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The Contribution of Higher Education to Economic Development

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ABSTRACT

Education is widely accepted as one of the leading instrument for promoting economic development. But what level of education that contributes most to development: Primary, secondary, or higher education? Knowledge-based competition within a globalizing economy is prompting a fresh consideration of the role of higher education in economic development and growth. Previously it was often viewed as an expensive and inefficient public service that largely benefited the wealthy and privileged. Now it is understood to make a necessary contribution, in concert with other factors, to the success of national efforts to boost productivity, competitiveness and economic growth. Viewed from this perspective, higher education ceases to contend with primary and secondary education for policy attention. Instead, it becomes an essential complement to educational efforts at other levels as well as to national initiatives to boost innovation and performance across economic sectors. Recent evidence suggests higher education is a determinant as well as a result of income, and can produce public and private benefits. Higher education may create greater tax revenue, increase savings and investment, and lead to a more entrepreneurial and civic society. It can also improve a nation's health, contribute to reduced population growth, improve technology, and strengthen governance.

KEY WORDS: Higher Education, Economic Growth, Economic Development.

INTRODUCTION

After World War II, several economists, including Milton Friedman, Gary Becker, and Jacob Mincer, developed the "human capital" theory to examine the benefits of education for individuals and society. But they have neglected higher education as a means to improve economic growth and mitigate poverty. In contrast to this early view, recent evidence suggests higher education is a determinant as well as a result of income, and can produce public and private benefits.[1]

Higher education is an important form of investment in human capital development. In fact, it can be regarded as a high level or a specialized form of human capital, contribution of which to economic development is very significant. It is rightly regarded as the "engine of development in the new world economy".

The contribution of higher education to development can be varied: it helps in the rapid industrialization of the economy, by providing manpower with professional, technical and managerial skills. In the present context of transformation of nations into knowledge economies and knowledge societies, higher education provides not just educated workers, but knowledge workers to the growth of the economy. It creates attitudes, and makes possible attitudinal changes necessary for the socialization of the individuals and the modernization and overall transformation of the societies. Fourthly and most importantly, higher education helps, through teaching and research in the creation, absorption and dissemination of knowledge. Higher education also helps in the formation of a strong nation-state and at the same time helps in globalization. Lastly, higher education allows people to enjoy an

1 D. Bloom, D. Canning, and K. Chan, Higher Education and Economic Development in Africa, Harvard University February 2006, p. 1. (http://siteresources.worldbank.org/INTAFRREGTOPTEIA/Resources/Higher_Education_Econ_Dev.pdf)

enhanced 'life of mind' offering the wider society both cultural and political benefits.[2] The purpose of this study is to examine the impacts of higher education on economic development at all aspects.

HIGHER EDUCATION AND ECONOMIC GROWTH

The contribution of higher education to economic growth is presumed to occur through a number of distinct yet interacting functions. First, it is believed that higher education contributes to economic growth through the "production of knowledge" and that is largely takes place within the major universities through faculty members' and their advanced students' research and creative activities.

Second, it is generally acknowledged that colleges and universities contribute to national growth through the "diffusion of knowledge", which may result from the external serve activities of their faculty, staff, and students.

Finally, it is universally accepted that postsecondary institutions contribute to the "transmission of knowledge" through extensive and varied teaching activities. Economists have focused their attention on this latter set of activities as measured by enrollments, man-years of postsecondary education completed, number of graduates, graduation rates, expenditures, and changes in student earnings. [3]

2 J. Tilak, Higher Education and Development, International Seminar: University XXI, Brasilia, Brazil, (25-27 November 2003), p. 3.

3 W.E. Becker and D.R. Lewis, Preview of Higher Education and Economic Growth, in "Higher Education and Economic Growth" Edited by: William E. Becker and Darell R. Lewis, Kluwer Academic Publishers, 1992, p. 2-3.

THE RELATIONSHIP OF HIGHER EDUCATION TO ECONOMIC GROWTH: EMPRICAL EVIDENCE

Macroeconomic Approaches

Perhaps the simplest framework in which to look at the effects of education on economic growth is offered by the growth accounting framework. The basic model is that output is a function of factor inputs as described by Solow (1956).[4] For the economy as a whole there are various ways to analyze the relationship, but the most usual approach would be to suggest that grow in output (Q) is a function of the growth of inputs of labor (L) and capital (K) plus an unknown residual or error term (R). Thus the basic equation is: Q= f (L, K, R)

The residual item is needed because investigations typically find that the growth in output is greater than the increase in labor and capital in the economy.[5] The unexplained residual is decomposed into a portion explained by the increase in human capital, usually measured by average years of schooling, and a portion frequently attributed to technological change. This accounting typically attributes 15-25% of growth in U.S.[6]

Pancavel (1991), in his work on the rate of education in economic growth, demonstrates how the contribution of the different levels of schooling (primary, secondary and higher education) can be derived from aggregate measures of the schooling and productivity. His estimates indicate that although the contribution of overall schooling rose from 14,78 percent

4 P. Stevens and M. Weale, Education and Economic Growth, International Handbook on the Economics of Education, Edited by G. and J. Johnes, August 2003, p. 7.

5 G.B.J. Atkinson, The Economics of Education, Hodder and Stoughton, 1983, p. 48-49.

6 W.E. Becker and D. R. Lewis, Higher Education and Economic Growth, Book Review by J. Siegfried, Industrial and Labor Relations Review, Vol. 47, No. 3 (April, 1994), p. 524.

to 23.41 percent, the growth in higher education and its relative contribution to economic growth in the US was much larger. Pancavel estimates that the contribution of higher education to economic growth has increased dramatically in 1990s, rising from only 1.29 percent in the 1913 to 1950 period to 14.61 percent in the 1973 to 1984 period.[7]

Bassanini ve Scarpetta (2001) have investigated the role of human capital accumulation in explaining growth paths across 21 OECD countries over the 1971-98 period via panel data analyze. They proxied human capital by the average number of years of formal education of the working age population. The results point to a positive and significant impact of human capital accumulation to output per capita growth. The estimated long-run effect on output of one additional year of education (about 6 percent) is also consistent with microeconomic evidence on the private returns to schooling. They also found a significant growth effect from the accumulation of physical capital, and a speed of convergence to the steady state output per capita growth path of around 15 per cent per year. [8]

In a cross-sectional study, Barro and Sala-i-Martin found that male educational attainment, particularly secondary and higher education, had significant positive growth effects.[9] An increase in average male secondary schooling of 0.68 years raises annual GDP growth by 1.1 percentage points, while an increase in higher education of 0.09 years raises annual growth by 0.5 percentage points. They find an interaction between initial GDP and human capital (broadly defined, including health and education), so that countries that lag behind tend to grow faster if they have high levels of human capital.

7 J. Pencavel, Higher Education, Economic Growth and Earnings, in "Higher Education and Economic Growth" Edited by: William E. Becker and D.R. Lewis, Kluwer, 1993, p. 53.W.E. Becker and D.R. Lewis, Higher Education and Economic Growth, p. 10.

8 A. Bassanini and S.Scarpetta, Does Human Capital Matter For Growth in OECD Countries? Evidences From Pooled Mean-Group Estimates, OECD Economics Department Working Papers, No: 282, (2001), p. 24.

9 R. J. Barro and X. Sala-i-Martin (1995). Economic Growth. New York: McGraw-Hill.

In a time series analysis of the United Kingdom, Jenkins looked at an index of total factor productivity and its relationship to different levels of educational attainment.[10] When higher education qualifications (including undergraduate, postgraduate, and other university graduate stock) increased by 1 per cent, annual output grew between 0.42 and 0.63 per cent.

A study in Taiwan showed that higher education played a strong role in the country's economic growth.[11] It found that a 1 per cent rise in higher education stock (as defined by those who had completed higher education, including junior college, college, university, or graduate school) led to a 0.35 per cent rise in industrial output, and that a 1 per cent increase in the number of graduates from engineering or natural sciences led to a 0.15 per cent increase in agricultural output. This work examined the effects of concentration in different disciplines and concluded that study of the natural sciences and engineering had the largest effect on output.

Wolff and Gittleman showed that higher education enrollment rates are correlated with labor productivity growth. The number of scientists and engineers per capita is also associated with economic growth.[12]

Microeconomic Approach

Conventionally the contribution of education to economic development is analyzed in terms of education-earnings relationships and more conveniently in the form of rates of return.

10 H Jenkins, Education and Production in the United Kingdom, Economics Discussion Paper No 101, Nuffield College, Oxford University, 1995.

11 T-C Lin, The Role of higher education in economic development: an empirical study of Taiwan case, Journal of Asian Economics 15 (2),2004, p. 355–371.

12 EN Wolff and M Gittleman (1993): "The role of education in productivity convergence: does higher education matter?" In A Szirmai, B van Ark, and D Pilat (eds), Explaining Economic Growth. Amsterdam: North-Holland.

Rates of return are a summary statistic of the relationship between lifetime earnings and the costs of education. [13] After adjusting for direct costs associated with the corresponding levels of educational achievement (for example, tuition and fees), and taking account of the fact that the value of a given sum of money will vary depending on the time at which it is spent or received, the (discounted net) earnings differentials can be expressed in classic "rates-of-return" terms. Rates of return are considered private if they are based on differences in take-home pay and the costs of schooling that come out of the pockets of students and their families.

Once both private and social rates of return are calculated, it is easy to calculate the difference in these rates, how much society benefits above and beyond the private return. It is this difference that provides an economic justification for government action. If the social return exceeds the private return, this tells us that the unfettered operation of private markets (so-called "laissez-faire") will not produce as much education as is desirable from the point of view of society. (This is because private markets base their decisions on private returns, whereas society should base its decisions on social returns.) Also, if the social rate of return to primary school exceeds that for higher education, this in turn suggests that primary school is a better social investment than higher education.

Such analyses were undertaken, and concluded that the difference was greater in primary education than in higher education, and therefore that government action was more justified in the former than in the latter. But the standard rate-of-return analyses stopped there,

13 J. Tilak, Higher Education and Development, International Seminar: University XXI, Brasilia, Brazil, (25-27 November 2003), p. 3.

consistently failing to reflect that the benefits of higher education extend well beyond the incremental earnings accruing to those individuals who receive it.[14]

Psacharopoulos (1973, 1985, 1994, 2004) provides an international survey of rates of return to education. Conventional rate of return analysis shows higher education in a less favorable light than it shows primary and secondary schooling. Psacharopoulos and Patrinos reviewed 98 country studies and found that social rates of return to investment in primary education are the highest (% 18.9), followed by secondary education (%13.1). The returns to higher education are the least (%10.8). This pattern is more or less true in general with respect to private rates of return also. Such evidence is extensively used to discourage public investment in higher education and to concentrate rather exclusively on primary education.

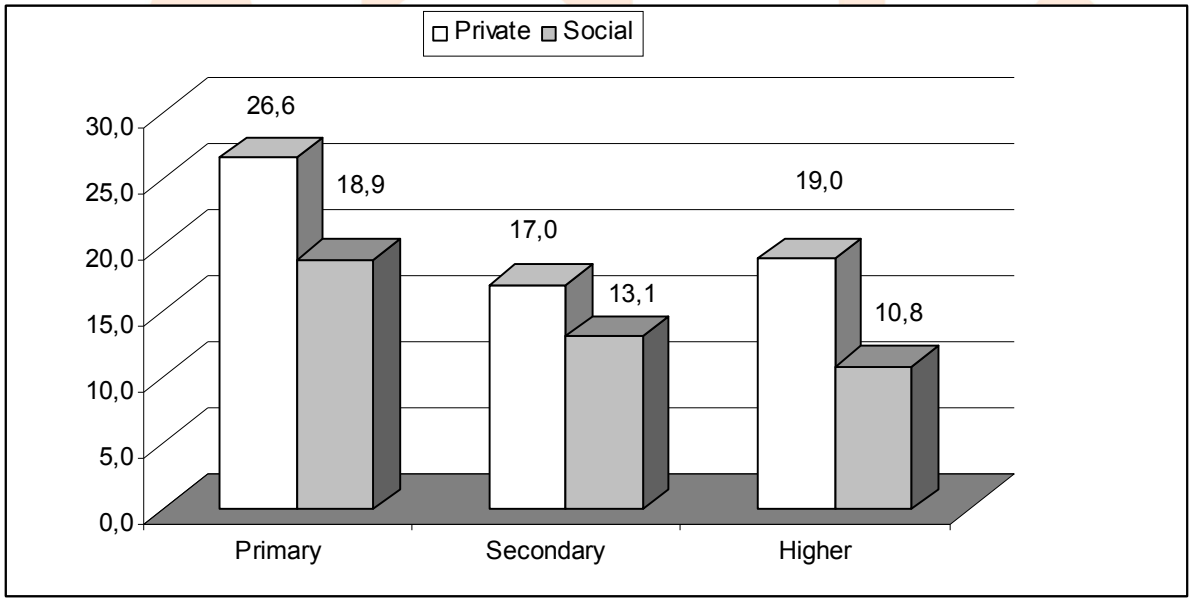


Figure 1: Returns to investment in education by level.

Though the rate of return to higher education is less than that to primary education, it should nevertheless be noted that higher education does yield an attractive rate of return to the society (above 10 per cent) and to the individual as well (19 per cent), as shown in Figure 1.[15]

14 World Bank, Higher Education in Developing Countries: Peril and Promises, The Task Force on Higher Education and Society. Washington, D.C.: The World Bank, 2000, p. 40.

Returns to education by level of country income are presented in Table 1. The highest returns are recorded for low-income and middle-income countries.

Table 1: Returns to investment in education by level, latest year, averages by per-capita income group (%)

Per-capita income group	Mean Per Capita (US$)	Social			Private		
		Primary	Secondary	Higher	Primary	Secondary	Higher
High income ($9266 or more)	22,530	13.4	10.3	9.5	25.6	12.2	12.4
Low income ($755 or less)	363	21.3	15.7	11.2	25.8	19.9	26.0
Middle income (to 9265)	2996	18.8	12.9	11.3	27.4	18.0	19.3
World	7669	18.9	13.1	10.8	26.6	17.0	19.0

G. Psacharopoulos and Patrinos H. A., "Returns to Investment in Education: A Further Update" **Education Economics,** Vol. 12, No. 2, (August 2004), p. 115.

Table 2 shows return to higher education by regional averages (%). There are wide variations in the rates of return between several countries. But on the whole, they show that (a) investment in higher education yields positive rates of return to the individual and also to the society at large; (b) in several countries social rates of return are high, above ten per cent, which can be considered as an alternative rate of return; and (c) rates of return seem to be increasing over the years in some countries. Generally, declining rates of return over time are often expected; but this is not necessarily the case in all countries. E.g., in some of the Asian countries, the rate of return is increasing. This may be due to rapid increase in the demand for higher educated manpower.[16]

15 G. Psacharopoulos and Patrinos H. A., Returns to Investment in Education: A Further Update, Education Economics, Vol. 12, No. 2, (August 2004), p. 112.

16 J. Tilak, Higher Education and Development, International Seminar: University XXI, Brasilia, Brazil, (25-27 November 2003), p. 4.

Table 2: Returns to higher education (%)

	Social	Private
Asia*	11.0	18.2
Europe/Middle East/North Africa	9.9	18.8
Latin America/Caribbean	12.3	19.5
OECD	8.5	11.6
Sub-Saharan Africa	11.3	27.8
World Average	10.3	19.0
* non-OECD		

G. Psacharopoulos and Patrinos H. A., "Returns to Investment in Education: A Further Update" **Education Economics,** Vol. 12, No. 2, (August 2004), p. 114.

* Non-OECD

Overall, the average rate of return to another year of schooling is 10%. According to Psacharopoulos and Patrinos, average returns to schooling have declined by 0.6 percentage points for over ten years. At the same time, average schooling levels have increased. Therefore, and according to theory, everything else being the same, an increase in the supply of education has led to a slight decrease in the returns to schooling.[17]

HOW HIGHER EDUCATION SUPPORTS DEVELOPMENT?

Statistical analysis, case study, and common observation all point to the fundamental importance of higher education to development. Higher education promotes the following:

• **Income growth:** The vitality of higher education is a fundamental—and increasingly important—determinant of a nation's position in the world economy. It contributes to labor

17 G. Psacharopoulos and Patrinos H. A., Returns to Investment in Education: A Further Update, Education Economics, Vol. 12, No. 2, (August 2004), p. 113.

productivity, entrepreneurial energy, and quality of life; enhances social mobility; encourages political participation; strengthens civil society; and promotes democratic governance. It does this by creating public goods such as new knowledge, and by providing a safe space for the free and open discussion of the values that define the character of a nation's development. Economic growth is a powerful determinant of poverty alleviation and improvements in people's lives. Higher education's contribution to growth, therefore, means better living standards for people at all levels of a society.

• **Creating new technology:** In a knowledge economy, higher education can help economies keep up or catch up with more technologically advanced societies. Higher education graduates are likely to be more aware of and better able to use new technologies. They are also more likely to develop new tools and skills themselves. Their knowledge can also improve the skills and understanding of non-graduate coworkers, while the greater confidence and know-how inculcated by advanced schooling may generate entrepreneurship, with positive effects on job creation. [18]

• **Enlightened leaders:** Higher education can give leaders the confidence, flexibility, breadth of knowledge, and technical skills needed to effectively confront the economic and political realities of the twenty-first century. It also generates cadres of well trained teachers for all levels of the education system.

• **Expanding choices:** Development is fundamentally concerned with expanding the choices people can make. As such, an accessible higher education system—offering a wide range of

18 D. Bloom, D. Canning, and K.Chan, Higher Education and Economic Development in Africa, Harvard University February 2006, p. 15-16. (http://siteresources.worldbank.org/INTAFRREGTOPTEIA/Resources/Higher_Education_Econ_Dev.pdf)

quality options for study— is a major achievement, bolstering social mobility and helping the talented to fulfill their potential.

• **Increasingly relevant skills:** Higher education is absolutely necessary for training scientists, engineers, and others to help invent, adopt, and operate modern technology in all sectors. When scientists in developing countries are inspired to define and address local problems, they are likely to contribute to appropriate solutions in such vital areas as environmental protection, the prevention and treatment of illness, industrial expansion, and infrastructure provision.

PUBLIC AND PRIVATE BENEFITS OF HIGHER EDUCATION

Higher education can lead to economic growth through both private and public channels. The private benefits for individuals are well established and include better employment prospects, higher salaries, and a greater ability to save and invest. These benefits may result in better health and improved quality of life, thus setting off a virtuous spiral in which life expectancy improvements enable individuals to work more productively over a longer time further boosting lifetime earnings.

Public benefits are less widely recognized, which explains many governments' neglect of higher education as a vehicle for public investment. But individual gains can also benefit society as a whole. Higher earnings for well-educated individuals raise tax revenues for governments and ease demands on state finances. They also translate into greater consumption, which benefits producers from all educational backgrounds.

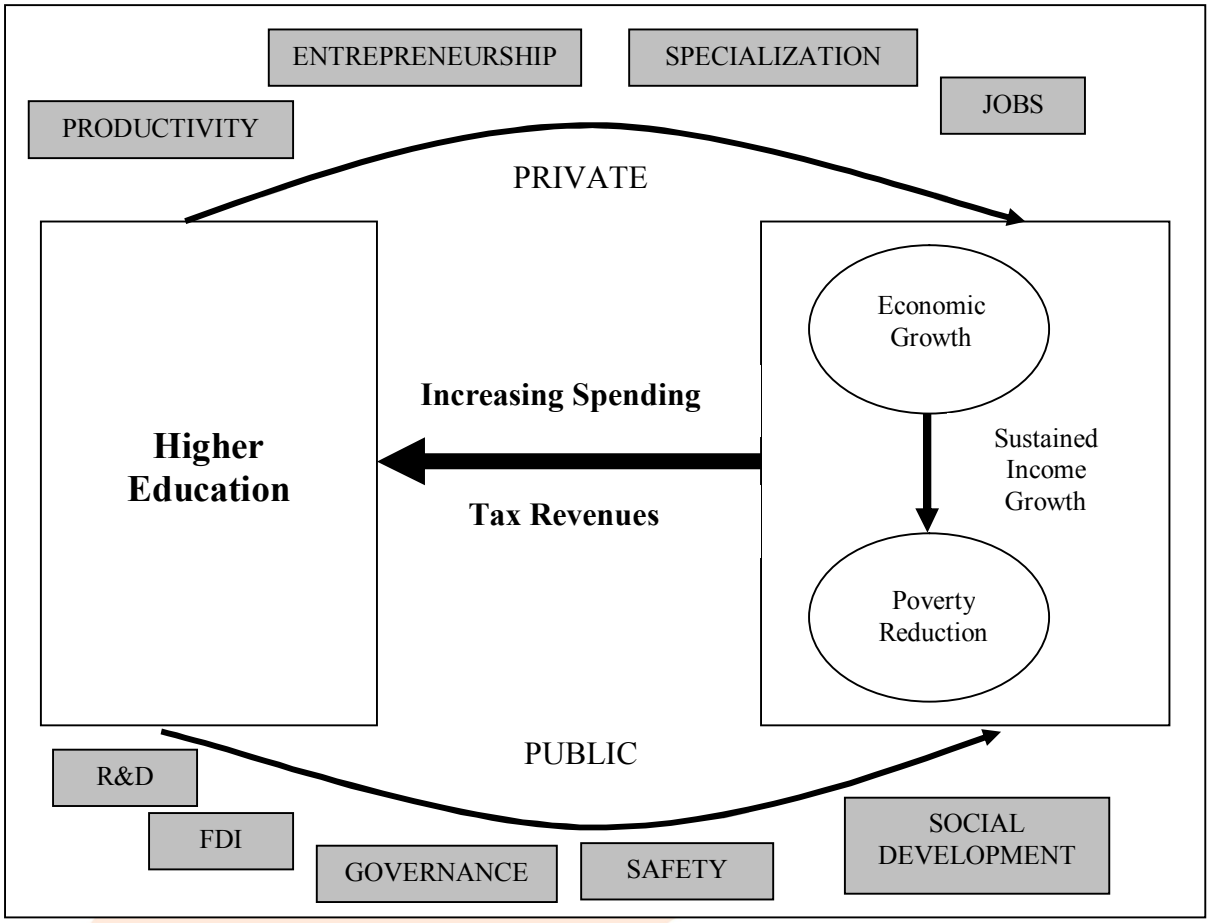


Figure 2. The channels of effect higher education to economic growth

Although none of these outcomes is inevitable, the framework presented in Figure 2 does suggest many possible routes through which higher education can benefit economies.[19]

PECUNIARY AND NON-PECUNIARY BENEFITS OF HIGHER EDUCATION

19 D. Bloom, D. Canning, and K.Chan, Higher Education and Economic Development in Africa Harvard University February 2006, p. 15-16. (http://siteresources.worldbank.org/INTAFRREGTOPTEIA/Resources/Higher_Education_Econ_Dev.pdf)

The benefits of higher education, both private and public, can be partitioned into pecuniary and non-pecuniary benefits. [20]

Pecuniary returns are anything that improves the financial well-being of individuals and the public. These would include the increased tax receipts collected from educated citizens. In addition, this larger and deeper tax base would reduce the tax pressure on the lower-income members of society at the same time as reducing the number of people that would require support from all levels of government.

A rather substantial pecuniary benefit of higher education that is almost universally ignored in economic research as well as the debate on higher education funding is called the "financial option" return of educational investments. Part of the monetary value of completing an education is that passing through various schooling thresholds provides one with the opportunity to obtain still more education. If students are unaware of this option value at the time of making their investment decisions (and this might be especially prevalent among students from disadvantaged families or families with lower average education levels), public subsidies can help avoid systematic underinvestment. Though it is easy to see why the option value is largest for more elementary levels of education, the changing technological and economic conditions of the twenty-first century are inflating the option value of a college education.

The non-pecuniary benefits of higher education are all of the nonmonetary benefits that accrue to individuals and society. The difficulty in attaching a dollar value to most of these types of benefits (and in many cases, recognizing) is likely responsible for the dearth of

20 World Bank, Higher Education in Developing Countries: Peril and Promises, The Task Force on Higher Education and Society. Washington, D.C.: The World Bank, 2000, p. 92.

economic studies that focus on measuring the public returns to higher education and for the apparent understatement of the benefits in those studies that do exist.

Other recognizable nonpecuniary benefits include promoting educational opportunity, promoting growth and economic productivity, supplying trained men and women to the economy, achieving specific social objectives such as income transfer or equalization, developing an educated citizenry, creating knowledge, and stimulating learning. There is a growing literature in human ecology that finds that female and maternal education affects children's health, female mortality, female fertility, birth rates, and the "quality" of children.[21]

Education may also increase productivity in nonmarket activities, such as home production; it may make parents into more efficient producers of children's human capital; and it may lead to more informed and effective consumption decisions. Other research shows that more educated individuals live longer—which itself has substantial economic value—and they report better health at any particular age. Finally, education is itself often a consumption good, which, in turn, enables the consumption and enjoyment of human capital goods such as information, literature, and ideas. All of these benefits of education are enjoyed directly by the educated person, so they are elements of "private" returns that people would be willing to pay for.[22]

21 M J. Rizzo, The Public Interest in Higher Education, A Federal Reserve Bank of Cleveland Research Conference Proceedings of a Conference Held in Cleveland, Ohio November 18–19, 2004, p. 20.

22 R. Topel, The Private and Social Values of Education, A Federal Reserve Bank of Cleveland Research Conference Proceedings of a Conference Held in Cleveland, Ohio November 18–19, 2004, p. 47, 48.

CONCLUSION

Individuals are interested in taking more schooling partly because they can earn more and get better jobs, on average, with more schooling. For many, more schooling can be a source of social mobility. Similarly, nation-states and regions are interested in raising the average level of schooling in their population because they think that doing so will improve productivity, increase economic growth, raise the quality of jobs in the economy, and reduce poverty and inequality. Some of the earliest work in the economics of education argued that a major effect of more education is to improve labor's capacity to produce. Because more highly educated workers are more literate and numerate. They should be easier to train to do more complex tasks. Further, they should have better work habits, particularly a greater awareness of time and more internalized norms that would make them more dependable.

Nations with more educated labor forces are characterized by higher output per worker, but typically these nations also have more physical capital per worker. Exactly how education increases productivity, how important it is, and it what ways it is important are difficult question which economists have been unable to answer definitively. Controversy also surrounds the level of education that contributes most to growth; primary, secondary, or higher education, although we will argue that the case for higher education as a key factor in economic development has grown stronger in recent years.

One of the clues that education does contribute to growth and how much it may contribute is that countries with higher levels of economic growth have labor forces with higher levels of

formal schooling. Such a macroeconomic approach to the relation between education and economic growth emphasizes the correlation between the stock of human capital and the increase in economic output per capita. This may just indicate that as individuals earn more income, they purchase more schooling for their children. In that case schooling would be primarily a consumption good, not an investment good. However, economists have been able to show that, on average, countries that have sustained high levels of economic growth are also those who have higher levels of literacy and have invested steadily in raising the education of their labor force. With the shift to an information economy, globalization, and flexible organizations of production, economists have taken these arguments about human capital in the production process a step farther. Theories of development now argue that developing nations have a better chance of catching up with the more advanced economies when they have a stock of labor who have the skills to develop new technologies themselves or to adopt and use foreign technology.

The claim that educated workers adjust more effectively to rapid change in opportunities and technology implies that in today's more rapidly changing and more competitive markets, the payoff to education should rise. The growth of science-based industries also means that economic development depends increasingly on highly educated and scientifically trained labor. Yet, more than simply increasing the demand for scientifically trained labor, economists argue that the new types of production reward innovation and learning-by doing on a broader scale, even among non-scientifically oriented workers. In this kind of model, more education in the labor force increases output in two ways: (a) education adds skills to labor, increasing the capacity of labor to produce more output; and (b) education increases the worker's capacity to innovate (learn new ways of using existing technology and creating

new technology) in ways that increase his or her own productivity and the productivity of other workers.

The first of these emphasizes the human capital aspect of education (education improves the quality of labor as a factor of production and permits technological development); the second places human capital at the core of the economic process and assumes that the externalities generated by human capital are the source of self-sustaining economic growth process—human capital not only produces higher productivity for more educated workers but for most other labor as well.

The fact that individuals with more education have higher earnings is another indication that education contributes to growth. The education-higher earnings connection reflects a microeconomic approach to the relation between education and economic growth. Greater earnings for the more educated in this approach represent higher productivity—hence, an increase in educated labor in the economy is associated with increased economic output and higher growth rates.

The positive economic payoff to individuals with more education in the form of higher earnings suggests that their economic value to the society is higher than those who have lower education. Economists estimate the payoff to more education relative to the cost of that education just like they would estimate the payoff to any investment. They calculate what the amount invested in education yields in higher earnings over the lifetime of those with more education. This rate of return to the investment in education is generally positive in almost every country. A positive rate of return to education suggests that investing in education contributes to economic growth. The higher the rate of return, the more likely that investment

in education contributes to growth. And those levels of education associated with higher rates of return should be the levels in which additional investment produces the greater contribution to economic growth.

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