Pergamon

Economics of Education Review, Vol. 15, No. 4, pp. 339–344, 1996

0272-7757/96 $15.00+0.00

S0272-7757(96)00025-8

Economics of Education: A Research Agenda

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Abstract—The paper presents a systematic taxonomy of research areas in the economics of education and gives a number of key topics that deserve more research attention in the future. Emphasis is put on documenting the unit cost of education at different schooling levels and curriculum types, along with the learning and earning outcomes of education. Evidence on the costs and benefits, from both the private and the social point of view, can lead to efficiency and equity assessments of an educational system. Among topics where the research effort should be intensified are the screening hypothesis, measuring education externalities and the quality of schooling. [*JEL* I21] Copyright ©1996 Elsevier Science Ltd

1. INTRODUCTION

GONE ARE the days when the economics of education literature could be annotated in the handful of items in Mark Blaug's (Blaug, 1966) first bibliography on the subject. The explosion of literature in the field is such that today a similar bibliography would occupy several volumes, if not an encyclopedia (for a modest attempt, see Psacharopoulos, 1987).

It is customary before suggesting a research agenda to provide an overview of what we already confidently know on the subject. But even this is a very difficult task, given the many dimensions "economics of education" has taken. For example, it has been merged with labor economics, and entered into complementary fields such as psychology, sociology, anthropology and political science. Instead, I have chosen to follow a different route: I will provide only a critical list of research topics that are important for answering the most common policy questions governments face today regarding education.

2. RESEARCH FADS

Let us first establish some broad trends of research in this field. Among the many themes and subthemes that have occupied the pages of journals and books, one can discern three clear research paths during the last three decades (see Table 1).

Table 1. Broad, over-time research themes in the economics of education

	Type of research		
Period	Rate of return	Screening	Externalities
1960s	X		
1970s	X	X	
1980s	X	X	X

The economics of education field essentially started in the late 1950s/early 1960s with estimates of the profitability of investment in education (see Becker, 1960). The 1970s witnessed the challenge to the social returns to education by the formulation of the screening hypothesis (see Arrow, 1973, among many others). And the 1980s saw a revival of attempts to estimate the effect of education on economic growth by means of "endogenous" models that allegedly catch much of education's positive externalities (see Lucas, 1988; Romer, 1990).

3. A POLICY-ORIENTED RESEARCH AGENDA

Other than for pure academic interest, research in the economics of education takes place in order to guide fundamental policy decisions that transcend levels of economic development. Educational reform is one of the most debated issues in contemporary

society. For example, the issue could be how to improve the quality of education in the United States (to match the enviable performance of Asian countries in the educational achievement "Olympics"), or how to provide more children aged 6–12 yrs with basic education in a sub-Saharan African country.

The following list, a taxonomy of *sine qua non* educational analyses, presents what I consider to be the most fundamental analyses that must be undertaken in order to arrive at more informed policy decisions in education:

First Level Analysis
1. Unit cost of education
   by schooling level
   by curriculum type
   of pedagogical inputs
   in public and private institutions
2. Benefits of education
   learning outcomes
   earnings/productivity of graduates
      by schooling level
      by curriculum type
      in public vs private sectors

Second Level Analysis
1. Efficiency assessment
   cost-effectiveness analysis
   cost–benefit analysis
2. Equity assessment
   costs incidence
   benefits incidence

The taxonomy is based on the (hopeful) belief that the two main concerns of the policy maker (or politician, or whoever makes the ultimate decision) are or should be: (1) the efficiency with which resources are being used in education; and (2) the way such resources and benefits are distributed in the population. These concerns correspond to the efficiency and equity arguments of a standard social welfare function.

3.1. On Costs

The first fundamental input for decisions in education is the unit cost per student or graduate by level of schooling (primary, secondary, university or postgraduate), by curriculum type (general vs vocational track in secondary education) or by type of faculty in higher education. Such cost must be decomposed by the many inputs that enter into the production function of education, e.g. teachers' salaries, rental cost equivalent of school buildings, textbooks, materials and supplies. Unit costs of private schools should be juxtaposed to those for public schools.

Costs must be broken down into public and private, the latter referring to what the student actually bears. Public costs are the total resource cost of schooling, regardless of who pays them. A significant part of the cost of schooling, especially in post-compulsory education levels, is the opportunity cost of student time.

It is important to know the unit social (resource) cost of education. On decisions at the margin, one must know, for example, how many primary school places are being sacrificed in order to create one university place. Equally, one must know what the unit cost is of different types of curricula in secondary education, and also the per student cost of university faculties. Actually, it is astonishing how many decisions on investment in certain levels (beyond primary) and types of education are being made without explicit consideration of the cost of such provision, let alone the expected benefits.

3.2. On Benefits

We can distinguish two broad classes of educational benefits. One refers to the immediate educational outcome, or student learning. The other is the eventual labor market outcome, referring, of course, only to those who will enter the labor market, often measured by the graduate's earnings.

Student achievement can be measured by any of the standard ways, e.g. by asking the student to take a test both at the beginning and end of the schooling period in order to record the achievement value added, which in turn can be compared to the pedagogical inputs that went into the learning process. Assessing student achievement as the end product is very important for two reasons. First, many students will never enter the labor market, or at least the formal modern wage sector. Hence, for them this is practically the only educational outcome one can measure. But among non-formal labor market participants, market outcomes can be measured by imputing shadow wages (*à la* Jamison and Lau, 1982). Second, even among those who will engage solely in "household production", literacy can contribute to a long series of beneficial outcomes, such as better sanitation conditions for all family members, awareness of family planning methods and reduced fertility.

Graduate earnings can be decomposed along the same lines as educational costs, i.e. they can correspond to the graduates of different educational levels,

to alternative curriculum types, public or private education, and to people working in either the public or private sectors of the economy. The latter two distinctions are very important to make in order to approximate the productivity of graduates, as measured by the earnings of those working in the private sector. Recording the earnings of graduates in the public sector is also useful, as this sector can set the signals to which prospective students respond.

It is also important to know the absolute (and therefore, relative) salaries of graduates of the educational system, for studying issues of equity and the factors determining income distribution (see below).

3.3. Cost-Effectiveness Analysis

Once the above primary analysis ingredients are available, there is a small step towards assessing the efficiency with which resources are being used in education. For example, the coefficients of an educational production function can be related to the cost of providing the respective educational inputs. This analysis can lead to policy conclusions that one could not have imagined before, such as determining what inputs are more effective in raising student achievement. (For an excellent application of this approach in Brazil, see Harbison and Hanushek, 1992.)

Similarly, the information of the costs and earnings/productivity differentials can easily be combined to produce rates of return to investment in education, along all the dimensions according to which the costs and benefits have been disaggregated, e.g. by level of schooling or curriculum type. (For a recent compilation of studies, see Psacharopoulos, 1994).

We need more estimates of the returns to education by curriculum type in secondary education and, especially, in higher education, as well as to investments in training. Evidence on this issue can establish investment priorities in the presence of limited funds, whether public or private. Private rates of return by level of education can guide decisions on the distribution of public subsidies to different levels of schooling and different income groups (see below).

If we axiomatically accept basic education and literacy as a *sine qua non* right of every person on this earth—a very tall order to be achieved in a short time period—then, other than for academic reasons, one need not waste time in estimating further returns to primary education. Whatever these monetary returns are—and they have proved to be very high in empirical estimations—they are irrelevant when the population's literacy is at stake. Every child should graduate from basic education knowing the three Rs, regardless of what a mechanical rate of return estimation to primary education may show.[2]

Information on the above costs and relative salaries can also lead to a *reverse rate of return* calculation, i.e. instead of inserting into the rate of return formula the stream of costs and benefits associated with the investment in question, one can insert just the education costs and solve for the required productivity benefits that would make the investment break even at a given discount rate.[3] Often, by just inserting the cost of the investment, it becomes extremely unlikely that the graduates of target educational level X will be 10 times more productive that the control group to justify the investment.

3.4. On Equity

Journalistically at least, it can be alleged that free education is equitable. However, someone must pay the bill for that education. To the extent that educational expenditures are financed from general tax revenue, it is an important empirical issue of who really pays and who really benefits from educational expenditure among tax payers at large. The controversy on this issue that started in the late 1960s in the United States and resulting empirical evidence (e.g. see Hansen and Weisbrod, 1969) has not yet become part of the standard tools for deciding the allocation of resources to education in most countries.

The incidence of education benefits is a very important ingredient in this debate. So it is important to record by socioeconomic background who attends the different levels of schooling and who does not.

Once such analyses are available, decisions regarding educational policy become more transparent. Even if political expedience often overrules scientific findings, it is important to know what the student/family/nation forgoes.

3.5. Methodology

The above short list of research analyses in the economics of education hides important methodological issues. As a rule of thumb, I would suggest:

- micro, within-country time-series, rather than international comparisons (countries differ in many things other than education that are very difficult to control for);
- using household surveys, rather than firm surveys (we are also interested in the unemployed and not only in those who have a job; this is a classic case

of sample selectivity that can give wrong signals to policy makers); and
- ensuring that there is a well-defined control group (and not just refer to open-ended "high" or "low" cost estimates, without reference to what is the standard by which highs and lows are being judged).

In particular, regarding the earnings of graduates, these would have to be generated by more sophisticated methods than those used earlier. Thus, one would have to be based on:

- recent cohorts of graduates (for example, those aged below 40), in order to compute marginal rather than historical/average rates of return;
- as unselected a group of the population as possible, hence ruling out wage surveys in urban establishments;
- those who engage in non-wage, informal sector activities in the economy; and
- those working in the competitive sector of the economy (however defined) in a social rate of return calculation, in order to better approximate their unobserved productivity based on their observed earnings.

When one is interested in a particular set of graduates, say those from a new type of school, a tracer study, following up the graduates for at least two years into the future, is the proper evaluation instrument.

Similarly, the costs of education should be assessed at the margin, i.e. relating to future expansion of the system, rather than being based on obsolete historical estimates. The latter might have been influenced by recent heavy investments in buildings and equipment, and thus contain a high fixed cost component.

4. WHAT ABOUT MORE COMPLICATED RESEARCH?

If the basic short list for research in the economics of education sounds too conservative, let me address a few of the most popular issues of contemporary research in this field.

4.1. From Screening to Productivity Measurements

One of the most fascinating hypotheses in the economics of education literature is the so-called screening hypothesis (or its many variants). One of the main appeals of this hypothesis lies in the difficulty of testing it empirically.

My feeling is that we have reached the limits of such research. Instead of asking whether the wine bottle is half empty (the screening hypothesis), I would prefer to see more research on the extent to which the wine bottle is nearly full. This line of research corresponds to documenting the productive value of education. In my opinion, testing for the productive value of education is the only valid way of testing the screening hypothesis. Thus, work on aggregate production functions [of the Jamison and Lau (1982) type] are bound to illuminate more policy making in this area than another fancy formulation and testing of the screening hypothesis.

4.2. Education Externalities

This is the contemporary Holy Grail of research in this field, stimulated by the recent growth literature that accommodates endogenous technical change and increasing returns to scale. However, I am concerned by the fact such tests take place by using cross-country data. Beyond the quality of such data, countries differ in many other respects than the general level of education of their labor force or population for the desired effect to be credibly picked up in such analysis (see Azariadis and Drazen, 1990; Barro, 1991). Thus, the externality in question might just be another name for our ignorance on what really determines economic growth.

Externalities have always intrigued the economics profession and may remain *deus ex machina* in order to explain an observed phenomenon. For example, it might be said that although higher education has a lower monetary rate of return relative to primary education, it might have a higher social rate of return because it confers benefits to society at large. But such statement implies that one can weigh two very elusive items: (1) the positive externalities associated with a university graduate discovering a new vaccine; and (2) the negative externalities associated with 30% of the population being illiterate for their entire lifetime. Pending evidence on the subject, and attaching likely probabilities to events (1) and (2) above, I contend that expansion of primary education would win the case.

4.3. Ability Corrections

Closely related to the screening hypothesis are the adjustments to earnings differentials to allegedly correct for ability differences between the more and the

less educated (e.g. see the early literature in the field on the so-called "alpha coefficient").

Of course, it is a truism to say that further education or higher earnings are positively correlated with a person's inherent "ability". They must be. The real question for educational policy purposes is, how much difference does superior ability make to a social rate of return calculation? Several studies, starting with that of Griliches (1970), to recent natural experiments (e.g. see Angrist and Krueger, 1991) have found that such corrections are not empirically validated.

Also, conceptually, when one provides for educational expansion in the country as a whole, schools are bound to receive both very able and less able students, and the labor market more able and less able graduates. Hence, the average (i.e. ability-uncorrected) earnings differentials might be the right signals to use, rather than trying to simulate a non-representative population.

4.4. Education Quality

Similar arguments apply to attempts to correct earnings differentials for educational quality. Quantitative measures of schooling (the famous S in the Mincerian earnings function) embody a certain level of educational quality, since years of schooling (S) are provided by both bad and good schools. Thus, in expanding S in the country as a whole, one most likely will expand it along the same quality lines, hence quality-uncorrected earnings differentials should be used as signals for policy, because these are likely to apply to schools at large. This is not to say that separate studies are not needed to measure school quality and assess the cost-effectiveness of the different educational inputs that contribute to it, as described above.

4.5. Labor Market Segmentation

This is another extremely popular theme in the economics of education, on which I feel we have reached diminishing returns. To say that a labor market contains good and bad jobs, or higher paid and less paid workers, is again a descriptive truism, and I need not go beyond the devastating critique of Cain (1976) on the labor market segmentation concept. In my opinion, the only true test of labor market segmentation is the identification of mobility barriers between the bad and good jobs, or the lower and higher income categories. Identifying such barriers is necessary for the development of policies in order to remove them.

But how many empirical labor market segmentation studies use longitudinal data, by means of which mobility can be recorded and barriers identified? Alas, not many.

5. EPILOGUE

Unfortunately, educational decisions in the world today are not always based on prior research. Too many policy reforms are based on what the legislator thinks is appropriate in a particular country. In the field of education, perhaps more than in any other sector of the economy, politics are substituted for analysis.

But work along the lines suggested above can help swing the pendulum away from popular fallacies on how things work in education, equivalent to "the sun is moving around the Earth". The more evidence that is produced to illuminate such fallacies, the better educational systems would be designed to serve those whom they are supposed to serve.

NOTES

1. The views expressed here are those of the author and should not be attributed to the World Bank.
2. By mechanical application I mean one that, by econometric default, wrongly assigns foregone earnings to children aged six or seven. This happens when the coefficients of a Mincerian earnings function with dummy variables for different educational levels are used to infer the returns to education. (For an elaboration see Psacharopoulos and Ng, 1994).
3.

$$r = \frac{B}{C} = \frac{\text{earnings differential}}{\text{cost of education}}.$$

By knowing the cost of education (C), and using a 10% rate of return ($r = 0.10$), one can solve for the required benefits (B).

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