ESTIMATING THE PAYOFF TO SCHOOLING
USING THE STANDARD MINCERIAN MODEL

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Abstract: Estimating the Payoff to Schooling using the Standard Mincerian Model. *Using data from Indonesia Family Life Survey (IFLS) wave IV, this paper empirically estimates the private rates of return to education in Indonesia. The result from ordinary least-squares estimate shows that one year of schooling increases an individual's earnings by 5.66 percent. Futhermore, Standard Mincerian Earnings function estimates reveal a gender asymmetry in private economic returns to schooling, with returns to women's education being substantially and statistically significantly higher than men's.*

Keywords: Return to Schooling, Standard Mincerian Earnings Function

Abstrak: Mengestimasi Hasil Investasi Pendidikan Menggunakan Model Mincerian Standar. Menggunakan data Indonesia Family Life Survey (IFLS) IV, artikel ini secara empiris mengestimasi "rates of return" investasi pendidikan di Indonesia. Hasil dari estimasi dengan menggunakan pendekatan OLS menunjukkan bahwa setiap tambahan satu tahun sekolah akan meningkatkan pendapatan individu sebesar 5.66 persen. Estimasi fungsi pendapatan Standard Mincerian mengindikasikan perbedaan "return to schooling" antara perempuan dan laki-laki. "return to schooling" perempuan lebih tinggi dari pada "return to schooling" laki-laki.

Kata Kunci: Kembalian Investasi Pendidikan, Fungsi Pendapatan Standar Mincerian

Introduction

Although the returns to education has been a topic of considerable interest in the empirical labour and education economics literatures for around 50 years, the analysis of returns to education remains a relevant issue for both the developed and the developing economies. Numerous studies, for many different countries and time periods, have confirmed that better-educated individuals receive higher wages and have occupations of higher status than less-educated individuals. For most developed countries, there is general agreement over the size and the patterns of the return to education across sub-groups of the population. In terms of the empirical findings from developing countries, however, there has been an ongoing debate concerning even the magnitude of the returns to schooling. Some studies, for example, provide evidence of a relatively low private return to schooling in developing countries, whereas there are numerous other empirical studies that find that the return to schooling is quite high. Despite the voluminous empirical literatures on the returns to schooling in less developed countries, to date there have been only a limited number of studies based on Indonesian data. The current set of

analyses for Indonesia therefore has the potential to fill a major gap in the literature.

The plan of the paper is as follows. In the next section the empirical model and estimation methods will be discussed briefly. Results and interpretation are explored in Section 3. Finally, Section 4 concludes the paper.

Method

The specification of the earnings equation used below is based on the human capital model developed by Mincer (1974). According to this model, the log of earnings in a given time period can be decomposed into an additive function of a linear education term and a quadratic working experience term,

$$\ln(earnings_i) = \beta_0 + \beta_1 edu_i + \beta_2 exp_i + \beta_3 exp_i^2 + \varepsilon_i$$

where *earnings* is monthly earnings for individual i, edu_i is years of schooling for individual i, exp_i is a measure of work experience for individual i, exp_i^2 is experience squared for individual i, and ε_i is an unobservable random variable, and β_1, β_2, and β_3 are unknown parameters to be estimated. According to human capital theory $\beta_1 = r$, and so the estimated regression coefficient β_1 is interpreted as the average private rate of return to one additional year of schooling. The Mincerian model assumes that (i) the only costs of schooling are the foregone earnings, and (ii) each individual starts working immediately after completion of school. Furthermore, this relationship provides a direct measure of the returns to schooling through the coefficient of the years of schooling variable in the earnings regression.

The data set used in the empirical analysis is the Indonesian Family Life Survey 4 (IFLS4). The coverage area of the survey can be seen in Figure 1. The survey collects data on individual respondents, their families, and their households. IFLS4 was fielded in late 2007 and early 2008. It was a collaborative effort by RAND, the Center for Population and Policy Studies (CPPS) of the Gadjah Mada University, and Survey Meter.

Figure 1. IFLS Survey Coverage (Source: IFLS, http://www.rand.org/labor/FLS/IFLS.html)

Table 1. OLS Estimates of Standard Mincerian Earnings Function

	all	male	female
Constant	5.12447	5.25857	4.92210
	(0.02718)***	(0.03354)***	(0.04398)***
Years of Schooling		0.05278	0.06459
	0.05663		(0.00290)***
	(0.00172)***	(0.00206)***	
Experience	0.01603	0.01224	0.01540
	(0.00195)***		(0.00327)***
		(0.00240)***	
Experience^2	-0.00023	-0.00015	-0.00023
	(0.00005)***		(0.00008)***
		(0.00006)***	
R^2	0.2051	0.1899	0.2585
Observations	4596	3065	1531
Chow test			63.53
p-Value			0.0000

Notes: Robust standard errors in parentheses. *, ** and *** denote statistical significance at the 10 percent, 5 percent and 1 percent levels, respectively.

For the analysis of the private returns to schooling, the sample is restricted to individuals 15 to 65 years old, who were not full-time students, reported non-missing labour income, and provided information on schooling. Persons in the military during the survey week are omitted, as it is generally argued that the wages of those in the armed forces do not necessary reflect market forces. A total of 4596 observations satisfy these criteria and are utilized in the analysis.

Results and Discussion

The analysis commences with results from the standard Mincer equation. In this section, OLS estimates of the earnings function parameters are reported, assuming education to be exogenous. The econometric analysis of the private returns to schooling are estimated using the basic Mincerian function, where, as described in previous section, the natural logarithm of earnings is regressed on years of schooling, potential work experience and its squared term. The results are reported in Table 1.

Table 1 presents the OLS coefficients estimated for the total sample and for males and females, separately. The Chow tests reject the null hypothesis of equality of the regression coefficients for males and females. The three standard models explain from about 19 to about 26 percent of the variation in actual earnings, figures which are comparable to other studies in the literature. All the coefficients reported in the table have the expected signs and are statistically significant at the level of α = 0.01.

According to the Table 1 results, an additional year of education is associated

with an annual 5.66 percent, 5.23 percent, and 6.46 percent increase in earnings for pooled, male, and female samples respectively. These estimates of the return to schooling in Indonesia are substantially smaller than the Psacharopoulos (1981) average estimate of 14 percent for Less Developed Countries, and the Psacharopoulos (1994) average estimate of 9.6 percent for Asian countries. However these results are in agreement with some empirical studies, for example: Flanagan (1998) in the Czech Republic, Maurer-Fazio and Dinh (2004) in China, Aromolaran (2006) in Nigeria, and Aslam *et al.* (2010) in Pakistan.

The estimates of the return to schooling for females (6.46 percent) are higher than those for males (5.28 percent). The t-test confirms that these differences are statistically different, indicating that schooling is more financially rewarding in the labour market for females than for males. This result is consistent with the

findings of many empirical studies, such as Behrman and Deolalikar (1993) in Indonesia, Miller *et al.* (1997) in Australia, Flanagan (1998) in the Czech Republic, Brunello *et al.* (2000) in Italy, Lopez-Avecedo (2001) in Mexico, and Asadullah (2006) in Bangladesh. Comparison of the return to schooling among the three specifications from Table 1 is provided in Figure 2. Using either potential work experience in the earnings function to estimate the returns to schooling yields a range of 5.28 to 6.46 percent increase in earnings associated with each additional year of schooling.

The coefficients on the potential labour market experience variable and its squared term have the expected signs, and portray the usual concavity of the experience-earnings profile. The payoff varies with the level of potential work experience. Among labour market entrants (experience = 0) the return estimated for the total sample is 1.6 percent. At 10 years of potential labour market experience the return is 1.14
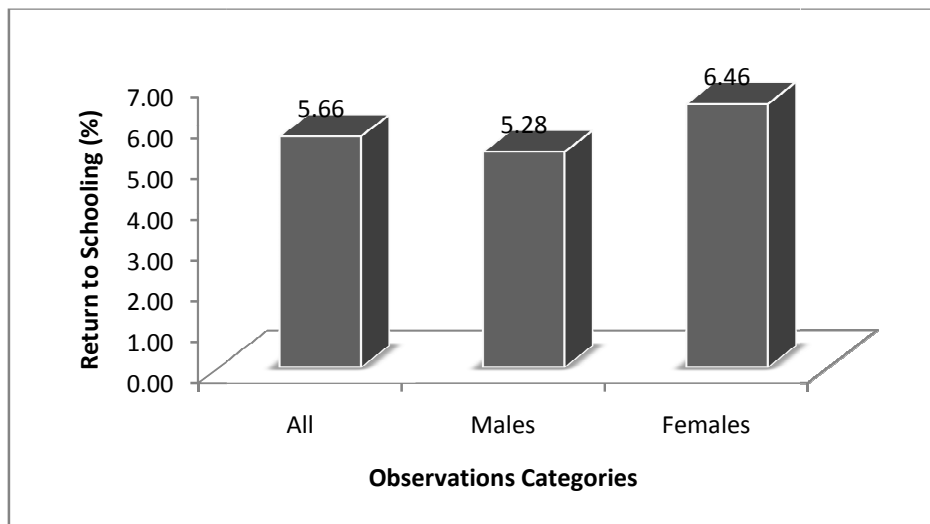

Figure 2. The Standard Mincerian Return to Schooling
(Source: Author's calculation based on Table 1)

percent, and at 20 years of potential labour market experience the return is 0.68 percent. The increase in earnings associated with additional labour market experience for females exceeds that for males up to around 20 years of experience. For example, among labour market entrants it is 1.54 percent for females and 1.22 percent for males. At experience = 10 it is 1.08 percent for females and 0.92 percent for males. Beyond 20 years of experience, however, the increase in earnings per year of labour market experience for males exceeds that for females, and for a number of years (e.g. at experience = 25 and experience = 35) it is positive whereas that for females is negative. This gender difference in the payoff to experience across levels of experience could be due to the following

reasons. First, it could reflect a cohort effect, where the younger female workers in the sample have joined the labour force under different - perhaps more favourable - circumstances than the older female workers in the sample. Second, it could relate to selectivity in labour force participation. In the young cohort, females in the labour force may be heavily selected toward more able and talented individuals. Third, the younger cohorts in the sample tend to have better education than the older cohorts in the sample, and there may be complementarities between labour market experience and the level of education.

Also of interest is the level of experience at which the predicted experience-earnings profile peaks. This is where $\hat{\beta}_2 + 2\hat{\beta}_3 expr =$
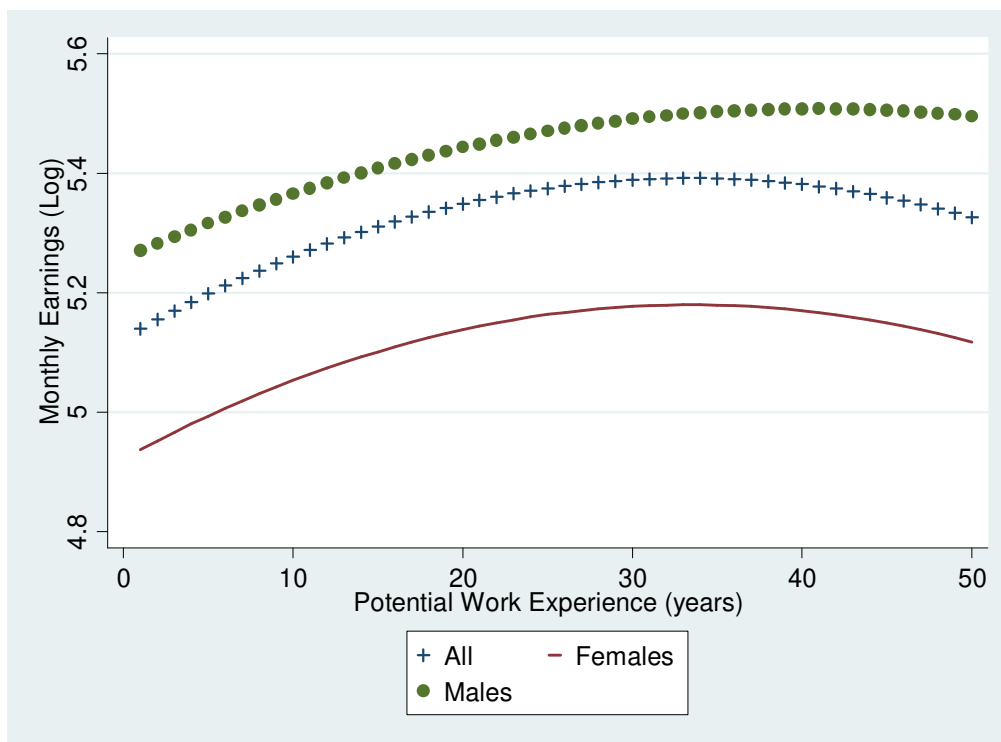

Figure 3. Experience - Earnings Profiles

(Source: Author's calculation based on Table 1)

0. This occurs when potential work experience reaches 34.85, 40.80, and 33.48 years for all, male, and female samples respectively (see Figure 3).

Figure 3 uses the estimates from Table 1 to predict experience-earnings profiles. The figure presents some patterns worth noting. As discussed above, the experience-earnings profiles have concave, first rising and then falling after reaching a given number of years. Based on the previous calculation of the experience-earnings profile we know that the earnings of male workers increase with experience until their peak at 40.80 years. Thus for a male leaving education at age 16, this peak would be at age 57. Female workers reach the peak of their experience-earnings profile earlier than their male counterparts, at 33.48 years. Thus for females leaving school at age 16 this peak would occur at 50 years. This would be well after women with career interruptions due to child bearing and rearing have returned to the labour market.

Conclusion

This paper reports evidence on the returns to schooling in Indonesia and highlights some critical issues. Separate estimates are obtained for males and females. OLS is employed as the methodological approach to measure the return to schooling. The estimation of the standard Mincerian earnings functions revealed that the return for an extra year of schooling is positive and significant. The results confirm that the returns to schooling in Indonesia are low in comparison with the return to schooling in many other countries, particularly Asian and developing countries.

Furthermore, it is clearly shown that the returns to schooling are higher for females than for males, which is in agreement with the findings of other studies.

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