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Estimating Returns to Education: Back to the Short-Cut

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Abstract

Estimates of the rate of return to investment in education have been the subject of an explosive literature in recent years papers. Most estimates come from the Mincerian earnings function. A less well-known method – the short-cut – offers an efficient means of quickly estimating returns with limited data. It has the added benefit of allowing for easy incorporation of public costs of schooling. Only needing grouped earnings by level of education the short-cut method the method is becoming popular again, especially in cases where lack detailed data, especially in developing countries.

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1 Introduction

Estimates of the rate of return to investment in education have increased in the literature (Deming 2022; Gong and Pan 2023; Khanna 2023). Three methods have been used to estimate returns to education: the full-discounting method; the Mincerian earnings function (Mincer 1974); and the short-cut method (Psacharopoulos and Mattson 1998). Most estimates come from the Mincerian earnings function (Card 1999; Psacharopoulos and Patrinos 2018).

The Mincerian earnings function has been the dominant estimation method in the literature, the reason being its convenience. The price one pays for this convenience is that by construction, the Mincerian method estimates only private returns to education. Private returns are useful for assessing the demand for education as well as equity issues. Unfortunately, Mincerian-estimated returns to education cannot be used to assess the efficiency of investment in various levels of education and derive policy priorities. For the latter, the resource cost of education has to be considered. It is reminded that the Mincerian method takes into account only the private cost of education measured by foregone earnings while studying.

It is typical, for example, that the private rate of return to higher education to exceed that of secondary. However, when considering the resource cost of higher education, the policy implication might be to give priority to secondary rather than higher education. In fact, many papers reach policy conclusions based solely on private returns to education.

The full-discounting method is the most accurate among the three estimating methods for estimating private and social returns because it can take into account the resource cost of education. However, its application is more laborious relative to the Mincerian method, hence rarely used in the literature (Psacharopoulos 1995).

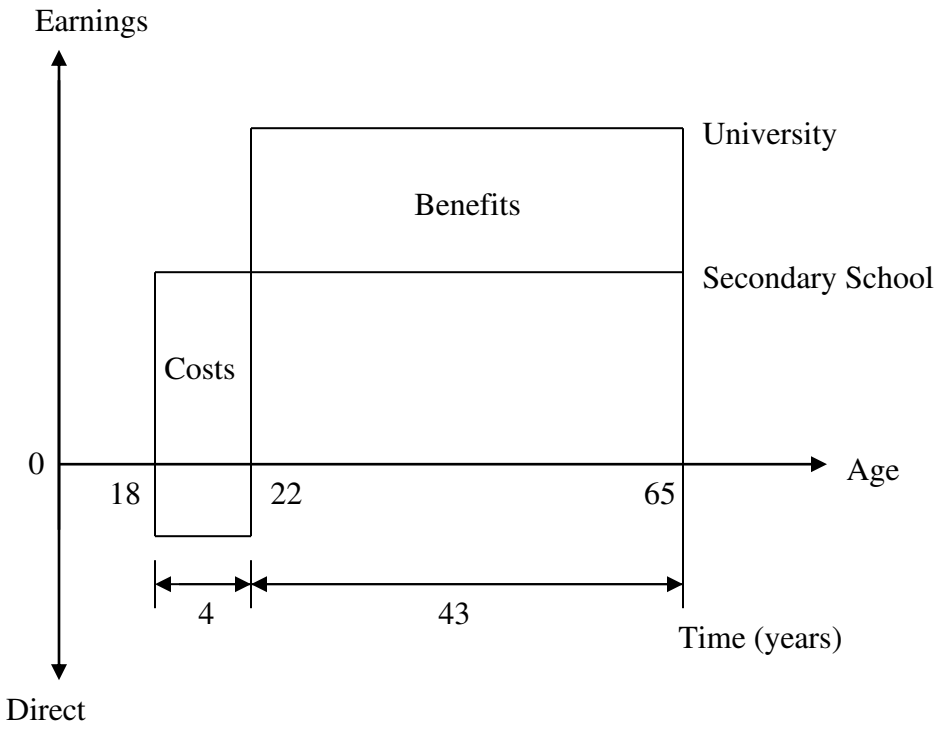
A less well-known method – the short-cut – offers an efficient means of quickly estimating returns with limited data (Psacharopoulos and Patrinos 2004). The short-cut method is the first method used (Schultz 1962; Psacharopoulos 1973). It requires less data, thus making it useful in contexts where data tend to be limited. Thus, it is easy and quick. It allows for computing the returns to levels of education.

The dominant method of estimating returns to education in the literature is the Mincerian earnings function that yields private returns. Estimation of social returns has become rare. The short-cut method has the advantage of making it easy to estimate social returns method makes it easy to incorporate social returns (see Gashi and Adnett 2022).

2 The Short-Cut Method

The short-cut method was the first used because at the time there were no data on age-earnings profiles by level of education. Only tabulated mean earnings by level of education were available (Figure 1). The short-cut method is by far the easiest and least data-intensive method (it does not require individual-level data), but it is also the one with the most restrictive assumptions about the shape of the age-earnings profiles (Barouni and Broecke 2014). The short-cut method does explicitly what the earnings function, with dummy variables, does implicitly (Rao and Datta 1989).

Figure 1. Flat Age-Earnings Profiles



3 Estimation

The returns to education are estimated on the basis of the following equation:

$$private\ r = \frac{\overline{W}_k - \overline{W}_{k-\Delta s}}{\Delta S * (\overline{W}_{k-\Delta S})} \quad (1)$$

where private *r* is the private rate of return to education; $\overline{W}$ refers to the mean earnings of workers with the subscripted level of education; *k* is the higher schooling level and *ΔS* is the difference in years of schooling between *k* and the control group.

Taking a concrete example, the private returns to university education can be estimated by:

$$private\ r_s = \frac{\overline{W}_u - \overline{W}_s}{4 * (\overline{W}_s)} \quad (2)$$

where *u* refers to university and *s* refers to secondary, and 4 is the length of the university cycle.

Other methods do not easily allow for the incorporation of educational costs (Harmon *et al*. 2003; Heckman *et al*. 2006, 2008). Paradoxically, the short-cut method, despite its simplicity in defining returns to education, easily accommodates for the integration of educational costs into the estimation of these returns. Hence, one could use the short-cut formula to estimate the social returns to university education:

$$social\ r_s = \frac{\overline{W}_u - \overline{W}_s}{4 * (\overline{W}_s + \overline{C}_u)} \quad (3)$$

where $\overline{C}_u$ is the annual direct cost of a university student.

The weakness of this method is that it assumes the earnings differential lasts forever, rather than 43 years for the working life of the graduate. There is a way to compensate for this by applying the following adjustment factor to the short-cut-estimated rate of return:

$$[\ 1 - \frac{1}{(1+r)^n}\ ] \quad (4)$$

where *n* is the working life of the individual.

Mincer (1962) and Harberger (1965) have used this adjustment. The intuitive interpretation of this adjustment is that if the length of benefits is infinite, the adjustment factor is equal to 1.

In the case of education, assuming the commonly found rate of return of 10 percent (Montenegro and Patrinos 2021), the adjustment amounts to virtually nothing. Similarly for returns 12 percent and above (Table 1). Based on the above, along with estimating Mincerian private returns, it should be easy to also estimate social returns by the short-cut method.

Table 1. Rate of return adjustment

Short-cut rate of return (%)	Adjustment factor	Adjusted rate of return (%)
8.0	0.97	7.8
9.0	0.98	8.8
10.0	0.99	9.9
12.0	1.00	12.0

The short cut continues to be used extensively (see, for example, Gashi and Adnett 2022). The reasons for this are three-fold. It is easy and quick; it allows for the incorporation of returns to education from countries that are data-challenged; and it provides a useful way to bring in social returns.

4 An illustration of the Short-Cut Method

Data availability tends to be the decisive factor in the selection of the methodology intended for the estimation of returns to investments in education. The short-cut method can be used to quickly assess a major investment decision. For example, what is the likely rate of return for someone intending to enroll in a college in the northeast of the United States? Using data from the U.S. Department of Education's College Scorecard for three colleges in Connecticut and assuming that tuition in private universities is a good proxy for the resource cost, all data needed are summarized in Table 2. Based on these calculations, which are higher than the national average – since these are elite colleges in the U.S.A. – it would be a good investment for the individual to consider any of the schools. The existence of a national database makes this quite easy and feasible. The data is publicly available at no cost and the technique is straight forward.

Table 2. An illustration of the Short-Cut: College in the Northeast U.S.A.

Data	Estimate	Source
Mean annual earnings of a secondary school graduate	$36,600	NCES 2022
Mean annual earnings of a college graduate	$75,000	USDoE 2022
Annual resource cost of a university place	$25,667	USDoE 2022
Rate of return (percent)		
Private	26.2	Own calculation
Social	15.4	Own calculation

5 Concluding remarks

When attempting to estimate international returns to investments in education, particularly in less developed countries, data tend to be limited. Even though other models are suggested to be more accurate in the estimation of rates of returns, they are ineffective when estimating and comparing returns to education in countries with deficient data (that is, less developed countries). The method is becoming popular again, especially in cases where lack detailed data especially in developing countries (see, for example, Anchor *et al*. 2011; Jahic and Pilav-Velic 2021; Jamal *et al*. 2003; Kopatz and Pilz 2015; Gashi and Adnett 2022).

One concern regarding the application of any estimation method, is that education positively affects the employment probability, thus underestimating the returns to higher education. This remark is particularly relevant in estimating returns in less developed countries where employment is the informal sector is dominant.

The short-cut method makes it easy to incorporate social returns. This makes the calculations more relevant for policy purposes. Exclusive reliance on private returns may be misleading. A combination of techniques may be useful in order to obtain the most likely private and social returns.

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