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Returns to education in the Philippines

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Abstract

The paper estimated the marginal private and social rates of return for education investments over time (1988, 1990, and 1995) using the "elaborate method" and Mincer equation. Rates of return estimates in general were relatively stable, mostly increasing between 1988 and 1990, but fell in 1995. The unlikely trend of high or stable returns when educational attainment was increasing suggests that demand for educated workers somewhat kept pace with supply, due perhaps to technological expansion which favors skilled workers. Private and social rates of return consistently exceeded benchmarks used to judge the profitability of investment except for dropouts, possibly indicating the "sheepskin" effects and validating the private incentive for completion. As non-completion can be involuntary, government intervention is necessary—it should provide financial support to poor families to keep their children in school or implement policies to reduce unnecessary attrition in schooling attendance.

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1. Introduction

The accumulation of human capital, such as education, is widely considered as one of the sources of modern economic growth. Although countless growth accounting studies have looked into the contribution of education to overall output, the macro link continues to yield varied and controversial results;[1] micro studies, on the other hand, have shown the positive relationship between education and earnings and productivity: individuals who obtain more education tend to have higher earnings and produce more output than those with less schooling. It is therefore not surprising that governments and private individuals allot substantial resources to

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[1]For example, Pritchett [1996].

education and forgo the productive use of these resources in anticipation of reaping higher benefits over time.

In this context, education is seen as an investment that equips individuals with knowledge and skills that improve their productive capacities, enabling them to earn more income in the future. If schooling yields a return that warrants the investment, comparisons of profitability between alternatives can render insights into how public funds are prioritized among the different concerns, or explain demand behavior of individuals for particular levels or types of schooling. As commonly done in the analysis of investment alternatives, a cost-benefit evaluation is instrumental in choosing the most profitable use of resources. In the case of education, most of the cost-benefit analyses have been based on the internal rate of return criterion. The rate of return technique simply identifies a discount rate that equalizes the net present value of costs to the net present value of benefits. This measure of investment profitability can be viewed in two ways: (a) private rates of return, which reflect the relationship of discounted costs and benefits accruing to an individual; and (b) social rates of return, which reflect those accruing to society as a whole.

Various rates of return estimates done for different countries reveal that as a country develops or as its educational system expands, the rate of return to education falls, although not to a very large extent.[2] The Philippine educational system is characterized by high attendance rates; unlike other developing countries, there is widespread private interest in educational investments. This feature reflects a rate of return that is more akin to advanced countries. What has been the behavior of the Philippines' rate of returns over time? What patterns can we observe across different dimensions, such as educational level, sex, and location? Various studies of the Philippines' educational returns for various years have utilized different data sets and methodologies. The objective of this study is to provide an analysis of the evolution of the returns to education in the Philippines using the Annual Labor Force Survey data for the years 1988, 1990, and 1995. Specifically it aims to

a. assess earnings differentials by level of education and assess how these differentials changed through the years;

b. estimate private and social rates of return across several dimensions (by gender, by urbanity); and over time

c. derive relevant policy implications.

2. Education as an investment in human capital

The decision to participate in the labor market or on job choice depends on a number of factors other than the present labor market conditions. Many choices are made accordingly through a lifetime perspective of the benefits of participating in market production. In such cases, individuals may incur costs, such as those

[2]See Psacharopoulos [1981, 1995].

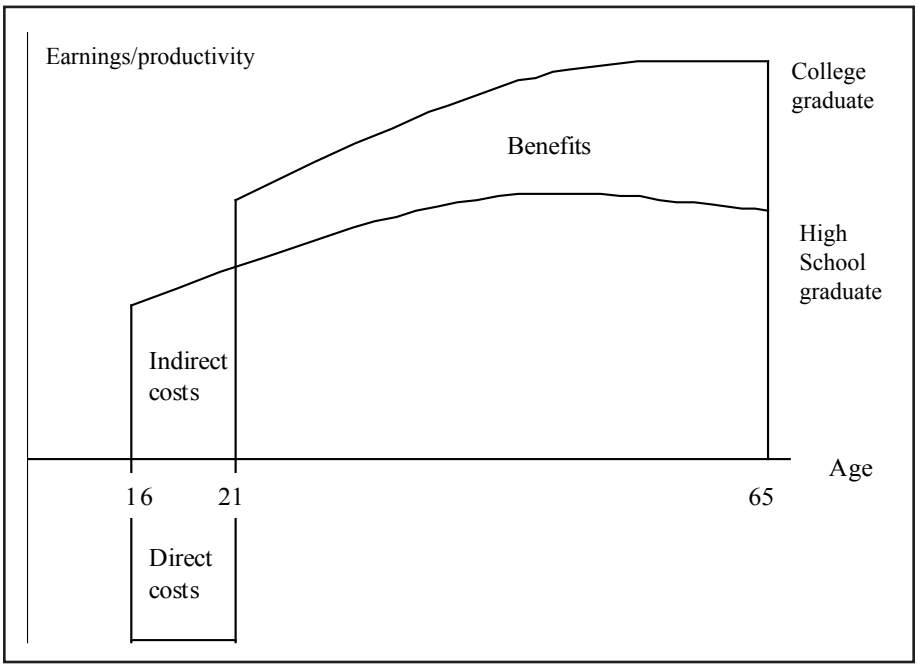
incurred to increase their quality or productive capacity, in the hope of increasing earnings that will accrue over their lifetime. Expenditure of this type is considered an investment in human capital and includes costs expended on formal education, on-the-job training, health, and migration. In the case of education, the general idea is that the additional knowledge and skill accumulated from an individual's increased education generates a value in the labor market in the form of higher wages or earnings. Thus, an individual will choose to undertake more education if he or she expects to amass higher lifetime earnings from doing so. Of course, the underlying assumption is that more educated individuals are more productive. If individuals are paid their marginal product, this marginal product is expected to increase as more education is undertaken. In this context, differentials in earnings (which are assumed to be equal to the marginal product of labor under a competitive model of the labor market) reflect mainly differences in education.[3]

To illustrate further the human capital decision of undertaking more schooling, we take, for example, a decision to finish a college education versus deciding to work right after completion of secondary school. A rational decision would entail comparing associated costs and benefits between the two alternatives. Costs will be incurred in the form of forgone earnings (the earnings the individual would have earned if he or she worked right after high school) and direct expenditures associated with schooling (such as tuition, books, supplies, etc.) if one goes to college. Economic benefits of investing in a college education, however, will be in the form of larger future flows of earnings upon entering the labor market. The empirical relationship between education and lifetime earnings flows can be represented typically in age-earnings profiles showing marginal differences in earnings between the two alternatives (labeled benefits and costs). As Figure 1 shows, human capital theory posits that the age-earnings profile of the more educated worker will tend to rise more rapidly than that of the less schooled.

Differences in earnings between those who obtained more education and those who obtained less tend to widen during the prime earning years. However, the comparison of differences or the costs and benefits are not enough evidence on which to base a decision, since the costs and benefits associated with a college education accrue at different points in a worker's lifetime. Discounting these costs and benefits to a common point in time or calculating the net present value (NPV) affords us a rational point of comparison between the two alternatives. An NPV greater than zero means that an investor can expect to earn over and above investment cost. Another way of assessing the profitability of an investment is by calculating the internal rate of return (IRR), which is the discount rate at which the net present value of the human capital investment will equal zero. The idea here is to compare the IRR or r with the market discount rate *i*. If *r* exceeds *i* educational investment is worth undertaking.

[3]This is a basic qualification of the analysis since differences may be accounted for factors other than education, such as family background, innate abilities, etc.

Figure 1. Hypothetical age-earnings profile with and without college education



Using this simple human capital model can provide insights into understanding why individuals vary in acquiring different amounts of schooling (human capital) and shed light on the implications of such decisions on the distribution of earnings. The following are generalizations about some outcomes predicted by the theory:

a. Returns to education will likely fall as more investment takes place mainly because of, first, the law of diminishing returns (as more education is undertaken, the marginal knowledge or skills acquired become smaller, which translates to diminishing incremental earnings as well), and second, the opportunity costs that tend to rise for each additional education acquired.

b. Given increasing opportunity costs, it is expected that younger individuals will likely generate a higher rate of return to education since they have lower forgone earnings. As people age, they acquire experience and maturity that are likely to generate higher "rents" in the labor market, implying higher opportunity costs. This is the reason why most of the schooling investments take place in the early years.

c. As seen from the hypothetical age-earnings profile in Figure 1, the wider the gap between the age-earnings profile between two cost-benefit streams of schooling alternatives, the higher the rate of return accruing to the higher educational level. Thus, in our example, it is predicted that more college

education will take place the wider the earnings differentials between an individual who finished college and one who stopped schooling after high school.

The predictive ability of the theory, however, is definitely not without criticisms. Some have argued that the decision to undertake schooling or to invest in human capital may substantially be based on differing abilities of individuals. Ability bias occurs: those who have innate intelligence, self-discipline, and higher motivation, as well as those who have more family wealth, are more likely to invest in education. Education may also affect earnings not because it results in increased productivity but because it is regarded as a signaling or screening device for prospective employers—that is, possession of a degree opens doors to higher-paying jobs and does not necessarily reflect increased productivity.[4] In the case of ability bias, measured returns may be overstated, while in the case of the screening hypothesis, they will tend to overstate the social rate of return since education may not mirror the increase in the productive capacity of the economy's workers. There are also issues on the causal effect of the education variable on earnings, implying that the endogeneity may cause biased results. Another criticism posits that education should not be viewed purely from an investment viewpoint since it has its consumption value; not all costs are purely investment costs and the conventionally measured return on education may well be understated. Although the debate persists, many of these arguments do not seem to hold much empirical ground.[5]

3. Methodology

This study utilizes the National Statistics Office Labor Force Survey (NSO LFS) for years 1988, 1990, and 1995. The LFS allows for a more detailed observation of earnings and education since each member of the household's schooling and earnings, where they exist, are reported. Unlike the Family Income and Expenditure Survey (FIES), which only reports earnings at the household level and the completed schooling level of the household head, the LFS provides a disaggregated representation of the pattern of earnings and schooling levels of individuals. Rates of return are measured using the October round (for which the earnings data are included) of the LFS for years 1988, 1990, and 1995.

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[4]See the seminal work of Spence [1973] on job signaling; for a survey of the screening hypothesis see Weiss [1995].

[5]Cawley, Heckman, and Vytlacil [1998] examined ability bias and concluded that a rise in the return to ability has no significant contribution to the rise in the return to schooling, and also recent studies using data on twins revealed small ability effects: net ability bias overstates returns only by 6-13 percent or 10 percent on average. See Arias and McMahon's [2001] review of current studies on ability bias using identical twin samples; see also Ashenfelter and Krueger [1994] and Rouse [1998]. The screening hypothesis has its share of skeptics too (see Willis [1986] for a review of the debate), conjecturing initial screening does happen but employers would not keep on rewarding employees if they are not productive throughout their working lifetime [Psacharopoulos and Woodhall 1985].

The main source for the direct and social costs used in the full or elaborate method is Maglen and Manasan [1999].[6] Government expenditures, also found in Maglen and Manasan [1999], are utilized along with the total number of students enrolled to come up with an estimate of costs per student. Secondary data on the education indicators are gathered from the Department of Education, Culture and Sports (DECS) (now Department of Education [DepEd]) and the Commission on Higher Education (CHED).

As discussed earlier, in analysing the marginal effects of education investment choices, the computation of the net present value or internal rate of return can be utilized in assessing profitability between alternatives. NPV is regarded as a superior guide for examining investment options in economic investment appraisal literature while the IRR criterion is inundated with shortcomings that often lead to erroneous ranking or conclusions to the profitability of alternatives. One major flaw with the computation of the IRR is that there could be more than one rate that equates the present value of benefits and costs to zero or, even more disconcerting, it may not exist. An alternative appraisal technique is to use the marginal internal rate of return (MIRR), which measures the IRR for an incremental investment. If the MIRR of, say, project B over project A is greater than the market interest rate (or social opportunity cost of capital in the economic perspective), it pays to invest in project B. As long as MIRR > i, this ensures that the NPV is positive and will be maximum when MIRR = i.[7]

Nevertheless, as Psacharopoulos [1995] points out, "education projects do not typically yield more than one internal rate of return, hence the internal rate of return criterion gives the same answer as the net present value". However, the matter of designing or employing a particular technique for investment appraisal in education is greatly dependent on the availability of data; hence determining the profitability of education investments has been a diverse task, utilizing different methodologies and assumptions.

The methodology of the rate of return analysis in education stems from the works of Gary Becker and Jacob Mincer on human capital investments. The rate of return can be computed from two points of view: private rates of return rationalize people's behavior in seeking education, while social rates of return guide the setting of public investment priorities. Both can invariably help in prioritizing investments in education across different levels or in other qualifying dimensions. The difference between these two types of rate of return basically lies in the computation of the costs. Private rates of return reflect the costs incurred by the individual while social rates of return reflect subsidies expended by the government or the society at large. Since the costs of education are higher from the social point of view, it naturally follows that a social rate of return is lower than a private rate of return. The difference then is attributed to the degree of subsidization of education investments.

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[6]Aside from their own cost estimates, Maglen and Manasan [1999] also cited the 1995 FAPE survey on the annual average direct expenditure of households on education.

[7]See Jenkins and Harberger [1992].

The estimation procedure[8] in determining the profitability of investing in education is dictated heavily by the type of data available. For the study's data set, two methods of estimation are utilized:[9]

3.1. Elaborate or full method

This approach uses detailed age-earnings profiles to solve for the discount rate (r) that equates a stream of discounted benefits to a stream of discounted costs at a given point in time.[10]

$$\sum_{t-1}^{N}(Y_H - Y_S)t(1+r) = \sum_{t-1}^{c}(Y_s)t(1+r)^t$$

In estimating the private rate of return, the benefit side includes the earnings of a graduate of a given educational level, less the earnings of a control group of a graduate of a lower level. The opportunity cost or the forgone earnings while in school plus the direct cost of schooling spent by households constitute the cost side. For the social rate of return, the resource cost of schooling and subsidies are added to the cost side.

It must be noted that primary schoolchildren (aged 6–12) in essence do not forgo earnings during the entire length of their studies, thus an assumption must be made concerning this aspect—in this case Paqueo and Tan's [1989]: the age-earnings equations are not utilized to predict earnings of children below 19 years old.[11] For this study, estimates of the earnings for children 18 years old and below are assumed to be a certain percentage of the earnings of those aged 19. For the 11-12 years-old bracket, it is assumed at 20 percent; for ages 13-16, 50 percent; and for ages 17-18, 75 percent. For sensitivity analysis, forgone earnings of 10 percent for young individuals aged 7-10 are assumed.

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[8]Due to the tricky nature of assigning appropriate weights of culled data set (i.e., retaining only wage and salary workers from the total population using the original survey weights will no longer apply; weights should be recomputed according to the survey design), the estimation procedures are unweighted. Deaton [1997] provides additional argument against weighting in regression for household data survey as he states that "in estimating behavioral models, and if those models are different in different parts of population … weighting is at best useless". See Deaton [1997] for details of arguments for and against weighting using survey data.

[9]This portion is heavily based on the review of the methods in Psacharopoulos [1981, 1995]. These two methods are the most commonly used; see Psacharopoulos [1995] for a review of other cost-benefit analysis techniques in examining the profitability of education investments.

[10]To construct "idealized" age-earnings profile, a regression is first done using the age-earnings function: $Y = a + b^{*} age + c^{*} age^2$ and the obtained parameter estimates are then fitted to the age-earnings equation to predict earnings for given ages and educational levels. Predicted values are then inserted in the original formula to compute for r.

[11]Paqueo and Tan's study does not include individuals below age 19.

3.2. Earnings function (Mincerian method)

This function involves regressing the natural log of earnings (the dependent variable) to the years of schooling and potential years of labor market experience and its square (the independent variables).

$$\ln Y_t = a + b \cdot S_t + c \cdot EX_t + d \cdot EX_t^2$$

where Y = income

S = schooling

EX = labor market experience, measured as age less the number of years of schooling minus 6[12]

The coefficient in the years of schooling (b) may be expressed as the average private rate of return or the relative change in earnings arising from a given change in schooling.[13]

4. Some methodological issues

Of the methods, the "Mincerian"[14] equation has invariably received criticism. For one thing, the function does not account for the direct opportunity cost of human capital investment unlike the full or elaborate method. Despite this, the earnings function is rather popular since it is not as data-hungry as the full method and is relatively easy to undertake. Some general methodological issues, however, have been brought to attention in Psacharopoulos and Patrinos [2002] concerning how researchers use this function: (a) confusion of interpreting the raw coefficients of dummy education variables in the extended earnings function as the returns to that education, whereas these represent the wage effects; and (b) many researchers seem compelled to include in their regression as many independent variables they can glean from their data set, including occupation, which leads to "stealing part of the effect of education on earnings that comes from occupational mobility[15]".

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[12]Information on actual labor market experience is rarely reported in surveys, thus experience in standard economic literature is approximated by age minus the years of schooling minus 6.

[13]Note that the estimate falls short in accounting for the educational level to which this year of schooling refers. This can be remedied by converting the continuous years of schooling variable into a series of dummy variables to account the returns to education at different levels. The private rate of return can then be derived for different levels by comparing adjacent dummy variable coefficients (known as extended earnings function).

[14]Estimating returns using the semi-log earnings function was first done by Becker and Chiswik in 1967, but the development of the methodology was mainly due to Jacob Mincer in 1974 [Schultz 1988].

[15]This caveat on including many independent variables was first put forward by Becker in his 1964.

In utilizing the equation by ordinary regression, biases are bound to occur. For one thing, regressing the earnings function through ordinary least squares (OLS)[16] ignores the self-selectivity problem in the data. A selection bias occurs when the dependent variable is not always observed for each sample but is observed conditionally on a sample selection rule. Thus, when a standard regression technique is utilized for the data set, the estimates yield biased results. Self-selection is predominantly a concern in estimating women's earnings functions, making comparison of rates of return between men and women rather deceptive. Falaris [1995] noted that most studies have ignored this type of problem in women's wage equations especially in most of the estimates of rates of return in low-income countries, implying that these estimates can be fairly misleading. The crux of this type of bias is that earnings will only be observed upon the decision of the individual to work, and the existence of a decision criterion determines whether the individual will participate in the labor market (and thus earn wages) or not. As the human capital theory hypothesizes, an individual will make the additional investment depending on the length of time the individual spends at work to recoup and gain from the investment. Women in general work fewer years than men and are frequently in and out of the labor market primarily because of the roles they play in household production and in rearing children. Studies on the determinants of labor force participation and earnings of women that were reviewed identify variables such as schooling, husband's wage, household characteristics (such as the number of young children present in the home and household income) as those affecting the decision of women to work for the market[17]. One relatively unique pattern of labor market participation of women in the Philippines, as noted by Alonzo, Horton, and Nayar [1996], is the extended family arrangement that offers the household the presence of older women to help rear children. This type of household structure gives younger women fairly constant labor market participation over the years.

In sum, what is observed in the data sets are the ex-post conditions, which imply that the estimates derived from a simple regression come from a restricted (censored), nonrandom population,[18] and further suggest departures from the

[16]A more selective approach to measuring returns uses instrumental variables (IV) to focus on the issue of the causality between schooling and earnings but is reviewed in the literature to have made little difference on the returns to education.

[17] King [1990] for Peruvian women and Falaris [1995] in estimating selectivity-corrected rate of returns to schooling for women in Venezuela.

[18]What was discussed is the self-selection problem in labor market participation. Another variant of the bias is accented in Roy's classic study of self-selection in 1951, wherein an individual will self-select between two professions, hunting and fishing, based on his productivity in each. Therefore, the observed distribution of income of the hunter and that of the fisherman are determined by these choices (see Maddala [1983] for a discussion). This is a type of "ability bias" stemming from the fact that individuals will self-select occupations in which they have comparative advantage. As put by Rosen and Willis [1979] in modeling the demand for college education, an individual will choose the classification (in this case, level of schooling) that maximizes the present value of benefits and thus those that amass larger net benefits in a particular class have a higher probability of being

distributional assumptions that make the OLS estimates the best linear unbiased estimates. The self-selection problem is very common in economics, and a variety of econometric methods have been developed in response to it. Among the most popular was developed by James Heckman who treated the self-selection problem as a specification error in the form of an omitted variable. Applying to a model of female labor supply consisting of two equations—a wage equation and the hours equation—it can be shown that the dependent variable in the wage equation will only be observed when the selection equation (hours equation) is greater than zero:[19]

Wage equation $y_j = x_j\beta + \upsilon_{1j}$ will be observed only if

hours equation $z_j^* = w_j\gamma + \upsilon_{2j} > 0$ where $corr(\mu_1, \mu_2) = \rho$

The selection equation determines the number of hours that women desire to spend working in the labor market, and this is determined by characteristics such as the number of small children in the household, marital status, etc. The first equation, specifying the wages of women, depends on the difference between the market wage she commands in the labor market and her reservation wage. And the degree of difference greatly depends on individual characteristics such as age and schooling as well as the number of children and where the person lives. Wage will not be observed if a woman's personal reservation wage is higher than that offered in the market. Even if the woman is offered a higher wage in the market, she may choose not to work because her competency is more rewarded in home production. Since $\rho \neq 0$ (error terms are correlated), estimating the wage equation will give inconsistent estimates and the underlying relationship from the two equations can be viewed as an omitted variable. Heckman uses the variable λ (known also as the inverse of the Mill's ratio) representing the probability that the individual is included in the sample with observed wages. When this term is included in the estimation of our dependent variable, we can produce consistent estimates; otherwise, a misspecification is committed. The Heckman selectivity correction model can be estimated by the maximum likelihood (ML) method. The procedure may be quite unwieldy, thus Heckman later introduced a two-step estimation where the first step uses a probit ML procedure to estimate λ, as a function of observable variables that are assumed to strongly affect the chances of the earnings variable to be observed. This will later be used in the second step of Heckman's procedure as an independent variable in the wrongly specified OLS to correct for the self-selectivity bias. It should be noted that the result of the procedure is the estimated earnings function as though all earnings are observed for each individual. For this study, the estimation procedure used is

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observed in it. The implication of this possibility is that estimated rates of return will tend to overstate the earnings gained by an individual since individuals that have high ability are relatively more schooled than those characterized to be of low ability. We do not observe ability but earnings and data sets rarely provide measures that can characterize ability, although attempts have been made to determine the extent to which this type of bias affects estimates of returns to education.

[19]This discussion is based on Greene [1994] and StataCorp [1999].

the ML method rather than the two-step method[20] since there have been issues on the efficiency of its estimates.

Another commonly disregarded issue is based on the fact that earnings depend on wage rates and hours of work. Schultz [1988] mentions that individuals with different levels of schooling may choose to work for different numbers of hours, implying that interpretations of rates of return will differ between what unit of measure (annual earnings or wage rates) is used. Though the choice is usually done arbitrarily, this issue deals with adjustments in labor supply and may be important in low-income countries [Schultz 1988]. Controlling for such factors, data on wage rates (annual earnings divided by hours worked) are said to be most relevant because they approximate the welfare benefits from schooling, especially for youths and married women whose participation in the labor market are relatively erratic. Wage rates, however, are often hard to get, and one crude way of controlling for work hours is to focus on estimating returns of full-time year-round workers [Ehrenberg and Smith 2000]. For the data set, two estimates are done, one using the natural log of total earnings and the other the natural log of earnings per hour as the dependent variable.

5. Review of past estimates of rates of return to education in the Philippines

For the past decades, a plethora of estimates have become available for different countries, making it possible to observe general patterns and infer comparisons. Psacharopoulos [1981; 1993; 2002 (with Patrinos)] has largely done the compilations of rate of return estimates and a survey of the patterns from the vast 40-year history of returns estimates generally confers that (a) rates of returns are highest for primary education especially in low-income countries; (b) countries with higher per capita income manifest lower private and social rates of return, depicting diminishing returns to human capital formation by level of development; (c) overall, women's rates of return to schooling are higher than those of men, although women's estimated returns are lower for primary education than those for men but opposite at the secondary level; and (d) private returns are higher than social returns, especially in higher education.

It must be noted, however, that computed social returns are grossly understated simply because the positive externalities that affect society are not captured in the earnings of individuals. Therefore it is possible that social returns may be as high as or even exceed those of the computed private returns. Mingat and Tan [1996] attempt to estimate the "full" economic returns to education using 1960-1985 economic performance of countries and find that the returns are greatly sensitive to the level of the countries' economic development. Their results show that expanding primary education greatly benefits low-income countries while middle-income countries benefit more in expanding secondary education and high-income countries best benefit in investing in higher education.

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[20]See Wales and Woodland [1980].

As mentioned earlier, the rate of return for the Philippines is more comparable to that of a more developed country (see Table 1). Given an educational system with high enrollment rates, this should not come as a surprise. Noting the low estimates of returns to secondary and higher education, Alonzo [1995] qualifies that the Philippine constitution gives the responsibility to the government to ensure the provision of secondary education for all, thus the low rates of return and higher education estimates are understated since survey estimates do not take into account individuals who work abroad who earn relatively more and who, incidentally, are more likely to decide to undertake more education that affords them the chance of working overseas. As evident in Table 2, results of the various studies done throughout the years confirm the low estimates of return to education for the Philippines. One should be cautious in concluding on the trend of the returns over time since these studies have utilized varied data sets and cost estimates. The first four studies are reviewed in Paqueo and Tan [1989] and some critical methodological issues are highlighted in the notes at the bottom of the table.

Paqueo and Tan's [1989] study utilizes only the FIES household samples whose head is the sole working member. The premise for this qualification is to ensure the strong link between education and earnings because the survey reports only the educational attainment of the household head while the reported income represents the aggregate income for the whole household. This, however, may inaccurately represent the true pattern of education and earnings and may underrepresent particularly the younger cohorts in the labor force who, given the extended family structure of an average Filipino household, typically live with their parents.

Table 1. Comparative returns to investment by level (percent), full method

	Social returns			*Private returns*		
Country/Region	*Primary*	*Secondary*	*Higher*	*Primary*	*Secondary*	*Higher*
Philippines (1988)	13.3	8.9	10.5	18.3	10.5	11.6
Asia	16.2	11.1	11.0	20.0	15.8	18.2
Sub-Saharan Africa	25.4	18.4	11.3	37.6	24.6	27.8
Europe/M. East/N. Africa*	15.6	9.7	9.9	13.8	13.6	18.8
OECD	8.5	9.4	8.5	13.4	11.3	11.6
Low income	21.3	15.7	11.2	25.8	19.9	26.0
Middle income	18.8	12.9	11.3	27.4	18.0	19.3
High income	13.4	10.3	9.5	25.6	12.2	12.4

*Non-OECD

Source: Psacharopoulos and Patrinos [2002].

Table 2. Previous estimates of rates of return, full method

	Social returns			*Private returns*			
Year	*Primary*	*Secondary*	*Higher*	*Primary*	*Secondary*	*Higher*	*Source*
1966	8.0	21.0	11.0	9.0	29.0	12.0	Williamson and DeVoretz[a]
1971	6.5	6.0	7.0	8.0	6.0	8.0	ILO[b]
1977			8.5			16.0	Dumlao & Arcelo
1985		16-20			22.0		Laya[c]
1985	11.9	12.9	13.3	18.2	13.8	14.0	Tan & Paqueo[d]
1988	13.3	8.9	10.5	18.3	10.5	11.6	Hossain & Psacharopoulos

Sources: Paqueo and Tan [1989]; see also Orbeta [2001: Table 22].

Notes: a. Estimates are for public education; data set from survey of two urban areas near Manila.

b. 1971 Family Income and Expenditure Survey; direct public costs from the Presidential Commission to Survey Philippine Education; out-of-pocket costs from author's personal observation and discussion with parents.

c. Calculations do not account for forgone income based on the argument that primary school graduates were depressed at the time; estimates are probably overestimated.

d. 1985 Family Income and Expenditure Survey, considered only household in which the head is the sole working member; also for 1971 ILO estimates.

Comparative earnings function estimates are given in Table 3, while returns to education estimates for the Philippines from the earnings function is summarized in Table 4.

The latest estimate from Schady [2001] arbitrarily limits the sample to the male population of the 1998 Annual Poverty Indicator Survey to get around the selection problem in the labor market, which is essentially more established in the estimation of returns for women. The author uses spline functions and semi-parametric regressions (not the prototype Mincerian function) to capture "sheepskin effects".[21] Though the reported coefficient may not be comparable to the rest of the previous estimates in Table 3 it is still interesting to note the result from the spline function: the smallest coefficient has resulted for primary education, slightly higher for secondary education, and much larger for tertiary education. The author found significant sheepskin effects, especially in the last year of schooling.[22]

Table 3. Coefficient on years of schooling (earnings function)

Country/Region	*Mean years of schooling* (%)	*Coefficient* (%)
Philippines (1988)	9.0	8.0
Asia*	8.4	9.9
Sub-Saharan Africa	7.3	11.7
Europe/M. East/N. Africa*	8.8	7.1
OECD	9.0	7.5
Low income	7.6	10.9
Middle income	8.2	10.7
High income	9.4	7.4

*Non-OECD

Sources: Psacharopoulos and Patrinos [2002]; Philippine estimate: Psacharopoulos [1993].

Table 4. Previous estimates of coefficient of schooling (earnings function)

Year	*Coefficient of schooling* (%)	*Source*
1982	8.0	Paqueo and Tan
1985	8.1	Paque and Tan
1988	8.0	Hossain and Psacharopoulos
1994	7.3	Malluccio
1998	12.6*	Schady

* Male population only.

Sources: Psacharopoulos [1993]; Psacharopoulos and Patrinos [2002].

[21]Sheepskin pertains to the material used for diplomas; sheepskin effect is analogous to the signaling theory.

[22]Schady used the 1998 survey which may not be a representative year as this was when the asian financial crisis occurred. Moreover, the El Niño phenomenon affected signifi-

6. Results and discussions

The sample data for 1988 consists of 16,763 wage and salary workers aged 19-65; 64 percent of the total sample are males. Individuals with no elementary education made up the group with the smallest number, represented with 226 individuals; only 96 are females. Secondary graduates are highly represented (22 percent) followed by college and elementary graduates. By age group, the 25-34 bracket represents 34 percent of both male and female samples; almost the same pattern can be seen for succeeding survey years. By area, urban dwellers are highly represented, majority of whom are secondary graduates. Elementary graduates, on the other hand, are most represented for the rural data set.

For the 1990 data set, the sample size is 17,348, with the composition of males relatively the same as in the previous years. Individuals with college degrees are most represented in the sample (23 percent); close second are secondary graduates (22 percent). For urban-rural data sets, males still dominate the sample while college graduates are most represented in the urban areas while in the rural areas, elementary graduates are the majority.

In 1995, the sample totaled 22,122; males comprise the majority (63 percent). Secondary graduates are most represented overall, and particularly for males. College graduates, however, are mostly females. Urban dwellers comprise 72 percent of the sample size; majority are secondary graduates (26 percent). For rural dwellers, elementary graduates are most represented (23 percent).

6.1. Earnings and schooling differentials

A summary of the third quarter mean earnings, in 1995 prices, of the sample data set is given in Table 5. In absolute terms, earnings have generally increased a little above 1 percent in the last eight years. Within the same time frame, male earnings have increased only by 1 percent compared to female mean earnings, which grew higher than the average growth rate for all salary and wage workers. Notably, male wage and salary earners experience a decrease in real earnings in the last five years unlike their female counterparts. The narrowing of earning differentials between gender holds true also for urban and rural employees. Earning differentials between urban and rural workers, however, have been increasing over time.

Relative earnings of individuals by level of education attained is shown in Table 6. Earning differentials, with respect to those who have graduated from elementary, have been gradually decreasing, except for college degree holders. The decreasing trend is consistent with the increasing educational attainment of the workforce through the years.[23] For males, however, earning differentials have increased (although not substantially) for those who have at least secondary schooling. For

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cantly the country's economy. These exogenous shocks, however, are difficult to delineate from each other (see Datt and Hoogeven [2000]; Reyes et al. [1999]).

[23]Orbeta [2001] reports that the proportion of high school graduates in the labor force increased from 32 percent in 1985 to 41 percent in 1995. This proportion has doubled in the last 25 years (1976-2000).

females, on the other hand, differentials have decreased for individuals with post-secondary education during the eight-year period, although college degree holders' earnings with respect to elementary graduates increased in the last five years. For comparisons within urban and rural areas, as reported in Tables 7a and 7b, earning differentials for college degree holders (with respect to elementary graduates) have been decreasing in urban areas during the eight-year period. In rural areas, however, the trend is increasing except for females.

Table 5. Earnings differentials sample set salary and wage workers, ages 19-65

	Mean earnings (P) (1995 prices)			*Growth rate* (%)	
	1988	1990	1995	1988-95	1990-95
All	9,685.92	10,674.09	10,638.00	1.34	(0.07)
Male	10,382.78	11,261.37	11,102.92	0.96	(0.28)
Female	8,462.42	9,700.49	9,860.46	2.18	0.33
Male/Female Earnings Ratio	1.23	1.16	1.13	(1.23)	(0.61)
Urban	11,223.30	12,269.77	11,971.73	0.92	(0.49)
Male	12,187.30	13,150.88	12,598.77	0.47	(0.86)
Female	9,680.67	10,954.29	10,972.52	1.79	0.03
Male/Female Earnings Ratio	1.26	1.20	1.15	(1.32)	(0.89)
Rural	7,088.00	7,892.51	7,144.36	0.11	(1.99)
Male	7,597.58	8,304.61	7,430.69	(0.32)	(2.22)
Female	6,035.47	7,066.59	6,599.30	1.28	(1.37)
Male/Female Earnings Ratio	1.26	1.18	1.13	(1.59)	(0.86)
Urban/Rural Earnings Ratio	1.58	1.55	1.68	0.81	1.50
Male Urban/Rural Earnings Ratio	1.60	1.58	1.70	0.79	1.37
Female Urban/Rural Earnings Ratio	1.60	1.55	1.66	0.51	1.40

Table 6. Earnings differentials by schooling level sample set salary and wage workers, ages 19-65

	Mean earnings (P) (1995 prices)			*Growth rate* (%)	
	1988	1990	1995	1988-95	1990-95
All					
No Grade	3,392.27	3,681.87	3,491.08	0.41	-1.06
Some Elementary	4,877.39	5,181.05	4,988.13	0.32	-0.76
Elementary Graduate	6,203.48	6,714.57	6,643.25	0.98	-0.21
Some Secondary	7,999.87	7,246.36	7,424.45	-1.07	0.49
Secondary Graduate	8,523.48	9,171.42	8,942.00	0.68	-0.51
Some College	11,076.03	11,704.02	11,779.24	0.88	0.13
College Graduate	16,394.37	18,182.02	19,099.14	2.18	0.98
Earnings by Level Index (Elem Grad=100)					
No Grade	54.68	54.83	52.55	-0.57	-0.85
Some Elementary	78.62	77.16	75.09	-0.66	-0.55
Elementary Graduate	100.00	100.00	100.00	0.00	0.00
Some Secondary	128.96	107.92	111.76	-2.04	0.70
Secondary Graduate	137.40	136.59	134.60	-0.29	-0.29
Some College	178.55	174.31	177.31	-0.10	0.34
College Graduate	264.28	270.78	287.50	1.20	1.20
Male					
No Grade	4,263.79	4,296.93	3,833.85	-1.52	-2.28
Some Elementary	5,592.25	6,036.22	5,376.07	-0.56	-2.32
Elementary Graduate	7,364.89	7,836.29	7,244.78	-0.23	-1.57
Some Secondary	8,918.79	8,176.14	7,861.26	-1.80	-0.79
Secondary Graduate	9,503.73	10,122.10	9,562.38	0.09	-1.14
Some College	11,985.82	12,376.86	12,243.08	0.30	-0.22
College Graduate	19,806.05	22,192.01	19,932.27	0.09	-2.15

Table 6. Earnings differentials by schooling level sample set salary and wage workers, ages 19-65 (continued)

	Mean earnings (P) (1995 prices)			*Growth rate* (%)	
	1988	1990	1995	1988-95	1990-95
Earnings by Level Index, Male (Elem Grad=100)					
No Grade	57.89	54.83	52.92	-1.28	-0.71
Some Elementary	75.93	77.03	74.21	-0.33	-0.75
Elementary Graduate	100.00	100.00	100.00	0.00	0.00
Some Secondary	121.10	104.34	108.51	-1.57	0.78
Secondary Graduate	129.04	129.17	131.99	0.32	0.43
Some College	162.74	157.94	168.99	0.54	1.35
College Graduate	268.93	283.20	275.13	0.33	-0.58
Female					
No Grade	2,212.08	2,951.04	2,522.19	1.87	-3.14
Some Elementary	3,279.31	3,255.20	3,007.78	-1.23	-1.58
Elementary Graduate	3,766.27	4,507.03	4,212.01	1.60	-1.35
Some Secondary	5,464.77	4,670.84	5,053.52	-1.12	1.57
Secondary Graduate	6,089.66	6,823.31	6,977.41	1.94	0.45
Some College	9,111.63	10,403.75	9,526.88	0.64	-1.76
College Graduate	13,928.89	15,348.07	15,013.85	1.07	-0.44
Earnings by Level Index, Female (Elem Grad=100)					
No Grade	58.73	65.48	59.88	0.28	-1.79
Some Elementary	87.07	72.22	71.41	-2.83	-0.23
Elementary Graduate	100.00	100.00	100.00	0.00	0.00
Some Secondary	145.10	103.63	119.98	-2.72	2.93
Secondary Graduate	161.69	151.39	165.66	0.35	1.80
Some College	241.93	230.83	226.18	-0.96	-0.41
College Graduate	369.83	340.54	356.45	-0.53	0.91

Table 7a. Earnings differentials by schooling level, urban sample set salary and wage workers, ages 19-65

	Earnings Index (*Elem Graduate* = 100)			*Growth rate* (%)	
	1988	1990	1995	1988-95	1990-95
All, Urban					
No Grade	64.90	67.18	50.70	-3.53	-5.63
Some Elementary	84.12	77.62	79.76	-0.76	0.54
Elementary Graduate	100.00	100.00	100.00	0.00	0.00
Some Secondary	133.67	102.99	111.87	-2.54	1.65
Secondary Graduate	129.39	127.84	127.81	-0.18	0.00
Some College	168.85	164.11	166.59	-0.19	0.30
College Graduate	254.07	257.60	242.79	-0.65	-1.18
Male					
No Grade	68.70	71.55	54.14	-3.40	-5.58
Some Elementary	78.41	77.62	80.92	0.45	0.83
Elementary Graduate	100.00	100.00	100.00	0.00	0.00
Some Secondary	124.50	100.53	108.24	-2.00	1.48
Secondary Graduate	121.10	120.61	123.04	0.23	0.40
Some College	152.36	146.01	158.44	0.56	1.63
College Graduate	258.06	267.31	250.84	-0.40	-1.27
Female					
No Grade	62.20	76.66	53.57	-2.13	-7.17
Some Elementary	99.13	73.86	75.35	-3.92	0.40
Elementary Graduate	100.00	100.00	100.00	0.00	0.00
Some Secondary	144.81	92.94	120.05	-2.68	5.12
Secondary Graduate	145.11	135.48	146.75	0.16	1.60
Some College	214.42	208.88	205.06	-0.64	-0.37
College Graduate	325.18	297.42	308.57	-0.75	0.74

Table 7b. Earnings differentials by schooling level, rural sample set salary and wage workers, ages 19-65

	Earnings Index (*Elem Graduate* = 100)			*Growth rate* (%)	
	1988	1990	1995	1988-95	1990-95
All					
No Grade	54.07	52.80	59.17	1.29	2.28
Some Elementary	78.46	80.42	75.70	-0.51	-1.21
Elementary Graduate	100.00	100.00	100.00	0.00	0.00
Some Secondary	108.94	108.84	104.23	-0.63	-0.87
Secondary Graduate	137.09	136.17	140.78	0.38	0.67
Some College	169.75	163.32	164.50	-0.45	0.14
College Graduate	239.11	245.56	271.22	1.80	1.99
Male					
No Grade	56.68	53.30	58.59	0.47	1.89
Some Elementary	77.48	79.74	74.40	-0.58	-1.39
Elementary Graduate	100.00	100.00	100.00	0.00	0.00
Some Secondary	103.67	102.60	101.45	-0.31	-0.23
Secondary Graduate	128.05	128.21	131.96	0.43	0.58
Some College	155.30	154.88	156.02	0.07	0.15
College Graduate	225.71	242.23	270.20	2.57	2.19
Female					
No Grade	69.50	67.38	72.91	0.68	1.58
Some Elementary	87.45	79.40	72.60	-2.66	-1.79
Elementary Graduate	100.00	100.00	100.00	0.00	0.00
Some Secondary	120.57	116.41	105.30	-1.93	-2.01
Secondary Graduate	163.09	151.58	176.13	1.10	3.00
Some College	260.55	216.05	211.47	-2.98	-0.43
College Graduate	425.28	396.56	392.56	-1.14	-0.20

As for mean schooling years by gender, women gained more education than their male counterparts, and there seems to be little evidence that the schooling gap will narrow in the future.

6.2. Full or elaborate method

As mentioned earlier, the earnings of an individual are influenced by wage rates and hours of work. To control for hours of work, this study focused on wage and salary workers rather than specify the dependent variable in earnings per hour. This also makes earnings compatible with the cost estimates used which are

annually based. The sample is limited to individuals aged 19-65 so as to assign predicted earnings for those at the age of 18 and below using Paqueo and Tan's [1989] assumptions. The first set of rates of return reported are for those who have completed the prescribed education cycle at each level. The returns are read as relative to the adjacent lower level; for example, the first column shows the rate of return to schooling of elementary graduates versus those who have no years of schooling (no grade), while the second column indicates returns for secondary education graduates vs. elementary graduates, etc. The cost estimates used are shown in Tables 9 and 10. The original FAPE estimates of direct costs include board and lodging and uniform costs—these cost items were taken out as Maglen and Manasan [1999] observe, most Filipino students live at home throughout their studies and children will inadvertently go to school even without a uniform. Enrollment data for each corresponding year and educational institutions (public and private) are used to produce per unit and weighted cost estimates. The social cost estimates (Table 10) are derived from Manasan and Maglen's table on the total expenditure on education. Social costs include those shouldered by the government, educational institutions, and households.

Table 8. Schooling differentials sample set salary and wage workers, ages 19-65

	Mean years of schooling			*Growth rate* (%)	
	1988	1990	1995	1988-95	1990-95
All	9.32	9.58	9.63	0.47	0.10
Male	8.93	9.13	9.17	0.38	0.09
Female	10.01	10.33	10.4	0.55	0.14
Male/Female Schooling Ratio	0.89	0.88	0.88	(0.17)	(0.05)
Urban	10.17	10.36	10.19	0.03	(0.33)
Male	9.83	10.03	9.77	(0.09)	(0.53)
Female	10.72	10.87	10.87	0.20	-
Male/Female Schooling Ratio	0.92	0.92	0.90	(0.29)	(0.53)
Rural	7.89	8.2	8.16	0.48	(0.10)
Male	7.54	7.71	7.72	0.34	0.03
Female	8.61	9.18	9.01	0.65	(0.37)
Male/Female Schooling Ratio	0.88	0.84	0.86	(0.31)	0.40
Urban/Rural Schooling Ratio	1.29	1.26	1.25	(0.45)	(0.23)
Male Urban/Rural Schooling Ratio	1.30	1.30	1.27	(0.42)	(0.55)
Female Urban/Rural Schooling Ratio	1.25	1.18	1.21	(0.45)	0.37

Table 9. Private direct cost by level of education

		1988	
Level	*Public*	*Private*	*Weighted*
Cost Estimate 1 (FAPE) Per Student			
Elementary	1,339.27	5,864.89	1,656.06
Secondary	1,693.25	4,398.54	2,694.21
Tertiary	4,354.81	8,576.36	7,943.13
Cost Estimate 2 (Maglen & Manasan) Per Student			
Elementary	398.06	3,057.30	584.21
Secondary	892.62	2,388.42	1,446.07
Tertiary	2,037.52	4,251.71	3,919.58

		1990	
Level	*Public*	*Private*	*Weighted*
Cost Estimate 1 (FAPE) Per Student			
Elementary	1,715.75	7,513.57	2,121.60
Secondary	2,169.24	5,635.02	3,416.92
Tertiary	5,578.99	10,987.26	10,176.02
Cost Estimate 2 (Maglen & Manasan) Per Student			
Elementary	509.96	3,916.73	748.43
Secondary	1,143.55	3,059.83	1,833.41
Tertiary	2,610.29	5,446.91	5,021.41

		1995	
Level	*Public*	*Private*	*Weighted*
Cost Estimate 1 (FAPE) Per Student			
Elementary	2,814.02	12,323.10	3,479.66
Secondary	3,557.80	9,242.06	5,319.92
Tertiary	9,150.16	18,020.33	15,980.19
Cost Estimate 2 (Maglen & Manasan) Per Student			
Elementary	1,201.29	7,803.16	1,663.42
Secondary	1,942.64	6,208.58	3,265.08
Tertiary	5,621.25	11,586.11	10,214.19

Source: Basic data for cost estimate 1 from FAPE 1995, as cited in Table 2.27, Maglen and Manasan [1999]; cost estimate 2 from Table B.4, Annex B, Maglen and Manasan [1999].

Note: Prices adjusted using CPI.

Table 10. Total expenditure by level of education, per student

Level	*1988*	*1990*	*1995*
Elementary	1,772.19	2,633.56	4,207.97
Secondary	1,669.25	2,480.58	4,385.52
Tertiary	4,390.51	6,524.51	10,746.52

Source: Basic data from Maglen and Manasan [1999], Table B.6, Annex B Note: Prices adjusted using Social Services Education Implicit Price Index

6.2.1. Private rates of return

Table 11a and the first portion of Table 11b show the private rates of return for the complete cycle of schooling.[24] Estimates in Table 11 show that, in general, the private returns have more or less increased during the eight-year period, although not drastically. The second table shows that the general trend is toward decreasing rates of return (although overall, elementary returns increased in the eight-year interval but decreased within the last five years; the same goes for males' elementary and college returns), with the exception of the overall college education returns. Secondary and tertiary rates of return, however, are relatively stable over time.

Table 11a is more consistent with previously estimated elementary rates of return, although this result is likely to be overstated as the FAPE cost survey includes well-to-do families who choose not to send their children to public elementary schools.[25] Higher private returns associated with elementary graduates in Table 11b, on the other hand, are due to the lower cost estimates used. These differences show the sensitivity of the rates of return estimates on the cost estimates used—perhaps as much as the assumptions on the forgone earnings for young cohorts (see results in brackets). The general outcome of the trend of the estimates can substantially differ.

For both tables, however, elementary education exhibits the greatest return while secondary education yields the lowest. Interestingly, educational returns for elementary education for men are higher relative to women but education returns for secondary education is higher for women relative to men.

6.2.2. Social rates of return

The middle part of Table 11b summarizes the results on social rates of return. Results are somewhat mixed but in general, secondary education social rate of returns have declined over the eight-year period along with female elementary returns. Higher education yields the most socially profitable venture followed by elementary education. This trend is consistent with the previous estimates of rates of return, and this behavior is characteristic of more developed countries. Again, the

[24]Complete cycle refers to six years of elementary education and four years each of secondary and tertiary schooling. To be discussed later, incomplete cycles refer to those who have fewer years of schooling at each level.

[25]See Maglen and Manasan [1999] regarding the details of the FAPE cost survey.

pattern for elementary and secondary education between genders is evident. College education returns are relatively comparable between the women and men.

6.2.3. Degree of subsidization

The extent to which society is subsidizing educational investments can be computed as the percentage difference between private and social returns. Table 11b shows that the subsidy is greatest in the elementary level and lowest in the tertiary level, implying tertiary education is primarily encouraged to be shouldered privately. Note, however, that the figures have decreased for elementary and college levels, and figures are relatively stable for the secondary level in the last five years.

Table 11a. Private rate of return estimates, full method, complete cycle salary and wage workers, direct cost from FAPE

	Both Sexes			
Year	*Elementary Grad vs. No Grade*		*Secondary Grad vs. Elementary Grad*	*College Grad vs. Secondary Grad*
1988	13.9	(12.5)	13.2	11.8
1990	16.9	(15.1)	12.5	12.8
1995	17.1	(15.3)	12.8	14.0
	Male			
Year	*Elementary Grad vs. No Grade*		*Secondary Grad vs. Elementary Grad*	*College Grad vs. Secondary Grad*
1988	14.2	(12.7)	11.3	12.8
1990	20.2	(18.1)	10.3	15.0
1995	18.7	(16.8)	11.4	15.7
	Female			
Year	*Elementary Grad vs. No Grade*		*Secondary Grad vs. Elementary Grad*	*College Grad vs. Secondary Grad*
1988	14.4	(13.3)	14.2	13.9
1990	11.5	(10.1)	13.3	14.2
1995	12.6	(11.1)	13.0	14.8

Note: Values in ( ) assume that 10 percent of the earnings of age 19 are forgone by ages 7-10 for sensitivity analysis.

Table 11b. Rate of return estimates, full method, complete cycle salary and wage workers, direct cost from Maglen and Manasan

Year	*Both Sexes*				*Male*				*Female*			
	Elementary grad vs. no grade		*Secondary grad vs. elementary grad*	*College grad vs. secondary grad*	*Elementary grad vs. no grade*		*Secondary grad vs. elementary grad*	*College grad vs. secondary grad*	*Elementary grad vs. no grade*		*Secondary grad vs. elementary grad*	*College grad vs. secondary grad*
PRIVATE RETURNS												
1988	21.6	(17.5)	15.3	14.6	21.6	(17.3)	13.0	15.3	25.3	(21.3)	16.7	17.7
1990	27.0	(21.3)	14.3	15.5	32.2	(25.6)	11.6	18.1	19.6	(15.2)	15.5	17.7
1995	24.0	(19.9)	14.3	15.8	26.2	(21.9)	12.7	17.6	18.4	(14.9)	14.6	17.0
SOCIAL RETURNS												
1988	13.3	(12.5)	14.9	14.2	13.8	(12.7)	12.7	14.9	13.8	(13.1)	16.2	17.2
1990	15.1	(14.1)	13.5	14.6	18.1	(16.9)	11.0	17.1	10.1	(9.3)	14.5	16.5
1995	15.5	(14.1)	13.5	15.6	17.0	(15.5)	11.9	17.4	11.4	(10.1)	13.7	16.8
DEGREE OF SUBSIDIZATION												
1988	62.4	(40.0)	2.7	2.8	56.5	(36.2)	2.4	2.7	83.3	(62.6)	3.1	2.9
1990	78.8	(51.1)	5.9	6.2	77.9	(51.5)	5.5	5.8	94.1	(63.4)	6.9	7.3
1995	54.8	(41.1)	5.9	1.3	54.1	(41.3)	6.7	1.1	61.4	(47.5)	6.6	1.2

Note: Values in ( ) assume that 10% of the earnings of age 19 are forgone by ages 7-10 for sensitivity analysis.

6.2.4. Incomplete cycle

Examining the differences in returns between those who have dropped out versus those who finished the required amount of schooling for each education level can prove insightful in determining incentives to completion or in acquiring a degree. From the point of view of the individual, completion is highly rewarded as evident in the high rates of return for elementary, secondary, and college graduates versus those who acquired only partial years of schooling at each level (see Table 12a and the first portion of Table 12b). These results indicates that acquiring higher human capital (as compared to obtaining only some) is highly rewarded in the labor market. Or, if we are to take the signaling hypothesis stance, obtaining a degree (or completing schooling) matters in getting a high-paying job. Of course, one explanation for low returns to schooling for nongraduates is that individuals who dropped out of school are likely to be poor. This implies that the cause of their dropping out is not associated with the low returns but rather dropping out per se. The strongest evidence supporting this explanation are the cost estimates for tertiary education. As Orbeta [2001] remarked in comparing the FAPE 1995 survey and the FIES 1994 household expenditure pattern cited in Maglen and Manasan [1999], "even if a family only sends one college student to school, it appears that only households from the 7th income decile can pay for tuition in private schools". Orbeta also notes that school attendance patterns in education between 1988 and 2000 shows that school attendance among children in higher income groups rises at the secondary and tertiary levels but is relatively less unequal at the elementary level.[26]

6.3. Earnings function

Schooling coefficients derived from the earnings function are shown in Table 13.[27] Two dependent variables are used to determine the returns to education (the schooling coefficient in the regression equation expressed in percent): the total earnings per quarter and the quarterly total earnings per hour. Heckman estimates are done for the women samples with the following selection variables: years of schooling, age, marital status, and a dummy for class of worker other than salary and wage workers.[28]

Rates of return commonly exhibit a declining pattern in the last five years but increasing for the eight-year-period comparison. Rates of return for males in general and for individuals in rural areas are increasing (with the exception on the second regression equation, which controls for hours worked). The increasing trend may not be surprising since male attendance rates in schooling have been decreasing for the period 1988-2000 because of better employment opportunities afforded to

[26]Less unequal at the elementary level because of the following: (a) attendance at this level is nearly universal, and (b) elementary education is publicly provided.

[27]The sample data set for the Heckman estimates for women excludes students, disabled, and pensioners since these individuals typically do not participate in the labor force.

[28]This includes own-account workers (who typically are not obliged to disclose their earnings or have seasonal working patterns) and unpaid family workers.

males compared to their female counterparts [Orbeta 2001]. Curiously, however, women's schooling coefficient is higher than that of men despite higher schooling years for women. Perhaps this reflects lower forgone earnings for females relative to males, which therefore translates to higher computed rates of returns. However, female workers still receive only a fraction of what the labor market pays their male counterparts although gender earnings differentials have been narrowing over time. This can be explained partly by the degree of wage discrimination in the workplace against female workers.[29] Nevertheless, the high returns for women suggest that schooling affords women higher benefits despite the fact that they still earn less in the labor market than men.

Selectivity-bias estimates tend to depress the estimated coefficients, but it is still difficult to generalize the direction this bias will take given additional selection variables. If selectivity-corrected estimates downplay the conventional estimates and will continue to do so if additional selection variables are fitted, then the resulting estimated returns for women will be lower than those for males. This is understandable since the benefits of education for women may not be directly reflected in increased labor market earnings but may be reflected in the increase of nonmarket productivity.[30]

By area, the first regression (where the dependent variable is total earnings per quarter) shows individuals from urban areas have lower returns compared to those from rural areas. But in the second regression (earnings/hour as dependent variable), the trend is reversed. These results perhaps reflect the higher amount of time urban dwellers spent in the labor market which translates to more earnings.

Comparing results between the earnings function and elaborate method estimates, private returns estimate of the elaborate method are generally higher because the estimation procedure for the earnings function neglects direct costs of schooling and only forgone earnings are taken into account.

7. Conclusion and policy implications

Rates-of-return estimates in general were relatively stable; mostly increasing between 1988 and 1990, but fell in 1995. High or stable returns when educational attainment is increasing suggests that the demand for educated workers has by and large kept pace with the increased supply generated by educational expansion and such demand may be in part due to technological expansion, which favors more highly skilled workers.[31]

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[29]See Alba [2001]; Alonzo, Horton, and Nayar [1996].

[30]Although there is also a tendency for women who obtained high levels of education to allocate more of their time to participate in the labor market.

[31]See Psacharapoulos and Woodhall [1985].

Table 12a. Private rate of return estimates, full method, with incomplete cycle salary and wage workers, direct cost from FAPE

				Both Sexes			
Year	*Some Elementary vs. no grade*	*Elementary grad vs. some elementary*	*Some secondary vs. elementary grad*	*Secondary grad vs. some secondary*	*Some college vs. secondary grad*	*College vs. some college*	*Some elementary vs. no grade*
1988	12.5	16.3	12.0	16.3	10.0	14.7	10.1
1990	16.5	17.6	6.6	25.2	8.8	17.6	20.4
1995	14.7	22.6	8.3	21.2	8.8	20.8	13.7

			Male			
Year	*Elementary Grad vs. Some Elementary*	*Some Secondary vs. Elementary Grad*	*Secondary Grad vs. Some Secondary*	*Some College vs. Secondary Grad*	*College vs. Some College*	*Some Elementary vs. No Grade*
1988	21.6	8.5	15.7	9.2	16.7	15.0
1990	20.0	5.7	18.2	9.1	20.8	-
1995	32.3	7.4	17.5	8.3	24.0	18.3

			Female		
Year	*Elementary Grad vs. Some Elementary*	*Some Secondary vs. Elementary Grad*	*Secondary Grad vs. Some Secondary*	*Some College vs. Secondary Grad*	*College vs. Some College*
1988	13.0	16.3	-	16.0	14.0
1990	24.4	-	33.2	13.1	16.9
1995	7.9	9.2	17.8	12.7	13.9

Notes: Incomplete cycle years of schooling: Elementary=4 yrs; Secondary=8 yrs and College=12 yrs.

Missing values denotes that either IRR asymptotically approaching zero, too high, or multiple IRR exists due to less well-behaved age-earnings profiles for females.

Table 12b. Private rate of return estimates, full method, with incomplete cycle salary and wage workers, direct cost from Maglen and Manasan

				Both Sexes			
Year	*Some Elementary vs. no grade*	*Elementary grad vs. some elementary*	*Some secondary vs. elementary grad*	*Secondary grad vs. some secondary*	*Some college vs. secondary grad*	*College vs. some college*	*Some elementary vs. no grade*
PRIVATE RETURNS							
1988	21.7	21.5	13.4	20.6	12.6	17.2	16.1
1990	30.0	22.6	7.2	30.2	10.8	20.5	36.4
1995	17.2	25.4	9.2	25.1	10.6	24.5	15.6
SOCIAL RETURNS							
1988	12.0	15.9	13.1	19.7	12.2	16.8	9.8
1990	14.4	16.4	6.9	27.9	10.1	19.5	17.9
1995	13.3	20.9	8.6	22.5	9.8	22.9	12.5
DEGREE OF SUBSIDIZATION							
1988	80.8	35.2	2.3	4.6	3.3	2.4	64.3
1990	108.3	37.8	4.3	8.2	6.9	5.1	103.4
1995	29.3	21.5	7.0	11.6	8.2	7.0	24.8

				Male		
Year	*Elementary Grad vs. Some Elementary*	*Some Secondary vs. Elementary Grad*	*Secondary Grad vs. Some Secondary*	*Some College vs. Secondary Grad*	*College vs. Some College*	*Some Elementary vs. No Grade*
PRIVATE RETURNS						
1988	29.3	9.7	18.7	11.4	14.5	28.0
1990	25.3	6.5	21.0	11.4	23.9	6.8
1995	36.5	8.3	20.2	10.0	27.9	22.5
SOCIAL RETURNS						
1988	21.1	9.5	18.0	11.1	18.8	14.3
1990	18.6	6.3	19.7	10.2	22.9	-
1995	29.6	7.8	18.4	9.2	26.2	15.9
DEGREE OF SUBSIDIZATION						
1988	38.9	2.1	3.9	2.7	(22.9)	95.8
1990	36.0	3.2	6.6	11.8	4.4	-
1995	23.3	6.4	9.8	8.7	6.5	41.5

Table 12b. Private rate of return estimates, full method, with incomplete cycle salary and wage workers, direct cost from Maglen and Manasan (continued)

	Female				
Year	*Elementary grad vs. some elementary*	*Some secondary vs. elementary grad*	*Secondary grad vs. some secondary*	*Some college vs. secondary grad*	*College vs. some college*
PRIVATE RETURNS					
1988	19.7	18.1	-	21.1	16.4
1990	36.0	-	40.4	16.6	13.4
1995	8.3	10.5	20.5	15.9	21.5
SOCIAL RETURNS					
1988	12.6	17.8	-	20.3	16.1
1990	21.9	-	37.1	15.3	18.9
1995	7.6	9.7	18.8	14.4	20.2
DEGREE OF SUBSIDIZATION					
1988	56.3	1.7	-	3.9	1.9
1990	64.4	-	8.9	8.5	(29.1)
1995	9.2	8.2	9.0	10.4	6.4

Notes: Incomplete cycle years of schooling: Elementary=4 yrs; Secondary=8 yrs and College=12 yrs.

Missing values denotes that either IRR asymptotically approaching zero, too high, or multiple IRR exists due to less well-behaved age-earnings profiles for females for incomplete cycles.

Table 13. Mincerian Rates of Return

	Schooling Coefficient (%)						
	OLS			*Heckman, MLE*			
	Both sexes	*Male*	*Female*	*Female*	*t-stat*	*Lambda Coefficient*	*Std. error*
DEPENDENT VARIABLE: NATURAL LOG OF EARNINGS							
All							
1988	13.81	12.37	17.39	16.07	(4.49)	(0.05)	0.01
1990	14.24	12.65	18.06	16.36	(5.94)	(0.07)	0.01
1995	14.01	12.96	17.41	15.94	(7.64)	(0.09)	0.01
Urban							
1988	12.92	11.32	16.18	14.74	0.19	0.00	0.01
1990	13.79	12.02	16.86	15.31	(1.44)	(0.02)	0.01
1995	12.95	11.82	16.13	14.93	(4.36)	(0.06)	0.01
Rural							
1988	13.08	11.60	17.48	14.93	(4.05)	(0.07)	0.02
1990	13.06	11.39	18.35	15.17	(4.20)	(0.08)	0.02
1995	13.36	12.24	17.68	14.16	(4.45)	(0.10)	0.02
DEPENDENT VARIABLE: NATURAL LOG OF EARNINGS/HR							
All							
1988	12.53	10.69	16.81	14.93	(0.86)	(0.01)	0.01
1990	13.17	11.06	17.71	15.39	(2.81)	(0.03)	0.01
1995	12.39	11.04	15.94	13.92	(6.90)	(0.08)	0.01
Urban							
1988	12.87	10.16	17.82	15.88	3.49	0.05	0.02
1990	14.04	11.13	18.65	16.48	0.87	0.01	0.02
1995	12.25	10.42	16.35	14.34	(4.02)	(0.05)	0.01
Rural							
1988	11.18	9.85	15.01	12.42	(3.92)	(0.06)	0.02
1990	11.22	9.47	15.92	12.85	(4.38)	(0.08)	0.02
1995	11.23	10.28	14.30	11.53	(5.12)	(0.10)	0.02

Note: All estimated schooling coefficients are significant at .01 level.

Table 14. Mean hours worked, 3rd quarter sample set excluding students, pensioners, and disabled

	Mean Hours Worked			*Growth rate* (%)	
	1988	1990	1995	1988-95	1990-95
All	577.36	578.4	574.05	(0.08)	(0.15)
Male	573.66	575.2	575.11	0.04	(0.00)
Female	583.86	583.69	572.27	(0.29)	(0.40)
Male/Female Hours Worked Ratio	0.98	0.99	1.00	0.32	0.39
Urban	604.96	604.36	595.87	(0.22)	(0.28)
Male	592.43	592.66	592.35	(0.00)	(0.01)
Female	625.03	621.83	601.49	(0.55)	(0.67)
Male/Female Hours Worked Ratio	0.95	0.95	0.98	0.55	0.65
Rural	530.72	533.16	516.9	(0.38)	(0.62)
Male	544.72	547.89	532.82	(0.32)	(0.56)
Female	501.73	503.61	486.57	(0.44)	(0.69)
Male/Female Hours Worked Ratio	1.09	1.09	1.10	0.12	0.13
Urban/Rural Hours Worked Ratio	1.14	1.13	1.15	0.16	0.34
Male Urban/Rural Hours Worked Ratio	1.09	1.08	1.11	0.31	0.55
Female Urban/Rural Hours Worked Ratio	1.25	1.23	1.24	(0.11)	0.02

Private and social rates of return all exceed the 10 percent (for social returns)[32] and 12 percent (for private returns)[33] benchmark commonly used to judge the profitability of investment. But this finding does not apply to individuals who did not complete the schooling cycle, suggesting sheepskin effects of investment in education. Even if only for this reason (assuming the signaling hypothesis holds true), private returns reflect incentive for completion. For those who are unable to complete productive schooling, dropping out can be involuntary and could have been caused primarily by the financial constraints. This is where government policy in education becomes critical—a mixture of direct intervention (e.g., financial support for poor families to keep their children in school) or by introducing policies that would prevent unnecessary attrition in schooling attendance. Whether the high education returns reflect the increase of the productive capacity of the workforce or merely represent a less expensive screening device used by employers is perhaps immaterial the fact that the labor market attaches a high premium on an educated workforce suggests that education produces social benefits.[34]

The preceding analysis can be complemented by an analysis of alternative decisions to further aid policy decisions. For instance, while it would appear that government support to families (through subsidies such as, universal elementary and secondary education) improve access to education and yield positive returns (from an economic viewpoint), public investment can be assessed against other related interventions (e.g., improving infrastructure such as roads to improve access to schools or investments in a school building program). For example, Balisacan's [2002] econometric results reveal that roads per se have a negative impact on the welfare of the poor. But if the roads variable is made to complement factors such as schooling, the results are reversed. These findings suggest that roads are useless unless they make schools more accessible to the poor. The challenge, therefore, lies in finding the right mix of investment that would best benefit the society.

It would also be useful to look into the dynamism of age-earnings profiles by cohort and age over time.[35] Though data are currently a constraint, further research in this direction can yield additional insights into the evolution of educational investments and its policy implications.

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[32]Also known as the Economic Internal Rate of Return.

[33]As discussed with R.P. Alonzo.

[34]See Lang [1994].

[35]See Arias and McMahon [2001] who estimated dynamic rates of return in the United States.

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