

Indicators of Investment and Returns to Investment in Human Capital

A Critical Review

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Abstract

The purpose of this paper is to review the attempt to construct indicators useful in international comparisons of human capital investments, measures of skills and competencies, and returns to investments in human capital. The leading organization in this work has been the OECD. In 1973 an indicator project was suggested with no success. From 1987 indicators have been constructed and there is a demand from public authorities, businesses and individuals in getting better comparable information. Other international organizations like the World Bank, The European Union, and UNESCO also have the same interest. The paper is critically analyzing some indicators and suggestions are made that better information about education systems must be developed. Different countries include different things when they calculate educational costs. Indirect measures of human capital based on initial educational attainment are only of limited applicability in studies of the relationships between knowledge and skills, productivity and earnings. To calculate the impact of education on macroeconomic performance has been difficult and generated more theories than agreed conclusions. However, indicators are here to stay, but further work on definitions, and continuing analysis on how to use indicators, will be important research areas for the future.

1. Introduction

Knowledge, skills and competencies are looked upon as valuable qualities in promoting economic growth and reducing inequality. These assets are usually referred to as human capital. When experiencing fiscal constraint governments are interested in measuring the impact of spending in education and training on economic performance and the welfare of societies. The solution has been to develop indicators measuring the stock of human capital, investment in human capital, and returns to investment in human capital. Already in April 1973, the OECD issued a document entitled: "A Framework for Educational Indicators to Guide Government Decisions". In this study 46 indicators were described as measures of the effects of education on the individual and society. The proposed indicators should be able to give information dealing with questions such as the contribution of education to the transmission of knowledge, the contribution of education to achieving equality of opportunity and social mobility or the contribution of education to meeting the needs of the economy. The high expectations on the use of indicators reflected some ideas more widespread during the 1960s that planning should be based upon scientific findings and that social engineering would be the best way to reach a modern, well functioning industrial society. The OECD's indicators project of the 1970s was a failure. It was heavily criticized, because among other things, it did not seek to establish a direct link between the indicators and the main policy questions of that period (OECD, 1994, p.22).

It was not until 1987 that the idea of developing a set of educational education indicators was brought up again. A meeting was held in Washington in November 1987 to discuss the issue. This meeting was a result of a series of events during 15 to 20 years, which highlighted the need for a systematic collection of education indicators. For example during the 1970s the International Association for the Evaluation of Educational Achievement (IEA) had published a number of reports in subjects such as Science, Reading, Literature, English as a Foreign Language, French as a Foreign Language, and Civic Education (Walker, 1976). The first study on Mathematics published by (Husén, 1973) had been followed by a new study in 1980. In the United States nationwide studies had been done 1973 and 1978 in Mathematics

by the National Assessment of Educational Progress (1980) and the results showed that the standard of achievement was lower in 1978 than five years earlier. The International Assessment of Educational Progress (IAEP) was also starting its work on studying student achievement in Mathematics and the Sciences in a number of countries (IAEP, 1992). The new interest in developing education statistics and indicators was also a result of a debate following a report published by the United States National Commission on Excellence in Education (1983). The report *A Nation at Risk* stirred up a debate in a number of countries asking for more information and data on financing of education, organization, enrollments and outcomes.

Improved comparability was the central aim of the OECD study on education indicators. This meant that new procedures and standards had to be developed in order to steer the management of data collection in the different countries. Organizational resources and organizational resources above the national level had to be developed. Four clusters of indicators were proposed: input indicators, output indicators, process indicators, and fiscal and human resource indicators. A framework of analysis was also developed (OECD, 1992) building upon earlier research using education indicators. International organizations including UNESCO, The European Community, and the Council of Europe expressed an interest in co-operating and sharing expertise (*op. cit.*, p.12). The first edition of *Education at a Glance* was published in September 1992 with the hope that politicians and decision-makers in OECD countries would put increased emphasis on comparability in future editions. Since then new and improved editions have been published every year with the last one in 1997 (OECD,1997). After 1992 four networks with voluntary country participation were formed to pursue the conceptual and methodological work needed for new indicators in different domains. The United States was responsible for developing and measuring indicators of student learning outcomes (OECD, 1995a). Sweden developed measures of education and labor market destinations (OECD, 1995b). The Netherlands had the task of measuring indicators of schools and school processes (OECD, 1995c). Finally the United Kingdom was invited to chart the expectations and attitudes of the various stakeholder groups in OECD societies (OECD,1995d). As adult literacy is seen as important to strengthen the economy of a country an International Adult Literacy Survey (IALS) was performed and results

were published from seven countries (OECD & Statistics Canada, 1995). Different indicators from this study were used in the next version of *Education at a Glance*.

2. International Comparisons of Human Capital Investment

One of the first articulations of the human capital theory is found in the presidential address of Theodore Schultz to the American Economic Association on the theme “Investment in Human Capital” (Schultz, 1961). His colleague Gary Becker (1964) developed the same idea in his book *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. The theory argues that education can not simply be viewed as a form of consumption but rather as a productive investment. Education does not only improve the individual choices available to men, but an educated population provides a labor force necessary in industrialized societies. International indicators of human capital should ideally be able to describe the quantity, quality, and use of human capital. After severe criticism during the 1970s the human capital theory is now experiencing a renaissance. OECD (1998) has emphasized the importance of the human capital, which is defined as:

“the knowledge, skills, competencies and other attributes embodied in individuals that are relevant to economic activity” (op. cit., p. 9)

Human capital can now be identified as a key factor in economic production, but a broad view of the variety of human abilities can be taken into account. The settings in which human capital are created and used strongly influence its impact, as does the existence of social networks, norms and relationships (*op. cit.*, p. 10).

Indicators of investment in human capital

Investment in human capital takes place during the life time of people in the family, at school, at work and during leisure time. Indicators of the quantity of human capital investment have usually been measured through two resources used for learning: money and time. Public and private expenditure on formal education, as a percentage of GDP, is used as an overall indicator of resources devoted to investment in education. Total annual spending per student as a percentage of GDP per capita for

primary, secondary and tertiary education is usually also shown. The problem for this indicator is that comprehensive data on public education might be available while it is much more difficult to get information on private spending. However, also when calculating costs for public education it is sometimes important to know what is included in the cost in different countries. In a study of costs for daycare in Denmark, Finland, Norway and Sweden the statistics showed much higher costs for Sweden than for the other countries (Statskontoret, 1986). The figures for Sweden included taxes paid to the State for pensions and social welfare, while this was not the case for Denmark. The fact that hot meals were served in Sweden while children were bringing sandwiches in some of the other Nordic countries could explain some of the differences. If we try to compare costs for formal education it is important to know what is included in the costs in different countries. Health service is included in the educational costs in some countries but not in other countries. The cost of space (lecture rooms and other facilities) is calculated quite differently not only in different countries but also within countries. The average annual expenditure on a student at primary, secondary and tertiary education as percentage of GDP per capita might give interesting comparisons both within countries and between countries. In the figures for 1994 Sweden, Mexico, and Hungary has the highest figures for tertiary education. My question is whether Sweden got these high figures because of very high estimates of cost for rooms in the university. It is said that the high figures for Sweden include costs for research at the universities while such costs are not included in several other countries. My conclusion is that indicators showing the share of national income devoted to education and training and average spending per student must be interpreted with care.

Expenditure on public labor market programs

Spending on public labor market programs usually use expenditure as a percentage of GDP, classified by type of participant. To show the direct expenditure by governments to improve workplace skills is an example of labor market indicator. Training for unemployed as well as employed adults is included but also measures for unemployed youth and vocational rehabilitation for disabled. Public expenditure for apprenticeship and related forms of general youth training are excluded from such

figures. When interpreting these figures it is important to know as much as possible of how public labor market programs are organized in different countries.

Investment by firms and organizations

Spending by enterprises on training as percentage of total labor costs is a very difficult indicator to measure. Much of the cost for training is not reported in company accounts. This indicator is extremely important, but the cost of the large amount of informal training taking place in modern workplaces is difficult to measure. Leaders of modern industries are well aware of the importance of investment in teaching new things. Spending is very uneven with more spending in large and rich companies than small, and also more spending on persons that already have a good background. In Sweden, there are estimates which indicate that the cost of training within the work-place is about the same as the cost of most of the formal education in the country. However, indicators seen in the literature are usually not very reliable and you must direct attention to the source of the figures.

Investment by families on human capital

Indicators of investment by families in activities that can directly or indirectly influence the development of human capital in their children are very difficult to collect. Percentage of households with personal computers is used as a very crude indicator as ownership of a computer might contribute to the creation of skills and competencies useful in the labor market.

Time Investment

Number of years spent in formal education is used as an indicator of time investment in human capital. However, this is a very crude measure if we are interested in the level of education people have reached. In some countries grade repeating is common while in others this is not the case. Of this reason we have to know the education system of a country if this indicator is to be used. Estimated number of years in formal education for a five-year-old child and estimated average number of years in tertiary education for a 17-year old are other indicators used. The last measure

combines information on how many undertake tertiary education and the length of time they spend in it. Participation in adult education is also an important indicator.

3. Measuring the Stock of Human Capital

The skills, knowledge and competencies held by individuals represent the stock of human capital. The highest level of formal education reached by an individual could be used as an approximation for human capital. Already in 1975 level of education was found to be much stronger than time in formal education as an indicator of human capital (Fägerlind, 1975). Several studies have shown that the privileged benefit most of formal education and will get the best achievement results (Chinapah, 1983; Engström, 1994; Chen, 1996). However, equipment in the schools and the quality of the teachers also plays an important role for achievement. Chen (1996) also found in China, Korea and Hungary that if school equipment was the same, smaller schools had better results. In order to understand simple indicators about level of formal education it is important to know the curricula in different countries and different programs.

Achievements in reading, mathematics and science at different age levels have been used as indicators of the stock of human capital. Reading and mathematics results might be good proxies. Over and above the results of schooling they are also carrying influences from the home both of environment and genes. Gender differences are also used. In many countries results from national evaluations can be used as indicators within the country. It is important to listen to discussions of how evaluations are made, and if multiple choice questions are good. Some countries claim that their educational system is not promoting such tests and want other ways of testing achievement. It has been argued that measures of human capital based on initial educational attainment are only of limited applicability in studies of the relationships between knowledge and skills, productivity and earnings.

Results from the Adult Literacy Survey (OECD, Human Resources Development Canada & Statistics Canada, 1997) are used as a new approach to the measurement of skills and competencies in an international context. Average literacy score in each

country of people with respective attainment levels are used. Such indicators show how much difference in education makes to literacy in each country. Comparisons across countries of literacy among people with similar educational attainment are also possible. Percentage of 16-25 year-olds and 46-55 year-olds on the lower literacy levels could be used as an indicator of the literacy level in different age cohorts.

There is a great interest among policy makers to know if school results have improved or deteriorated over time. The IEA studies used anchor items in their studies. In the science study performed in 1970 and 1983 Keeves & Schleicher (1991) compared results for the countries that participated on both occasions. When the national results were published Swedish policy makers were very happy as the results were better in 1983 than they were in 1970. However, when the comparisons were made with all countries it was found out that most countries except the United States had improved their results, some of them to a much higher extent than Sweden. Indicators where such comparisons can be made are rare, but are important in fully understanding the changes that are taking place.

4. Returns to Investment in Human Capital

According to the human capital theory investments in human capital would be economically beneficial to individuals, enterprises and societies. Such benefits might be in nature in the form of additional earnings, productivity or economic growth. To calculate rate of return is not very easy. The returns are usually attained over long periods after the investment has been made. Fägerlind (1975) showed that the rate of return to level of formal education was much higher at the age of 43 than before. He could also show that interactions were taking place. Men at the three highest levels of education, with higher ability measured at the age of ten, had higher incomes than men with lower ability while ability did not matter for the two lowest levels of education. Tuijnman (1989) showed that adult recurrent education became a more important indicator for income than level of formal education after the age of 45.

The OECD (1995) has calculated the impact of educational attainment, literacy and labor market experience on earnings. The results show that literacy is a stronger indicator in the United States, the United Kingdom and Ireland than it is in other

countries. Educational attainment is a strong indicator in Belgium, Canada and Poland while experience in the labor market is a strong indicator in Belgium, The Netherlands and Sweden. Explained variance is a little more than 20 per cent in most countries except Belgium where 41 percent of the variance in earnings is described. Over and above such comparisons studies must be performed on individual data, and longitudinal data where information is available over longer periods are more reliable than cross sectional studies.

Macroeconomic benefits to nations

To calculate the impact of education on macroeconomic performance has been difficult and generated more theories than agreed conclusions. It is clear that both human capital and technological know-how are important to growth. In studying the impact of education it is also important to take unemployment into account. A number of studies have shown that unemployment is more common in groups with a low level of education.

The more educated have a better possibility to understand information about health risks than the less well educated. (Furu, 1985), using data from a Swedish longitudinal data set, showed that level of education was the strongest predictor of good health among a number socioeconomic variables. Ankarsand (1998) showed, by using data from the same data set, that participation in recurrent education was a very strong indicator for staying on in your job. People who did not participate in recurrent education had an early retirement to a much larger extent than those who had participated in recurrent education did. There are studies showing that early childhood programs can produce long-term effects on school achievement, grade retention and social adjustment (Myers, 1998).

5. Conclusion

Indicators are here to stay. Further work on definitions, and continuing analysis on how to use indicators, will be important areas for the future. It is also important that indicators are measured the same way over longer periods. When this is not done it is impossible to compare the same indicators over time. It is also important to discuss

how changes over time can be measured. Much greater attention to the data collection and selection issues must be paid in the future. It will be very important when countries other than the OECD ones will begin to collect and distribute indicators. There might also be a demand for other types of indicators, building more on a humanistic paradigm (Delors, 1996).

Indicators do not solve the problem of comparability. For policy makers to better understand their own system it is also important to include comparative analyses of educational and societal systems. More detailed studies of the relationship between variables are needed. Such variables can use cross sectional as well as longitudinal data. Attempts to compare research results between countries are important.

Very few measures are available on the quality of the teaching force, and there is no agreement on how to measure such a factor. Teacher unions are not very cooperative when discussing such issues. One reason is that there is not a common understanding of basic concepts such as “What is a school?” “What should go on in a school?” and “What is a good teacher?” Another weakness of indicator systems is that managers in schools do not know the proper role of indicators in the organization of schooling (Wyatt, 1994).

Continued research and analysis on social indicators is needed to better understand the role of education in the world societies.

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