

THE ROLE OF HIGHER EDUCATION TO ECONOMIC DEVELOPMENT

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During the second half of the last century, the question of educational expansion attracted much attention and the debate revolved mostly around the evaluation of its socio-economic benefits and costs. Nowadays in the context of the European higher education policy, the knowledge economy discourse expressed in the EU Lisbon Agenda rendered higher education increasingly important for the development of nation's economies through their central tasks of generation, application and dissemination of knowledge and training high skilled labour force. In this paper we have analysed the role of higher education to economic development by highlighting private and societal benefits of university education as well as trying to look at possible negative effects that higher education expansion might have. In addition, we made an overview of empirical studies, providing us with the evidence from cross-country analyses whether higher education promotes economic growth at macroeconomic level. Most empirical studies show, that there exist only weak and elusive connections between education and economic development.

Key words: economic development, higher education, private and societal benefits of higher education, human capital

Introduction

Concern about expansion of higher education in Western Europe and North America is not a recent phenomenon. Major changes took place in the 19th century that prepared the way for increased participation (Curtis and Boulwood 1966) and, with the acceleration of the process since the end of the Second World War, higher education has become *de facto* part of the national system of education in most European countries. Since the 1960s, human capital theorists have presented education as one of the most productive means of growth investment. Acquiring a university degree is a form of human capital investment.

Nowadays in the context of the European higher education policy, the ideas of human capital theorists have reached its definitive expression in the EU Lisbon Agenda. The first priority in the Lisbon strategy for Europe is the realisation of the knowledge society, based on dynamic and competitive knowledge-based economy. The term is associated with the recognition of the role of knowledge in economic growth. The concept of knowledge economy or knowledge society is often used to illustrate the shift from an economy based on the low skills industrial production to knowledge intensive production and services as the back bone of the economy, or the shift from a fordist to a post-fordist society, marked by denationalisation and transnationalisation of state regulation, transnational flow of capital and ensuing global competition. The discourse of knowledge economy emphasizes the shift to knowledge intensive high skills labour force, international circulation of brains, life long learning, transferable skills and competences and knowledge management as a key individual and organisational capacity.

A competitive economy can only be based on a well-educated population as well as a dynamic R&D sector. The two components of knowledge the human beings ("human capital") and the technology have become central to economic development. In the age of globalisation, the knowledge economy discourse has become a way to characterize the new relationships between the state, society and economy and rendered higher education increasingly important for the international competitiveness of the nation states through their central tasks of generation, application and dissemination of knowledge and training high skilled labour force.

In this paper we have analysed the role of higher education to economic development by highlighting private and societal benefits of university education as well as trying to look at possible negative effects that higher education expansion might have. In addition, we made an overview of empirical studies, providing us with the evidence from cross-country analyses whether higher education promotes economic growth at macroeconomic level.

Higher education influences economic well-being in three ways. First, the direct expenditures by the institutions, their employees, and their students impact the local economy. This spending multiplies through the local economy until the monies are used to purchase goods and services from outside the local area. Second, higher education provides financial and non-financial benefits to the individual who pursues an advanced education and to society in general. Third, institutions of higher education are increasingly focused on knowledge creation. Thus, universities are sources of key research and development innovations that simultaneously can be beneficial to society and conducive to economic growth.

Our academic institutions are publicly funded institutions entrusted with two main tasks: to carry out research and to educate part of the next generation at a higher level. In this context, the qualitative aspect of the expansion of higher education has been concerned with the strategic options for economic growth favoured by decision-makers. These strategic options have ranged from the priority given to broadening access to

undergraduate studies, with an implicit endogenous growth model based on the importance of human capital accumulation, to priority given to research activities, with an implicit exogenous growth model based on the importance of technical innovation as a driving force behind future economic growth. Although education policy makers when allocating funds always have to choose between those options, in fact, a combination of both is important if higher growth is to be achieved. Besides, analysis at a macro-level has proved, that it is particularly difficult to distinguish and separate the respective contribution to economic development of the technological infrastructure and know-how and of human capital, understood as the quantitative and qualitative characteristics of the workforce measured by using the average educational level of the population (OECD 1998).

Analyzing the contribution of higher education to economic well – being we will discuss benefits provided to individuals by acquiring a university degree, as well as will try to describe benefits, that society in general experiences because of better educated individuals in it.

1. Personal Benefits of Higher Education

1.1. Monetary benefits

In micro-economic terms human capital theory relies on the implicit understanding that through education the individual acquires competences and skills whose essential characteristic is the ability to be transferable and negotiable on the employment market and which also have a transactional value and a direct bearing on individuals' average income throughout his live. The average earnings of individuals are closely related to their educational attainment. In particular, those with a bachelor's degree earn substantially more than even those with some college education. Relative to those with a bachelor's degree, a postgraduate degree provides nearly as large a boost in earnings. The higher salaries that educated entrants are able to command on the job market represent both the interest on the capital they have invested in education and the fact that they have become more productive by having invested, regardless of the type of education they have received. However, rapid changes in employment conditions, the future macroeconomic environment, technical innovation and skills obsolescence are amongst the variables that throw into question the full validity of the human capital model applied to the individual.

To compare the return on investment offered by a university education with other investments, it is useful to compute the "internal rate of return." This is the discount rate that equalizes the present value of benefits and costs. The concept of internal rate of return is equivalent to what financial economists refer to as the "yield to maturity" on a financial asset. Returns calculated in this way can be compared across all kinds of loans or bond purchases, regardless of the time pattern of interest and principal payments. Based on a cost-benefit analysis over a person's working life, the expected net return from an individual's payment of tuition and fees and foregone income while obtaining a bachelor's degree, in most studies is estimated to be between 10 and 13 percent. Such estimates suggests, that financial returns from higher education compares favourably with real returns on most financial assets and this kind of investment is as good as or better than most investments a family could make for its children. A reverse corollary of this understanding might be, that when employers are prepared to hire less qualified people, rates of participation in formal education decrease accordingly as the possibility of earning an immediate salary increases the opportunity cost of staying longer in formal education.

The differential in earnings based on educational attainment has increased over time. Analysis confirms that the incomes of university graduates, especially those with advanced degrees, have been rising faster than the incomes of those with no university education. This rising differential constitutes the principal evidence for the emerging "knowledge economy."

1.2. Distinguishing the Effects of Educational Attainment from Ability

Social scientists long have been concerned that simple correlations between educational attainment and earnings may overstate the causal role played by education in determining earnings capacity. Individuals with high innate abilities, cognitive and non-cognitive, find it easier to be successful in school and will complete more years of schooling. But these innate abilities are themselves important in determining earnings capacity. Because abilities are difficult to observe, the correlation between educational attainment and unobserved ability will confound attempts to identify the true effect of education on earnings.

One method statisticians use to try to correct for unobserved and missing variables is a technique known as "instrumental variables". In the case of earnings and its relationship to educational attainment (observed) and ability (unobserved), the idea is to find another variable (the instrument), that determines and correlates with education but is itself uncorrelated with ability. The true effect of education on earnings can be estimated

by replacing observed education with the value for education predicted by the instrument in an earnings regression (Hill, Hoffman and Rex, 2005).

Some studies of the benefits of schooling have tried to deal with the issue of ability bias by using special data sets. Card's (1999) studies of identical twins, for example, find that the benefit of schooling is 10 percent lower than simple estimates. If one believes that identical twins have identical abilities, then these findings suggest only a small upward bias in simple estimates of the effect of education on earnings. Another special data opportunity arises when countries enact broad changes in compulsory schooling laws. Britain, for example, in 1972 raised the age at which children could leave school from 15 to 16. With the new law, about one quarter of the youth population was forced to stay in school an extra year. Presumably there was no difference in the distributions of innate ability between people born in 1955/1956 and those born a little later who were affected by the law. Yet those born later, those with extra schooling, had significantly higher earnings later in adulthood. Estimates from these data suggest an earnings benefit of at least 10 percent for the extra year of schooling (Card 2002).

In summary, the issue of ability bias remains a formidable statistical problem for education researchers. But the weight of evidence from dozens of studies and the consensus view of social scientists is that the earnings differential between people with different levels of educational attainment is primarily a reflection of education itself, not differences in ability.

1.3. Non-monetary benefits

In addition to higher earnings opportunities, individuals with higher education experience some non-monetary benefits. University education makes individuals more entrepreneurial and adaptable through increased flexibility in the face of change and difficulties, so besides increased income it also provides a good protection against unemployment. International statistics presented in the work of Howe (1994) reveals a clear relationship between the education level and the employment prospect. The highest employment rate is observed among persons with tertiary education, followed by persons with secondary education. The highest unemployment rate is recorded for persons with basic education or less. Wang (2003), in an extensive study of the impact of universities on surrounding cities, finds that proximity to institutions of higher learning even induce greater rates of job growth.

Education provides a variety of benefits to students including enhanced social skills, greater awareness of human achievement, and an appreciation for cultural diversity. Increasing education is associated with better working conditions, lower disability rates, longer job tenure, more on-the-job training opportunities, and more promotion opportunities. The value of these non-monetary benefits adds to the economic returns to education.

2. Societal Benefits of Higher Education

2.1 Monetary benefits

Human capital theory proponents cite two types of the benefits to society from investments in higher education: monetary and non-monetary. Societal monetary benefits of a workforce with greater educational attainment and skills can be traced to the enhanced worker productivity associated with greater educational attainment. These productivity gains translate into higher output and incomes for the economy.

While widely discussed, relatively few authors have attempted to quantify the social monetary benefits of higher education investments. One way to do so is to examine whether regional economies with greater proportions of college trained workers exhibit evidence of prosperity that may be attributed to the higher levels of education attainment. Recent work by Moretti (2004) is a notable exception. Moretti examines the relationship between greater labour force shares of college graduates and the wages attained by all workers, as well as the productivity of manufacturing enterprises.

The challenge in quantifying the social benefits of higher education is to establish statistical evidence of a causal relationship linking additional education to observed outcomes. Otherwise, the relationship may be simply a correlation of higher wage employment opportunities and greater numbers of college graduates, or a relationship of both to unobservable attributes. The following provides a technical perspective:

If changes in the share of college graduates are positively related to unobservable factors that influence labour supply, then simple ordinary least squares (OLS) estimates (e.g. simple correlations) of the impact of college graduates on wages would be biased downward, understating the extent that college graduates actually contribute to wage determination. Essentially the positive labour supply shocks dampen wages and obscure the positive impact that graduates have on the labour market.

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biased upward, overstating the extent that college graduates actually contribute to wage determination. Essentially the positive demand shocks increase wages so the observed wage effect is the combination of the demand shock and the effect of increased graduates in the area.

Moretti controls for a host of factors that explain wage and productivity differentials across cities and through time, uses instrumental variable techniques to account for potential reverse causation, and checks results against a distinct longitudinal data set. These approaches are designed to establish evidence, or lack thereof, of a causal relationship.

Moretti finds, after controlling for other factors, that a 1 percent increase in the labour force share of college graduates in a city drives up wages for all workers:

- 1.9 percent for labour force participants without a high school diploma;
- 1.6 percent for labour force participants with a high school diploma;
- 0.4 percent for college graduates.

One explanation for these higher wages in areas with higher educational attainment is the enhancement of productivity that comes with a workforce with more education and skills. Moretti argues, that the observed wage benefits are a combination of spillovers, complementarities and substitution effects that are induced by changes in the labour force composition that take place as a natural consequence of labour market adjustments triggered by the change in the supply of educated workers.

The biggest portion of this significant wage effect is attributable to spillovers, which are the benefits that extend to third parties other than students and institutions of higher education. The source of these spillovers is the greater labour productivity that educated workers bring to the labour force. Spillovers may be technological, when social interaction is a catalyst for learning and overall knowledge creation. The more contact that takes place among educated people, the more the stock of knowledge expands. Learning and networking are important determinants of knowledge creation. According to Lucas (1988), productivity spillovers are large enough to explain the differences between rich and poor countries. The spillovers provide a basis for public investment in endeavours that increase the number of college graduates in the workforce.

All of the wage effects in Moretti's work cannot be attributed to spillovers generated by the additional graduates because other labour market effects also exist, but estimates of the net wage effect on college graduate wages alone help establish a lower bound for the spillover effect. The wage increment represents the net effect of the social spillovers and the wage-dampening supply shock induced by the greater number of college graduates. If the additional supply of graduates has a greater impact on wages than does the social spillover, the net impact on wages of college graduates would be negative. Instead, Moretti's estimates suggest a net positive increment to wages of 0.4 percent. Assuming that the supply shock has zero effect (unlikely but arithmetically conceivable), a lower bound for the social spillover effect for college graduates is obtained at 0.4 percent though the actual spillover effect is likely to be larger.

The idea of complementarities lies under the assumption, that physical and human capital can be complementary. Increased education, knowledge, and skills create an increase in the quality of the existing physical capital stock — increasing the productivity of capital that translates in higher labour productivity for all workers. For example, more educated workers use more sophisticated equipment that results in improved productivity. Moretti provides empirical evidence of this productivity enhancement.

Romer (1988) provides an explanation of substitution effects. As the knowledge economy increases in importance, the role of human capital may outstrip physical capital and labour in determining aggregate growth rates across countries. Using this argument, the acquisition of knowledge capital creates “endogenous” growth — growth that feeds on itself — and economic returns that accelerate. This argument is widely discussed among economists as one of the most important ways in which bigger accumulation of highly educated workforce and higher education institutions impact regions economy through innovation driven endogenous growth. University boosters often cite links between scientific breakthroughs from university research and subsequent product development by high-tech firms. Jorgensen (2000) et al. estimates that a considerable portion of the late 1990's growth was directly attributable to roles played by research innovation at institutions of higher education and the greater absorptive capacity of a labour force with greater proportions of college graduates. However, some economists find such benefits fleeting, because products are usually developed elsewhere. Even though investments in research at a number of institutions may increase the inventive activity of R&D laboratories located within the same metropolitan region, any resulting new products or processes will frequently be developed in other locations, where labour force is cheaper.

Glaeser et al. (2000) also examined wages in cities — identifying effects that accrue to those cities with higher education and skill levels. Results point to agglomeration spillovers that manifest themselves in faster

growth and higher wages as educated people interact. Gottlieb and Fogarty (2003), using similar data, confirm the result and note that it persists across a wide range of cities even after controlling for region.

One more source of monetary social benefits that has to be mentioned is that to the extent that university graduates earn and spend more than those without a degree, the government collects more tax revenue from university graduates, which represents a social good. The taxes paid by university graduates repay the public cost of their education several times over.

2.2. Non-monetary benefits

In addition to monetary benefits, a long list of non-monetary societal benefits from enhanced educational attainment in regions with greater shares of educated workers, especially highly educated workers has been documented. Wolfe and Haveman (2002) have suggested the following list of non-monetary societal benefits:

Non-wage labour market remuneration, such as fringe benefits, and the quality of working conditions are positively affected by educational attainment levels.

Consumer choices are more rational and efficient.

Job searches are more extensive among the more highly educated, resulting in a better match between the individual and the company, which enhances efficiency.

Savings rates are higher among the more highly educated.

Research and development activities are more common and numerous in regions with higher educational attainment.

Education is inversely related with reliance on welfare and public assistance. Investing in education reduces the necessity to invest in other public income transfer programs. Twenty-four percent of individuals without a high school diploma have at some time participated in a public assistance program, compared with 4.6 percent of those with a bachelor's degree (Lee, 2003).

Less criminal behaviour and lower incarceration rates occur among the more highly educated.

Charitable giving increases with educational attainment.

Social cohesion is higher among the more highly educated, as reflected in higher voting rates. Informed and involved voters are the foundation of a democratic society, and education helps develop skills for a democracy. Milton Friedman, a conservative economist, believed that public support for the laissez-faire approach to economic market mechanisms could be achieved by increasing knowledge: more educated individuals are less influenced by populist rhetoric and make more rational, informed decisions in voting behaviour.

Perhaps most important are the intergenerational effects that accrue to investments in higher education. The educational attainment and cognitive development of children are positively affected by the educational attainment of parents (first-generation effects). The quantitative importance of these effects is very difficult to estimate precisely since costs to society incurred today to create opportunities for individuals to acquire university degrees must be compared to benefits realized two, three or four generations in the future.

The health of the individual, their spouse, and their children are positively related to educational attainment.

Desired family size is more commonly attained among those with higher educational attainment.

Mortenson (1999) has provided an exhaustive list of activities and behaviours that are associated with having a baccalaureate degree. Those activities are beneficial for individuals themselves as well as to society in general. In addition to societal benefits in Wolfe and Haveman's list, Mortenson has also mentioned those beneficial activities and behaviours:

More likely to do volunteer work;

Less likely to smoke;

More likely to use the Internet;

More likely to use computers;

More likely to attend art and cultural activities;

More likely to exercise;

More likely to buy and read books;

More likely to read newspapers and newsmagazines.

As difficult as the social monetary benefits are to quantify, the implicit value of non-monetary benefits are even less conducive to measurement. However, the non-monetary contributions that more educated individuals bring to society, coupled with the reduction in social costs that they incur over their lifetimes, suggests that the non-monetary benefits represent considerable return on social investments made to support

higher education. From what is said above, we can conclude that we all benefit from the monetary and non-monetary public effects of higher education and lack of university educated individuals could represent a huge cost to our society.

3. Possible Negative Effects of Higher Education Expansion

The history of the development of formal education, both in terms of participation rates and the lengthening of study-time has gone hand in hand with a critical questioning of its real necessity, its usefulness and even its potential drawbacks and dangers. Recent growth of higher education has raised concerns that are not entirely dissimilar from those expressed when primary and, in particular, secondary schooling expanded in the course of the 19th and 20th centuries. Mandeville's (1732) criticisms of charity schools, Schumpeter's (1943) forecasts of growing dissatisfaction among 'sub-employed' graduates and today's recurrent criticisms of expansionist trends in higher education in the form of the 'more means worst', 'dumbing down' or 'over-education' debates share a suspicion of the worth of educational expansion.

It is noted that the rapid expansion in higher and continuing education has negatively impacted the quality of educational outcomes. More and more young people gaining access to higher education now come from an educational and often social background with little tradition of university education. In the case of Lithuania - and the same would be true in many other European countries - the rapid increase in volume due to a rapid increase in participation rates has reinforced a sense of crisis within academia as this evolution has more or less directly called into question its traditional culture and values. Expansion of higher education in most European countries has brought about the availability of new qualifications (e.g. the creation of multi-disciplinary courses and the relative demise of single honour degrees), the setting-up of new degree programmes, the formal definition of new levels of study (e.g. qualifications at sub-degree level, the development of taught masters degrees) and/or the reorganisation of syllabuses and examination practice (e.g. the development of credit accumulation and transfer). The extent to which these pedagogical changes have become widespread and even a permanent feature of a higher education system will have a considerable impact on the process and output of the sector. In particular, they are likely to breed a sense of loss and uncertainty among both academics and employers because the meaning of working towards and holding a university degree is no longer what it was. In this situation, quality management becomes a key element in ensuring a proper return on education. Quality assurance represents process control procedures to reduce variations in outcomes. In higher education it involves an accreditation system, standardized curricula and textbooks, the qualifications of faculty, teaching facilities, teacher/student ratio, etc. The international ISO10015 is a quality standard for education and training. Its function is to ensure the effectiveness of the educational system.

While human capital theory offers a partial explanation for an understanding of the demand side of expansion in education, it is of little help in terms of supply for it considers education and training to be like any other goods with supply adjusting to demand. This may be true for certain specific types of short-term training programmes but, for various reasons mostly related to time-lag, it does not reflect accurately what is happening in other parts of the higher education sector. This suggests numerous sources of market failure, such as uncertainties, asymmetrical information or risk avoidance behaviour. For example in Britain a general increase in the schooling level has been accompanied by a modification of the direct relation between academic titles and their associated social status. Machin (1999) states that throughout the 1970s, 1980s and 1990s, the time-series pattern of the relative supply of highly educated workers and wage changes shows that there has been a dampening down of wages in response to increased supply. Over the years, similar jobs have been filled by increasingly qualified staff as more people with higher qualifications have emerged from the educational system. Some graduates have even experienced the growing gap between the nominal value (i.e. name and level) of their degrees and their market value in real transactional situations in the form of periods of unemployment or sub-degree level occupations. This goes a long way towards explaining the semantic shift in relation to expansion in higher education to terms such as hyperinflation and the devaluation of diplomas (Deer, 2001).

Various sociological explanations have been put forward to interpret this phenomenon. For the neo-Durkheimian school of thought the rapid expansion of higher education has exposed the symbolic dimension that has always been implicitly embedded in university titles through the social and cultural representation of their rarity. The systematic discrepancy that has existed between, on the one hand, the actual state and status of the academic sector and, on the other hand, the cultural representation of academia and the social strategies related to the social representation of academic titles, has helped successive governments to justify their reforms of quantitative expansion and decreasing unit costs. In the short term, the process of expansion in higher education tends to expose variations in the certifying effect of university diplomas as the number of

candidates joining the employment market outstrips the number of graduate jobs that are available. This explains the growing use of the notions of 'sub-employed' graduates or an overeducated workforce. Meanwhile, employers revert to more stringent selectivity in their recruitment practices, which has the paradoxical but understandable effect of reinforcing the role of higher-level diplomas and qualifications as selection criteria.

Japanese scientists Horii, Kitagawa and Futagami (2005) have examined the economic growth effects of limited availability of higher education in a simple endogenous growth model with overlapping generations and have found that education expansion can have two opposing effects. According to them, a rise in the aggregate supply in human capital would lower its price compared to other factors summarized as physical capital. Since the distribution of production factors is not uniform across cohorts of different age - that is, human capital belongs to working-age generations whereas physical capital is largely owned by older generations—the implied change in factor prices shifts the distribution of income from the young to the old. If the aggregate saving rate is adversely affected by the reduced income of the young generation, the shift in income distribution would be critical for long-term growth. In many countries, aggregate investment in human capital is constrained by the number of higher education institutions and the enrolment capacity of each institution. These are not entirely determined by market forces but are also determined by non-economic factors such as history, culture, and the social system of the country, as well as the government's education policies. The limited availability of higher education puts an upper bound on the rate at which the economy can accumulate human capital, hence potentially restricts the rate of economic growth. At the same time, however, the scarcity of human capital keeps its price high and thereby enables young households to earn a larger share of the aggregate output than without such a limitation. Their increased savings contribute to maintaining a high rate of accumulation of both physical and human capital and therefore of growth. The relative significance of the two opposing effects is shown to depend on the stage of development to which the economy in question belongs. In agrarian countries, or more precisely in economies where the nature of existing knowledge allows it to be transferred intergenerationally largely without higher education, the savings-enhancing effect is marginal and therefore expanding enrolment capacity promotes growth in the long run. Conversely, in industrialized economies where the transfer of existing knowledge is substantially dependent on higher education, there is a range of levels of the availability within which the savings-enhancing effect dominates the growth-restricting effect. In this case, the economy has a balanced growth path on which human capital accumulation is constrained by limited availability but nonetheless grows faster than in the case without such a limitation. It implies, however, that a further expansion in enrolment capacity will lower the long-term rate of growth since it causes a regime change beyond which the limited availability is no longer binding. After the regime change, young households no longer enjoy rent from the limited aggregate supply of human capital and therefore their savings cannot maintain that high rate of growth in the long run.

De Gregorio (1996) has examined the issue of the limited availability of education in the context of credit market imperfections. He constructs an endogenous growth model in which the availability of education is limited by the borrowing constraints imposed on the young generation, and argues that relaxing these constraints has two opposing effects on growth. First, it makes possible a rapid accumulation of human capital through increased participation in education, which has a positive effect on long-term growth. Second, it enables young households to enjoy more consumption by borrowing more, which reduces the aggregate saving rate and therefore has a negative effect on growth. Some authors have already pointed out the possibility that severe borrowing constraints rather accelerate economic growth by encouraging aggregate savings. Modigliani (1986), for example, argues that credit market imperfections prevent households from borrowing as much as would be required to carry out an unconstrained optimum consumption plan, which has the general effect of postponing consumption and increasing wealth as well as savings. If the second effect dominates the first, relaxing the borrowing constraint reduces the rate of economic growth.

4. Empirical Evidence from Cross-country Analyses of Higher Educations' Role to Economic Development

Now, when we have highlighted private and societal benefits of university education as well as tried to look at possible negative effects that higher education expansion might have, it is just the right time to make an overview of empirical studies, providing us with the evidence from cross-country analyses whether higher education promotes economic growth at macroeconomic level. Although this may appear to be obvious as there is the common belief of the importance of universities as an engine of growth, deeper examination has proved to be an uneasy task for economists. Given that human capital is individually productive, existing models of economic growth predict that education should enhance growth (e.g., Barro and Sala-i-Martin,

2004). The growth accounting literature devotes enormous effort to confirming this prediction using aggregate data, but so far, most studies only find weak and elusive connections between education and economic growth. Using the Solow (1956) growth model, Mankiw, Romer and Weil (1992) argue that a large part of cross-country differences in steady-state income is explained by a certain measure of human capital. Using growth accounting techniques, King and Smith (1988) estimated that only 1.9 percent of annual economic growth rates from 1940 to 1980 were non-education related. Pencavel (1991) estimates that from 1913 to 1950 only 1.3 percent of total growth was directly attributable to higher education, but higher education accounted for 14.6 percent of the growth from 1973 to 1984. Mingat and Tan (1996) for the period 1960 to 1995, the social rate of return of tertiary education for OECD countries have estimated at more than 10 percent.

Islam (1995) finds, however, that once differences in technologies (individual country effects) are accounted for by a dynamic panel data model, the role of human capital becomes insignificant. Romer (1989), De Gregorio (1992), Barro and Lee (1994), Benhabib and Spiegel (1994), and Pritchett (2001) also report that the direct effect of human capital on growth is either insignificant or even negative. Topel (1999) and Temple (2001) argue that the growth effect of education is found to be positive under more sophisticated specifications, but both admit that the literature connecting human capital investment to economic growth is still inconclusive.

Economic growth may have taken place because of rising education in certain countries such as Germany, Britain or France, but until a clear methodology can demonstrate that historical events have persistently followed the logic that states that education precedes any economic development, it is equally plausible to suggest that nations which have experienced fast economic growth and increased wealth have consequently been able to invest more in education. Empirical evidence from cross-country studies allows us to draw an inference, that the exact nature of the causal link between the two – education and economic development - remains undetermined. With the rapid introduction and development of new techniques and technologies, it is reasonable to think that more investment in education in industrialised countries will help boost future rates of economic growth. However, whether this will generate for individuals and society returns on the scale of the two-digit figures that are currently being advanced to justify expansion remains to be seen. In purely economic terms, this may turn out to be a speculative bubble.

Conclusion

The average earnings of individuals are closely related to their educational attainment. The higher salaries that educated entrants are able to command on the job market represent both the interest on the capital they have invested in higher education and the fact that they have become more productive. Monetary benefits to society from investments in higher education are higher wages for all workers in areas with bigger share of highly educated labour force, which also streams from the enhancement of productivity that comes from combination of spillovers, complementarities and substitution effects. In addition to monetary benefits, a long list of non-monetary societal benefits from enhanced educational attainment has been documented. Higher education expansion might have possible negative effects like decreased quality of educational outcomes, sub-employed graduates or an overeducated workforce. Overviewed cross-country analyses find only weak and elusive evidence that higher education promotes economic growth, therefore the exact nature of the causal link between the two remains undetermined. It is equally plausible to suggest that nations which have experienced fast economic growth and increased wealth have consequently been able to invest more in education.

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