EXECUTIVE SUMMARY

The Economic Impact of Education

Lessons for Policy Makers

George Psacharopoulos

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George Psacharopoulos is with the World Bank. The views expressed here are his own and not necessarily those of the World Bank.

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PREFACE

The International Center for Economic Growth is pleased to publish *The Economic Impact of Education,* by George Psacharopoulos.

Dr. Psacharopoulos reviews and summarizes the literature on the subject of education and its importance for economic growth. That education is important to economic growth is self-evident, but there has been a great deal of interest in which type and which level are most important. Dr. Psacharopoulos also investigates how the return on investment in human capital compares with the return on other investments. He concludes by examining current debates in the field and summarizing lessons for policy makers.

Dr. Psacharopoulos's contribution will be beneficial to policy makers and all those interested in improving educational standards in developing countries throughout the world.

Nicolás Ardito-Barletta
General Director
International Center for Economic Growth

Panama City, Panama
August 1991

GEORGE PSACHAROPOULOS

The Economic Impact of Education

The view that education is a form of investment is at least as old as the economics profession itself. Adam Smith put it loud and clear in his *Wealth of Nations* that the creation of labor skills entails an expense that is later paid off by increased productivity.[1] This basic principle, almost forgotten for nearly two centuries, took on new vigor in the late 1950s with the work of T. W. Schultz, Gary Becker, and Jacob Mincer at the University of Chicago and Columbia University. Estimates of the so-called rate of return to investment in education have been made and much of the previously unexplained residual in accounting for the sources of economic growth has been accounted for by introducing the stock of human capital in the aggregate production function.

1. In his words, "A man educated at the expense of much labor and time . . . may be compared to one . . . expensive machine. . . . The work which he learns to perform . . . over and above the usual wages of common labor will replace the whole expense of his education" (Smith 1776, 101).

In this paper I review the evidence on the economic impact of education produced in the past thirty years and compile a number of lessons from the literature that might be useful to policy makers. And since no field is without controversy, I also review the major debates that have surrounded human capital theory and its applications.

The Evidence

The evidence on the economic impact of education can be divided into two distinct types: micro and macro.

Micro. If expenditure on education is a kind of investment leading to the formation of human capital, either for the individual or for society at large, one should be able to estimate the rate of return to this investment. In its most simplified form, the rate of return to investment in education (r) can be estimated by dividing the permanent annual benefits stream due to education ($Y_1 - Y_0$) by the cost of obtaining such education ($Y_0 + C_1$),

$$r = \frac{(Y_1 - Y_0)}{S\,(Y_0 + C_1)}.$$

In this case, Y_1 and Y_0 could refer to the mean earnings of workers who are literate and illiterate, respectively, S to the number of years of schooling it takes for someone to become literate, and C_1 to the annual cost of keeping someone in school. Note the appearance of Y_0 in the denominator of the expression, representing the opportunity cost of attending school rather than working in the labor market.[2]

There are several ways to examine rates of return to education: by whether the returns refer to the individual investor or to society at large, namely, the private or social rate of return; by the country's level of

2. For a review of alternative methods of estimating the returns to education, see Psacharopoulos (1981).

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economic development; by the type of curriculum—say, general or vocational secondary education; by type of economic sector the worker is in, say, modern wage employment or self-employment; and by gender.

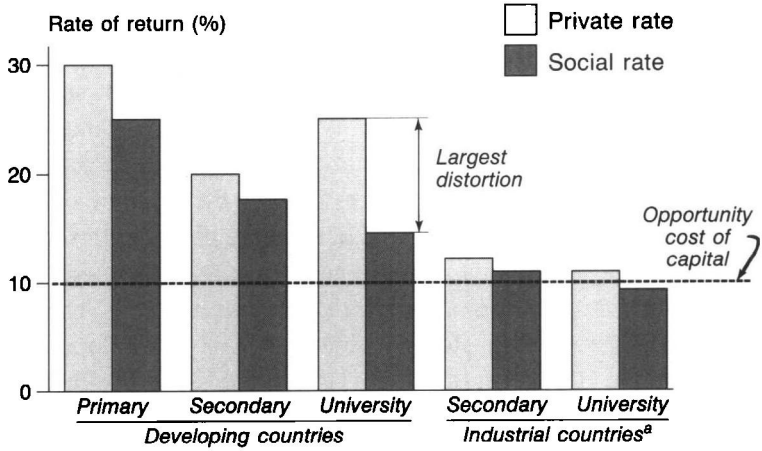
Hundreds of studies have been conducted in the past thirty years on the profitability of investment in education in a large number of countries across the dimensions cited above (for a summary see Psacharopoulos 1985). Figures 1 and 2 offer an impressionistic summary of the results of these studies. The figures are impressionistic in the sense that I want the reader to focus on the structure of the returns to education rather than the exact percentage points represented by the vertical axes. As a point of reference I give an illustrative 10 percent opportunity cost of capital or alternative discount rate. This might be more realistic in a developed country than in a developing country, although the 10 percent rate could be defended in a developing country setting if the country could borrow internationally for investment in education at this interest rate.

The first notable result of the application of rate of return studies to education is that the rates are not far off the yield of more conventional investments. The returns to investment in education in advanced industrial countries are roughly the same as those of investment in physical capital. By contrast, the returns to education in developing countries stand at a much higher level relative to industrial countries. This reflects both the continuing scarcity of human capital in poorer countries and barriers to the allocation of funds to human capital investment, so that the returns to any kind of capital (physical or human) equalize at the margin.

A typical pattern, found since the early days of rate of return estimation in education, is that returns decline by level of schooling. Thus, returns to primary education are higher relative to returns to secondary education, and the latter are higher than returns to university education. This finding, corroborated in study after study, has fundamental policy implications (see the final section).

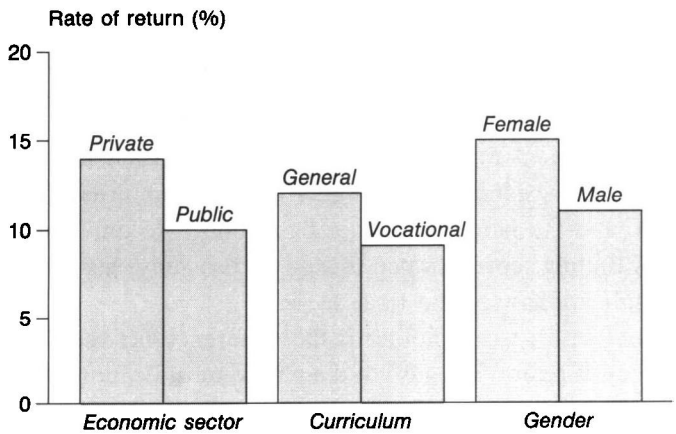
Another result worth noting is the difference between social and private rates of return. Because of the public subsidization of education in all parts of the world, private rates are typically several percentage points higher than social rates of return. By definition, the cost in a private rate of return estimation refers only to what the individual pays

FIGURE 1 The Returns to Investment in Education by Level and Country Type



a. The rate of return for primary education in industrial countries is undefined because of universal enrollment at this level of schooling.
SOURCE: Based on Psacharopoulos 1985.

FIGURE 2 The Returns to Education by Economic Sector, Curriculum Type, and Gender



SOURCE: Based on Psacharopoulos 1985.

out of his or her pocket, whereas the cost in a social rate of return estimation refers to the full resource cost of someone attending school.[3] The distortion incurred by the public subsidization of education means that, in some instances, individuals will find it profitable to pursue education to a given level whereas, from the point of view of society, this investment is not profitable. The maximum distortion between the private and the social rates refers to education at the university level. This level is more heavily subsidized in most countries relative to any other level.

Figure 2 presents three additional rate of return patterns that have been found in studies in many countries, irrespective of whether the rate of return is social or private. The first comparison shows that the return to education is typically higher in the private or competitive sector than in the public sector. It is well known that the public pay structure is very compressed, leading to a lower rate of return relative to estimates based on earnings in the private sector, where there is no limit to rewards. To the extent that private sector earnings truly approximate a worker's productivity, rates of return based on earnings in the competitive sector provide a better fix for the scarcity of human capital than rates of return based on civil service pay scales. The latter, however, are very important for explaining the private behavior of individuals in seeking different levels and types of education. Given the dominance of the public sector in hiring university graduates in any kind of country, a private rate of return estimation using civil service data is very appropriate, if not a must, in understanding the demand for university education. However, a private earnings base would be more appropriate for setting priorities for educational investment in a given country.

The second pattern in Figure 2 provides a well documented yet highly counterintuitive finding: within a given level of education, say, secondary schooling or university education, the more general the curriculum the higher the returns to education. This startling finding is due to two factors. First, the unit cost of vocational education, at

3. Another difference between the two types of rates refers to the before-tax (social) or after-tax (private) earnings used in the estimation. However, differences in taxation rates between more-educated and less-educated persons are not as important in accounting for differences between private and social rates of return as is the public subsidization of education.

any level, is higher than that of general education, because of the more specialized faculty and equipment that vocational education entails. Second, graduates of general programs are more flexible in fitting a wide spectrum of occupations—and perhaps are more easily trained on the job—than graduates of vocational programs that are earmarked to enter a particular occupation (to put it at the extreme, mechanical watch repairers).

The last pattern presented in Figure 2 refers to the worker's gender. Investment in the education of females often yields a higher rate of return than investment in the education of males. This finding could also be considered counterintuitive, in the sense that males typically earn much more than females. One must remember that the rate of return to investment in education is a *relative* concept, comparing the *difference* between more- and less-educated workers to the cost of their education. A major component of the cost is the forgone earnings of the worker while studying, which can lead to a higher rate of return for females than for males.

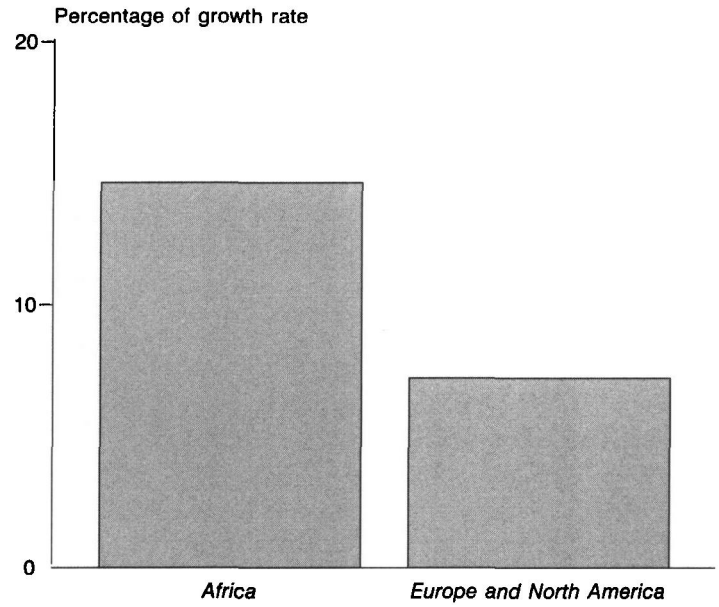
Macro. If investment in education yields returns at the individual or social level, this must be reflected at the level of the economy. Growth accounting in the post–World War II period was based on the so-called aggregate production function,

$$\text{Output} = f(\text{Land, Labor, Capital}),$$

expressing a country's output (measured by gross domestic product) as a function of the traditional triad of factors of production: land, measured in terms of cultivated area; labor, measured in terms of the number of persons or man-hours worked; and capital, measured in terms of the value of the physical plant in operation. Fitting the above relationship to time-series data for the United States left a huge unexplained residual, named "the coefficient of our ignorance." Output grew much faster than increases in the traditional factors of production could account for. Relabeling the residual "technical change" was simply begging the question "what determines technical change?"

It was then that Schultz (1961) and Denison (1967), using computationally different although conceptually similar approaches, introduced

FIGURE 3 The Contribution of Education to Economic Growth by Continent



SOURCE: Based on Psacharopoulos 1984.

the quality of labor or human capital into the traditional production function. Schultz, for example, plugged in the amount of investment represented by expenditures on education and explained a great part of the previously puzzling residual. The macro approach has been replicated by others over the past thirty years with similar results.[4]

Figure 3 shows that in Africa, investment in education explains nearly twice the proportion of economic growth that it does in more affluent Europe and North America. This macro result essentially replicates the rate of return structure by country type presented above, given that human capital is much scarcer in the poorer countries.

Beyond the results cited above, which have been generated by econometricians, economic historians took a stab at the matter by taking a much

4. For a review see Psacharopoulos (1984).

longer-term view than sophisticated statistical analysis permits. Thus it has been established that bouts of long-term economic growth were preceded by increases in the population's literacy level. The examples of Japan and Korea are the classic cases in which an educated population base has provided the necessary infrastructure for industrial advances to take place at a later date (see Saxonhouse 1977 and Easterlin 1981).

Wider social impact. Beyond the above "strict" or monetary impact of education, investment in human beings also has many other social values. Some come under the heading of externalities—namely, values captured by persons other than the individual investor. Others are labeled "nonmarket effects" (for a superb account of this see Haveman and Wolfe, 1984). And others are simply means or mechanisms by which the overall impact of education is realized.

When a person becomes literate, this person will enjoy a higher lifetime consumption path, according to statistics for a large number of countries. Others will also benefit if the country has a more literate population—through lower transaction costs than if they were dealing with illiterates, for example.

Many educated females may choose not to participate in the labor force. This does not mean, however, that such females are not more productive (relative to their less educated counterparts) in the variety of goods and services produced within the household that are not readily marketable. For example, they may provide better sanitation conditions for all members of the family and more nutritional meals. Such effects should be counted as part of the social impact of education.

Education increases the opportunity cost to a woman staying in the household and induces her to participate in the labor market. This contributes to overall efficiency in the economy to the extent that her market wage is higher than her implicit, shadow wage of being engaged in household activities.

Migration is an illustrative example of the means by which the returns to education are realized. To the extent that education makes the worker aware of employment opportunities elsewhere, or simply makes him or her employable in other contexts, it will instigate a more efficient allocation of labor to the most productive uses.

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