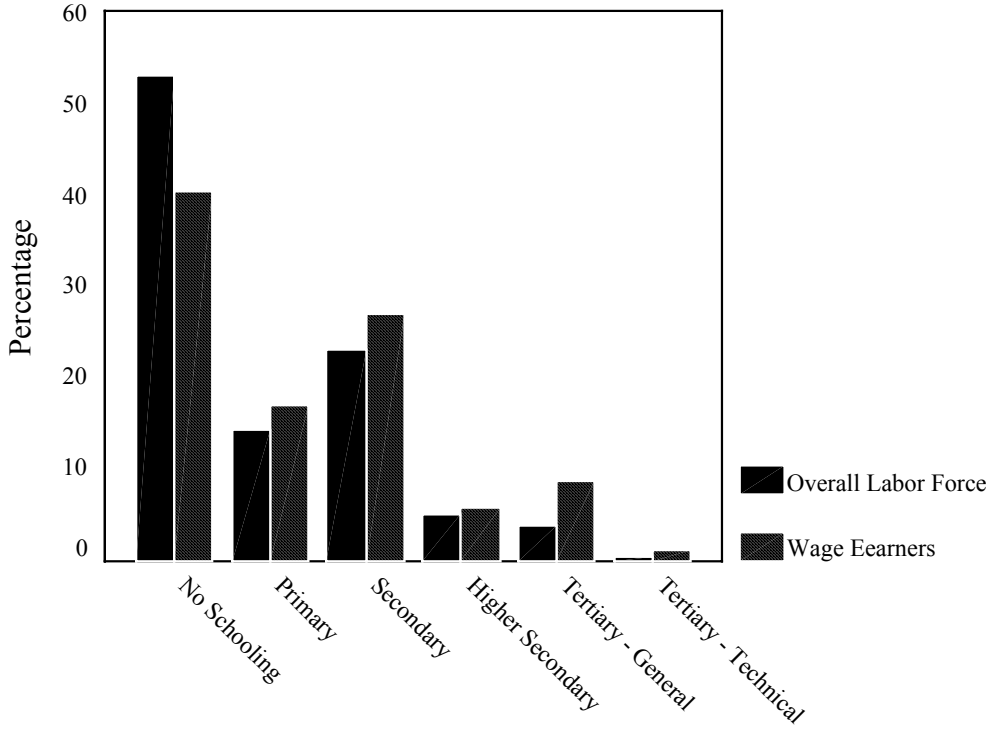
These surveys record the educational attainment of each household member. The year of schooling has been constructed using information of the individual's highest level of completed education. These surveys also provide information about the type of schools last attended and the medium of instruction. Experience is computed in a traditional Mincerian way (age – years of schooling – 5). The sample is purged from self-employed persons, and pensioners. The analysis is, therefore, confined to paid employees or wage earners aged 15 to 65 years with positive income.

## 4. EARNING AND EDUCATIONAL ATTAINMENT OF WAGE EARNERS

Figure 1 and Table 1 display the composition of the labor force by educational attainments. More than 50 percent of the labor force has no formal schooling. About 5 percent workers have obtained higher secondary and tertiary education each. Only 0.6 percent workers possess tertiary technical education. The pattern of distribution is somewhat different in the case of wage earners or paid employees. The percentages of each category of educational attainments are higher. About 10 percent of wage earners possess tertiary education, while about 40 percent have no schooling.

The provincial scenario of the composition of the labor force is depicted in Table 2 and 3 for overall labor force and for wage earners respectively.

**FIGURE 1**
**THE STRUCTURE OF EDUCATIONAL ATTAINMENT OF LABOR FORCE**




Source: PIHS, 2001-02

**TABLE 1**
**LABOR FORCE COMPOSITION BY EDUCATIONAL ATTAINMENT**
***[Percentage]***

| Education Level | Overall Labor Force | Wage Earners |
|---|---|---|
| No Schooling | 53.0 | 40.3 |
| Primary | 14.4 | 16.9 |
| Secondary | 23.0 | 27.0 |
| Higher Secondary | 5.0 | 5.9 |
| Tertiary – General | 4.0 | 8.8 |
| Tertiary – Technical | 0.6 | 1.1 |

**Source:** Pakistan Integrated Household Survey, 2001-02

**TABLE 2**
**COMPOSITION OF LABOR FORCE – PROVINCIAL SCENARIO**
***[Percentage]***

| Education Level | PROVINCE | | | |
|---|---|---|---|---|
| | Punjab | Sindh | NWFP | Balochistan |
| No Schooling | 49 | 52 | 60 | 67 |
| Primary | 16 | 15 | 10 | 8 |
| Secondary | 25 | 19 | 21 | 18 |
| Higher Secondary | 5 | 6 | 4 | 3 |
| Tertiary – General | 3 | 6 | 3 | 3 |
| Tertiary – Technical | 1 | 1 | 1 | 0 |

**Source:** Pakistan Integrated Household Survey, 2001-02

**TABLE 3**
**THE STRUCTURE OF EDUCATIONAL ATTAINMENT OF WAGE EARNERS**
***[Percentage]***

| Education Level | PROVINCE | | | |
|---|---|---|---|---|
| | Punjab | Sindh | NWFP | Balochistan |
| No Schooling | 41 | 39 | 36 | 52 |
| Primary | 17 | 18 | 15 | 10 |
| Secondary | 29 | 23 | 30 | 24 |
| Higher Secondary | 5 | 7 | 7 | 5 |
| Tertiary – General | 7 | 11 | 9 | 8 |
| Tertiary – Technical | 1 | 2 | 1 | 0 |

**Source:** Pakistan Integrated Household Survey, 2001-02

The educational attainments of the labor force are comparatively better in the province of Punjab, which is the most developed province of Pakistan. However, the percentages of workers having higher secondary and tertiary education are relatively greater in Sindh province than Punjab. This is mainly due to Karachi, which is the hub of commercial and industrial activities of Pakistan. Balochistan and NWFP provinces are far behind in terms of workers' educational attainments. Similar trends are evident in the case of paid employees or

wage earners. However, an interesting observation emerges from Table 3. Wage earners in NWFP province are relatively better educated than Punjab province. This is mainly due to the small agriculture sector. Wage earners are largely in the manufacturing or services sector which, require better education.

Table 4 presents the sectoral composition of wage earners. As perceived, relatively better-educated wage earners are in the service sector. In the manufacturing sector, only 9 percent paid employees possess above secondary education, while this percentage is 20 in the case of the service sector. The average monthly wages are also higher in the service sector upto secondary level (Table 5). The payoff to manufacturing workers who possess tertiary education is, however higher than the workers in the service sector. On the average, monthly wages of paid employees that possess tertiary education are 5 times higher than workers with no schooling.

**TABLE 4**
**SECTORAL COMPOSITION OF WAGE EARNERS**
***[Percentage]***

| Education Level | SECTORS | | |
|---|---|---|---|
| | **Agriculture** | **Manufacturing** | **Services** |
| No Schooling | 73 | 42 | 32 |
| Primary | 14 | 20 | 17 |
| Secondary | 10 | 29 | 30 |
| Higher Secondary | 1 | 4 | 8 |
| Tertiary – General | 1 | 4 | 11 |
| Tertiary – Technical | 0 | 1 | 1 |

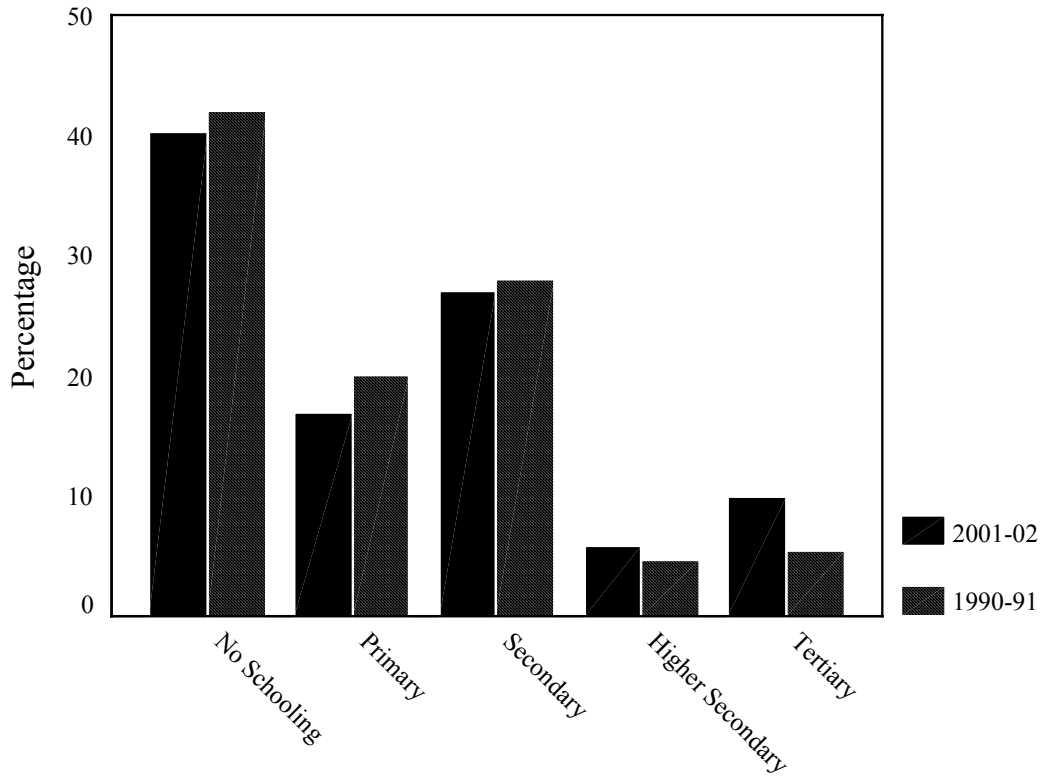
**Source:** Pakistan Integrated Household Survey, 2001-02

**TABLE 5**
**AVERAGE WAGES BY EDUCATIONAL ATTAINMENT**
***[Rupees per Month]***

| Education Level | Overall | Sectors | | |
|---|---|---|---|---|
| | | Agriculture | Manufacturing | Services |
| No Schooling | 1738 | 1160 | 1653 | 2089 |
| Primary | 2135 | 1585 | 1928 | 2321 |
| Secondary | 2809 | 1729 | 2693 | 2930 |
| Higher Secondary | 3829 | 2320 | 4321 | 3823 |
| Tertiary – General | 5893 | 4574 | 6842 | 5804 |
| Tertiary – Technical | 8358 | 4000 | 10740 | 8012 |

**Source:** Pakistan Integrated Household Survey, 2001-02

**FIGURE 2**
**CHANGES IN STRUCTURE OF EDUCATIONAL ATTAINMENT**




Source: Pakistan Integrated Household Surveys

**TABLE 6**
**CHANGES IN STRUCTURE OF EDUCATIONAL ATTAINMENT OF WAGE EARNERS**
***[Percentage]***

| Education Level | 2001-02 | 1990-91 | Difference |
|---|---|---|---|
| No Schooling | 40.3 | 42.0 | - 1.7 |
| Primary | 16.9 | 20.0 | - 3.1 |
| Secondary | 27.0 | 28.0 | -1.0 |
| Higher Secondary | 5.9 | 4.6 | 1.3 |
| Tertiary** | 9.9 | 5.4 | 4.5 |

**Source:** Pakistan Integrated Household Surveys

** Due to definitional changes, it was not possible to classify tertiary level into general and technical categories for both years.

Figure 2 and Table 6 portray a dynamic picture of changes in the structure of educational attainment. An improvement in the wage earners' education is evident from the table and figure. During the decade, a 5 percent increase in workers possessing tertiary education appeared in Table 6. Overall, about 6 percent wage earners have been shifted from secondary and below to higher levels.

## 5. Estimated Returns to Education

Table 7 and 8 present the Ordinary Least Square estimates for equation 2 and 3 respectively. The estimated results of both equations clearly indicate a good fit of the model. All coefficients are statistically significant and signs are according to a priori expectations. About 6.4 percent[8] increase in the monthly income is associated with the increase of one year additional schooling (Table 7). This is slightly lower than the estimates of Nasir and Nazli (2000), which was 7.3 percent for 1995-96.

[8] This is calculated by taking anti-log of 0.062, subtracting from 1 and multiplying by 100 to express into percentage terms.

**TABLE 7**
**REGRESSION RESULT [SCHOOLING YEARS]**
**DEPENDENT VARIABLE: LN (MONTHLY WAGES)**
***[Equation 2]***

| Variables | Coefficients | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| Schooling Years | 0.062 | 0.00 | 45.85 | 0.00 |
| Professional/Technical Education | 0.226 | 0.06 | 3.85 | 0.00 |
| Experience | 0.069 | 0.00 | 33.62 | 0.00 |
| Experience Square | -0.001 | 0.00 | -25.20 | 0.00 |
| Medium of Instruction – English | 0.454 | 0.05 | 9.98 | 0.00 |
| Type of School – Private | 0.168 | 0.05 | 3.29 | 0.00 |
| Male Employee | 1.278 | 0.03 | 44.04 | 0.00 |
| Working in Manufacturing Sector | 0.185 | 0.03 | 6.33 | 0.00 |
| Working in Services Sector | 0.373 | 0.02 | 17.15 | 0.00 |
| Resident – Urban | 0.220 | 0.01 | 15.64 | 0.00 |
| Resident – Punjab | -0.448 | 0.02 | -25.73 | 0.00 |
| Resident – Sindh | -0.222 | 0.02 | -14.16 | 0.00 |
| Resident – NWFP | -0.473 | 0.02 | -21.00 | 0.00 |
| (Constant) | 5.332 | 0.04 | 141.83 | 0.00 |
| R-squared | 0.52 | F-statistic | | 1058 |
| Adjusted R-squared | 0.52 | D-W Statistics | | 1.60 |

**Notes:** **Prob.** reflects the level of significance.
Data are obtained from Pakistan Integrated Household Survey, 2001-02
Number of observations are 12638

The coefficients for quality of education, proxied by medium of instruction (English) and type of school (private) are highly significant and indicate a positive association with earnings. The coefficient for dummy variable to represent technical/professional education is also positive and significant. The results of Table 7 also confirm higher returns for urban workers, male employees, and workers in the service sector. All three provincial dummies are demonstrating an inverse relation with the monthly wages. This phenomenon indicates that returns to education in Balochistan, which is the least developed province, are higher.

The estimates for equation (3) – furnished in Table 8, depict more or less similar trends. Increasing and significant marginal returns to each level of education confirm the positive role of education in determining the payoff in the labor market. Except for the magnitude of coefficients for educational attainment dummy variables, the results of both equations are almost identical with the earlier comparable study of Naisr and Nazli (2000). This study however, uses different classification (than those of Nasir and Nazli) for educational attainment to link the education structure with policy application.

**TABLE 8**
**REGRESSION RESULT [EDUCATIONAL ATTAINMENT]**
**DEPENDENT VARIABLE: LN (MONTHLY WAGES)**
***[Equation 3]***

| Variables | Coefficients | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| Primary Level | 0.137 | 0.02 | 6.99 | 0.00 |
| Secondary Level | 0.336 | 0.02 | 19.96 | 0.00 |
| Higher Secondary Level | 0.661 | 0.03 | 25.38 | 0.00 |
| Tertiary – General | 1.077 | 0.02 | 43.89 | 0.00 |
| Tertiary – Technical | 1.157 | 0.06 | 19.27 | 0.00 |
| Experience | 0.066 | 0.00 | 32.02 | 0.00 |
| Experience Square | -0.001 | 0.00 | -24.00 | 0.00 |
| Medium of Instruction – English | 0.338 | 0.05 | 7.33 | 0.00 |
| Type of School – Private | 0.181 | 0.05 | 3.56 | 0.00 |
| Male Employee | 1.316 | 0.03 | 45.04 | 0.00 |
| Working in Manufacturing Sector | 0.218 | 0.03 | 7.48 | 0.00 |
| Working in Services Sector | 0.402 | 0.02 | 18.60 | 0.00 |
| Resident – Urban | 0.221 | 0.01 | 15.70 | 0.00 |
| Resident – Punjab | -0.436 | 0.02 | -24.84 | 0.00 |
| Resident – Sindh | -0.221 | 0.02 | -14.06 | 0.00 |
| Resident – NWFP | -0.464 | 0.02 | -20.61 | 0.00 |
| (Constant) | 5.368 | 0.04 | 142.79 | 0.00 |
| R-squared | 0.52 | F-statistic | | 869 |
| Adjusted R-squared | 0.52 | D-W Statistics | | 1.58 |

**Notes:** **Prob.** reflects the level of significance.
Data are obtained from Pakistan Integrated Household Survey, 2001-02
Number of observations are 12638

Table 9 shows returns to education for various educational attainments. These estimates are computed from the regression results of equation (3). The average rate of return $r_k$ per year of schooling for the *k*th level can be measured as $r_{k} = (\beta_J - \beta_{J-1}) / Y_k$, where $Y_k$ is the number of years of schooling at *k*th level of education.

Private[9] returns to education levels are 3, 4, 16, 11, and 13 for primary, secondary, higher secondary, tertiary general and tertiary technical respectively. Highest incremental return is estimated for higher secondary education suggesting that expansion f this level of education would be more rewarding. Relatively average annual returns to tertiary (general as well as technical) education are lower than higher secondary education. These findings are plausible given the structure of educational attainment of wage earners.

**TABLE 9**
**ESTIMATED RETURNS TO EDUCATION**
***[2001-02]***

| Education Level | Regression Coefficients | Estimated Annual Returns | Incremental Returns |
|---|---|---|---|
| Primary | 0.14 | 3 | --- |
| Secondary | 0.34 | 4 | 1 |
| Higher Secondary | 0.66 | 16 | 12 |
| Tertiary – General | 1.08 | 11 | -5 |
| Tertiary – Technical | 1.16 | 13 | -2 |

**Source:** Regression Results (Table 8)

Inter-provincial differences in returns to education are displayed in Table 10. The highest returns to tertiary technical education are estimated for Balochistan, which is the least developed province. The finding is consistent with international research on returns to

[9] A short-cut method to calculate the public return is suggested by Psacharopoulos (1995) as follows: Social/public return for level '2' is equal to [Mean Wages of Level '2' – Mean Wages of Level '1'] / [(number of years for Level '2') * (Mean Wages of Level '1' + Public Cost of Level '2')]. The public returns for the year 2001-02 are estimated as 2.4, 2.9 and 2.2 for primary, secondary and tertiary education respectively.

education. According to Psacharopoulos and Patrinos, (2002), higher returns are associated with lower levels of economic development. Returns to education also depend on the demand and supply situation of the work force. In Balochistan, workers with tertiary technical education are insignificant in terms of relative percentages (Table 3). Surprisingly, the return to tertiary technical education is lower than tertiary general education in Punjab province, which perhaps indicates the relatively more supply of work force than demand. Similarly, the returns to higher secondary education for Punjab province are highest among all provinces.

**TABLE 10**
**INTER – PROVINCIAL DIFFERENCES IN RETURNS TO EDUCATION**

| Education Level | PROVINCE | | | |
|---|---|---|---|---|
| | Punjab | Sindh | NWFP | Balochistan |
| Primary | 3 | 2 | 2 | 3 |
| Secondary | 5 | 3 | 1 | 4 |
| Higher Secondary | 18 | 15 | 17 | 9 |
| Tertiary – General | 13 | 9 | 13 | 9 |
| Tertiary – Technical | 10 | 13 | 13 | 18 |

**Note:** Returns are estimated from separate provincial regressions

Table 11 presents returns to education by sectors. On the average, returns are highest for the service sector and lowest for the agriculture sector. Some phenomenon, however are unexplainable. For instance, the returns to higher secondary and above are high for agriculture relative to primary and secondary education. This may be as exceptional case as the demand for labor force that has higher secondary or tertiary in agriculture is non-existence. Urban-Rural differences in returns to education are highlighted in Table 12. According to the estimates, rural return for primary is higher in rural areas. For higher secondary and tertiary education, returns are much higher in urban areas.

**TABLE 11**
**INTER – SECTORAL DIFFERENCES IN RETURNS TO EDUCATION**

| Education Level | SECTORS | | |
|---|---|---|---|
| | **Agriculture** | **Manufacturing** | **Services** |
| Primary | 2 | 1 | 2 |
| Secondary | 3 | 4 | 4 |
| Higher Secondary | 7 | 14 | 15 |
| Tertiary – General | 7 | 9 | 10 |
| Tertiary – Technical | 7 | 13 | 12 |

**Note:** Returns are estimated from separate sectoral regressions

**TABLE 12**
**INTER – REGIONAL DIFFERENCES IN RETURNS TO EDUCATION**

| Education Level | **R E G I O N S** | |
|---|---|---|
| | **Urban** | **Rural** |
| Primary | 2 | 3 |
| Secondary | 4 | 4 |
| Higher Secondary | 18 | 14 |
| Tertiary – General | 11 | 8 |
| Tertiary – Technical | 13 | 5 |

**Note:** Returns are estimated separately for urban and rural areas

Interesting information, regarding the impact of quality on returns to education are provided in Table 13. Albeit crude[10], the results are plausible and are according to general perception. Approximately, 20 percent increase in returns to tertiary education is estimated, if the degree is obtained from institutions where subjects are taught in the English language. Noticeable incentives may also be obtained by studying in private institutions.

[10] It is not certain that these proxies truly reflect the quality of education. Ideally, the quality may be incorporated in the equation by using some sort of achievement or ability score of individual workers. This information is only obtained by using micro data on individual labor.

**TABLE 13**
**EFFECTS OF EDUCATION QUALITY ON RETURNS TO EDUCATION**
***[Percent Increase]***

| Education Level | Quality Proxy | |
|---|---|---|
| | English as Medium Of Instruction | Private Schooling |
| Primary | — | — |
| Secondary | — | — |
| Higher Secondary | — | 45 ↑ |
| Tertiary – General | 20 ↑ | 16 ↑ |
| Tertiary – Technical | 22 ↑ | 19 ↑ |

**Notes:** Effects on returns are estimated using interactive dummies (quality multiplied by level of education)

— indicates the regression coefficient is statistically insignificant

Table 14 displays the changes in returns to education during the decade. Before discussing the dynamics in returns to education, it warrants attention to indicate that these results are tentative due to the small sample of the survey of 1990-91[11]. According to the table, workers with primary education experienced a decrease in returns. The return to workers with higher secondary and tertiary education rose by 4 and 1 percent respectively.

**TABLE 14**
**INTER – TEMPORAL CHANGES IN ESTIMATED RETURNS**

| Education Level | 1990-91 | 2001-02 |
|---|---|---|
| Primary | 4 | 3 |
| Secondary | 3 | 4 |
| Higher Secondary | 12 | 16 |
| Tertiary | 10 | 11 |

**Note:** Due to definitional changes, it was not possible to classify tertiary level into general and technical categories

[11] However, several authors used this survey for the analysis. Recently Holmes J. used the data of Pakistan Integrated Household Survey of 1990-91. ["Measuring the Determination of School Completion in Pakistan", Economic of Education Review, 22 (3), June 2003, pp 249-64, forthcoming]

There are multiple factors that may cause changes in returns to education. However, it is plausible to argue that demand side factors, in the case of Pakistan, are mainly responsible for these changes during the decade. The following hypothesis or suppositions may illustrate the increasing returns to more educated workers. New technology sharpens the demand for skilled labor. Since, new technology is primarily accessible by workers with higher education, the demand for skills rises as new technology is introduced in the economy. Increased openness also increases the demand for skilled labor. Reduction in tariffs and elimination of most non-tariff barriers supposedly alters national price on skills to the world market price. Further, if sectors with relative high demand for skilled workers expanded, then total demand for high skills would increase. Some institutional changes, e.g. deregulation of labor market, diminished labor union power, expansion of the informal sector etc. also affect the changes in returns to education.

## 6. CONCLUDING REMARKS

This study conducted a macro-analysis of returns to education using latest Pakistan Integrated Household Survey of 2001-02 and has documented the high returns to investment in education. Comparatively, returns are higher for higher-secondary and tertiary education. However, the results must be qualified by the aggregate nature of the data. For instance, worker's ability, family background, achievement score etc. are missing in the analysis. Further, the proxy for experience (adjusted age) and quality perhaps, do not truly reflect the labor market experience and education quality. Barring this qualification, the results support the hypothesis that extra high returns to higher secondary education are due to the fact that individuals are not able to obtain the optimal amount of education.

The dynamics of the rate of returns also suggest the increasing demand of higher educated workers. This is despite the low growth and tight labor market during the decade of the 90s. The findings of the paper strongly argue that the current supply of workers with above secondary education in Pakistan inadequately meets demand. Therefore, policy makers might consider adopting new regulation that induces private and public providers of higher secondary and tertiary education to increase access, enrollment and completion.

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