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Return to Education in Pakistan: A Brief Overview

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ABSTRACT

The rate of return to education is a measure of the economic benefits of education in terms of increased earnings and productivity. To provide evidence on the rate of return for Pakistan, we conducted an extensive literature search using online sources such as Google Scholar, JSOR, and others. We also presented global evidence, for comparison on the rate of returns covered extensively in the literature surveys of Montenegro and Patrinos (2023) Patrinos and Psacharopoulos (2020). There are two main estimation frameworks to estimate the rate of returns; the earning function and the full discounting method. The survey of earning differentials in Pakistan reveals several key insights. The rate of return to education varies, but overall, investing in education yields higher returns for females compared to males. However, the average returns for males are relatively low in Pakistan compared to global averages. Across economies, the returns are generally higher for females, and high-income economies exhibit the smallest gender gap. While private returns in Pakistan exceed social returns at higher education levels, a significant proportion of children end up with only primary education, leading to lower productivity and hindering long-term economic growth.

1. INTRODUCTION

The difference in earnings based on the level of education signifies the monetary gains or the incentive to invest in education. It indicates an equilibrium point where demand and supply for skilled labor intersect in the labor market. Moreover, variations in relative earnings between countries highlight the significance of various factors such as minimum wage regulations, skill demand in the labor market, the availability of labor with different educational levels, years of experience, collective bargaining agreements, and the influence of labor unions. Additionally, the distribution of the workforce across various professions and the proportion of part-time/casual and seasonal employment are also important factors to consider (OECD, 2017; Patrinos & Psacharopoulos, 2020). For instance, factors that have been accounted for in Pakistan include relative earnings of employees of different sectors of the economy (Haque 1992; Abbas and Foreman-Peck 2007), by type of enterprises (Hyder 2007).

The literature on earning differentials by level of education has also been explored from important social perspectives including, studies on racial and ethnic biases (McNabb and Psacharopoulos, 1981; Chiswick, 1988; Psacharopoulos and Patrinos, 1994), gender disparities (Goldin and Polachek, 1987), income distribution, (Mincer, 1958). Under assumptions, variations in earnings by educational level have been used to pinpoint drivers of economic advancement. However, the notable application of educational earnings data lies in estimating the rate of return to investment in education (Patrinos and Psacharopoulos, 2020).

Methodologically, the association between earnings and education has been extensively researched in the literature. Most importantly, the causal impact of education on earnings has remained the prime focus. For instance, a person with a graduate degree earns more than a person without such a degree may not imply that a graduate degree causes a wage differential. Instead, the person who had a graduate degree might have certain unique characteristics that might make him more productive and in return paid more in the labor market. One such factor can be innate ability; higher-ability people might be more able to go to university and be more productive. So, the causal impact of education on earnings cannot be isolated in the absence of data on the innate ability of the people. To avoid such difficulties researchers usually compare people who are as similar as possible but only differ in the level of education. Many factors are controlled for in such comparison to isolate the causal impact, such as age, gender, race, school quality, and experience. Family background, measured through parental education, being an important variable is also controlled for. Innate ability measured through IQ or aptitude tests is also factored in the comparison. To account for these many different factors, distinct estimation approaches have been utilized with the conclusion that more education is associated with better earnings (Kolesnikova, 2010).

In what follows, the study is organized into different Sections. Section 2 elaborates on the estimation procedure of the rate of return to education, Section 3 presents evidence on private returns to education in Pakistan, Section 4 reports global evidence and section 5 shows evidence on the comparison of private rate of returns to social returns. Section 6 discusses the use of returns in public policy and the research gaps. Whereas, Section 7 concludes with key findings.

2. RETURN TO EDUCATION ESTIMATION PROCEDURES

According to Patrinos & Psacharopoulos (2020), there are two main estimation procedures to calculate the rate of return to education.

2.1. The Earnings Function Method

The Mincer earnings function, also known as the Mincerian method, fits a function of logarithmic wages (LnY) as the dependent variable. Whereas, the independent variables include years of education (E), years of labor market experience (EXP), and the square of labor market experience (EXP^2). The semi-log specification's coefficient related to years of education represents the average private rate of return to an additional year of schooling, regardless of the specific educational level to which the extra year of education pertains. The Mincerian earnings function is expressed as follows:

$Ln(Y) = \beta_0 + \beta_1 S + \beta_2 EXP + \beta_3 (EXP^{\wedge 2})$

This method exclusively calculates the private returns to schooling because the only expenses evaluated are foregone earnings.The Full Discounting Method

To assess the social rate of return on investment at a particular level of education, the procedure comprises determining the discount rate *(r)* that makes the present value of the discounted benefits *(Y)* equal to the present value of the costs *(C)* at a specific point in time. This calculation involves comparing the long-term benefits and costs associated with the investment in education.

$$\sum_{t=1}^{42} (Y_U - Y_s)_t / (1+r)^t = \sum_{t=1}^{4} (Y_s - C_u)_t \ (1+)^t$$

In the formula, $(Yu\text{-}Ys)_t$ represents the earnings difference between a university graduate (denoted by subscript u) and a secondary school graduate (denoted by subscript s, the control group) at a specific time *(t)*. C_u represents the direct resource cost associated with university education, including expenses such as buildings and salaries. Alternatively, Y_s represent the foregone earnings or indirect costs incurred by the student. To put it differently, the equation captures the disparity in earnings between university graduates and secondary school graduates, considering the direct costs of university education and the opportunity costs represented by the foregone earnings of students (Patrinos & Psacharopoulos, 2020).

2.2. Evidence from Pakistan-Private Return

The rate of return to education is a measure of the economic benefits of education in terms of increased earnings and productivity. To provide evidence about Pakistan's rate of return, we conducted an extensive literature search using online sources such as Google Scholar, JSOR, and others. This yields more than fifty papers. All publications were thoroughly assessed, and only those papers were included in this review based on their relevance, academic rigor (methods), data quality, and publication avenue.

Table 1 outlines the average rate of return to education in Pakistan across various studies and gender categories estimated through different estimation procedures such as OLS, IV, etc. Montenegro and Patrinos (2023) reported that recent work on return to education shows that traditional estimates are close to estimates provided in studies that control for endogeneity etc. The evidence indicates that female labor force participants

consistently exhibit higher returns than males in most studies, with rates ranging from 7.6 to 16.6 percent for females and 3.3 to 7.2 percent for males.

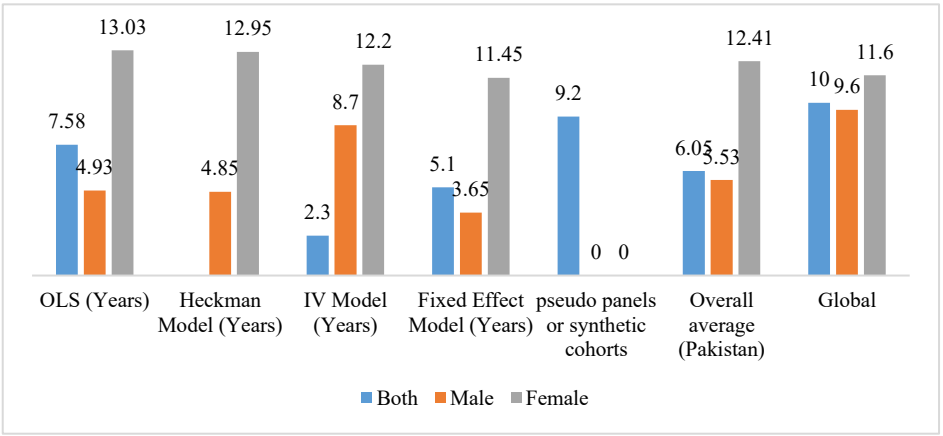
Table 1

Average Private Rate of Return to Education in Pakistan

Authors		OLS (Years)	Heckman Model (Years)	IV Model (Years)	Fixed Effect Model (Years)	pseudo panels or synthetic cohorts	Overall average
Aslam, M. (2009)	Male	7.2	6.4	10	6	–	
	Female	16.6	14.2	17	14	–	
Kingdon and Soderman (2007)	Male	3.3	3.3	5.9	1.3	–	
	Female	14.9	11.7	12.9	8.9	–	
Jamal (2015)	All	5.5	–	–	–	9.2	
Nasir & Nazli (2000)	All	7.2	–	–	–	–	–
Aslam, Bari & Kingdon (2012)	All	4.8	–	2.3	5.1	–	
	Male	4.3	–	10.2	–	–	
	Female	7.6	–	6.7	–	–	
Montenegro and Patrinos (2023)	All	9.2	–	–	–	–	
Haque (1992)	All	11.2	–	–	–	–	
Average	All	7.58	–	2.3	5.1	9.2	6.05
	Male	4.93	4.85	8.7	3.65	–	5.53
	Female	13.03	12.95	12.2	11.45	–	12.41

Notably, Aslam (2009) reports substantially higher returns for females than males, with a difference of around 9.4 years. However, there are variations between studies, with some showing lower returns for males, such as Kingdon and Soderman (2007), while others report higher returns for both genders, such as Montenegro & Patrinos (2023) and Haque (1992).

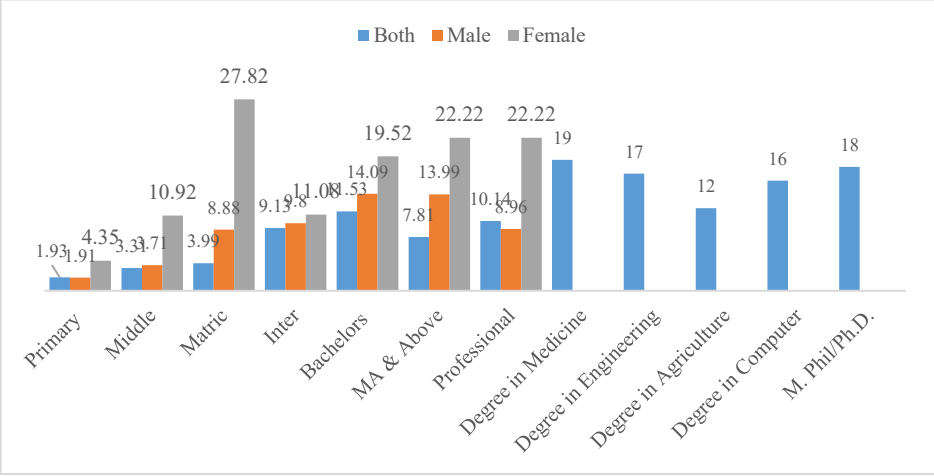
Fig. 1. Average Rate of Returns by Technique and Gender in Pakistan and Global



Moreover, the average rates for females and males are 12.41 and 5.53 percent respectively, across all studies and estimations procedures. Whereas the average return for both genders is 6.05 percent. These differences reveal the complexity of assessing the returns on education, influenced by factors like gender, methodological approaches, and the study's specific context (Figure 1).

Table 2 provides insights into the rate of return to education in Pakistan across various levels of schooling and gender. First, private return to primary education is low or return increases with the increase in the level of education in most of the studies. Second, females consistently exhibit higher returns compared to males across most educational categories. For instance, in Aslam's (2009) study, females achieve significantly higher returns than males across all education levels, with the widest gap observed at the Middle and Professional levels. Similarly, Abbas and Foreman-Peck (2007) report higher returns for females in all categories except at the Primary level, where males have a slightly higher return. This trend is also reflected in other studies like Kingdon & Soderman (2007), where females consistently achieve higher returns than males across various educational levels. Overall, females tend to achieve higher returns across different levels of education compared to males, indicating the significance of investing in female education for economic advancement (Figure 2). Additionally, returns are low at the lower level of education or the returns to higher levels of education are notably higher for both genders compared to primary and secondary education, indicating the increasing economic value of higher education, so the transition to higher grades or levels needs to be facilitated through appropriate policies in Pakistan (Figure 2).

Fig. 2. Average Rate of Returns by Level and Gender in Pakistan



According to Dougherty's (2005) analysis, cited in Patrinos & Psacharopoulos (2020), the gender wage gap is mostly caused by the negative impact of discrimination and other factors that lead women to accept wage offers that undervalue their qualifications. The study hypothesizes that more educated women are better able and willing to overcome these gender-based disadvantages and compete with men in the labor market, while also taking into account the possibility that differences in educational attainment between men and women, as well as women's tendency to choose sectors where their education is highly valued, may contribute to the observed wage disparity. For example, most educated women work in public and private schools, or in Pakistan's

Table 2
Private Return to Credentials or Level of Education in Pakistan

		Primary	Middle	Matric	Inter	Bachelors	MA & Above	Professional	Degree in Medicine	Degree in Engineering	Degree in Agriculture	Degree in Computer	M. Phil/Ph.D.
Jamal (2015)	All	2	3	7	11	19	18	-	9	17	12	16	18
	Male	-	-	-	-	-	-	-	-	-	-	-	-
	Female	-	-	-	-	-	-	-	-	-	-	-	-
Aslam (2009)	All	-	-	-	-	-	-	-	-	-	-	-	-
	Male	2.7	4.5	13.2	11.4	15.4		15.1	-	-	-	-	-
	Female	6.8	20.5	27.4	16.9	22.6		30.7	-	-	-	-	-
Abbas & Foreman-Peck (2007)	All	-	-	-	-	-	-	-	-	-	-	-	-
	Male	1.1	4	10.8	12.2		20.1		-	-	-	-	-
	Female	-1.5	10.3	16.6	14.1		28.8		-	-	-	-	-
Hyder (2007)	All	1.5	2.24	3.94	5.81	9.02	-	9.23	-	-	-	-	-
	Male	-	-	-	-	-	-	-	-	-	-	-	-
	Female	-	-	-	-	-	-	-	-	-	-	-	-
Kingdon and Soderman (2007)	All	-	-	-	-	-	-	-	-	-	-	-	-
	Male	1.92	2.63	2.65	5.8		6.77		-	-	-	-	-
	Female	7.76	1.96	39.45	2.25		7.15		-	-	-	-	-
Jamal et. al (2003)	All	3	4		14	11		13	-	-	-	-	-
	Male	-	-	-	-	-	-	-	-	-	-	-	-
	Female	-	-		-	-	-	-	-	-	-	-	-
Nasir & Nazli (2000)	All	2.7	4	5	5.7	7.1	-	8.2	-	-	-	-	-
	Male	-	-	-	-	-	-	-	-	-	-	-	-
	Female	-	-	-	-	-	-	-	-	-	-	-	-
Average	All	1.93	3.31	3.99	9.13	11.53	7.81	10.14	19	17	12	16	18
	Male	1.91	3.71	8.88	9.80	14.09	13.99	8.96	-	-	-	-	-
	Female	4.35	10.92	27.82	11.08	19.52	22.22	22.22	-	-	-	-	-

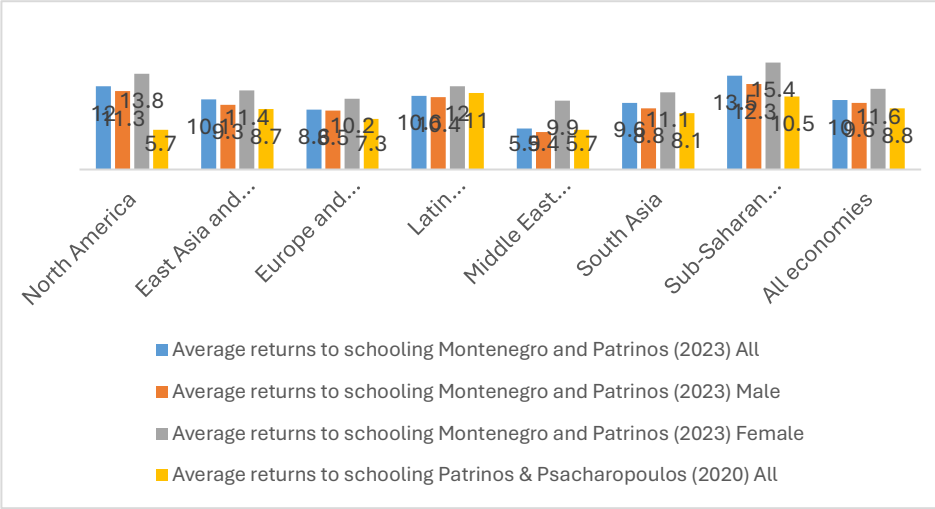
education sector. Additionally, a smaller proportion of educated women at different levels of education relative to men as well as uneducated women could also be a factor in Pakistan.

According to Patrinos and Psacharopoulos (2020), there exists an inverse relationship between the level of education and the magnitude of the economic rate of return on educational investment. Across the world, returns are higher in nations with low levels of educational attainment, as shown by the average number of years spent in school. Lower-income countries with less schooling get better returns. As a result, in nations where coverage at this level is not universal, primary education should have been prioritized, followed by secondary and university education.

4. GLOBAL EVIDENCE-PRIVATE RETURN

Figure 3 presents the average returns to schooling across various regions, segmented by gender, and includes data from two sources: Montenegro and Patrinos (2023) and Patrinos & Psacharopoulos (2020). The literature survey of Montenegro and Patrinos (2023) is a meta-analysis of more than 1000 rate of return estimates in more than 100 countries. The literature survey of Patrinos & Psacharopoulos (2020) provides private return estimates for 142 economies from 1970 to 2014 using 853 harmonized household surveys.

Fig. 3. Private Returns to Credentials by Region



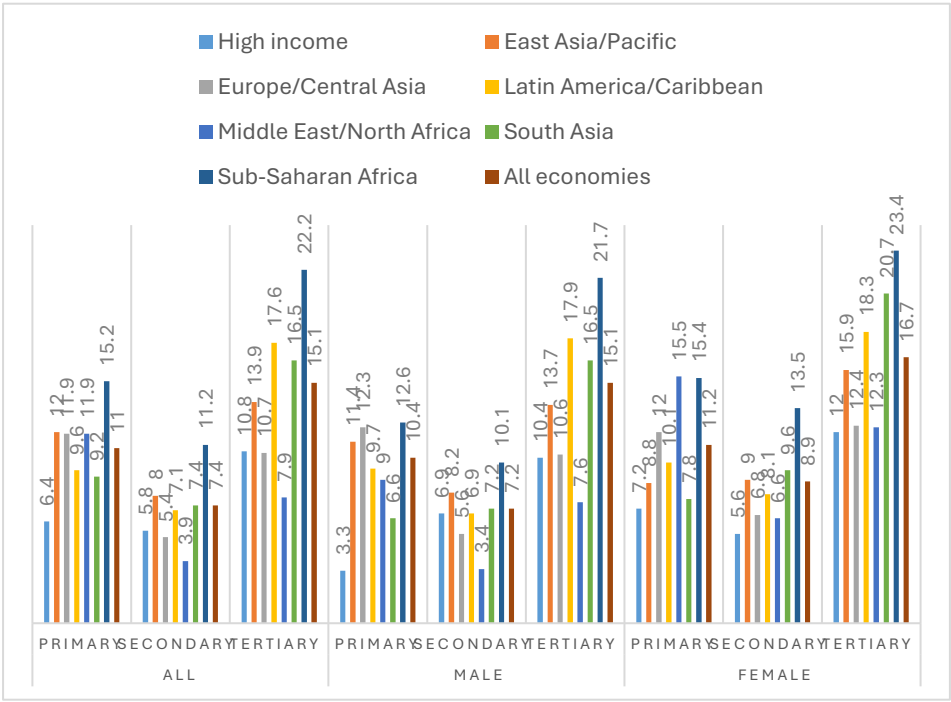
Source: Montenegro and Patrinos (2023) and Patrinos & Psacharopoulos (2020).

Overall, the returns to schooling are higher for females than males in almost all regions. Sub-Saharan Africa demonstrates the largest gender disparity in returns to schooling, with females consistently experiencing higher returns compared to males. Across all economies, the average returns to schooling for males range from 8.5 to 12.3, while for females, they range from 9.9 to 15.4. Notably, in most regions, the average returns to schooling for females are consistently higher than for males, indicating that investing in education yields greater economic benefits for women. Additionally, the average returns to schooling for all genders combined fall within the range of 5.7 to 13.5 across different regions, with Sub-Saharan Africa showing the highest overall returns and the Middle East and North Africa showing the lowest. Notably, average returns are very

low (6.05 for both genders) in Pakistan in comparison to the average return across all economies presented in Figure 3.

Figure 4 provides insights into the private return to credentials across different regions, disaggregated by gender and educational level, adopted from Montenegro & Patrinos (2023). Overall, the returns to primary, secondary, and tertiary education are higher for females compared to males in all regions, like the trends we observe in Pakistan's case. Sub-Saharan Africa exhibits the largest gender disparity in returns to education, with females consistently experiencing higher returns across all levels. However, the returns to tertiary education are notably higher for both genders compared to primary and secondary education in all regions, indicating the increasing economic value of higher education. Across all economies, the average returns to primary education range from 3.3 to 12.3 for males and 7.2 to 15.4 for females. For secondary education, the returns range from 3.4 to 10.1 for males and 5.6 to 13.5 for females, while for tertiary education, they range from 7.6 to 21.7 for males and 12 to 23.4 for females. Additionally, the returns to education are generally highest in Sub-Saharan Africa across all levels and genders, reflecting the significant economic benefits of education in this region.

Fig. 4. Private Return to Credentials by Region, Gender, and Level



Source: Montenegro & Patrinos (2023).

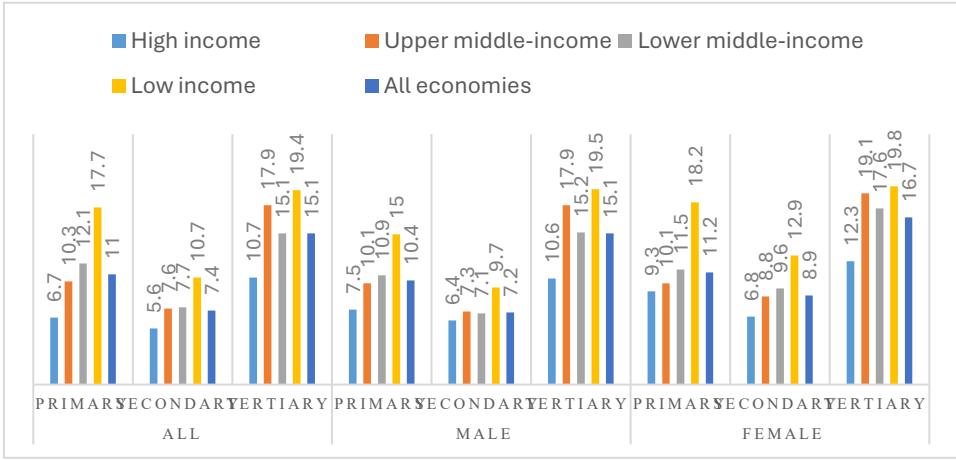
Figure 5 illustrates the private return to credentials categorized by type of economy and gender, with data sourced from Montenegro and Patrinos (2023). Overall, across types of economies, females tend to have higher returns to education compared to males. High-income economies demonstrate the smallest gender gap. Conversely, low-income economies exhibit the largest gender disparity, with females having significantly higher returns than males. Across all economies, the average returns to education are consistently

higher for females than males. For instance, in high-income economies, the return for males is 9.1 percent compared to 10.8 percent for females. Similarly, in low-income economies, the return for males is 10.8 percent compared to 13.5 percent for females. These findings highlight the persistent gender gap in private returns to education across various economic contexts. The average returns in Pakistan's case, except for females, are low in comparison to the average return of lower-middle-income and low-income economies.

Fig. 5. Private Return to Credentials by Type of Economy and Gender

Source: Montenegro & Patrinos (2023).

Fig. 6. Private Return to Credentials by Type of Economy, Level of Education, and Gender



Source: Montenegro & Patrinos (2023).

Figure 6 depicts the private return to credentials by type of economy, level of education, and gender, with data derived from Montenegro and Patrinos (2023). Across all regions and levels of education, females consistently exhibit higher returns than females. In low-income economies, the gender gap widens, indicating a consistently higher return to female education across different economic contexts and levels of education, that is what we also observed for Pakistan.

5. SOCIAL RETURN

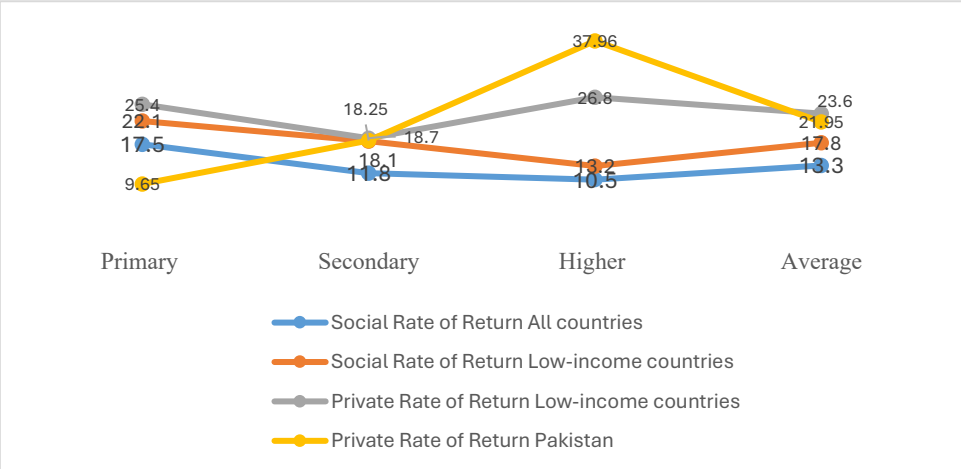
Figure 7 presents the social rate of return for all countries, low-income countries, and the private rate of return for Pakistan across different levels of education. In low-income countries, the social rate of return is notably higher across all levels compared to the global average, indicating the potentially greater societal benefits of investing in education in low-income settings. Also, the social rate of returns declines with the level of education across all countries and low-income countries. Conversely, the private rate of return surpasses the social rate of returns at secondary and higher levels of education.

Table 3
Social and Private Return to Credentials in Low-income Countries and Pakistan

	Social Rate of Return		Private Rate of Return	
	All Countries	Low-income Countries	Low-income Countries	Pakistan
Primary	17.5	22.1	25.4	9.65
Secondary	11.8	18.1	18.7	18.25
Higher	10.5	13.2	26.8	37.96
Average	13.3	17.8	23.6	21.95

Source: Patrinos & Psacharopoulos (2020) and Table 2 for Pakistan.

Fig. 7. Social and Private Return in Low-income Countries and Pakistan



6. RETURNS, ITS USE, AND GAPS IN RESEARCH

Patrinos and Psacharopoulos (2020) argue that there is confusion in the literature regarding the interpretation of "social" rates of return on educational investments. Traditionally, the mainstream literature on education has used the term "social" to describe a private rate of return that has been adjusted for the total cost of schooling, as opposed to just the expenditures incurred by the individual. The authors argue, however, that a true "social" rate should consider benefits that extend beyond those realized by the individual investor, like effects on health or reproduction. These broader "wide social returns" can lead to markedly different policy conclusions compared to the more limited "narrow

social returns" typically reported. For example, the order of profitable education investments may change if the externalities associated with primary and postsecondary education are different. Thus, research in this direction is needed for Pakistan.

The paper also discusses the methodological approach used to estimate returns to education. While many studies rely on the Mincerian earnings function, the authors argue that the more accurate approach is the "full discounting method," which rests on the real forms of age-earnings profiles rather than the smoothed estimates provided by an earnings function.

According to Patrinos & Psacharopoulos (2020), there exists an inverse relationship between the level of education and the magnitude of the economic rate of return on educational investment. Across the world, returns are higher in nations with low levels of educational attainment, as shown by the average number of years spent in school. Lower-income countries with less schooling get better returns. As a result, in nations where coverage at this level is not universal, primary education should have been prioritized, followed by secondary and university education.

Evidence on social returns is limited in the case of Pakistan[1]. However, when the private rate of return in Pakistan is contrasted with the social rate of return in low-income nations, it becomes clear that while private returns in Pakistan are relatively low at the primary education level, they exceed social returns at the secondary and higher education levels. This is because in Pakistan, a greater proportion of the children are enrolled at the primary level, about 16.41 percent of the children are enrolled in the middle level, and only 4.33 percent in the universities, so the per-student spending/subsidy is higher at the postsecondary level and hence low social returns at the secondary and higher education levels in Pakistan.

The lower private returns to education in Pakistan indicate inefficiencies in the labor market, such as limited job opportunities, underemployment, or a mismatch between skills and job requirements. This suggests the need for policies that improve job creation prospects or investments in the private sector, align education with labor market demands, and enhance vocational training. For females, the higher returns may reflect the relative scarcity of educated women in the workforce, underscoring the importance of promoting gender equality in education and labor participation.

7. CONCLUSION

Based on the evidence reported in Section 5, numerous key conclusions can be drawn regarding earning differentials in Pakistan and their comparison with the global rates:

- The rate of return to education in Pakistan varies across studies, estimation procedures, and gender categories. However, overall, investing in education yields higher returns for females compared to males. Notably, the average returns for males are relatively low in Pakistan compared to global averages.
- The returns tend to increase with the level of education, indicating the increasing economic value of higher education. Females consistently achieve higher returns across different levels of education compared to males, emphasizing the significance of investing in female education.
- Across various regions and types of economies, the returns to schooling are generally higher for females than males, suggesting that investing in education brings

[1] Khan (2022) computed the relative social rates of return for children in model colleges and cadet colleges.

greater economic benefits for women. The returns tend to increase with the level of education, highlighting the increasing economic value of higher education.

- In addition to this, high-income economies exhibit the smallest gender gap, while low-income economies demonstrate the largest gender disparity. Investing in education yields positive private returns for both genders in all types of economies but with variations in the magnitude of returns. The findings highlight the persistent gender gap in private returns to education across different economic contexts.
- Evidence on social returns is limited in the case of Pakistan. However, when the private rate of return in Pakistan is contrasted with the social rate of return in low-income nations, it becomes clear that while private returns in Pakistan are relatively low at the primary education level, they exceed social returns at the secondary and higher education levels.
- Pakistan has 22.8 million children out of school between the ages of 5 and 16, accounting for 44 percent of children in this age group (Khan and Ahmad, 2021). Moreover, according to the economic survey of Pakistan, out of 55.6 million enrolled children (at all levels), only 4.33 percent made it to the universities and 16.41 to the middle level in 2o22-23. Therefore a bigger proportion of children in Pakistan end up with a lower education level (primary level of education). As shown above, the rate of return is low at the primary and middle levels of education in Pakistan. Consequently, a bigger proportion of children in Pakistan end up with low productivity/earnings, which is detrimental to the country's long-term economic growth and development.

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