

Educational reforms in Spain and Estonia and their impact on human capital growth

On example of tertiary education in Estonia and Spain

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Master thesis of Comparative and International Education/Faculty of
Education

UNIVERSITETET I OSLO

2007

Abstract

The transition of modern economy to the economy based on knowledge and information makes human capital one of the main components for economic welfare. That is why I considered the problem of human capital growth as a very interesting object for my research. In this paper the human capital is represented only by tertiary education, namely by enrolled, graduated and admitted students in tertiary education institutions. This makes the problem of the research more limited and therefore clearer. A part of the paper describes the essence of human capital and its components to make it easier for the reader to understand the core of the research problem. The main question of the study is the influence of educational reforms on human capital growth. Thus, the paper studies educational reforms and other factors that influence on growth or decrease of the human capital. Spanish and Estonian higher education reforms carried out from 1983 till 2003 are studied in the paper in connection with the research problem. The results received in empirical analysis answer the main question and basing on them interesting conclusions are made.

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1. Introduction

1.1 Educational investment in modern economies

Modern economies are increasingly becoming dependent on what is often referred to the knowledge and information economy. This transition is often described as movement of labour from agriculture and industry towards services, while at the same time traditional industrial production is becoming increasingly dependent on capital deepening investments. Given the importance of capital deepening investments, European educational systems face new challenges. In order to maintain their competitive position, it is widely believed that educational systems need to provide the right type and the right level of human capital investments for the economy in order to prosper. (Schleicher, 2006).

Knowledge as a productive factor is contained in human capital, the economic factor. A nation's total investment in human capital would consist of several components: on the job-training, vocational training, part-time education, formal education, and health care. In this thesis I will focus on tertiary education

In this research, besides tertiary education, I shall also study factors that influence the level of human capital investments. In this study such factors can be: live births, income, general economic development, expenditure on education, educational reforms. It will be accompanied with the description of educational reforms that were carried out during the analyzed period.

As it was mentioned in the Communication from the Commission of the European Communities, the future of the European economy (and society) will depend on the skills of its citizens, and these in turn the continuous updating and improvement which is appropriate in knowledge societies. Investment in education and training produces rates of return to individuals (private return) and to society (social return) comparable to investment in physical capital. It was stated in Communication from the Commission of the European Communities that money cannot be a guarantee for strong results in education. The educational system should be more flexible, more effective and accessible for bigger range of people. To achieve that some countries will need to carry out educational reforms.

(Investing efficiently in education and training: an imperative for Europe, 2003) Thus, analysis of investment and reforms in tertiary education is relevant to Europe nowadays.

Several countries in EU introduced educational reforms to improve economic growth prospects. This thesis studies two countries that have implemented major educational reforms and asks whether the reforms have increased their human capital growth. Human capital growth is believed by economists to be important for economic growth for these reasons. In the first chapter of the paper, introduction and methodology are described. The second and third chapters of the thesis will focus on human capital growth and investments and explain how human capital affect growth and discuss various explanations of human capital growth. In chapter four and five I present the educational reforms in Estonia and Spain respectively and discuss whether these reforms will be beneficial for human capital investments. The empirical analysis of factors that influence investment, admittance, graduates and enrolment in tertiary educational institutions in Estonia and Spain is given in chapters six and seven correspondingly. The last, conclusion chapter gives the conclusion opinion based on the performed analysis of the data about Spain and Estonia.

The countries of analysis will be Estonia and Spain. This choice is not accidental. Both Estonia and Spain are European countries and are European Union members. Both of them have adopted the same objectives from Bologna declaration, and had sustainable economic development during the last 15 years (see the table in appendix GDP). Thus, they were, so to say, approximately on the same level of development when educational reforms started there.

1.2 Methodology

1.2.1 Different measures of human capital investment

As mentioned before the focus of my study is on human capital. While studying the human capital different scientists have given different definitions to what is human capital, and consequently they defined different ways of measuring human capital. It is important to look through different definitions of the studied object in order to have a fuller idea of what will be analysed, from what point of view.

Human capital studies can be seen as divided among three major methodological approaches: a) the production function approach, b) the measurement of the returns approach, and c) the aggregate accounting approach.

Nelson and Phelps (2003) specify human capital as effective labour that is the weighted sum of the number of workers. The weight is assigned to each worker being an increasing function of that worker's educational attainment.

Scott R. Sweetland (as cited in Krueger & Lindahl, 2001) considers that human capital suggests that individuals and society derive economic benefits from investments in people. Educational attainment has an element of investment in future benefits that differentiate it from consumption. Although types of human capital investment generally include health and nutrition, education consistently emerges as the prime human capital investment. One main reason for this is that education is perceived to contribute to health and nutritional improvements; a second one is that education may be measured in quantitative dollar costs and years of tenure.

Smith (cited in Krueger & Lindahl, 2001) considered that human effort lies at the root of all wealth. He said that the annual labour of every nation is the fund which originally supplies it with all the conveniences of life which it annually consumes, and it consist always either in the immediate produce of that labour, or in what is purchased with that produce from other nations. Smith stated that the number of useful and productive labourers is in proportion to the quantity of capital stock employed in setting them to work, and to the particular way in which it is employed. Two principal components considered by Smith serve as the foundation of all productive human capital frameworks:

- 1) Labour inputs that are not merely quantitative.
- 2) Ability acquired through education, study, or apprenticeship, always costs a real expense, which is capital fixed and realized in person.

In their article A. Krueger and M. Lindahl (2001) write that around 1848, Mill pronounced human capital abilities, inseparably fixed in person, could not be reasonably counted as wealth per se. Mill required a market exchange for determining value before including anything in his definitions of wealth. He considered human abilities as economic utilities – means to wealth – liberally acknowledging all activities which lead to their improvement.

In the same article Marshall wrote (as cited in Krueger and Lindahl, 2001) that personal wealth may be defined so as to include all those energies, faculties, and habits which directly contribute to making people industrially efficient. He defined capital so broadly that personal wealth could be interpreted as capital.

In Mincer's theoretical model (as described in the article of Krueger & Lindahl, 2001) the process of investment is subject to free choice. The choice refers to training differing primarily in the length of time it requires. To measure two major types of training, formal and informal, the model incorporated years of education and years of work experience. Worker age was used to surrogate work experience. Mincer found that years of work foregone to pursue education were rationally compensated with higher earnings. Occupations demanding high levels of education afforded higher compensation, at least sufficient to ensure the lifelong receipts equalized the present value of compensation received by workers with less education.

Solomon Fabricant (as stated in Krueger & Lindahl, 2001) discovered that the methods and assumptions underlying productivity figures frequently promoted underestimation of intangible capital investment and, consequently, overstatement of productivity. This discovery prompted him to emphasize the importance of intangible capital – human capital. He said that society's intangible capital includes the improvements in basic science, technology, business administration, and education and training, that aid production – whether these result from deliberate individual or collective investments for economic gain.

The methodology developed by G. Becker (1962) compared personal incomes of college graduates with those of high school graduates. Income difference between the two groups were then related to costs of attending college such a way that Becker was able mathematically derive a rate of return on investments in college education. His research hypothesis stated, that if this rate of return was significantly higher than the rate of earned on tangible capital, there would be evidence of underinvestment in college education. Conversely, if the rate of return were lower than the rate of return on investments in tangible capital, there would be evidence of overinvestment in college education.

Schultz (1962) discussed the inescapable problem of how to distinguish between expenditures for consumption and for investment. To clarify this problem, he suggested that analysts categorize expenditures by three types: pure consumption, pure investment, and

expenditures exhibiting both characteristics. He asserted that expenditures for education belonged to the third category. Schultz lists five major categories of human activity – investments – which lead to improved human capabilities:

- 1) health facilities and services;
- 2) on-the-job training, including old-style apprenticeship organized by firms;
- 3) formally organized education at the elementary, secondary, and higher levels;
- 4) study programs for adults that are not organized by firms;
- 5) migration of individuals and families to adjust to changing job opportunities.

Bowen (as cited in Krueger & Lindahl, 2001) identified two distinct perspectives of returns-to-education approach: 1) the personal profit orientation; and 2) the national productivity orientation. According to Bowen, the personal profit orientation considers differences in lifetime earnings as evidence of personal financial gain relative to investments in education. Therefore, this orientation is useful to the individual who attempts to determine the appropriate level of education to acquire. The personal profit orientation is also useful for guiding the country's decision as to what fraction of the costs of education should be borne by the students themselves.

Benson (as cited Krueger & Lindahl, 2001) stated that human capital theory rests on two basic assumptions: 1. Education helps to develop skills of work, that is, improves the capacity of the worker to be productive. 2. Earned income reflects marginal productivities of different categories of workers.

In this study I shall consider human capital as the amount of people admitted, enrolled and graduated from tertiary education. And investment in human capital will be public expenditure on tertiary education. In this work, human capital is represented by people getting and graduating from tertiary education. I decided to take this number of people as a component of human capital because it is easier to analyze the growth or decrease of human capital (as decrease of enrolled students, for example) and factors that influence this growth: the data about expenditure on education, population's income, etc. is available in statistical databases.

1.2.2 Methodology choice

The research could be carried out in different ways regarding gathering and analyzing data. Since the factors influencing the human capital are studied in this research, a survey could be carried out among students from higher education institutions regarding their opinion how educational reforms or some other factors influence their decision about getting tertiary education. But this method is very time-consuming. It requires a big group of students to be interviewed, and this group must be representative for our survey. Plus, the opinion of students gives quite one-sided information, that is to say, the researcher will study the case only from the point of view of students without studying other, more objective factors and more precise data that could influence the human capital growth.

Another method of analysis could be an econometric time series analysis. But this method requires the data of longer period for analysis (time series analysis).

I chose the method of analysis where the data is collected from policy documents, and time series observations are taken for the variables.

1.2.3 Factors of the analysis

The factors that are considered to influence the growth of human capital in this case are: population's income, general economic situation of the country, the group of people of the age 17-18 years old (when usually students graduate from secondary school and are able to enter a higher education institution), and educational reforms reflected in expenditure on education.

Income (according to my hypothesis) is taken as a mean equalized net income of the population in Spain, and disposable income per household member in Estonia. Indicators are annual. These indicators are considered to be representative for the income of population of these countries. The currency in both cases was revised by statistical agencies.

The general economic development as the factor influencing the growth of human capital in Spain is represented by gross national product in annual amount for each year of the analyzed period and is in estimated prices.

The public expenditure on education in Spain is given in euro PPS for full-time students in tertiary education, public and private educational institutions. The expenditure on public educational institutions in Estonia is given for all levels of education.

In order to study how demographic factor can influence human capital growth it was taken the group of people aged of 17-18 years as an amount of live births that took place 17-18 years before each analyzed year.

The human capital itself is represented in the thesis by the amount of students enrolled, graduated and admitted in tertiary education and concerns full-time students. Both university and non-university tertiary education institutions are taken for the analysis.

There are some delimitations or, let's say inaccuracies that take place in the research. They are introduced below:

- 1) I took the expenditure not on tertiary education in Estonia (because it was not available), but on all levels of education. So, it could be that the expenditure on tertiary education had some different trend than on all levels. But it may be suggested that its trend does not differ so much basing on education reforms at that period.
- 2) The data on Spain is not available for every year of the analyzed period. But the probable inaccuracy in the study can be moderated by the length of the analyzed period. That is to say, the bigger period I analyze, the better trends can be seen in all indicators.

The statistics data was taken from internet sites that study education in Europe and in the world. Such organizations as OECD (Organization of Economic and Cultural Development), Eurostat, Unesco and Central Statistics Bureau of Estonia. That is why one can consider the data received from these sources quite reliable.

1.2.4 Structure of the study

In theoretical chapters the reader is introduced to different strands in human capital that suggest explanation for why people enrolled, admitted to and graduated from tertiary education institutions are considered to be human capital; explains the importance of human capital nowadays, how the return to human capital is measured, etc.

There are two chapters dedicated to educational system and reforms in Estonia and Spain during the studied period. That makes it clearer for the reader in which system (centralized or decentralized) the reforms were carried out, how the education is financed in the studied countries, which access to higher education people have, etc.

For the analysis, first all the data was transferred in percentage in comparison to one selected year. The data in percentage makes it easier to see the dynamics of different indicators. It is also important because the indicators are measured by different figures. For example, enrolment in tertiary education is measured in persons and expenditure on tertiary education is measured in monetary units. Having all the data in percentage makes it easier to compare and to analyze it.

The analysis itself of the collected data was performed with the help of didactic method. That means that I took all possible hypotheses that could be the answer to the research question “Which factors influence the human capital growth?” Then I studied a possible effect of each of these factors on human capital growth. And by verifying and removing false hypotheses a true one has been found.

2. Why it is important to invest in human capital

2.1 Introduction

As I mentioned before, education is the component of human capital theory. Human capital is an economic factor that takes part in production. Thus, human capital theory is a useful approach while studying the economic impact on different educational systems. In order to understand it in a more deep conception it is necessary to learn how it was understood by different scientists and which practical application it has in educational domain.

In this chapter the definition of human capital is given and it is described how human capital theory has been developed during the last century. Further the relationship between participation in schooling, costs and benefits of education is explained. After that I show how the investment in education influences the rate of return from education and what the optimum level of schooling is. By the end of the chapter the interrelationship between economic growth and return from education is described.

2.2 Human capital

The concept of human capital was applied in the 1940s by two American economists, Friedman (1962) and Kuznets (1961), to give a normative assessment of incomes in the professions, but really took hold of the field of economics in the 1960s thanks to Theodore Schultz. The birth itself may be said to have taken place two years later when the Journal of Political Economy published its October 1962 supplement volume on “Investment in Human Beings” (as mentioned in Blaug, 1992)

During the several decades prior to the 1980s, the concept of human capital took a significant place in the analytical economics. The theorist, Irving Fisher, “saw clearly and cogently that all deficient resources that render economic services are forms of capital and that the services from the total stock of capital at a given date are the available income streams”. (Schultz, 1987, p.12) The theory of human capital represented a new substantial

framework for understanding the rationale for investment in education and training, as well as for evaluating the profitability of that investment.

The formation of human capital by education has been high on the research agenda of an increasing number of economists. That was due to the effects of education on economic activities that are pervasive. Human capital is essentially a supply side characteristic: it is a valuation of people's skills. A simple definition specifies it as the value of a person's productive, marketable skills.

The concept of human capital is sometimes restricted to the value of those skills and productive capacities that people have had to acquire at a cost, as an investment. Then, it would exclude the innate abilities that people are born with. It is also possible to use a wide concept of human capital, not necessarily considering the sales value of improved skills, but also including the private valuation of greater consumption. Schooling may not only raise the person's market value as an employee (or employer) but may also increase one's enjoyment of literature, culture, etc. Human capital in this broad sense might then be valued as the cost of all actions taken to increase future welfare.

Human capital expressed in education can be considered as a type investment, thus "it ought to be possible to measure its rate of return in a manner analogous to the measurement of rates of return to physical capital. And indeed, the calculation of both private and social rates of return to educational investment for all stages of post-compulsory education in both developed and developing countries, was part and parcel of human investment revolution that swept through economic thought after 1960." (Blaug, 1992, p.69)

2.3 Relationship between participation in schooling, costs and benefits of education

Since human capital contains education as one of its components, and education is a kind of investment (of time, money, etc.), it would be reasonable to look at the education from the point of view of investors: which costs and benefits investor will get and after which period of time.

Joop Hartog (2000) looks at education from this point of view. He designed a model according to which the person will go to school if the lifetime earnings balance from the schooling alternative is positive, or if the lifetime benefits are larger than the investment cost discounted. The simple model has some interesting conclusions. First, it may be noted that investment cost, the cost of going to school, consists of direct cost and opportunity cost, the wage that might have been earned. It is often not realised that foregone earnings are by far the biggest cost component. Quite often, the direct outlay for tuition and books is no more than 10% of the opportunity cost, the wages that are lost.

Second, J. Hartog (2000) makes some immediate predictions. Participation in schooling will increase if:

- 1) the future benefits increase, i.e. at a higher wage premium for those who have completed their education;
- 2) the direct cost of education decreases because schools lower tuition or the government subsidises schools;
- 3) the discounting rate for present wage gains decreases (or, stated otherwise, those with an orientation towards the future rather than towards the present, i.e. a lower discount rate are more inclined to embark on schooling);
- 4) financing of education becomes easier. The banks may be more inclined to provide funds, parents may become richer and have more funds available in a process of economic growth, the bank lending rate may drop or the government may provide cheap loans, or even free scholarships.

All these predictions have been supported by empirical evidence, although magnitudes of effects may sometimes be small.

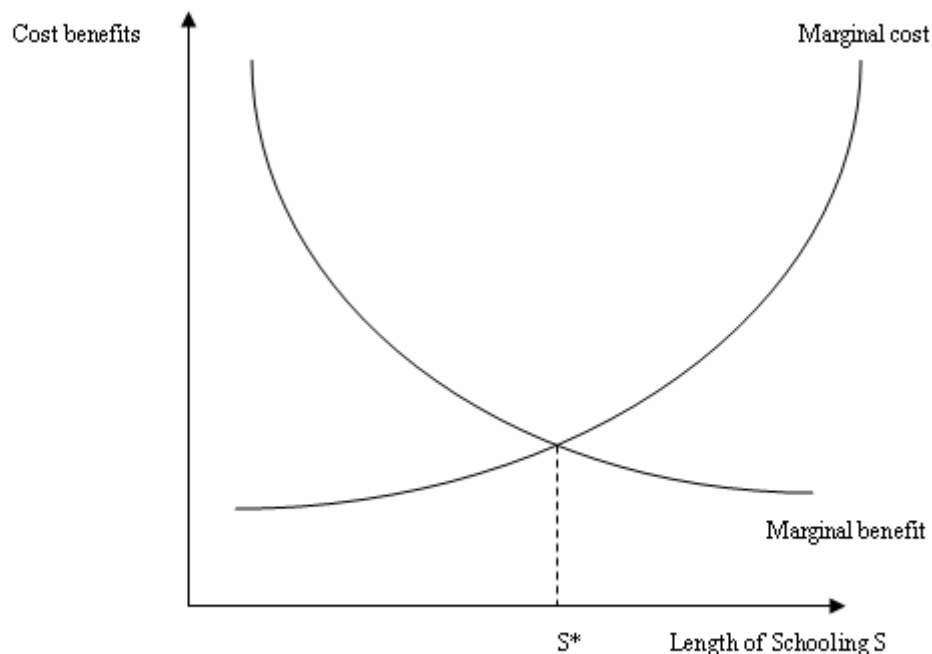
Here it would be interesting to notice what Robert Barro (2003) wrote about it. School-enrolment rates are used as proxies for human capital. For a given starting value of per capita GDP, a country's subsequent growth rate is positively related to the measures of initial human capital. Moreover, given the human-capital variables, subsequent growth is substantially negatively related to the initial level of per capita GDP. Thus, the following conclusions can be made. A poor country tends to grow faster than a rich country but only

for a given quantity of human capital; that is, only if the poor country's human capital exceeds the amount that typically accompanies the low level of per capita income. Given the level of initial per capita GDP, the growth rate is substantially positively related to the starting amount of human capital. Thus, poor countries tend to catch up with rich countries if the poor countries have high human capital per person (in relation to their level of per capita GDP), but not otherwise.

2.4 Investment in education

To show profitability or non-profitability of investment in education, J. Hartog (2000) applied an economist's marginal analysis. He supposed that the premium for another year of schooling is not constant, but depends on the total years of schooling. In a lifetime perspective, this benefit should drop, as the remaining working life becomes shorter and shorter. He drew a picture like Figure 1.

Figure 1: Optimum length of schooling



He supposed then, that the costs of schooling increase: the more advanced the schooling level, the higher the cost of an extra school year. An immediate reason for this increase is the

higher opportunity cost. The longer one has been in school, the higher the wage one may earn with that level of schooling. The optimum level of schooling occurs at the intersection of marginal benefit and marginal cost. Increasing beyond S^* would generate more additional cost than additional benefit, and hence would not be rational. This framework has also been used to derive some predictions, mainly by allowing the cost and benefit curves to differ between people. Joop Hartog (2000) made the following predictions by allowing the cost and benefit curves to differ between people:

- those with lower marginal cost will invest more, will study longer. One cost element is the cost of funds, the borrowing rate. Wealthier families have cheaper access to funds and send their children to school for a greater number of years. If cost includes psychological costs, those with more intrinsic interest in schooling opt for longer schooling;
- those with higher marginal benefit will invest more, will study longer. Suppose family networks are important in placing you in the right job after school. Then families from the higher social strata have children who study longer. It is also conceivable that those with higher academic ability or IQ benefit more from schooling, as schooling is complementary to their talent. This would lead them to study longer. However, abler people presumably also have higher opportunity costs (they would also earn more than those with little schooling).

2.4.1 Private investment in education

It was found by researchers that in many countries that there are relatively low private investment levels and high private returns on university education. Thus, the main responsibility of authorities is not only to continue to provide higher education institutions and students with a sufficient level of public funding, but also to find ways to add to it by increasing and diversifying private investment in higher education.

George Psacharopoulos (1981) worked out the following generalities regarding rates of return from education:

- private rates of return are higher than social rates of return. Private returns relate the person's after-tax earning gain from education the person's cost, social returns relate

gross earnings gains to true social cost, and hence, consider the real cost of schooling without subtracting subsidies by the government.

- rate of return diminishes by level of education. The highest returns relate to primary education: learning to read, write and do arithmetic are the most profitable investments. There are some signs that the relation for private returns could in fact be U-shaped, with a somewhat lower return for intermediate schooling levels.
- rate of return diminishes by level of development of the nation: highest rates are found in developing countries.

If everyone had equal ability to benefit from education at any desired level and everyone was only interested in maximizing lifetime earnings, then, everyone would decide to follow just the education that promised the highest lifetime net earnings (net of schooling investment cost). The identical return for each education could be established by flexible taxes. But, if too many people follow a particular education, they would invade the labour market and the wages for those with that particular degree would drop. Similarly, if few people graduated from that education, shortage would increase their wages. So, labour market and human capital depend on the market law.

Joop Hartog (2000) makes an interesting note in his work. He says that if the demand for university graduates increases and the demand for primary school graduates declines, we say that the demand for human capital has increased.

2.5 Economic growth and return from human capital investment

Since human capital growth is important for economic growth, it should be seen from, so to say, economic point of view, as an economic factor. Generally, the theory of economic growth postulates a production function which states how maximum current output depends upon the current services of tangible capital goods, the current number of men performing each of these jobs, the current educational attainments of each of these job-holders, and time. To simplify that, some analysts have specified a production function in which “output depends upon tangible capital and “effective labour”; the latter is a weighted sum of the

number of workers". (Nelson & Phelps, 2003, p.158) The weight is assigned to each worker being an increasing function of that worker's educational attainment. This specification assumes that highly educated men are perfect substitutes for less educated men. "In fact, it is possible that educated men are more substitutable for certain capital goods than for other labour. For example, they permit production with less complex machines." (Nelson & Phelps, 2003, p.160) But at the same time these are educated people who make more complex machines, more complex technologies and perform more intellectual labour. Educated people make good innovators, so the human capital makes an input to the research sector which generates the new products or ideas that are the basis of technological progress. Thus, education speeds the process of technological diffusion.

J. Hartog (2000) compares worker employing with setting an engine in motion. Capital is the value of productive services that can be generated; it is the potential performance of the engine. There are two ways of assessing the value of the engine: calculating the cost necessary to produce it, or calculating the present value of all the services that the machine can offer, the value of all the trips that can be generated by the locomotive of a train. In equilibrium, in a smooth market, the cost of making the machine will be equal to the value of all the productive services. In a market for locomotives, one can see its value (the capital good) by the market price paid when it is sold.

According to R. Barro, "the rate of return on human capital increases over some range, an effect that could arise because of the spillover benefits from human capital. For example, the return to some kinds of ability, such as talent in communications, is higher if other people are also more able. In this setting, increases in the quantity of human capital per person tend to lead to higher rates of investment in human and physical capital, and hence, to higher per capita growth." (Barro, 2003, p.94)

There is a direct relation between schooling and the growth rate of per capita GDP across countries. (Nelson & Phelps, 2003) This proves that there is influence of education on economical development. Transitional differences in human-capital growth rates explain temporary differences in country growth rates. Thus, countries with greater initial stocks of human capital experience a more rapid rate of introduction of new goods and thereby tend to grow faster. Since there is technological change in many countries, the spread of new ideas across countries is also important. A larger stock of human capital makes it easier to absorb

the new products or ideas that have been discovered elsewhere. Therefore, a follower country with more human capital tends to grow faster because it catches up more rapidly to the technological leader.

Now I shall describe the channel from schooling to growth. Bills and Klenow (2003) start the description with production technologies since much of their estimation and calibration is based solely on them, with no assumptions needed about preferences or capital markets. Consider an economy with the production technology

$$(1) Y(t) = K(t)^\alpha [A(t)H(t)]^{1-\alpha}$$

where Y is the flow of output, K is the stock of physical capital, A is a technology index, and H is the stock of human capital. The aggregate stock of human capital is the sum of the human capital stocks of working cohorts in the economy. For exposition, they suppose for the moment that all cohorts go to school from age 0 to age s (so that s is years of schooling attained) and work from age s to age T . Then they have

$$(2) H(t) = \int_s^T h(a,t)L(a,t)da$$

where $L(a,t)$ is the number of workers in cohort a at time t and $h(a,t)$ is their level of human capital. Note the efficiency units assumption that different levels of human capital are perfectly substitutable. The researchers generalize (2) to the case where s and T differ across cohorts.

Other noteworthy implications of the model are as follows. A permanently higher level of technology A does not affect the optimal amount of schooling because it affects the marginal cost and benefit of schooling in the same proportion. Similarly, neither teacher's human capital nor its contribution to learning affects the schooling decision. These results on A and teacher's human capital hinge on no utility benefit to attending class. Regardless of the level of utility benefit to attending class, a higher life expectancy (T) results in more schooling, since it affords a longer working period over which to reap the wage benefits of schooling. Likewise, a higher tuition ratio lowers schooling. Using (1) the combined growth is isolated in h and A for each country as

$$(3) gh + gA = \frac{1}{1-\alpha}(gy - \alpha gk)$$

where h is human capital per person, A is a productivity index, y is GDP per worker, and k is physical capital per worker. Bills and Klenow (2003) estimate k using investment rates from the Penn World Tables.

Now, I shall examine a model with finite-lived individuals in which human capital can grow with rising schooling attainment and thereby contribute to a country's growth rate. Each generation learns from previous generations; the ability to build on the human capital of one's elders plays an important role in the growth generated by rising time spent in school. Bills and Klenow (2003) incorporate into their model a positive externality from the level of human capital onto the level of technology in use. They calibrate the model to quantify the strength of the effect of schooling on growth. To do so, they introduce a measure of the impact of schooling on human capital based on exploiting returns to education and experience. The calibration requires that the impact of schooling on human capital be consistent with the average return to schooling observed in estimates of the equation conducted on micro data across 56 separate countries. They also require that the human capital returns to schooling exhibit diminishing returns consistent with the observed higher returns to schooling in countries with low level of education. The principal finding is that the impact of schooling on growth probably explains less than one-third of the empirical cross-country relationship, and likely much less than one-third. The conclusion is robust to allowing a positive external benefit from human capital to technology.

If high rates of schooling are not generating higher growth, what accounts for the very strong relationship between schooling enrolments and subsequent income growth? One element is that countries with high enrolment rates in 1960 exhibit faster rates of growth in labour supply per capita, say, from 1960 to 1990. A second possibility is that the strong empirical relation between schooling and growth reflects policies and other factors omitted from this example that are associated both with high levels of schooling and rapid growth in total factor productivity (TFP) during the same period. For example, better enforcement of property rights or greater openness might induce both faster TFP growth and higher school enrolments. Finally, the relationship could reflect reverse causality, that is, schooling could be responding to the anticipated rate of growth for income. (Bills & Klenow, 2003)

To explore the potential for expected growth to influence schooling, Bills and Klenow (2003) extend the model to incorporate a schooling decision. A primary result is that

anticipated growth reduces the effective discount rate, increasing the demand for schooling. Schooling involves sacrificing current earnings for a higher profile of future earnings. Economic growth, even of the skill-neutral variety, increases the wage gains from schooling. Thus, an alternative explanation is that growth drives schooling, rather than schooling drives growth. The researchers calibrate the model to quantify the potential importance of the channel from growth to schooling. The calibration suggests that expected growth could have a large impact on desired schooling. This conclusion is very important for our study. It shows that there is interdependence between investment in education and economic growth. (Bills & Klenow, 2003)

Qualitative descriptions of human capital, when considered, generally come from one of two sources: measures of schooling inputs (such as expenditure or teacher salaries) or direct measures of cognitive skills of individuals. Growth provides increased resources to a nation, and a portion of these resources may be ploughed back into human-capital investments. This suggests that the relationships previously estimated could overstate the causal impact of higher labour-force quality.

2.6 Conclusion

This chapter gives a clear understanding of what human capital theory is and of its functions in economics. It shows also investment functions of human capital. The chapter helps us to understand the economic role of the level of education.

3. Literature review about human capital and its connection to economic growth

3.1 Introduction

In this chapter I give several understandings of human capital theories. How different authors (economists) interpreted what human capital is. Afterwards opinions about rates of return and benefits from education are described. Screening hypothesis, as a part of human capital, is described in order to show how human capital is useful for labour market. Further criticism of human capital theory concerns its usage for the theory of national economic growth.

3.2 Literature about human capital

According to Henry E. Levin (1989), the human capital theory enabled the establishment of a field in the economics of education that could explain: a) the relation between a society's educational investments and its economic growth; b) the relation between an individual's educational investment and the economic returns to that investment; c) the relations between the distribution of educational investment within the population and the distribution of earnings; d) the demand for education as a response to its profitability as an investment; and e) the overall investment in on-the-job training as well as the division of the financial burden between the worker and the firm. The theory was based on awareness that a society can increase its national output or an individual can increase his income by investing in either physical capital or in human capital. Thus, economic growth is a consequence of additions to quantity and quality of the stock of capital which contribute to total income. In this paper I shall consider different economic categories related to education: education as human capital, education as an investment, education as technological and scientific progress, and of course, as economic growth.

Regarding investment in education Henry M. Levin (1989) made an interesting statement that unlike such investments in physical capital as plants and equipment, there is a

considerable gestation period before educational investment in human capital is available to the economy. For example, if preschool investments are included, a college graduate will have absorbed two decades of human capital investment before that investment pays off in the added productive capacity of the economy. In contrast, return on most investments in physical capital, such as buildings and equipment, are available in a relatively short period. Further, as Levin argued, it is not clear how to calculate the depreciation of human capital for aging and obsolescence.

Simon Kuznets observed that for “the study of economic growth over long periods and among widely different societies – the concept of capital and capital formation should be broadened to include investment in health, education, and training of the population itself, that is investment in human beings.” (Kuznets, 1961, p.390) His concept of capital is restricted to structures, producer equipment and inventories.

M. Blaug (1992) considers that initially the paradigm case of self-investment was on-the-job training and not formal schooling according to the formulation of human capital model by Schultz. In the absence of post-school investment, lifecycle earnings profiles were assumed to show neither appreciation as a result of learning-by-doing, nor depreciation as a result of biological aging and obsolescence of knowledge. Individuals tending to invest in themselves after completing schooling by choosing occupations that promise general training lower their starting salaries below alternative opportunities in exchange for higher future salaries as the training begins to pay off.

M. Blaug (1992) also distinguishes the type of knowledge called “common knowledge” that is not related to the human capital, nor is embodied in physical capital that can be so identified and measured. It is a scope of that is widespread in the social environment of a society. It has a value and it therefore has the attributes of capital, although it is neither private nor public property in any legal sense. It considers the requirements of achieving economic efficiency. This stock of “common knowledge” that is a part of the social environment also affects the performance of organized education. Blaug (1992) states that considering the economy of any country people will see that its growth depends fundamentally on increases in the quantity and quality of resources and on economic efficiency. Correspondingly, education depends basically on the additional quantity and quality of its personnel and other inputs and on the economic efficiency of its organization.

3.3 Options about rates of return and benefits from education

In his article "The Empirical Status of Human Capital Theory: A Slightly jaundiced Survey" M. Blaug (1992) considers also the problem of "overtaking". He says that according to human capital theory, all individuals with a given level of schooling choose occupations, so as to equalize the present value of lifetime earnings (this conveniently ignores the non-pecuniary attractions of different occupations); since individuals have different time preferences, the effect of this post-school investment decisions is to produce an initial dispersion of earnings by levels of education. It follows from the logic of the equalization of present values that the dispersion must decline subsequently, only to increase again in the later stages of working life; in other words, the different profiles must cross each other at some point. "The time at which the dispersion of earnings is minimized is called the point of overtaking." (Blaug, 1992, p.67) The problem with the concept "overtaking" is similar to that of distinguishing costly on-the-job training from costless learning-by-doing, namely, the failure to observe the lifetime earnings profiles of individuals who have neither invested in nor received any post-school training. The private rates of return to successive years of formal schooling are not equalized at the same margin; indeed, they decline with successively higher levels of schooling.

M. Blaug (1987b, p.134) argues that "public expenditure on tertiary education depends not only on the costs of instruction but also on the volume of direct aid to students". Further he notes that the "levels of public spending on student aid can encourage or discourage the private demand for tertiary education but cannot directly affect levels of economic development or rates of growth of GNP per head" (Blaug, 1987b, p.135). Even within economic discourse, 'investing' in education, does not necessarily bring equity. Nevertheless, the commitment of Western governments to education policies of economic growth through human capital development is increasingly funded through private debt in the form of student loans."

The essay by Carnoy and Marenbach (1975) shows that the case for calculating the private rate of return on educational investment by way of casting light on the private demand for education has always been stronger than the case for calculating social rates of return to serve as decision criteria for public investment policies in education.

Friedman (1962), for example, has argued that all the benefits of vocational and professional education are limited to the individual who is educated. The maximisation of rational self-interest separated from the social group that the individual belongs is a central article of faith in human capital theory.

3.4 Screening hypothesis

One of the interesting “parts” of human capital theory is ‘screening hypothesis’. It shows a clear connection of human capital theory to labour market. Mark Blaug describes it in his article “Studies in the Economics of Education” (1992). The ‘Screening hypothesis’ argues that education is indeed associated with increased earnings, and perhaps even with increased productivity, but that it does not cause them. Employers seek high ability workers but are unable, prior to employing them, to distinguish them from those with low ability. Faced with little information about the personal attributes of job applicants, employers are forced to make use of ‘screens’ to separate high-ability from low-ability workers, such as evidence of previous work experience, personal references and, of course, educational qualifications. Moreover, knowing that employers are making use of screens for hiring purposes, job applicants have an incentive to make themselves distinct by some sort of ‘signal’. According to the screening hypothesis, post-compulsory schooling fills exactly this function. It is high-ability individuals who perform well in the educational system. Educational achievement is therefore correlated with higher productivity but does not cause it, and hence is no more than a screening or signalling device to prospective employers which it is in the individual’s, although not necessarily in society’s interest to acquire. Just as an individual’s good health may be due more to a naturally strong constitution than to medical care, so according to this view is productivity the result of natural ability rather than post-primary education.

The screening hypothesis, in its strongest version, argues that secondary and higher education do nothing to increase individual productivity and hence have no economic value at all. There are at least three counter-arguments to this contention. The educational system may select students according to their natural aptitudes but in the process it may also improve these aptitudes; thus, the educational system is perhaps more than just a screening device. Second, the screening hypothesis may explain the association between education and earnings at the point of hiring workers out, surely once at work, employers will soon be able

to sort out the more from the less able without resort to paper qualifications? In other words, employers no doubt use education as a screen but experience is constantly testing the accuracy of that screen. Third, an information problem is inherent in the process of hiring workers and if one somehow eliminated the use of educational qualifications as proxies of ability, it is not at all clear that he could replace it by some superior social selection mechanism; in short, the educational system may well be the most efficient social screen one can devise.

3.5 Contribution to growth

Further criticism of human capital theory concerns a more technical problem with criticisms about the employment of the theory as a means of accounting for national economic growth. Arguments about economic growth accounting such as Becker's (1962), show at best that education contributes to differences in earnings between people and then only in certain circumstances.

M. Blaug (1987a, p.233) contends, "it has to be said that the models so far examined in the growth accounting literature fail utterly to explain the mechanism by which this effect is produced". He continues that it is "not that education contributes to growth, but that more education would contribute more to growth at the margin than more health, more housing, more roads, etc" (Blaug, 1987a, p.231).

4. Educational Reforms in Spain

4.1 Introduction

Nowadays globalization takes higher and higher speed. This is connected with the development of technologies, commercial intercourse, migration of population, economical development and other factors. The globalization processes provoked changes in labour markets that required, in their turn, big changes (reforms) in educational and personnel training, organization of educational achievement, reforms in financing of education from public-sector budgets and private company incomes, as well as reforms regarding political and social role of education.

The acquaintance with higher education system in Spain is important in this study because it is one of the components of our study: human capital is represented by tertiary education. Thus, the acquaintance with Spanish higher education system will help the reader to understand why exactly these or those types of educational reforms were carried out in the country and how they were reflected on Spanish higher education system in general. The chapter describes higher education system in Spain, its funding, access to education as well as educational reforms. The last ones may play an important role in human capital growth.

4.2 System of higher education in Spain

The present university system in Spain is actually descendant of the 19th century liberal university, inspired by the centralized French model. The 19th-century emergence of a centralized, state-controlled school system helped stabilize government and legitimize a state model during a revolutionary period in French history. The centralized model assisted national integration goals by fabricating a symbolic public space. The French university model involved strict discipline and control over every aspect of the university. In the last years Spanish university system is advancing towards a self-governing and decentralized system.

Higher education is provided by both public and private institutions. Universities are divided into departments, university faculties, higher technical schools, university schools, university institutes, and other centres, notably the university colleges.

The Ministry of Education with the departments of higher education in the universities coordinates the activities of state and private institutions and proposes the main lines of educational policy. The University Council sets up guidelines for the creation of universities, centres and institutes. It can also propose measures concerning advanced postgraduate studies, the defining of qualifications to be officially recognized throughout the country and standards governing the creation of university departments. The legislation on university autonomy provides for administrative, academic and financial autonomy.

Admission to faculties, advanced technical schools and university colleges is based on the national university entrance exam.

Higher education comprises university education, which integrates more than 95% of students at this level, and non-university education. The latter includes a series of educational opportunities which may be grouped into three categories. These are higher grade art education and higher military education; higher specific vocational training; and lastly, a collection of educational opportunities which follow particular legislative regulations and lead to a specific qualification. Specific vocational training offers professional qualifications for the practice of different trades. The goals of specific vocational training are to facilitate the incorporation of the young into working life, to encourage continuing training of citizens and to meet the demands of production.

The autonomy of universities concerning teaching and training makes them responsible for the organization and the establishment of their education offers. University education is organized into cycles according to which there are five types of teaching:

- only first-cycle, which has a clear vocational orientation, without a further second cycle.
- two cycles without intermediate qualification.
- two cycles with intermediate qualification.

- only second-cycle. These studies constitute the organization of university studies.
- third-cycle. This cycle aims at specialization in a scientific, technical or artistic field.

Although there are an increasing number of private institutions the public universities are the most important. Non-university tertiary education is not very significant in Spain. The public system has 48 public universities in 17 regions. There are 20 private universities. As a result of regionalisation, universities depend on 18 authorities (one central and 17 regional governments) with different political ideologies.

4.3 Financing of education

According to the Organic Act on University, university finance comprises the following:

The overall subsidy fixed annually by the Autonomous Communities, province's regional government. This subsidy should distinguish clearly between running costs and investment costs. For the former, the costs of the teaching staff and non-teaching civil servants have to be specifically authorized by the Autonomous Community. The global amount of each university subsidy is determined by objective criteria reached according to the number of students and lecturers, the number of subjects they teach, the state of the up-keep of the university buildings and the universities' need for innovation and funds for scientific research.

Economic aid for students is framed by the general policy of compensatory education based on the principles of equity and solidarity. The system of scholarships and other study grants constitutes its basic tool, the objective being to allow access and continuation of higher education studies to those who show ability but lack economic resources.

The general rules regulating grants are established under the Royal Decree 2298/1983 of 28 July, and there have not been any subsequent modifications, although there is an annual updating of the basic grant amount. Grants are awarded according to an assessment of academic record and family income, using a legally established formula. The Government establishes the threshold above which it is not possible to be awarded a grant. The renewal of a grant from the previous year has priority over new applications as long as a certain level of academic attainment is maintained.

A scholarship includes an exemption from paying tuition fees and enables registration at higher education institutions. The Ministry of Education and Culture, in turn, gives the universities annual compensation for the amounts that they do not receive as a consequence of this exemption. Most of the Autonomous Communities organize additional calls to complete or widen the scope of scholarships in general.

4.4 Preconditions of educational reforms

Access to the European Community and the availability to the European funding played an important role in the growth of higher education in Spain. Since 1980, changes in the European labour market, particularly the move away from heavy industry towards more service-based employment, have reinforced the demand for higher-level training to improve employment prospects in most European countries. According to Eurydice report, despite the decrease in the number of school-leavers seen in most countries since 1985, the demand for higher education has continued to increase in most countries as young people and adults choose to obtain further qualifications before entering a very competitive job market. (Harvey, Hunter & Delhaxhe, 2000)

The labour market changes appear also to have become increasingly important in the planning of higher education programmes at both national and local level, leading to the creation of more vocationally-oriented higher education courses for both young people and adults and stimulating closer links between business and higher education institutions.

The legislation or policy based reforms affecting higher education courses or programs most commonly involved the re-structuring of university courses. This could imply the offering of shorter undergraduate courses, the specification of the levels at which different types of degrees could be awarded, increasing the flexibility of programmes and/or establishing closer links between the course offer and the demands of labour market by, for example, increasing the number of technological courses.

4.5 Educational reforms

The change of government taking place in December 1982, as a result of the triumph in the elections by the PSOE with its large overall majority, allowed the new Government to send immediately an Organic Act on University Reform (LRU) to the Houses, which was passed in August 1983. The provisions of the LRU set out the structure of the Spanish university system in the reform period considered.

The LRU has three basic goals. The first is to develop the constitutional principle of university autonomy as established in the Constitution. Secondly, it is to determine how to develop the powers on university education shared among the State, the Autonomous Communities and the Universities themselves. Finally, it is to enable the reform and running of the university so that it adapts itself to the modernization and democratization of Spanish society in the form of a parliamentary monarchy.

The sharing of power among the State, the Autonomous Communities and the universities themselves was also set out and the Council of Universities was established as the coordinating, planning and organizing university body. As for students, the LRU confers on the Government the establishment of selection procedures for admission to university centres, and the establishment of a general policy of grants, aids and credits for students, in collaboration with the Autonomous Communities and universities themselves, so that nobody is excluded from studying on economic grounds. Furthermore, student representatives should take part in the governing and administrative bodies of the universities.

The economic and financial autonomy of Universities is also established, and the budgetary and audit regulations which it must abide by. Finally, the LRU allows the creation of private universities, on the basis of the freedom to create educational centres under the Constitution, as long as these meet certain requirements concerning the number of centres, facilities and staff. They must likewise be passed by an Act from the corresponding Assembly of the Autonomous Community.

The reform of university studies brought about by the LRU has as its main objective the change of conditions of study at university in order to ensure the highest possible success rate among university students. The reform of the curricula, the establishment of credits, the

organization of subjects in four-month terms, and the reform carried out with respect to the lecturer body itself have contributed to improving the performance of universities, despite expansion of this sector.

There have been two objectives in the process of reform in this field. The first is to organize courses into cycles in order to facilitate the gaining of an official first-cycle qualification which leads to a profession or to second-cycle studies. Secondly, in redefining the training and academic content of the curriculum, the aim is that university education comes closer to professional and social requirements and is thus more responsive to labour market demands.

Before 1983, the 1970 General Law on Education divided courses in faculties and upper technical schools into three cycles (a first cycle of three years, a second of two years and a third specialization cycle which, after approval of a thesis, led to a doctorate) and established that university schools would have a single three year cycle with professional programs in nature. It was only with the study plans of the LRU that a first university cycle with its own qualification appeared. This was of two or three years' duration and conferred the university diploma though many now lead on to other courses. Equally, a two-year second cycle course may be taken which leads to a licentiate degree, though these usually take five years.

Royal Decree 2298/1983 on grants and other forms of assistance to students established general rules covering grants to students to economic need.

Here it should be mentioned about the establishment of the credit system through Royal Decree 1497/1987. This laid down general regulations for the evaluation of study plans for university qualifications throughout the country. It defined a credit as a unit of theoretical or practical teaching which corresponds to 10 hours or its equivalent. Established numbers of credits for each qualification are between 60 and 90 per academic year.

An Act that has also had a notable influence on the organization of higher education, is the Organic Act on the General Organization of the Education System 1/1990 of 3 October (LOGSE), regulates the structure and organization of the whole education system. There are two important decisions in this Act which affect higher education: the regulation of higher grade specific vocational training and the ordinance of art education. According to the LOGSE, educational authorities shall evaluate the education system. Secondly, the LOGSE establishes that those who have completed baccalaureate studies and wish to access

university studies must pass an entrance examination which together with the grades achieved in baccalaureate studies, give credit for the academic maturity of the pupils and for the knowledge acquired at that level.

On 28 February 1982, the Government of the nation and the representatives of the two most important parties signed certain agreements by virtue of which the Autonomous Communities which had gained their autonomy via the Constitution assumed new powers. At the same time, the operating scheme for all the Autonomous Communities was completed.

As a consequence of agreements between the Government and the two most important parties, the Organic Act 9/1992 of 23 December was passed in Parliament and later, in 1994, the corresponding by-laws were reformed. On the basis of such acts, the other Autonomous Communities assumed the power of legislative development and implementation of education in all its extension, levels and grades, modalities and specialties.

The two most relevant actions in this period have been the establishing of university autonomy and that of making all university education depend on the Autonomous Communities. General legislation on universities has to be approved by the Spanish Parliament.

Royal Decree 676/1993 established guidelines on the qualifications and the corresponding minimum level of vocational training required. It laid down general guidelines for qualifications and curricula for higher level vocational training and non-university higher education.

Report on the financing of the universities dated of 1994, recommended increases in spending on higher education, especially on the non-university sector, and self-financing of the public universities, mainly through tuition fees and contract-based funding. Further it recommended the introduction of new funding formulae promoting quality and competence and a new student aid system including loans. It also insisted on institutional reform to improve coordination between universities and to render institutional management more efficient.

Royal Decree 1947/1995 of 1 December established the National Plan for the Evaluation of Universities, proposed by the Agreement of the Full Assembly of the Council of Universities

held on 25 September 1995. This plan sets the foundations for and embraces the Universities Council actions developed in the last few years through the Experimental Program for the Evaluation of the Quality of the University System and the European Pilot Project for the Evaluation of the Quality of Higher Education. Before 1995, quality evaluation was the responsibility of the individual institution, aided by its institute of educational sciences. The Council of Universities, which was behind the National Plan, initiated interest in quality evaluation.

Organic Act on universities (LOU) taken in 2001 introduces accreditation for official programmes and the creation of a European Higher Education Area (EHEA) force the redesigning of teaching activities. It controls a pre-selection of candidates by national committees through national examinations. This Act repealed the previous Act of University Reform (LRU) of 1983 with the aim of improving the quality and developing university activity. The central problem, the internal power structure of universities remains untouched. Nevertheless, the LOU introduced some elements of flexibility that could be taken by universities or autonomous regions as a means of moving forward. For instance: non-civil-service positions at all levels of the academic staff ladder can be created; wage increments to compensate staff productivity will be introduced by regional governments; and, universities will have more freedom to establish their own internal statutes. Universities can create, in order to promote and develop their activities, enterprises, foundations or other legal entities according to the applicable general legislation.

In order to have better overview of Spanish educational reforms throughout the analyzed period, they are classified into four types according to their effects on educational system. Here is the classification of education reforms in Spain that took place from 1983 till 2001:

- 1) reforms concerning autonomy of institutions;
- 2) reforms concerning public funding;
- 3) reforms concerning tuition fees;
- 4) reforms concerning efficiency.

Table 1: *List of education reforms in Spain from 1983 till 2001*

Name of document	Date of implementation	Spectra of higher education
Organic Act of University Reform	1983	1, 2, 4
Royal Decree on Grants and Other Forms of Assistance to Students	1983	2
Royal Decree Establishing Guidelines for Course Structure and Official Degrees, their Nation-wide Recognition	1987	4
Organic Act 1/1990	1990	4
Organic Act 9/1992	1992	1
Royal Decree 676/1993	1993	4
Report on the Financing of the Universities	1994	2, 3
Royal Decree 1947/1995	1995	4
Organic Act on Universities	2001	1, 4

In Table 1 above it is represented which reform concerned which spectre of education. From this table one can see that mainly educational reforms concerned efficiency in higher education, that is to say quality assurance system, curriculum, courses duration, etc. That means that the major part of educational reforms in Spain during the analysed period had qualitative character. It can be suggested that higher education institutions planned to increase the amount of enrolled students (representing human capital) by improving the quality of educational programs and the quality of teaching and making university education closer to professional and social requirements, and thus making it more responsive to labour market demands.

Three of nine reforms, that means one third of the total amount, concerned autonomy of higher education institutions. There is a question whether these reforms could intensify the incentives to increase the amount of enrolled students or influence somehow the amount of graduated students. The Organic Act of University Reform assisted in modernization and democratization of Spanish society in the form of a parliamentary monarchy. The economic and financial autonomy of universities was also established by that Act. As for students, the LRU confers on the Government the establishment of selection procedures for admission to university centres. Further reforms establishing university autonomy from the state regarding the questions of internal budget and establishing of internal regulations hardly could increase the incentive to enrol more students, i.e. to increase human capital. But, the last reform carried out in 2001 and aimed to promote and develop university activities could contribute in the increase of students' amount. This made university life more attractive.

The reforms aimed to improve or change public funding took place three times during the analyzed period. These reforms made the establishment of a general policy of grants, aids and credits for students. The reform of the year 1994 recommended increases in spending on higher education, especially on the non-university sector. This makes us believe that the changes in the funding model could increase the enrolment as well as the amount of graduated students.

The reform concerning self-financing of the public universities, mainly through tuition fees and contract-based funding could slightly increase the human capital growth. Its real effect on human capital growth will be analyzed in chapter 7.

4.6 Conclusion

From the analysis of educational reforms in Spain the following conclusion can be made. The reforms in higher education had mainly an intensive character, but not an expansive one. That is to say, that they were aimed to improve the educational system by means of making it more autonomous, by improving funding of education and improving the quality and duration of study programmes. Very few of the carried out reforms can be considered as contributing to the growth of the amount of enrolled and graduated students. Thus, the growth of human capital in the domain of tertiary education in Spain can be considered as the growth of its quality.

5. Educational Reforms in Estonia

5.1 Introduction

Educational reforms in Estonia were caused mainly by the change of political system. In 1991, the Soviet Union collapsed. Hence, Estonia became an independent state. This provoked reforms in education regarding autonomy of higher education institutions, change of curricula (there was no more ideological subjects in higher education institutions). Economy has transferred from planning to the market one. During the years 1992 till 1995 the process of privatization took part in Estonia. The majority of state enterprises were privatized. The new law began to rule on the market: the law of demand and supply. The process of transition from one type of economy to another took about fifteen years. And this influenced many spheres of the society: economy, politics and culture. Thus, new type of economy and political structure required some changes in financing of higher education.

First, the changes in higher education are described in the chapter. Then the description of higher education funding and study access comes. Afterwards I write about preconditions of educational reforms in Estonia, and finally, write about the reforms themselves.

5.2 Preconditions of reforms

In the last years, the broader context in which education functions — its economic, social and cultural environment — has been characterised by change. Estonia has had to cope with transition to a democratic form of government, similarly to other post-socialist countries, and this has been accompanied by continuous institutional changes, the invasion of market relations into most spheres, and a modification of values. In the centre of these changes has been a transition to an information society, along with higher structural complexity, a more rapid turnover of knowledge and a sudden rise in the risks of failure.

“So today, the Ministry of Education and Research of Estonia is continuously working to shape the conditions for an education system that is ready for the demands of a modern, knowledge based society. Such a system provides a high quality education, is transparent

and open for innovation, works on social inclusion and creates incentives for lifelong learning in order to support the development of all citizens and of the Estonian nation, especially within a unified Europe.” (Estonian Ministry of Education and Research, n.d.)

Changes in the education system after the restoration of independence began as early as the second half of the 1980`s when initiative teachers, parents and head of educational institutions of various levels gained pace for a renewal of curricula and democratisation of the organisation of learning, and a discussion over the future of the education system was opened.

Since 1992, Estonia has made constant progress in the gradual establishment and improvement of the education system and the related legislation of an independent state. The legal framework was built up concurrently with changes in the subject matter of study, the system of educational institutions and the organisation of education. The developments of the first decade following the restoration of independence have received considerable support from international cooperation: Estonia has joined the Bologna and Sorbonne conventions establishing a European Higher Education Area, joined the Lisbon Convention on the Recognition of Qualifications Concerning Higher Education in the European Region and adopted the Recognition of Foreign Professional Qualifications Act, which ensure equal participation opportunities for studies and employment in Europe.

At the end of the 90`s, the Estonian education system was characterised by the efforts of various education authorities and experts to improve curricula, make management of educational institutions more professional and effective and use means allocated for the education system more efficiently. The current priorities upon development of the education system are related to ensuring the quality and availability of education at all levels of education. Introduction of the principles of lifelong learning among all people of Estonia becomes increasingly important in order to preserve self-respect, citizen awareness and competitiveness on the labour market.

“There is a social consensus according to which education is the main prerequisite for the development of Estonia - open, international cooperation that is based on new knowledge promotes Estonian culture and science and increases public wealth.” (Estonian Ministry of Education and Research, n.d.)

5.3 Educational reforms

The first reform in Estonian education after the collapse of Soviet system took place in 1992. It was Republic of Estonia Education Act. The Education Act determines the general principles of the Estonian educational system. The Act enunciates the following general goals of the system: to promote development of a personality, family and the Estonian nation, as well as those of national minorities, of Estonian economic, political, and cultural life and nature preservation in the global economic and cultural context; to educate loyal citizens; and to set up the prerequisites of continuing education for all. The Estonian State guarantees the instruction of the Estonian language in all minority-language public schools and minority-language study groups. In basic schools, the owner of school (the state or a local government) makes the choice of the language of instruction.

The purpose of the Education Act is to provide legal basis for the formation, functioning and development of the education system. This Act described also the extent of authority of legislative and executive power.

Estonia, as a Member of European Union, has initiated and implemented policies that aim to identify and eliminate inefficiencies in education. For example, the Universities Act which was implemented on 12th January 1995 provides that a university may demand that study costs be reimbursed by students who do not study in a State-commissioned place and by students who studied in a State-commissioned but who exceeded the standard period of study by one year or failed to fulfil the requirements of full-time study and have been transferred to part-time study. This system which follows the principle of satisfied with performance or demanding a reimbursement from the student, aims to close the door on students who might fail to take their studies seriously at the expense of the taxpayers.

Law on institutions of higher education (year 1995) granted universities substantial autonomy not only in academic policy, but also in fiscal and human resource management.

University of Tartu Act (year 1995) determines the legal status of the University of Tartu in its relations with state institutions. It sets out the autonomy of the University and the specifications for the basis and organization of the activities of the University as compared to other universities in public law. The number of state-funded residency places shall be formalized by a contract under public law entered into by the University and the Ministry of

Education and Research pursuant to this Act. The training activities of the University shall be financed from the state budget to the extent of the number of state-funded student places, from the state budget to the extent of the number of state-funded residency places; from the reimbursement of study costs and funds received from the provision of fee-charging services related to the main activity of the University; and from other sources.

Standard of higher education (year 1996) specifies the requirements to higher education in Estonia, and it is a fundamental act for the granting of education licenses and for accreditation of study programs or higher education institutions. The Ministry of Education is responsible for determining whether institutions meet the standard.

Law on Private schools (year 1998): Private higher education institutions have the right to award a state diploma or a degree after accreditation but only to graduates who have completed the accredited study program. Qualifications awarded up to 2 years before the accreditation decision shall be recognized as state diplomas.

Institutions of Professional Higher Education Act (year 1998) provides a basis for the establishment, reorganization, operation and closure of state institutions of professional higher education, the principles of management of such institutions, the conditions for acquiring higher education, the basis for the organization of studies, the basic rights and obligations of students, and the basis for the budget, financing and state supervision of institutions of professional higher education. The Ministry of Education and Research finances student places according to the number of graduates who have acquired professional higher education specified in the state-commissioned education directive.

Since 1999 some post-secondary vocational schools have a right to offer vocational higher education. Until the 2002/2003 academic year, according to the Law on Vocational Education Institutions, higher education programmes in the vocational education institutions were offered as vocational higher education programmes. Until 1998 the vocational education institutions offered diploma-study programmes. Generally, professional higher education programmes replaced vocational higher education programmes and diploma-study programmes. Diploma studies can take place at university or in professional higher education institution. The programme at university may have a common element with bachelor studies.

According to the Study allowances and Study Loans Act (2003) a student who is an Estonian citizen or is staying in Estonia on the basis of a permanent or temporary residence permit and acquires secondary vocational education on the basis of secondary education according to a study program, which foresees student training places financed by state, or acquires higher education according to a study program which foresees student places formed on the basis of state commissioned education in full-time study and has not exceeded the nominal period of studies according to the study program has the right to apply for basic study allowance. Students whose residence is located outside the local government in which the educational institution at which they study is located or outside the bordering local government are granted supplementary monetary allowance in order to cover expenses related to housing and transport. Credit institutions that grant study loans from the funds of their credit resources are deemed to be lenders of study loans. The recipient of a loan shall commence repayment of the loan amount not later than twelve months after finishing his or her studies due completing the study program if, during that time the recipient of the loan has not began to continue his or her studies at an educational institution specified above. A person who has finished his or her studies at a vocational school or higher education institution due to completing the study program to the full extent and who has commenced service or employment in a state or local government authority or has commenced employment at a legal person in public law has the right to have the part of the amount of his or her study loan which has not yet been repaid written off by the authority or legal person in public law.

In order to have better overview of Estonian educational reforms throughout the analyzed period, they are classified into four types according to their affects on educational system. Here is the classification of education reforms in Estonia that took place from 1992 till 2003:

- 1) reforms concerning autonomy of institutions;
- 2) reforms concerning public funding;
- 3) reforms concerning tuition fees;
- 4) reforms concerning efficiency;

In Table 2 below we shall describe which reform concerned which spectre of education.

Table 2: *Educational reforms in Estonia from 1992 till 2003*

Name of document	Date of implementation	Spectra of higher education
The Education Act	1992	1, 2, 4
Law on Institutions of Higher Education	1995	1
Universities Act	1995	1, 2, 3
University of Tartu Act	1995	1, 2
Standard of Higher Education	1996	4
Institutions of Professional Higher Education Act	1998	1, 2
Law on Vocational Education Institutions	1999	1, 4
Study Loans Act	2003	3

From the table the following conclusions can be made.

The major part of the reforms concerned the autonomy of higher education institutions that is quite understandable for the country living in transition period: changes happen in all spheres and of course, it influenced education as well. The introduction of bilingual studies (in Russian and Estonian) could contribute to human capital growth because about 40% of Estonia's population are Russians. Thus, they will not need to go to another state to study in the Russian language. The later reform permits higher education institutions to decide about the demand of a reimbursement from student in case if he does not manage to pass exams and needs to prolong studies or does not comply with entrance commission requirements. This reform is quite neutral towards the human capital growth. Institutions of Professional Higher Education Act and Law on Vocational Education Institutions concerning public funding and autonomy of institutions could also be the reason of the students' motivation growth. Since the institutions have right to find themselves other sources of financing their work, it can improve their scientific basis and technical equipment. Public expenditure on tertiary education depends not only on the costs of instruction but also on the volume of direct aid to students. Level of public spending on student aid can encourage or discourage the private demand for tertiary education.

The changes to be made in public funding are mentioned in four reforms. And there are some of them that were important for human capital growth. The most important of them was University of Tartu Act that regulated financing of training activities from the state budget to the extent of the number of state-funded student places; from the state budget to the extent of the number of state-funded residency places; from the reimbursement of study costs and funds received from the provision of fee-charging services related to the main activity of the University. This could affect the amount of human capital compared to which extent study-places were financed before.

There were three reforms concerning efficiency of tertiary education. The one that could make an influence on human capital growth is Standard of Higher Education (year 1996) because it makes higher educational institutions more attractive for students, thus increasing enrolment and admittance numbers.

Among the reforms concerning tuition fees, Study Loans Act implemented in 2003 was the most decisive for human capital growth. According to this Act all university and vocational

school students who have graduated from secondary schools are entitled to a study loan at 5% annual interest. The loan is paid out twice a year. Repayment begins one year after graduation. The loan interest rate is 5% and it is set by the state. Students who have no income or whose income is very small and there is no support from parents, have a right to apply for that state grant.

In the higher education sphere, during 2001- 2003 numerous legislative changes were made in order to render the Estonian higher education system comparable to the systems of other countries in the region and open up better opportunities for higher education graduates to be competitive on the European labour market:

- 1) After the signing of the Bologna Declaration, Estonia started the transition to the two-stage study system. Similar principles of structure of the programs promote the national mobility of students, allowing them to choose between master's programs of different universities after completion of their bachelor's studies.
- 2) On January 01, 2001 in Estonia entered into force the Recognition of Foreign Professional Qualifications Act. The issues of academic recognitions are regulated by the Lisbon Convention on the Recognition of Qualifications Concerning Higher Education in the European Region.
- 3) Those graduating from applied higher education programs have been receiving an English diploma supplement as a matter of course from spring 2003. The Diploma Supplement was first issued by a number of universities in English and Estonian in 1999. Starting from the 1 January, 2004, the government requires all institutions of higher education to issue a diploma supplement in English and Estonian.

5.4 Higher education system

There are two types of higher education institutions in Estonia:

- university - academic higher education and applied, professionally oriented diploma-study programmes (until the 2002/2003 admission) and professional higher education programmes (since the 2002/2003 admission);

- professional higher education institution - applied, professionally oriented diploma-study and vocational higher education programmes until 2002/2003. Starting from 2002/2003 students are no longer admitted to vocational higher education and diploma-study programmes, instead, both higher education programmes have been implemented as professional higher education programmes.

The administration of higher education institutions or their study programmes is the responsibility of the Ministry of Education.

A university is an institution of research, development, learning and culture, where bachelor-, master-, and doctor-study take place in several fields. It is also possible to obtain professional higher education at universities. The broader objective of a university is to foster research and academic practices and to guarantee and develop opportunities to obtain higher education according to the Standard of Higher Education.

Estonian public universities are relatively autonomous. In addition to organising the academic life of the university the competence of universities extends to opening new study programmes, establishing admission terms and conditions, approving the budget, deciding about the structure, approving the development plan, electing the rector and making restricted decisions in matters concerning assets.

The legislation provides the obligation of students' participation in the council of a university or an institution of professional higher education and the representatives of students should make up no less than one fifth of the membership of the council. All higher education institutions are run primarily under the direction of a rector who acts under council.

Higher education is regulated by the Law on Universities. It says that 1/5 of decision making body (the Council) must be students. So the students are present in final decision making.

Private universities provide a few bachelor-level study programme. From the 2005 academic year a university should possess study-programmes up to the doctoral level in at least two fields of study. They are financed by their own means but the state may participate in financing certain study programmes if there is a public demand for the graduates that they provide.

There are six public universities, twelve private universities, seven state institutions of applied higher education, six private applied higher education institutions, nine state vocational education institutions and eight private vocational education institutions offering vocational higher education.

5.5 Changes in higher education

In the higher education sphere, during 2001-2003 numerous legislative changes were made in order to render the Estonian higher education system comparable to the systems of other countries in the region and open up better opportunities for higher education graduates to be competitive on the European labour market.

In April 1997 in Lisbon, the minister of education signed the UNESCO and the European Union joint convention on mutual recognition of diplomas in the European region.

The main change that had to be made in Estonia after the signing of the Bologna Declaration was related to the transition to the two-stage study system. Before that time specialists were usually prepared on the basis of a four-year program, which granted them access to positions requiring higher education. The former bachelor's studies were acquisition of the end qualification, but the new bachelor's degree only indicates that the basic knowledge and skills have been acquired. Although according to law, Estonian universities can choose whether bachelor's programs last three or four years most of the universities have opted for a 3-year bachelor's program. The restriction imposed by the state is related only to master's programs and it is confined to the 5- year financing scheme. This new rule could influence human capital in the following way: bachelor degree is not enough any more for the positions requiring higher education. That means professionalism has grown up improving the quality of human capital. Another challenge is that longer studies duration caused by new two-stage study system requires bigger funding both of studies and of students. If the state cannot increase the funding for longer period of studies for the same amount of students like it was for the shorter period, then it will affect human capital as the amount of enrolled, admitted and graduating students.

Similar principles of structure of the programs promote the national mobility of students, allowing them to choose between master's programs of different universities after

completion of their bachelor's studies. The increased mobility would lower the threshold for students to move between educational institutions, and would, besides that, lower the costs of studying. At the same time it would increase educational investments.

Transition to the new structure of the curriculum was performed relatively quickly in Estonia. After adoption of the renewed Universities Act in June 2002, the legal preparations had been fully completed for securing the desired transition. Several other topics mentioned in the Bologna Declaration do not require as many changes for application in Estonia. The calculation of the volume of curricula based on the workload of the student was already launched in Estonia in the beginning of the 90's following the example of the Scandinavian countries, a system of accreditation based on collegial assessment, where stronger emphasis on external experts for the purpose of objectivity has been applied as well.

The state supports the mobility of Estonian students and teachers in the framework of European programs, and all necessary preparation for the implementation of the uniform diploma supplement as of academic year 2004/05 will be completed. In Estonia, higher education comprises two branches: academic higher education and applied higher education.

Since the 2002/03 academic year, the general structure of academic higher education comprises three stages. The first level is a bachelor's study, ISCED 5A and the second level is a master's study, ISCED 5A. Bachelor's and master's study are in basic medical study, pharmacist study, dentist study, architect-engineer study and class teacher study integrated into one unit. The third and the highest level in academic studies is a doctor's study, ISCED 6.

Applied higher education study, ISCED 5B is the first level in the higher education system and is equal to the bachelor's study of the academic branch. Each stage of higher education study is considered as graduation from a university.

Estonia has adopted the Recognition of Foreign Professional Qualifications Act, which entered into force 1 January 2001. The issues of academic recognitions are regulated by the Lisbon Convention on the Recognition of Qualifications Concerning Higher Education in the European Region, which was ratified in the Estonian Parliament 1 April 1998. (Structures of education, vocational training, and adult education systems in Europe. Estonia, 2003).

State professional higher education institutions are financed by the state. Private professional higher education institutions provide study programmes mainly in the field of social sciences (economics, international relations, and law), business administration and theology, but also fine arts.

Private higher education institutions must have a teaching license issued by the Ministry of Education and Research in order to carry out instruction at the higher education level. Private higher education institutions or their study programmes are officially recognised by the state and they have the right to issue state diplomas and award degrees after the positive accreditation decision. According to the Private Schools Act (July 1998), diplomas awarded up to two years before the accreditation decision shall be recognised as state diplomas.

5.6 Higher education funding

Estonia has two parallel systems: government funding and study fees.

The public universities, state professional higher schools and vocational education institutions are funded by state budget. Private university-type higher education institutions are financed by their own means but the state may participate in financing certain study programmes if there is a public demand for the qualifications they provide.

The schools can find additional sources of income elsewhere. The basis for funding is the number of students which is multiplied by a coefficient according to the specialty and level of education. The public universities are somewhat freer in spending money than professional higher schools. There is a certain amount of state financed places (the state order). The amount is fixed by the Government and covered by state allocation.

There is also social aid for living. But the amount of money is too small for a student to live so many students have to work.

All university and vocational school students who have graduated from secondary schools are entitled to a study loan at 5% annual interest. The loan is paid out twice a year. Repayment begins one year after graduation. The loan interest rate is 5% and it is set by the state. Students who have no income or whose income is very small and there is no support from parents, have a right to apply for that state grant.

Applied higher education institution receives their funding from the state budget to the extent of the state commissioned student places. An applied higher education institution has the right to offer paid services related to its basic activities (in-service training and distance studies, contracted activities, professional counselling etc).

5.7 Study access

The Estonian Constitution states that everybody has the right to an education. (Education in Estonia, 2002) Attending school is compulsory for all school-age children to the extent established by law, and is free in general education schools established by state and local governments.

In order to make education accessible, state and local governments are financially responsible for maintaining the necessary number of educational institutions. The law allows the establishment and operation of other types of educational institutions, including private schools. In order to make education accessible, the state and local governments must maintain the requisite number of educational institutions. Other educational institutions, including private schools, may also be established and maintained pursuant to law.

The study places are financed in correspondence to the number of graduates from applied higher education or master's studies, determined by the state commission. Financing is realized in the amount of calculated cost of a student place during the nominal duration of applied higher education or master's studies. The calculated cost of a student place is established by the state. The Government endorses both the basic costs and indices. This so called strict calculation would not contribute to the growth of enrolled or admitted students. But at the same time it would not decrease it either. It is aimed to make students finish their studies in the right time that prohibits studies of overlong duration.

Everybody has the right to an education in the Estonian language. In an educational institution in which minority students predominate, the language is chosen by the educational institution. Education is under the supervision of the state. These constitutional principles form the basis for legislation concerning educational problems.

According to the Estonian legislation for admission to higher education institutions there are general and specific requirements giving access to higher education. The general requirements are approved by the Ministry of Education and are binding to all higher education institutions and study programmes.

There is a selection procedure for most higher education institutions and programmes. The most important selection criteria are the results of state examinations. Entrance examinations are most commonly set by faculties and certified by the councils of universities or by applied higher education institutions.

Students are admitted to higher education study according to the number of student places commissioned by the state and the additional number of student places outside the number funded by the state budget.

5.8 Conclusion

Educational reforms in Estonia were aimed to the changed conditions in politics and, mainly, in economy. These reforms were aimed to help higher educational institutions to survive in hard transition and market economy conditions, as well as to support students in getting higher education. The main part of educational reforms in tertiary education during the period 1992-2003 concerned autonomy of educational institutions and public funding. It's hard to say whether these reforms had expansive or intensive character. I would say there was some balance because the state of Estonia tried to reorganize educational system that would comply with new quality standards and financed by state on democratic basis.

6. Empirical Analysis on Estonia

6.1 Introduction

In this chapter we shall analyze how the changes in educational policy regarding: funding of education, autonomy of educational institutions, rights for the access for education, tuition fees and efficiency of education influenced the investment in human capital in Estonia.

In order to perform this analysis I shall first determine how human capital is measured, because we need to evaluate this variable. Then we shall describe what other factors influence human capital investments: income growth (a larger proportion of people's income is spent on education as income rises), population growth. Having analyzed these factors that may influence the investment in education, we shall then check whether there are still some factors influencing the expenditure on human capital.

To make this analysis we shall use the comparison of data about population growth, income growth, enrolment, admittance and graduates from tertiary education evaluated in percentage. Each variable is expressed in percentage in order to see the growth within the variable and then to compare the changes of one variable with changes of another variable. The starting point for evaluation in percentage equal to 100% is the year 1997. We decided to take this year mainly because it is starting from this year that we have the data for all variables. Plus, the first educational reform took place in Estonia in 1995. Usually it takes 1 - 2 years while it is introduced in educational system and institutions after having been signed by government and while the society reacts on it (by growth of enrolment, for example).

6.2 Factors influencing human capital growth

A wide range of factors may explain the overall human capital growth. The first factor I will focus on is the growth of population. Let's call it a natural growth because if the fraction of a students in a population enrolled in higher education is kept constant, an increase in the same population rate will lead to an increase in the overall enrolment rate.

The second factor is the growth of population's income. It is a common fact that with the growth of income the distribution of expenses changes. People spend less part of their income on nutrition and cloths and spend more on accommodation, education, and other cultural aspects. It was described earlier, in the chapter about human capital, the wealthier is the family of a student, the more opportunity he has to study longer, because the family can fund the studies, and they may have suitable networks to place the graduated student on a right job. Each generation learns from previous generations; the ability to build on the human capital of one's elders plays an important role in the growth generated by rising time spent in school.

The growth of human capital depends also on the country's economic growth because the last one increases the wage gains from schooling. The length of schooling depends a lot on future returns from the education. If the person knows (or suggests) that future earnings from the schooling are positive, or if the lifetime benefits are larger than the investment cost discounted, then he is motivated to get higher level of schooling. Plus, the developing technology raises the demand for university graduates, and the demand for primary school graduates declines. Thus, one may say that the demand for human capital increases too. Here it can be mentioned that the situation on labour market plays not the last role in it.

6.3 Data representative for the analysis

To my mind the indicators of enrolment, admittance and graduates only of public education are representative for the analysis, because the same indicators in private education are not significant. That is to say that the amount of students enrolled, admitted and graduated from private tertiary institutions is too small in comparison with public institutions.

Table 3 below presents the nominal amount of students both in private and public institutions enrolled, admitted and graduated and percentage rates of the same indicators.

Table 3: *Numerical data on enrolment, admittance and graduates in public and private higher education institutions in Estonia¹*

Figures	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Enrolment public	27234	30072	34542	40621	49574	56437	60409	63625	65659	67760	68287
Admittance public	7292	8651	10691	12002	14903	17193	16441	18491	18855	18923	19620
Graduates public	3355	3301	3821	4039	5032	6048	7595	8814	9877	10235	11793
Enrolment private	3618	4619	4527	5917	5756	5226	4557	5301	6634	7399	7452
Admittance private	1362	1700	1872	2113	1813	1645	1307	1976	2344	2516	2109
Graduates private	32	150	506	428	534	503	829	674	725	804	874

Table 4: *The share of amount of enrolled, admitted and graduated students in private higher educational institutions towards to public ones, expressed in percentage*

Figures	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Average
Enrolment	13	15	13	14	9	7	7	8	10	11	11	10,7
Admittance	18	20	17	18	12	9	8	10	12	13	11	13,4
Graduates	1	4	13	10	11	8	11	8	7	8	7	7,8

¹ The data in the table is taken from statistical database of Estonian Statistics Bureau

In Table 4 above the data shows the percentage of students from private tertiary education institutions in comparison with the amount of students in public tertiary education institutions.

As one can see from the table above, the average difference between the amounts of students enrolled, admitted and graduated in private and public higher education institutions is quite small. The average share of students in private institutions does not exceed 13,4% from total amount of students in higher education. Basing on this result I can conclude that the amount of students enrolled, admitted and graduated from private higher education institutions is not representative for our analysis of human capital growth.

6.4 Is the increase due to the growth of cohort?

To answer this question I should analyse the amount of live births that took place during the period of time started 18 years before the period of enrolment that is included in this analysis. Since the period of analysis of enrolment is taken from 1990 till 2005, then the analyzed period of live births will be from 1972 till 1988 (because most of the students enter the university right after the completion of upper secondary school, that is to say at the age of 17).

The indicators in Table 5 below are expressed in percentage in relation to the year 1997 that is considered to be a 100% indicator.

Table 5: *Live births, enrolment and admittance in public higher education institutions expressed in percentage related to the year 1997²*

Figures	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Live births	96	98	99	100	103	104	109	109	106	109	113	113
Enrolment	75	79	87	100	118	144	163	175	184	190	196	198
Admittance	49	68	81	100	112	139	161	154	173	176	177	184

² The data in the table is taken from statistical database of Estonian Statistics Bureau

As Table 5 shows, both the growth of population and enrolment in tertiary education were permanently increasing during this period. But the growth of live births was quite low in comparison with the growth of students enrolled in higher education, especially in public one. By the year 2005 the population increased by 13% from the year 1997 and the enrolment in public education – by 98% from the year 1997.

The conclusion is that the interrelationship between these two variables (population growth and enrolment in public education) is not significant. Thus, there are strong reasons to expect that population growth in Estonia is not the most important factor explaining the expansion of human capital during the period from 1990 till 2005.

6.5 Is income is the explanation to the increase of human capital?

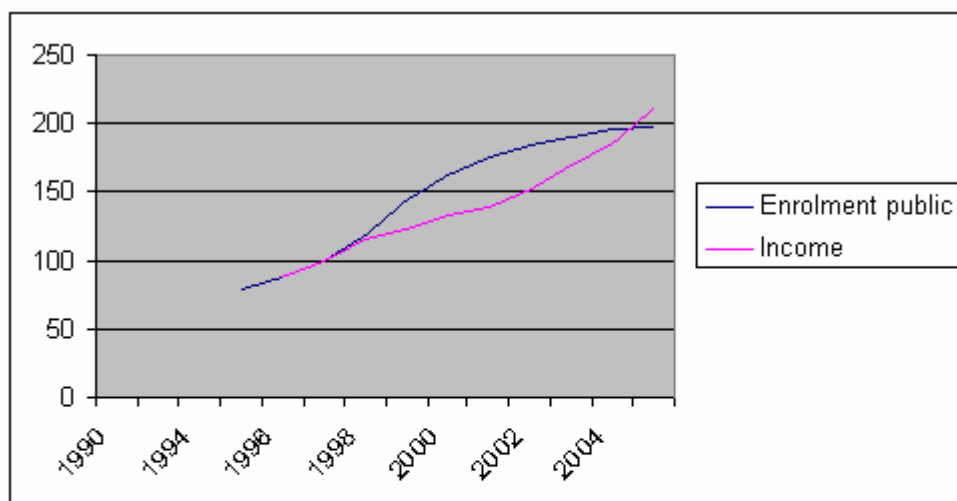
Another indicator that could influence the growth of human capital is the population's income. In this subchapter human capital will be represented by three factors: admittance, enrolment and graduates from tertiary education.

To make this analysis it is necessary to take the income of Estonian population from 1996 till 2005 (the data from 1990 is not available, unfortunately). In the table below four indicators are presented: income, admittance, enrolment and graduates in public tertiary education). I included also graduates and admittance because it is important not only how many students study, but how many of them had enough financial support from parents (or could finance themselves) to finish tertiary education. Plus, as it can be seen from the analysis, the indicator of admittance is necessary because it shows whether income could influence on people's decision to get tertiary education. The data about income is given as disposable income per household member in a month. The data in Table 6 is expressed in percentage. The year 1997 is taken as equal to 100%.

Table 6: *Enrolment, graduates, admittance in public higher education institutions and population's income in Estonia*³

Figures	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Enrolment	75	79	87	100	118	144	163	175	184	190	196	198
Graduates	82	88	86	100	106	132	158	199	231	258	268	309
Income			87	100	116	123	133	139	152	170	185	212
Admittance	49	68	81	100	112	139	161	154	173	176	177	184

Diagram 1: *Enrolment in public higher education institutions and population's income in Estonia*



³ The data in the table is taken from statistical database of Estonian Statistics Bureau

Table 6 shows that starting from the year 1996 the growth of income and enrolment in tertiary education were the same in percentage and kept a small distance until 1998 inclusive. After that the enrolment grew up noticeably, and the difference between them was from 21% till 36% maximum in 2000. Then the difference began to decrease. And in 2005 the growth of income was higher than the increase of the amount of students enrolled. This can be clearly seen on Diagram 1 above. Thus one can suggest that during the years from 1999 till 2004 the enrolment in tertiary education did not depend so much on the income of population.

As for the graduates from tertiary education shown on Diagram 2 below, there was not a big difference between this variable and income from 1996 until 1998 inclusive. But after that a big gap arose between them in 1999 and kept on growing until the end of the analysed period. In 2005 the difference between the growth of income and graduates was 97%. It means that the amount of graduates was influenced by some other factors.

The difference between income growth and increase of admittance shown on Diagram 3 is not so big. It is even lower than the difference between income growth and enrolment increase. Thus, one can say that there is a close interrelationship between admittance and population's income. But, since the increase of total enrolment is bigger than the increase of admittance and income growth, one can say, that there are some other factors that influence the amount of students enrolled in tertiary education.

Diagram 2: *Enrolment and graduates in public higher education institutions and population's income in Estonia*

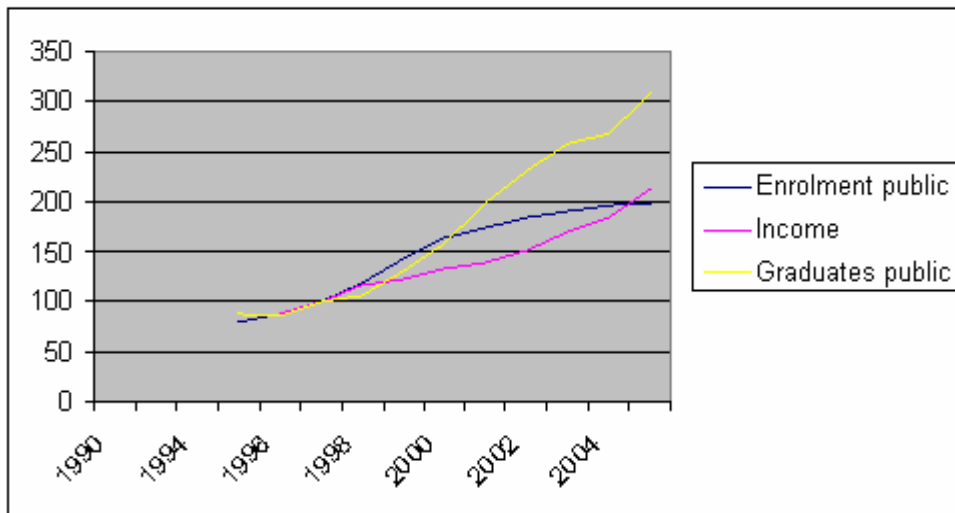
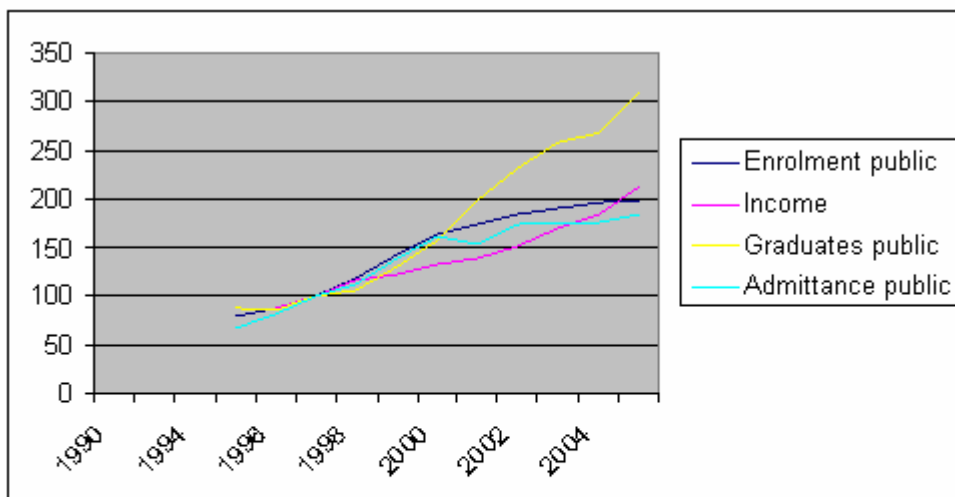


Diagram 3: *Enrolment, graduates, admittance in higher education and population's income*



6.6 Other factors that influence the growth of human capital

From the previous subchapter it is known there is a correlation between population's income and only two components representing human capital in the analysis. The third component, graduates, depends on something else. I suggest that it could also depend on the educational reforms carried out for higher education institutions during the analysed period.

The list of the reforms and characteristics are given in Chapter 5. So, now it should be analysed whether these reforms could influence the growth of human capital, namely enrolment, admittance and graduates from tertiary education basing on numerical data. I will also take the data about the expenditure on education throughout the analysed period because some of reforms influenced public funding of education and could have some influence on the investment in tertiary education in general.

It will be easier to make the comparison through diagrams based on Table 8. The expenditure on tertiary education is public.

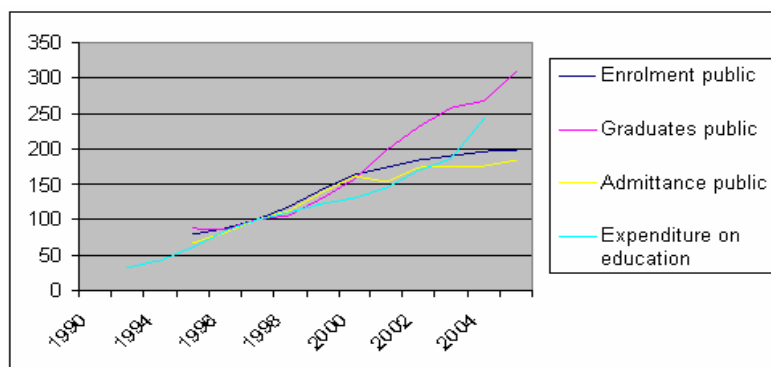
From Diagram 4 below it can be noticed that enrolment and admittance in public education, as well as expenditure on education have positive correlation. Only in 2004 expenditure on education grew up by 57%. And it is interesting to notice that in the next year, 2005, the amount of graduates increased significantly too, by 41%. The first high increase in the amount of graduates happened in 1999 – by 26%. This can be partly explained by the introduction of Study Loans Act in 2003. Students got more financial help and got better opportunity to finish their studies. This can explain the high growth of graduates until 2005.

The amount of graduates increases significantly from the year 2001 and continues to increase with a high growth rate. The closest reform to 2001 was Institutions of Professional Higher Education Act implemented in 1998. Among other things it concerned the principles of management of higher education institutions, the conditions for acquiring higher education, the basis for the organization of studies, the basic rights and obligations of students, and the basis for the budget, financing and state supervision of institutions of professional higher education. The next reform implemented during the period of the growth of graduated students' amount is Study Loans Act implemented in 2003 and suggested in 2002.

Table 8: *Enrolment, graduates, admittance in public higher education institutions and expenditure on all levels of education in Estonia⁴*

Year	Enrolment	Graduates	Admittance	Expenditure on education
1990	75	82	49	
1993				33
1994				43
1995	79	88	68	62
1996	87	86	81	83
1997	100	100	100	100
1998	118	106	112	110
1999	144	132	139	123
2000	163	158	161	131
2001	175	199	154	146
2002	184	231	173	170
2003	190	258	176	186
2004	196	268	177	243
2005	198	309	184	

Diagram 4: *Enrolment, admittance, graduates in public institutions, expenditure on education*

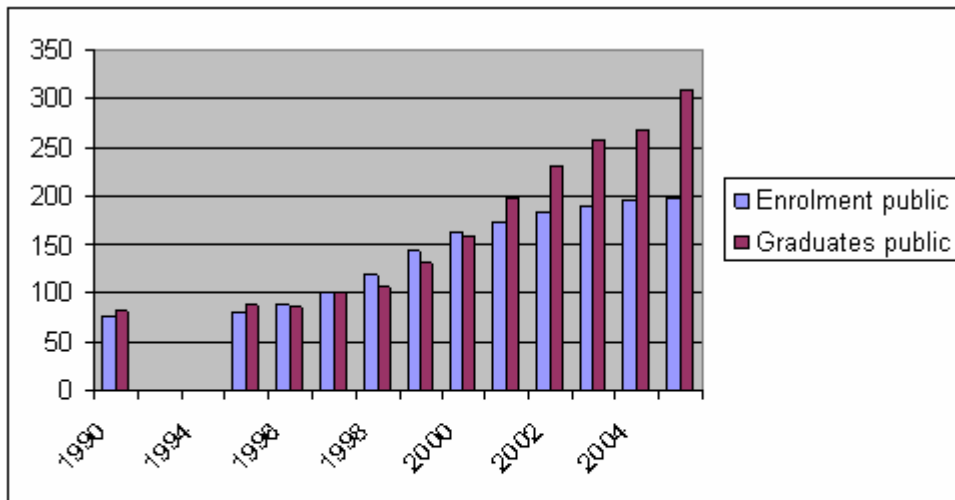
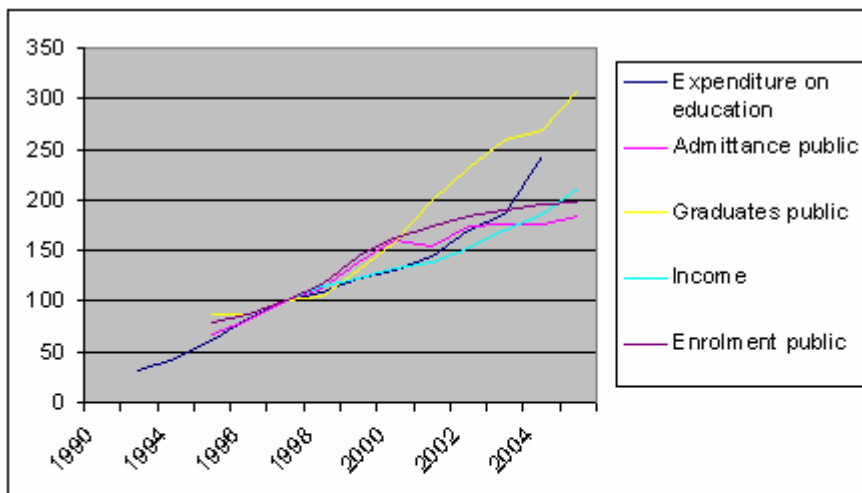


⁴ The data in the table is taken from statistical database of Estonian Statistics Bureau

There are good reasons to suggest that this reform could have a big influence on the students' motivation to get higher education and in fact could help students financially. This can be also reflected on that students do not need to work but concentrate on their studies and finish the education on time. The increase of expenditure on education in 2001 on 41% played an important role in it too.

On Diagram 5 below we can see that the gap between the amounts of students enrolled and graduated from tertiary education institutions increases greatly starting from 2001. And in 2005 it was especially high because that was the first year when students both with bachelor and master degree could graduate from higher education institutions. Since students both with bachelor and master degrees were considered as graduates in statistics, the amount of graduated students increased. It resulted in the increased gap between enrolled and graduated students.

Now it will be useful to make a diagram with the following indicators: population's income, enrolment (admittance), graduates, expenditure. This will make easier for the reader to see which periods of time were less influenced by income and expenditure on education and more influenced by other factors. In my research I consider that these factors could be educational reforms. As one can see from Diagram 6 below, the expenditure on education grew slower than admittance from 1997 to 2001, but the opposite is true afterwards. This fact can be explained by the rising gap between the expenditure on education and population's income.

Diagram 5: *Enrolment and graduates from public higher education institutions*Diagram 6: *Enrolment, graduates, admittance in public higher education institutions, population's income and expenditure on all levels of education in Estonia*

It could be also the general economic growth in the country and the growth of employment connected with the joining of Estonia in European Union in 2004 that raised students' motivation to get tertiary education.

6.7 Conclusion

The carried out analysis of factors influencing the human capital growth shows that in Estonia the biggest role in it was played by educational reforms. And other factors, such as population growth, income did not have a big influence on human capital indicators. However, there was a positive correlation between population growth, society's income and human capital growth. So, educational policy plays the main role in the development of human capital, namely people with tertiary education in Estonia.

7. Empirical Analysis on Spain

7.1 Introduction

In this chapter I will discuss how changes in educational policy have affected human capital investments. I will hereunder discuss changes in funding of higher education, in autonomy of educational institutions, the organisation of educational institutions, rights for the access for education, financial help to students and efficiency of education. They are supposed to influence the investment in human capital in Spain.

In order to perform this analysis I shall first determine how human capital is measured, because I need to evaluate this variable. Then I shall describe which factors influence human capital investments: economic development expressed by the change of gross domestic product in estimated prices and population growth. Having analyzed these factors that may influence the investment in education, I shall then check whether there are still some factors influencing the expenditure on human capital.

To make this analysis I shall compare the data about population growth, GDP growth, enrolment and graduates from tertiary education evaluated in percentage. It would be also good to use the data about admittance in tertiary education, but I don't have it for the whole length of period the analysis is made on. Each variable is expressed in percentage in order to see the growth within the variable and then to compare the changes of one variable with changes of another variable. I will consider the amount of enrolled and graduated students in tertiary education both public and private, because the expenditure on tertiary education is accounted for both patterns of ownership.

The starting point for evaluation in percentage equal to 100% is the year 1988. I decided to take this year mainly because it is starting from this year that we have the data for all variables. Plus, the first educational reform took place in Spain in 1983. Usually it takes several years while it is introduced in educational system (especially in the countries with such decentralized system like in Spain) and institutions after having been signed by government and while the society reacts on it (by growth of enrolment, for example).

7.2 The reasons for human capital investment growth

Increases in human capital spending can be explained as a result of influence by different factors. The first one is the growth of population. Let's call it a natural growth, because if the same opportunities for getting higher education are kept in the society (economic and social conditions), then the growth of cohort of potential students can be provoked only by the amount of students that decided to get higher education after graduation from secondary school. It should be also taken into account the population immigrated into Spain. As stated in Thematic Review about equity in education in Spain, the rapid growth in immigration to Spain together with the national complexity of the sources of growth has occurred at a critical phase in the history of education in Spain — the extension of compulsory secondary education and increasing participation in upper secondary education and to a lesser extent tertiary education. In other words, Spain has experienced major population influxes just at the time major reforms to education were being implemented. (Teese, R., P. Aasen, S. Field & B. Pont, 2006) Since it was impossible to find the data about the amount of immigrants enrolled in tertiary education in Spain, plus, as a reliable source (OECD) states, a lesser extent of this immigrated population influenced the extension of students enrolled in tertiary education, I shall consider some fault in the results of our analysis based purely on live births.

The second factor, not less important, is the growth of population's income. It is a common fact that with the growth of income the distribution of expenses changes. People spend less part of their income on nutrition and cloths and spend more on accommodation, education, and other cultural aspects. But since it was impossible to get the data about population income for the whole analyzed period (from 1985 till 2004), I shall take another important factor – economic development expressed in gross national product. This factor is important because economic growth increases the wage gains from schooling. As additional factors I shall also use the rate of unemployment and the share of wages in total labour costs for the analysis.

The directions of change in the Spanish economy have implications for the performance of the education system. Tourism, for example, is a major source of economic growth whose expansion sets up demands on skills and training in different skill areas and at different levels. Current patterns of participation in vocational education and training do not

necessarily support this direction of industry growth and may ultimately inhibit further growth.

As the author of the thematic review about equity in education notes, this remains a challenge to the Spanish economy, with difficulties for young people in adjusting to the labour market. There are high levels and long periods of unemployment for young people who have not attained tertiary education. However, a strong growth industry, such as tourism, can also depress participation or at least attendance and graduation because it creates many jobs and ready income and has disruptive seasonal employment patterns. (Teese et al. 2006)

7.3 Is the increase due to the growth of cohort?

To answer this question I should analyse the amount of live births that took place during the period of time started 18 years before the period of enrolment that is included in this analysis. Since the period of analysis of enrolment is taken from 1985 till 2004, then the analyzed period of live births will be from 1967 till 1986 (because many students enter the university right after the completion of upper secondary school, that is to say at the age of 18).

The indicators in Table 9 below are expressed in percentage in relation to the year 1988 that is considered to be a 100% indicator.

Table 9 presents below the main tendency of live births is decreasing throughout the period. Thus, by the end of the analyzed period it decreased till 66%. The enrolment increases significantly from 1985 until 1995 inclusive. And from 1997 till 2004, it increases until 175% and stays approximately the same with a slight deviation during 4 years.

Since the trends of these variables are very different, the interrelationship between them is not significant. Thus, there are strong reasons to expect that population growth in Spain is not an important factor explaining the expansion of human capital during the period from 1985 till 2004.

Table 9: *Enrolment in higher education institutions and live births in Spain*⁵

Year	Enrolment	Live births
1985	81	102
1986	89	100
1987	93	100
1988	100	100
1989	105	101
1990	111	102
1991	116	102
1992	124	104
1993	131	101
1994	140	102
1995	159	99
1996	152	96
1997	160	91
1998	166	86
1999	170	81
2000	174	78
2001	175	73
2002	175	72
2003	175	69
2004	175	66

⁵ The data is taken from Eurostat statistics database

7.4 Is the increase due to economic development?

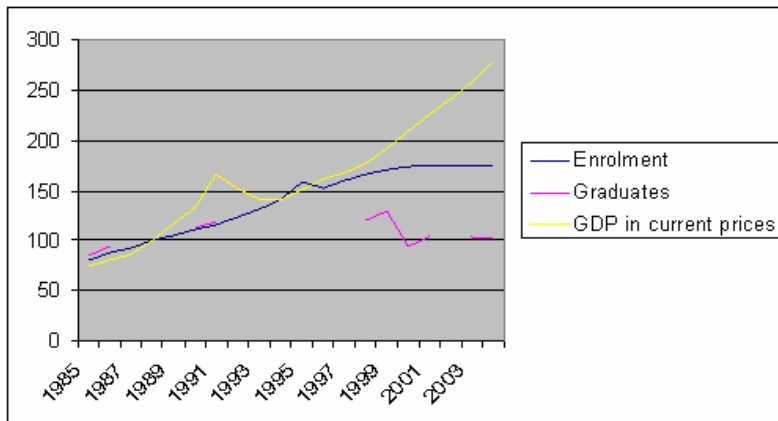
Another indicator that could influence the growth of human capital is the country's economic development. In this subchapter I shall represent the human capital by two factors: enrolment and graduates from tertiary education. To make the analysis I shall first take the data of Spanish gross domestic product (hereinafter referred to as GDP) in current prices from 1985 till 2004. In the table below three indicators are given: GDP, enrolment and graduates in tertiary education. I included graduates because it is important not only how many students study, but how many of them were motivated to finish studies because of economic development, competition on labour market, growth of wages, and how many of them had enough financial support (or could finance themselves) to finish tertiary education. Further I shall give the additional data for the analysis. The data on GDP is expressed in percentage. The year 1988 is taken as equal to 100%. The data is given in Table 10 below.

Diagram 7 shows that starting from the year 1985 until 1988 inclusive the development of GDP and enrolment in tertiary education had the same tendency of growth with not so big gap between them. Since 1989, the gap between enrolment and GDP began to increase, then it decreased. From 1993 till 1998 the gap between enrolment and GDP was little again. After that the enrolment in tertiary education stabilized, and GDP continued to grow. By the year 2004 gross national product grew up till 277% and enrolment - only till 175%. Thus one can suggest that economic development of the country did not influence the enrolment, that is to say, the motivation of students to study, at least during the period from 1999 until 2004.

As for graduates from tertiary education, looking at the diagram, it is possible to suppose that until the year 1991 inclusive the growth of graduates had almost the same tendency like the enrolment. But after that it is too difficult to suppose anything for the period from 1992 till 1997 inclusive because of the lacking data. From 1998 till 2004 the tendency of graduates was not stable. Enrolment and graduates from tertiary education had the same tendency since 1985 till 1991. The growth of graduates and of GDP had a positive correlation since the beginning of the analyzed period until 1991. Upon this data, the conclusion is that since the year 1998 until 2004 the correlation between GDP growth and graduates was negative.

Table 10: *Enrolment, graduates in higher education institutions and GDP in current prices*⁶

Year	Enrolment	Graduates	GDP in current prices
1985	81	86	75
1986	89	94	80
1987	93		87
1988	100	100	100
1989	105		118
1990	111	113	133
1991	116	119	166
1992	124		153
1993	131		141
1994	140		140
1995	159		151
1996	152		162
1997	160		167
1998	166	121	177
1999	170	130	192
2000	174	95	208
2001	175	103	225
2002	175		241
2003	175	104	258
2004	175	102	277

Diagram 7: *Enrolment, graduates and GDP in current prices*⁶ The data is taken from OECD statistics database

Now I shall give the data below that can help to understand the trends of graduates and enrolment in tertiary education related to economic situation in the country. As auxiliary information it will be taken:

- 1) growth of employment that gives the change in percentage from one year to another of the total number of employed persons in the country.
- 2) unemployment rates that represent unemployed persons as a percentage of the labour force. The labour force is the total number of people employed and unemployed at the age from 15 to 74.
- 3) mean equalized net income. Here the indicator for the year 1995 is taken for 100%. The indicators of further years are given in percentage in comparison with the indicator of 1995.

It might be that income, unemployment and employment could also slightly affect the enrolment growth since there is a positive tendency of growth in employment and population's income, and the rate of unemployment stayed low. The same can be said about the graduates, but only for the period from 1985 until 1991. After that period I do not have data, and later it is different. So, my preliminary suggestion is that economic development played an important role in the growth of human capital, namely, production of employees with tertiary education.

Table 11: *Growth of employment giving change in percentage from one year to another of the total number of employed persons in Spain⁷*

Figures	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Average
Employment, %	-0,5	1,9	1,7	3,6	4,5	4,6	5,1	3,2	2,4	3,1	3,5	3

Table 12: *Unemployment rates representing unemployed people as a percentage of the labour force at the age from 15 to 74⁸*

Figures	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Average
Unemployment, %	18,4	17,8	16,7	15	12,5	11,1	10,3	11,1	11,1	10,6	13,5

Table 13: *Mean equalized net income. Here the indicator for the year 1995 is taken for 100%. Other indicators are given in percentage in comparison with the indicator of 1995⁹*

Figures	1995	1996	1997	1998	1999	2000	2001	Average
Income, %	100	102	108	111	120	131	142	116

⁷ The data is taken from Eurostat statistics database

⁸ The data is taken from Eurostat statistics database

⁹ The data is taken from Eurostat statistics database

7.5 Other factors that influence the growth of human capital

As mentioned in the previous subchapter there is a correlation between economic development and only one component representing human capital in our analysis. The other component, graduates, depends on something else. Plus, it would be wrong say that the correlation between enrolment in tertiary education and economic development is very close. I suggest then that it could be also educational reforms carried during the analysed period that influenced the amount of enrolled and graduated students.

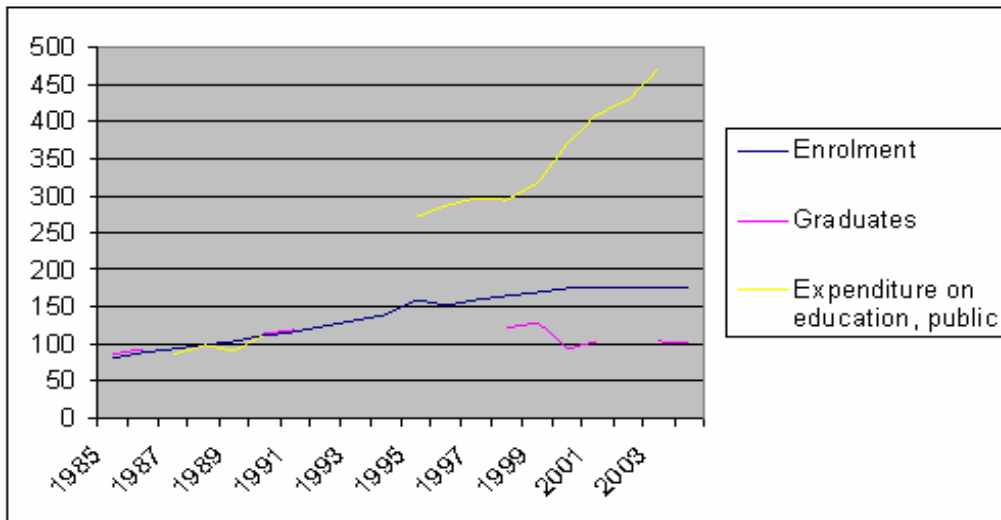
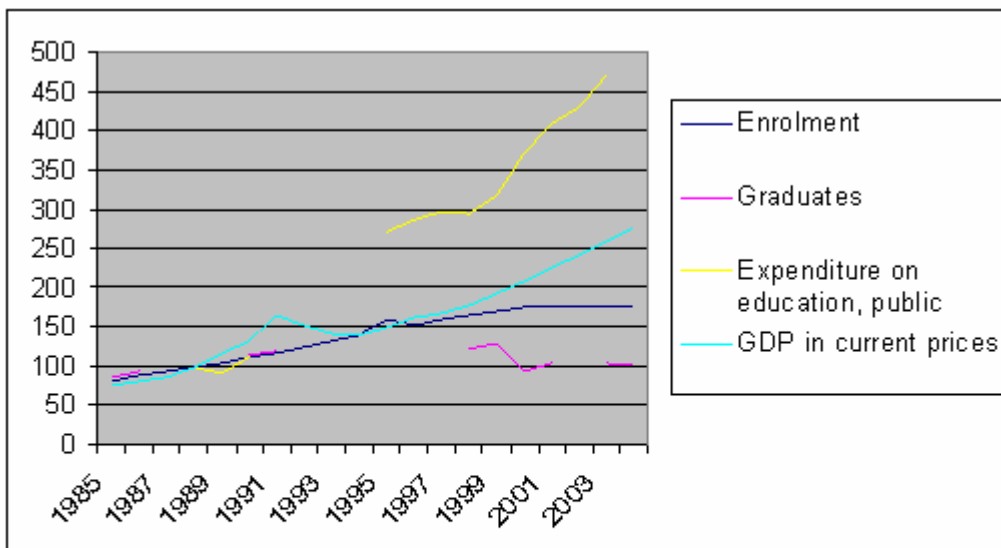
Now, by means of numerical data I will analyse whether these reforms could influence the growth of human capital, namely enrolment and graduates from tertiary education. It should be taken also the data about the expenditure on education throughout the analysed period because some of reforms influenced public funding of education and could have some influence on the investment in tertiary education in general. In Table 14 below the data on enrolment, graduates from higher education and public expenditure on education is presented. In the case with Spain both private and public tertiary education institutions are analysed because the data on expenditure is given for both patterns of ownership.

Diagram 8 will give a better picture about the tendencies of these indicators throughout the analyzed period. On the diagram one can see that from 1987 until 1991 the growth of all three indicators was almost the same. Since 1995 until the end of the analyzed period the growth of expenditure on education was much higher than the growth of enrolment or graduates from tertiary education. So, here there isn't any significant correlation between human capital and expenditure on it.

Table 14: *Enrolment, graduates in higher education and expenditure on tertiary education*¹⁰

Year	Enrolment	Graduates	Expenditure on education
1985	81	86	
1986	89	94	
1987	93		86
1988	100	100	100
1989	105		91
1990	111	113	111
1991	116	119	
1992	124		144
1993	131		
1994	140		
1995	159		271
1996	152		287
1997	160		298
1998	166	121	294
1999	170	130	316
2000	174	95	370
2001	175	103	409
2002	175		429
2003	175	104	469
2004	175	102	

¹⁰ The data is taken from OECD, Eurostat and Unesco statistics databases

Diagram 8: *Enrolment, graduates from higher education, expenditure on higher education*Diagram 9: *Enrolment, graduates from higher education institutions, public expenditure on higher education and GDP in current prices in Spain*

Further I will try to give some explanations why the expenditure on education grew headily up without any affect on the amount of enrolled and graduating students. The growth of public expenditure on education increased significantly in 1992. This could be the result of the reform in 1992, Organic Act 9/1992 on the transfer of powers to the Autonomous Communities. This reform concerned autonomy of institutions and public funding. Starting from 1999 the expenditure on education began to grow headily. This growth could be provoked by several policies:

- 1) Royal Decree 1447/1995 that established the National Plan for the Evaluation of Universities. Though it was taken in 1995, the passing and implementation of reform takes time, up to 2-3 years. This plan sets the foundations for and embraces the Universities Council actions for the Evaluation of the Quality of the University System and the European Pilot Project for the Evaluation of the Quality of Higher Education. The objectives of the National Plan for Evaluation of the Quality of Universities are the following: to promote the institutional evaluation of the quality of universities; to provide society and mainly university students with relevant and objective information on the level of quality in Spanish universities, the level of benefits and services that are on offer, etc; to provide educational authorities with objective information on the level of quality in universities. The Ministry of Education and Culture has financed the carrying out of these evaluation projects with the sum of ESP 184 million. The results of this first call are presently being evaluated by the Council of Universities.
- 2) The development of ICT, namely, introduction of computer technologies in tertiary education institutions that took place in Europe starting from 1995 approximately.
- 3) The implementation of Bologna declaration objectives. Among them: the adoption of a common framework of readable and comparable degrees; the introduction of undergraduate and postgraduate levels in all countries; ECTS-compatible credit systems also covering lifelong learning activities; a European dimension in quality assurance; the elimination of remaining obstacles to the free mobility of students and teachers.

So, the expenditure on quality assurance and effectiveness and directly on student financial support or creation of new study places could not affect the amount of enrolled or graduated

students during the last period. The growth of expenditure is 294% higher than the growth of enrolment. And in case with the graduates there is a negative correlation throughout some periods (from 1999 till 2001 and from 2003 till 2004). The reform of 2001 concerning tuition fees did not contribute to the increase of enrolled or graduated students either.

Diagram 9 presents the following indicators: gross national product, enrolment, graduates and expenditure. This will make easier for us to see which periods of time were less influenced by GDP and expenditure on education and more influenced by other factors. In our research I consider that these factors could be educational reforms.

Looking at Diagram 9 above it can be concluded that the gap between the enrolment and graduates is much smaller than between the human capital indicators and expenditure on it. Expenditure on education has affected the amount of enrolled and graduated students only until 1991. After that the gap between these three indicators is too big to talk about any correlation between them.

7.6 Conclusion

From the analyzed data it can be concluded that in Spain during the period from 1985 till 2004, the growth of human capital was affected by economic development of the country, as well as by low unemployment rate, growing income and good employment rate. My hypothesis regarding the influence of educational reforms and expenditure on human capital growth was not proved by the analysis.

8. Conclusion

The purpose of my study was to check which factors influence the growth of human capital represented by the amount of students enrolled, admitted and graduated from tertiary education institutions. The analysis was done with the help of such factors as population growth, income growth, gross domestic product growth and implementation of educational reforms. As an attendant factor to educational reforms we took expenditure on higher education.

The analysis of these factors on the example of Estonia and Spain shows that not only educational reform can play the main role in human capital growth as it was hypothesised at the beginning of the study. I took for the analysis rather different countries by its economic and political development. Spain has been on market economy during a long historical period. Estonia was on planning economy during fifty years (after Soviet occupation in 1940). And since 1991 this country began to transfer from planning economy to the market one. Consequently, there needed to be some challenges in higher education system in all spheres: starting from financing of educational institutions and ending with change of curriculum and adding of some new study programs.

The period of transition economy was a hard one for Estonian society. This could be the reason that it was not economical factors that influenced human capital growth in this country, though economy was constantly developing in Estonia. Correct educational policy turned out to be more effective for human capital growth. It motivated students for better education, supported them during studies and gave bigger opportunity to be enrolled in higher educational institutions (enlarged capacities of institutions). In Spain the main role in human capital growth was played by economic growth and such economic factors as low unemployment, good level of employment and growing income.

On the example of the analyzed countries I can make a kind of conclusion that (speaking in frames of European countries) in countries with transition and changing economy and political system educational policy plays a more important role for human capital growth. And in countries that have not recently had any specific political and economic changes, educational policy does not play the first role in human capital growth, but economical

situation in the country. I would say that in the first case it is an influence of internal factors. And in the second case it is the influence of external ones.

The need for reforms in education and training depends in each country on its particular structures, levels of attainment, strengths and weaknesses and policy orientations. These reforms while decided and conducted at national level, need to take serious account of their increasingly important European dimension which has become a critical factor for their efficiency.

Investment and reform in investments in education geared not only national and regional needs, but also in European dimension thanks to the implementation of Bologna declaration items. The main goal of investment and reforms is to achieve as much convergence as necessary (while keeping as much diversity as possible). Such reforms are also crucial for economic growth and employment policies and for the efficiency of structural funds investments.

The achievement of greater efficiency of educational investment in the European context and the completion of the European labour market call for a step change in the recognition of qualifications and competencies acquired anywhere in the EU.

Also education tends to affect the control on population growth and to increase overall quality of life. Education also provides the means to an enlightened citizenry able to participate in democratic and legal due process and pursue values such as equality, fraternity and liberty at both private and social levels.

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