UNIVERSITY of OULU
OULUN YLIOPISTO

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Economic Aspects in Education

Master's Thesis in Education

FACULTY OF EDUCATION

Technology Oriented Primary Teacher Education

2013

UNIVERSITY of OULU
OULUN YLIOPISTO

Faculty of Education **Thesis abstract**

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Title
Economic Aspects in Education

Major subject	Type of thesis	Year	Number of pages
Education	Master's Thesis	December 2013	61 + 1

Abstract

Leading theme in this master's thesis is adaptation and preparation to ever changing requirements of skills and knowledge in the working life. These changes of requirements in the working life are implied by the changes in the occupational structure in Finland that is presented in the thesis. The data used in thesis to show the changes in the occupational structure in Finland Finnish Longitudinal Employer-Employee Data, FLEED, which is gathered by Statistics Finland and it shows changes in occupational structure of Finland between years 1995 and 2007. Education is considered in this thesis so that its object is to prepare children and future generations for working life with suitable skills and knowledge. The variety of other, equally important, objects that education has and possibly contradictions as well as problems that might arise in the course of achieving all the objects is beyond of this study. Changing occupational structure arises a question that how education prepares itself to the unknown changes?

To answer the question asked, I will introduce Economics of education and Educational planning and how these two relate to each other, especially how economics of education has affected education and educational planning. Therefore I will first take historical review of the economics of education and introduce two main theories; human capital theory and screening theory. The main difference of these two will be explained and also what kind of difference it would make to education if either one could be proved right. It would also have an effect on how education should be arranged in the society. Educational planning has had, in its course, different approaches to analyze and predict future. I will review those approaches; also these approaches have been influenced by economics of education.

In the last part of the thesis I bring up studies in Finland has tried to prepare and project changing work life. Also I discuss about can education bring something new to economics of education.

Keywords Human capital, Educational planning

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Kasvatustieteiden tiedekunta **Tiivistelmä opinnäytetyöstä**

Luokanopettajankoulutus		Tekijä **Suutari, Tero Mikko Olavi**	
Työn nimi Economic Aspects in Education			
Pääaine Kasvatustiede	Työn laji Pro gradu-tutkielma	Aika Joulukuu 2013	Sivumäärä 61 +1

Tiivistelmä

Tämän Pro gradu-tutkielman johtava teema on mukautuminen ja valmistautuminen muuttuviin vaatimuksiin tiedoista ja taidoista työelämässä. Ammattirakenteen muutos Suomessa viittaa siihen että vaatimukset erilaisille tiedoille ja taidoille työelämässä on tapahtumassa. Aineisto ammattirakenteen muutoksesta on Tilastokeskuksen yhdistetty työntekijä-työnantaja-aineisto (Finnish Longitudinal Employer-Employee Data FLEED). Ammattirakenteen muutos ajoittuu vuosien 1995 ja 2007 välille. Koulutus mielletään tässä Pro gradu-tutkielmassa sellaiseksi toiminnaksi jonka tavoite on valmistaa lapsia sekä tulevia sukupolvia työelämään oikeanlaisilla taidoilla ja tiedoilla. Yhtälailla tärkeät muut tavoitteet, mitä koulutukselle ja kasvatukselle on annettu, sekä mahdollisesti syntyviä ristiriitoja tavoitteita saavuttamisessa ovat tämän tutkielman ulkopuolella. Muutokset ammattirakenteessa luo kysymyksen, että miten koulutus on valmistautunut tällaisiin tuntemattomiin muutoksiin?

Vastatakseni kysymykseen esittelen koulutusekonomian ja koulutussuunnittelun, sekä erityisesti miten koulutusekonomia on vaikuttanut koulutussuunnitteluun. Aluksi käyn läpi koulutusekonomian ja esittelen sen kaksi pääteoriaa: inhimillisen pääoman teorian ja siiviläteorian. Selitän millä tavoin nämä teoriat eroavat toisistaan ja mikäli jompikumpi voidaan todistaa oikeaksi millainen vaikutus sillä olisi koulutukseen. Koulutussuunnittelussa on käytetty monenlaisia analysointivälineitä tulevaisuuden ennakoimiseksi. Esittelen nämä eri tavat ja työkalut, sekä miten koulutussuunnittelu on historiansa aikana muuttunut ja miten taloudellinen ajattelu on muuttanut koulutussuunnittelua.

Viimeisessä osassa tuon esille tutkimuksia siitä miten Suomessa pyritään ennakoimaan ja valmistautumaan muutoksiin työelämässä. Käyn myös keskustelua siitä voiko kasvatustiede tuoda jotain uutta koulutusekonomiaan.

Asiasanat Inhimillinen pääoma, Koulutussuunnittelu

Table of Contents

1. Introduction

The relationship between educational planning, economics and skills needed in the future is a complicated affair. I will review in this Master's thesis how economics of education and educational planning has evolved historically. I will explain how especially economics of education has had an influence to educational planning and show data about changes in Finnish occupational structure. The changing work environment should be taken into consideration when education is planned.

The economics of education has evolved as an academic discourse from the 1960's. From the time of Theodore W. Schultz (1902-1998) the economics of education has evolved from the orthodoxic formulation of human capital theory to a wide range of different ideas. Economist have filled the framework of the human capital paradigm with analyses of the returns to education and training, with explanations of individual's behavior in the labor market and firms' labor investment behavior, with studies of human capital's contribution to economic growth (Carnoy, 1995, 1).

Outside of the academic world, economics and education have been bound together as long as education has existed. The two have always walked hand in hand throughout the history. Any civilization can be taken as an example in any particular time of the recorded history. From feudal Japan to ancient Europe we find similarities of how education and economy are connected. On rare occasions in Japan, a great scholar would establish a school of his own, but the only students who gathered were of the samurai class whose livelihood was assured by the stipends from their lords. They were to study in between their service to their lords, and subjects of their learning, too, were geared to the needs of the ruling class. (Fukuzawa 1875 via Eiichi 1985, 108.)

Times have changed since the days of samurais in Japan as all around the world. They have changed so that everyone can educate oneself. For a little over hundred years every one of us has been able to invest in ourselves, and we can enlarge the range of choices available to us (Schultz 1961, 2). Therefore the economics of education, academic and non-academic, should be seen as a universal discourse that concerns all of us.

What then makes this topic particularly interesting for a student in the faculty of education is that first of all it gives a viewpoint to education. Thinking in monetary terms for example is not something that comes very natural for a person who will be a teacher after graduation. Secondly, the economics of education is explored by economists like Becker, who made the theoretical work for economics of education, educationalist are rare in this field. Perhaps the terminology and scientific thinking is so different that meaningful academic discussion is hard to come by, therefore it has been great learning experience for me to learn some of the basic concepts of economics. Thirdly, Finnish educationalists have been quite about education's economic implications. The latest systematic book about economics of education from an educationalist in Finnish was from the year 1985; see e.g. Vaherva & Juva, 1985. A more practical approach about how to finance and manage education is Heikkilä, Juva, Kettunen, Lahtinen & Tiihonen 2008. There have, nevertheless, been studies that fall under economics of education in Finland, mostly they have been economists, Roope Uusitalo, Rita Asplund and Mika Maliranta are the few to mention, see e.g. Uusitalo 1998 and Asplund & Maliranta 2006.

This, in my opinion, underlines the problem described few lines above. Perhaps educationalist and economists speak different language that meaningful discussion is hard to come by. Whatever the reason is, this thesis' purpose is to try to narrow that gap. It very well might be that educationalists have much more learning to do. If so then we must learn to argue with economic facts for education. Also perhaps economists have some learning to do about the specific conditions of education.

The leading question for this research arises from the research done in the field of economics, where scientists have gathered statistical information about the changes in occupational structure. There has been a trend in the job market that has lasted several decades. The trend is that occupational structure is polarizing. Occupations of high-skill level and low-skill level have increased as medium-skill level occupations have decreased. This trend is seen all around the developed world, Finland included.

This change in working life has an effect for what skills are required in future occupations. It is a challenge for the educators and for educational planning in over all to provide the

right knowledge. Therefore the question is; how education system is adapting to these changes?

To answer the question, I will firstly introduce the historical context of economics of education: the link between human capital theory and production function model as the latter being a construction to explain the predictions of the former. Also, I introduce the debate about production function versus screening models. The basic difference how these two theories view relationship between society and education is important to understand. If either one of the theories would proven to be right in such a way that the other theory would be wrong, then the society's function as a provider of education would be drastically different.

The discussion of education's function towards the economy in the economics of education has been discussed in the production function versus screening models debate. The production function theory views education as system that produces skills and knowledge, which affect positively to individuals and society. If the production function for schools were known, it would then be possible to predict what would happen if resources were added or subtracted, and to analyze what actions should be taken if the prices of various inputs were to change (Hanushek, 1995, 277). This then leads to the idea that the different parts, which affect the rise of productivity, could be identified and controlled. Therefore, education's function to the economy in production function theory would be raising individuals' productivity.

The screening models see education as a system that provides information to the society as well as skills to individuals (Stiglitz, 1975, 299). But the return of education is only positive for the more able ones and for society the return of education can even be negative. (Stiglitz, 1975, 285.) Therefore, education's function to the economy and to job markets is to work as a screening device, which makes the productive traits of employees' public knowledge (Groot & Hartog, 1995, 35).

Secondly I will introduce education planning, that is how societies have planned their education and which institutions are in charge of it. The educational planning was strongly influenced by economists after the idea of human capital. The production function model

gave some predictions about which occupational sector would give relatively better productivity and therefore it would be forthwhile to invest into those sectors. Educational planning was not only wanted in national context, it was also major theme for different international organizations like OECD and UNESCO to name few. This part of the thesis is also written in its historical context that is to say I review some of the methods and tools that were developed by educational planners and the shortfalls of them.

Thirdly I will examine empiric evidence about the changes in the occupational structure in Finland in different skill levels. The change that has happened in the occupational structure underlines the importance of educational planning. I will present some sector-level and industry-level data of how the occupational structure has changed between years 1995 and 2007. I will use data from Statistics Finland and use their classification of occupations 2001. The empirical part of this study is descriptive in nature and in graphical form, so the limitation of this kind of simple and blunt method is that one cannot do extensive analysis and reasoning, but merely stating what has happened. The third part of the thesis underlines the need of understanding macro-economic changes, which affect our occupational structure. Education system needs to prepare and adapt for the changes, but the adaption should be done as a process that takes account what human capital theory and what the past experiences of educational planning suggest as a good way. In the last part of the thesis I will describe some of the problems that the education system might have to respond to due to occupational polarization. The last part of the thesis is Discussion, which will gather all the theoretical information and the data into a synthesis.

The leading theme in the thesis is: that one of the purposes a school has is that it should prepare younger generations for the future life and specifically for the working life. In this thesis I will restrict my point of view in such a way that schools and school system are examined as a tool to enhance economic conditions of individuals and also societies. Schools provide skills and knowledge that will be useful in the job markets at the time of graduation. I acknowledge that schools and school system have also goals that are not economic in nature and some of these goals might even be considered more important. This kind of comparing and evaluating of economic and non-economic goals and the tension as well as contradiction is an interesting and challenging field of study, but that is beyond the scope of this research.

2. Economics of Education

Here I will introduce the modern academic discourse of economics of education. This will include human capital theory and two models called production function model and screening model. The human capital theory looks education from the standpoint of an investment contrary to the long behold thought that education is consumption good. When education is seen as an investment the question arise that who will bear the costs and who take the gains. To answer this question I will review the economics of education literature and point out the historical findings for society as a large and for individuals when education is an investment.

The production function is vital part in formulating the idea of human capital theory into statistically measurable outcomes, such as skills and knowledge. Screening and signaling theories examines the beneficiary side and contemplates that how much the society will benefit by investing into education and if the individuals are the only beneficiaries, is it worthwhile to invest into education. There are a number of screening and signaling models, in this thesis only one is taken under scrutiny as the main difference to production function is the debate about beneficiary. The variation of screening and signaling models comes of their different views of how the education functions as a screening or signaling mechanism. The human capital and screening theory were considered as exclusionary models at first but now days they are considered to be mutually coexisting.

2.1 The Human Capital Theory

In this chapter I will go through Theodore W. Schultz's orthodox formulation of human capital theory, its historical background and human capital theory's relationship between individuals and society. Thereafter, education in human capital theory will be discussed and the chapter is concluded with the idea that education may also be seen as a consumption benefit not just an investment.

The human capital theory argues that education produces skills and knowledge and that these attribute in a substantial amount to a nation's economic growth and an individual's higher income. The human capital theory itself does not prove that education enhances economic growth. That is a presumption of the theory; the presumption was based on

earlier models of describing economic growth, which were lacking something profound: economy was growing faster than those models could explain. It has been widely observed that increases in national output have been large when compared with increases of land, man-hours, and physical reproducible capital. (Schultz 1961, 1.)

It can be said that the basis of the economics of education is the human capital theory; this was formed by Theodore W. Schultz in the 1960's. He argues that by educating people, we can grow both individual's and nation's wealth. (Schultz, 1961, 6.) From this viewpoint, it could be said that human capital theory was and is a tool for explaining economical growth, and that education was and is a medium for achieving economical growth. The theory does not reveal what kind of education is efficient education, or with what kind of education we could better achieve economical growth.

After Schultz's ideas, we have seen a wide range of studies about education from the economic viewpoint: how education should be developed to produce more knowledge and skills as well hoe to use the resources devoted to it in a more efficient way. Also we have seen how education should be developed so that it supports economic growth. A large body of empirical work has examined the impact of resources on education outcomes. Economists have been concerned with resources devoted to education and the return to education. (Akerlof & Kranton 2002, 1170.) Economists have studied education to find out how to get better educational results or the same results with less money. One of these ideas of examining and explaining the processes of producing education is the production function model. The model will be discussed later on in this thesis.

2.1.1 Individuals and Human Capital Theory

In the human capital theory man is seen as a component, into which resources can be invested the same as into machines. This does not mean that man and machine are treated in the same way. To make an investment means that the investor is expecting to receive at least the same amount of money back that he invested in the first place, preferring that the investment makes some profit. Another important factor for the investor is the time range when the investment is paid back. With machines it is relatively easy to calculate these two compared to making an investment decision about human beings. Investing to man can be divided into two types; in the first one investor and the object of investment are different,

for example; company training its employees. The second one is in which the investor is investing in oneself; high school graduate thinking about whether to go for a tertiary degree or to enter the job markets for example. The second one concerns everyone and for this reason it might be from the educational point of view, more interesting. Schultz summaries this so that the ability to deal successfully with economic disequilibria is enhanced by education and that this ability is one of the major benefits of education accruing to people privately in a modernizing economy. This means that person who has got education has better knowledge to make decisions that are beneficial to her. Economic disequilibria means that a product's or service's price is either under- or overpriced and education gives skills and knowledge to assess this difference. (Schultz 1975, 843.)

In the human capital theory man invests, that is, educates oneself with a presumption that longer education will provide larger income than shorter education. Schultz gives an example of this about younger workers who had had twelve years of training. They found it easier to obtain jobs than the older workers who had had only six years of education. (Schultz 1961, 4.) The productivity of man will increase due to the education, which will be seen as an increase in man's income. The human capital theory assumes that longer education increases productivity, which means that the income also increases. According to Krueger & Lindhahl (2001, 1101) each additional year of schooling appears to raise earnings by about 10 percent. Though it might be questionable does the 10 percent increase concern anyone in any given time? One's increase in income through education is clearly economical point of why to educate oneself longer. Education's perspective might be that it is better to educate oneself longer, for the sake of education itself. In the economic of education terms this is best, but not perfectly, considered when education is look as consumption good.

Even though explanations of how education affects the earnings are still only partially explained, Schultz had some insights from early on. The role of differences in abilities in students is yet in large part unknown (Schultz 1975, 828). Students also differ in their allocative ability, which in turn affects their efficiency as they invest in education. In analyzing the equilibrating activities of people, we postulate that there are economic incentives to reallocate resources, that people respond to these incentives to the best of their ability, and that the difference in their performance is a measure of the difference

among people with respect to the particular type of ability that is required (Schultz 1975, 833–834).

Individual's time of making an investment, or education, decision depends on the country. Different nations have different kinds of school systems, which affect the time and the kind of changes he or she can do later to his or her investment and educational decisions. In Finland the time to make that kind of decision is in the ninth grade of basic school. In the ninth grade of basic school student makes a decision of going to high school, vocational school or to enter job markets and end educating oneself. There are other times in the basic school where one has to make choices that could be described as investing into oneself. Perhaps one of the biggest decisions to be made before the ninth grade is whether to take an additional foreign language or not. As the children are at the age of eleven to twelve, it is questionable how largely the decision is their own. It is certainly affected by parents and peers. Education has profound influence on one's personal economy. Yet the investment decisions about education are done at an early age, when it is questionable if one understands the consequences of these decisions.

2.1.2 Society and Human Capital Theory

The human capital theory as a tool for thinking about a nation's economic growth was one of the ideas of Schultz (1961). Other economists, like Becker (1975), also contributed greatly to the human capital theory by formulating different aspects of the relationship of education, individuals and economic growth. Nation's economic growth is measured in different ways; one of the widely used instruments is gross domestic production, GDP. GDP is calculated so that everything a nation produces, products and services are summed up. The gross domestic production is used as a standard measurement for economical growth and as an indicator of nation's economical well-being.

The basic idea of human capital theory is that education increases human capital, which then affects the economical growth. A lot of research has been done to estimate education's role in economic growth. According to Hanushek & Woessmann (2008, 629) the standard method to estimate the effect of education on economic growth is to estimate cross-country growth regressions where countries' average annual growth in gross domestic product (GDP) per capita over several decades is expressed as function of

measures of schooling and a set of other variables deemed to be important for economic growth. A vast early literature of cross-county growth regressions has tended to find a significant positive association between quantitative measures of schooling and economic growth. (Hanushek & Woessmann 2008, 629.) The return to years of schooling in Finland in the year 1993 was estimated to be 8.2 percents (Asplund, 1999, 55).

The economic growth of a nation is better explained by the human capital theory than the conventional economic explanation models that were dominant in the time of Schultz. Nations' economies grew much faster in the post Second World War than the conventional economic growth models could explain. The income of the United States has been increasing at a much higher rate than the combined amount of land, man-hours worked and the stock of reproducible capital used to produce the income (Schultz 1961). The conventional models were missing humans' input to the economy. Conventional models naturally took account the human input as working hours, but this a narrow view of human capabilities. The conventional models did not take account differentiation of skills that people have and here is where the human capital have a large part to resolve the difference in growth rates. For example the growth rates are affected by ideas and invention, which in turn relate to the stock of human capital either through research and development (R&D) activities or through adoption behavior (Hanushek & Kimko 2000, 1184). This is just a one of the ways how human influence and the difference of skills affect the economy.

Later on there has been a lot of research on how education affects the economic growth and even on what subjects have the most effect on the economic growth. Hanushek & Kimko (2000) have argued that the concentration on mathematics and science corresponds to the theoretical emphasis on the importance of research and development activities as the source of growth. Direct measures of labor-force quality from international mathematics and science test scores are strongly related to growth. (Hanushek & Kimko 2000, 1184–1186.)

One cannot deny the importance of language abilities in an economy. The problem has been that different languages have not been comparable with each other. The recent OECD PISA exams have tried to solve this problem and the results between different languages are supposed to be comparable. Also in the past decade, especially Hanushek has

contributed a lot to the research about the quality of education and its effects on the economic growth. School quality also has direct implications for the productivity and earnings of individual (Hanushek 2005, 276). Cognitive skills have a strong and robust influence on economic growth (Hanushek & Woessmann 2008, 609). Hanushek (2005, 270) describes what economic growth means for a society; the economic growth determines how much improvement will occur in the overall standard of living in a society. One needs to be reminded that economic growth is not the only thing, which counts in the overall standard of society. Other measurements also need to be considered. Even if we only observe economic growth, one also needs to observe the distribution of the economic growth and the distribution of the wealth in a nation.

From theoretical viewpoint, there are at least three mechanisms through which education may affect economic growth. First is that education increases the human capital inherent in the labor force, which increases labor productivity and thus transitional growth towards a higher equilibrium level of output. Second is that education may increase the innovative capacity of the economy, and the new knowledge on new technologies, products and processes promotes growth. Third is that education may facilitate the diffusion and transmission of knowledge needed to understand and process new information and to implement successfully new technologies devised by others, which again promotes economic growth. (Hanushek & Woessmann 2008, 627–628.)

Aggregate individuals form society, if such an economistic term is used to describe the relationship of individuals and society. Therefore when individuals' productivity improves their personal economy improves also, this will in turn improve society's economy too. In a very straight forward thought the more educated aggregate individuals enhance the whole society's economy. The basic premise of the human capital is that more educated individuals are more productive, therefore they earn more. Even if education's effect to economic growth would be only through this kind of mechanism, one clearly sees that education is not a cost to a society but in fact it is an investment.

2.1.3 Education and Human Capital Theory

One could make a fair question of why economics have any meaning in education. Or let me phrase the question in other words. *What kind of educational purposes there are for economics in education?* As Schultz (1961, 2) puts it, by investing in themselves, people can enlarge the range of choices available to them. We have chased individual freedom from the times of French revolution. The ideas of those days still mark our thinking today. That is, if we educate ourselves and others around us, we will free ourselves. The human capital puts one more piece to the puzzle, for freeing ourselves we need a certain level of economical freedom. To achieve economical freedom we should educate ourselves. Investing to oneself is one way free men can enhance their welfare (Schultz 1961, 2).

Education enhances human capital, which in turn enhances economic growth. What kind of education enhances the accumulation of human capital the most, then? Does it matter what subjects we teach to the children, do some subjects enhance the accumulation of human capital more than other subjects?

The analysis of international differences in growth rates suggests that math and science skills are a primary component of human capital relevant for the labor force. The relationship between education and economic growth is best seen in the science-subjects and mathematics. The link between the two has been proved in a numbers of researches, but the economics of education has rarely if in any research grounded itself from the education perspective. Most studies see education only quantitatively and one of the most frequently employed measures is either the primary- or secondary-school enrollment rate. (Hanushek & Kimko, 2000, 1184.)

Quality issue has risen in recent years and a school system's quality may have a huge impact on economic growth as it may be an important factor in explaining the differences in nations' economic growth. Quality of education in the economics of education is the knowledge that students gain from formal schooling and from informal learning. Quantity analyses of economic growth and education have focused to length of formal schooling. Hanushek & Kimko (2000, 1204) conclude that labor-force quality differences are important for growth; that these quality differences are related to schooling; and that quality has a causal impact on growth. Hanushek & Woesmann (2008, 607) also argue that

there is strong evidence that the cognitive skills of the population, rather than mere school attainment, are strongly related to individual earnings, to the distribution of income, and to economic growth. The quality issue means that it introduces another element of measurement error into the growth analyses (Hanushek & Woesmann, 2010, 61).

Another indication of the importance of education quality to economic growth lies in our ability to explain global variation in GDP growth (Hanushek, Jamison, Jamison & Woessmann 2008, 66). Labor-force quality has a consistent, stable, and strong relationship with economic growth. 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. (Hanushek & Kimko, 2000, 1186.)

One of the challenges in understanding the impact of school quality differences in human capital has simply known how to measure the quality (Hanushek 2005, 270). Another part of the return to cognitive skills comes through continuation in school. Using just quantity of schooling in the earnings analyses assumes that formal schooling is the only source of skill development. But, if a variety of the other inputs such as families or peers is also important in the formation of human capital, simple years of schooling is subject to this additional source of omitted variables bias. (Hanushek & Woessmann, 2008, 626.)

The full complexity of education's implications for economic growth and how to achieve it were understood years after Schultz's initial outlines of the relation between education and economy. One of the aspects that were not included in the earliest concepts of human capital was above mentioned family and peer inputs. One way in trying to capture the effects of family to children's schooling is called joint production. There is research about families providing good nutrition and health care to their children and spend more time talking with them and paying attention to them in positive ways at an early age, all this makes the children inherently better learners. (Carnoy, 1995, 5.)

Most countries are involved in policy debates about the improvement of their schools. These debates, often phrased in terms of such things as teacher salaries or class sizes, rest on a presumption that there is a high rate of return to schools in general and to quality in

particular. (Hanushek & Woessmann 2008, 616.) Education is a tool a nation can use for the purposes it chooses. Education has a large effect on a nation's well-being, economic as well as any other kind.

Regardless of how education precisely enhances economic growth, the human capital theory views education system as a primary medium for any nation to enhance its accumulation of human capital. Therefore investment to education in general is considered to be valuable for society. The view, about what is and where does education happen, has broadened since the initial idea of economics of education in the 1960's. That has meant enormous developing of methods to factoring in all the inputs of education. The same development of methods has also been important in calculating the outcomes that education produces. I have reviewed earlier in this thesis how education affects to earnings and how this productivity gain affects the society as whole, education benefits individuals as well society in more subtle ways too than just earnings. That will be the topic of next chapter.

2.1.4 Education and Benefits

Education can affect economic growth in various ways. It does not affect only through growing income but also as nonmonetary benefits or nonmonetary return on an investment (McMahon, 1995, 169). In the earlier chapters I explained how education has been proved to have influence on an individual's and on nations' economic growth. Those studies have large support among the researchers, even though the question of how exactly education affects the economic growth is in many parts unknown. In addition to education's direct effects to productivity for individuals and through them to national economies, education has indirect effects both to individuals and to society.

In economic, these indirect effects that occur to others than the participants of the activity are called externalities. Externalities can be either positive or negative. Pollution for example is negative externality that is in many cases related to manufacturing. Pollution affects the people nearby, and some cases in remarkable far away, therefore we have environment laws to prevent pollution of nature and to address the responsible if pollution has occurred. In short externality is an effect on others not considered by the individual decision maker (Lochner, 2010, 93).

Education externalities are the public benefits of education spillover to benefit others in the society, including others in future generations. External benefits are distinguished from private market benefits to earnings and from private nonmarket benefits beyond earnings such as those to own health, longevity, and other quality of life. The evidence is that, with a few exceptions, education externalities are overwhelmingly positive. (McMahon, 2010, 68.)

McMahon (2010, 68–69) distinguish benefits of education into private–social benefits, which can be market–nonmarket benefits. Education has a direct or indirect effect on all types of the benefits. Direct effects of education to private market benefits are addition to earnings, this have been explained in the earlier chapters. Indirect effects of education to social benefits are called external. The addition to earnings of educated man compared to less educated man is where the economics of education started. Later on in the 1980's economists started contemplate the value of nonmarket benefits that education has direct effect on, like crime rate or health. In the past decade or so, researchers have tried to calculate the external social benefits to which education has indirect effect. This has been challenging task, and developing statistical tools has been in the center to figuring the value of external social benefits. Here on I will summarize some of the private nonmarket and social nonmarket benefits that are affected directly or indirectly by education.

One clear example of private nonmarket benefits that education has a direct influence on is health. Better health for individuals means lower costs for society in healthcare, which is therefore nonmarket social benefit. Groot & van den Brink (2007, 189) states that it is likely that individuals with more intellectual endowments not only achieve more in education, but also have more knowledge of, or attach more value to health and a healthy life style. Almost all studies show that education strongly contributes to a better health (Groot *et al*., 2007, 186). The effect of education on health is not restricted only to oneself. It affects also spousal health and child health. McMahon (2010, 68) classifieds these two to private benefits as family is considered to be decision-making unit.

Another example about education's direct effect on nonmarket private benefits is crime rate. This again in the aggregate level lowers the costs to society. Lochner (2010, 94–95)

have reviewed the literature about the effects of education on crime and compiled four reasons how schooling might affect crime. Firstly education raises wage rates, which raises the opportunity costs of crime. Secondly, education may directly affect the financial or psychic rewards from crime. Thirdly, education may alter preferences for risk taking or patience. Fourthly, schooling may affect the social networks or peers of individuals. The crime an education research has mainly focused on school attainment and post school criminal activity and found that when comparing graduates from high-school and youth that have not a degree, the latter have more income from crime related activity and they compose larger group of incarcerated 20–23 years old in the USA. Lochner (2010, 95) also warns not to put too much trust, as these are difficult to measure in statistically and there might be unobserved individual characteristics that affect both schooling and criminal decisions.

McMahon (2010, 71) has compiled a table of different studies where the monetary value for already mentioned social nonmarket benefits have been calculated. In addition, McMahon lists as social benefits democratization, human rights, political stability and environment to name a few. These all are social benefits that education has a direct effect on. These direct effects of education compose a substantial sum to society for one bachelor's degree. There are also the indirect effects of education that are not yet factored in. The problem with the indirect effects education is that if the direct effects are difficult to estimate, the indirect effects are more so.

McMahon (2010, 76) explains that the indirect effects of education operate through other variables to set the stage for growth of earnings and nonmarket benefits later. This means that there are generational benefits in place. Our generation has benefitted from generations before us in the form political stability and dissemination of technology, and so will the generations benefit after us. The indirect effects of education are expressed as a percent of the market benefits and nonmarket benefits. The percent calculated is 42% of the value of the market benefits and the private nonmarket benefits.

The benefits of education are not only earnings for individuals or for the society. Earning increases are the usual way to think in monetary terms but as we can see other benefits, such as human rights and political stability, can be estimated in monetary values. When

factoring these other benefits into what education brings to society, the monetary value of education increases substantially.

2.2 Production Function

This chapter will discuss how production function theory tries to prove the human capital theory's presumption that education increases productivity, which means a productivity augmenting role of education. In this chapter I will present some of the common measurements that are considered to be inputs and outputs of education in the production function. Education has also another role that is productivity identification, which means screening or signaling theories. Screening theories are discussed in the next chapter. The difference of production function and screening theories are may be to related different view of economic theories, whether markets are most of the time efficient or whether distortions extensively exist in the markets. Even though differences of economic theories are very much related to economics of education naturally, unfortunately analyzing those differences, beyond production function and screening theory in education, are out of the scope of this paper.

Production function is a theory that tries to prove the presumption of the human capital theory. The presumption is that education – even primary schooling – enhances the ability of students to perceive new classes of problems and to learn ways of solving them (Schultz 1975). There are two types of variables; first ones are those that have some kind of effect on the learning process, like class size and teacher's education. These are called inputs. The second ones are those types of variables that show that learning has happened. These ones are called outputs. The production function tries to find and explain the relationship of these two, inputs and outputs. Production function is focused primarily on the relationship between school outcomes and measurable inputs. (Hanushek 1995, 277.)

If the exact relationship between inputs and outputs would be known, it would help teachers and all others, who are working in the field of education, to change their educating methods to better, more efficient and economical ones. Education is a field, which consist of a large amount of variables, which are difficult to categorize and even more difficult to prove to be causal. Another challenge for the production function theory is that learning happens outside of school too. When scholars thought of where education happens, they

found out that a lot of it takes place also at home, especially during the first years of children's life. Schultz did not think these inputs in the 60's. Peer and family inputs were contemplated in later on when economics of education evolved. One attempt to add family and peer inputs to production function is called joint production, see e. g. Carnoy 1995. Also researchers often see vast difference in educational outcomes with little difference in quantity of resources (Akerlof & Kranton 2002, 1167).

Inputs and outputs are studied widely in the economics of education. The purposes of these studies have been to find causality between inputs and outputs. If this kind of relationship between certain input and outputs could be proved, that would give tools to educators to improve learning environments. (Hanushek 1995. 277.)

A *production function* defines a boundary in the input-output space, specifying the maximum *physical* output that can be obtained from every possible combination of *physical* inputs, given the existing level of technical knowledge. It assumes, as it were, the solution of an engineering problem before turning to the economic problem of choosing the optimum combination of inputs in response to relative input prices. On the other hand, technical change that raises the productivity of all input combinations is depicted by an upward shift of the function; if the function shifts without changing its basic shape, technical change is *neutral*. (Blaug 1980, 89–90.)

The inputs can be divided into two groups; first one consists of the inputs that the school has an influence on and the second one consists of those the school does not have influence on. For the first ones can be named such things as school size, teacher's salary, teacher's experience and facilities that can be further divided to smaller components. The second ones, those that are outside of school's influence, like parents' devotion to spend time with their children, help with the school work and hobbies. And with all of these there is quite a large uncertainty of how much any given input has effect on measurable outputs.

There is a longstanding debate regarding the return to small classes, especially in elementary and secondary education (Bedard & Kuhn 2008, 253). Here said inputs are not the only ones that matter of course, plenty more can be named and that should give the picture of how many of those inputs there actually are. The vast majority of growth

modeling has simply taken measures of school attainment to characterize skills (Hanushek & Woessmann 2008, 614). But there has been no consensus on the importance of specific teacher factors, leading to the common conclusion that the existing empirical evidence does not find a strong role for teachers in the determination of academic achievement and future academic and labor market success (Rivkin, Hanushek & Kain 2005, 419).

The inputs rarely cover the children themselves in any way. Children's skills, knowledge and the ability to use them to learn are not considered widely as inputs, which have an effect to the learning process. Children are thought to be passive subjects, whose environment can be manipulated for the purpose that they will learn better, not as active doers that have inputs, which may have an effect on learning. The research that includes children as an input to the model uses peers as a proxy for children's inner capabilities. Peer inputs, when included are typically aggregate summaries of the sociodemographic characteristics of other students in the school (Hanushek 1995, 278). Learning certainly is an activity that is done by the person himself. Therefore the students' own willing and motivation to learn is crucial. Student's will and motivation naturally are not all that it takes to learn, teaching has its own purpose in this pedagogic process as to stipulate students to take part in actively.

The aggregate skills of individuals in a country will vary with family inputs, school quality, ability differences, and other country specific factors (Hanushek & Woessmann 2008, 614). Cognitive skills may come from formal schools, from parents, or from other influences on students. It seems crucial to focus on how much students have learned while in school when estimating the effect of education on economic growth (Hanushek & Woessmann 2008, 658). It may be that measurable characteristics such as teacher experience, education, and even test scores of teachers explain little of the true variation in quality (Rivkin, Hanushek & Kain 2005, 419–420). Prior investigations of the influence of the school and teachers have raised as many questions as they have answered. This is in large part because of the difficulties introduced by the endogeneity of school and classroom selection and in part because of the failure of observable teacher characteristics to explain much of the variation in student performance (Rivkin, Hanushek & Kain 2005, 449).

Outputs are thought to show the results of the influence of inputs. In order to know the effectiveness of certain an input, it should be able to be related to a measurable output. If this was known, it would then be possible to predict what would happen if resources were added or subtracted, and to analyze what actions should be taken if the prices of various inputs were to change (Hanushek, 1995, 277). Most widely used output in the researches is school grades, but other kind of measurable features exists; student attitudes, school attendance rates, and college dropout rates (Hanushek, 1995, 277).

The production function tries to prove the premise of human capital theory, that education affects productivity positively. Even if education would affect economic growth in such a simple way with individuals, when we consider this mechanism in whole the society, we will come to the conclusion that education has enormous potential as a medium for economic growth. The problem, nevertheless, has been proving the causality between particular inputs and outputs.

If all the inputs and the correlation and causality of them to the outcomes were identified, teachers would be able to affect and change the inputs so that learning would be more efficient in economical terms, which, of course, would be a good thing. The production function identifies education like an assembly line. The assembly line in the production function of education is the school. The main ingredients are students. Books and other learning materials are supplemental ingredients, which will have an effect on the students. Teachers are tools to shape pre-described outcomes from the "material" they work with. We know what outcomes or what kind of "products" we want, so in the economical sense the only thing to find out is the most cost-efficient way to produce them.

There is nothing wrong in the idea of finding the most cost-efficient way to produce education. Resources are limited, and it is best to make the most of them. Unfortunately, producing education is far more complicated than producing dairy products for example and so the production function of education waits to be found. Again Carnoy (1995, 5) have insights of education's special interaction processes of learning-teaching that are difficult to analyze in assembly-line model. The complexity of the interactions in-school and out of school means that it is difficult to monitor all that affect the product called learning.

2.3 Screening in Education

As there are various screening theories each of which stresses somewhat different aspects, there is not a single explanation that would be adequate to explain all theories. In the 1970's economists such as Joseph E. Stiglitz, Michael Spence and George Akerlof examined the asymmetry of information in markets. Asymmetry of information means that the participants of market transaction, the buyers and the sellers, have different amount information about the product that is exchanged. This asymmetry of information, or imperfect information, will have an effect to market behavior. In the production function it is consider to be irrelevant as in the production function framework all the information are thought be available to every participant. I will review Joseph E. Stiglitz's (1975) screening model in this thesis. In the field of economics of education the asymmetry of information will have implications on the benefits that education offers to individuals and societies. Those implications will also be contemplated also in this chapter. Also, there is question of how to empirically study when education program is producing education, that is productivity augmenting and when it is screening, which is productivity identification. An example of such study will be presented about Finnish polytechnic reform.

Screening theory refers to a variety of theories that have in common the fact that they challenge the human capital assumption of the productivity-augmenting role of education (Groot & Hartog, 1995, 34). Screening theories assume that private returns are always higher than social returns. Education's function is to screen individuals' abilities so that employers are able to recognize those employees who have the right abilities for the job. Therefore it assumes that those individuals that do most schooling are those who have the most abilities. The role of education is not productivity augmenting but more of productivity identification.

Screening theory is a group of various models, which all have a bit different emphasis on the production-augmenting role of education; therefore it is not possible to give a short explanation that covers all the different theories. Screening models are a group of theories that challenge the human capital assumption of the productivity-augmenting role of education. Screening models are basically divided into two groups; in one group individual's education is seen as a signal of individual's abilities, in the other is where

education is considered only a screening mechanism that gives an admission ticket to certain professions. (Groot & Hartog, 1995, 34.)

Stiglitz (1975, 283) acknowledges that individuals differ from each other in various ways. Schools identify and label these differences so that individuals and job markets come aware of them. Those individuals that are labeled as "more productive" are thereby able to obtain a higher wage. Social and private returns to education in the screening model differ from the production function theory. In the production function theory, both private and social returns are positive. Stiglitz (1975, 285) argues in his screening model that there is not any social return to education and private returns are positive only to more productive ones. The social return is zero but the private return of screening is positive for the more able ones. Nevertheless Stiglitz does consider education to be important, he sees it as a system, which sorts people to right kind of jobs. The benefits that society gets from education are twofold. First is that with education giving the information of individuals' abilities, the individuals may find their true marginal product. Second is that education works as a matching tool so that students find a job, to which they fit. (Stiglitz, 1975, 288.)

There are three mechanisms by which individuals are screened in education system and by these screening processes the productive traits become public knowledge. The educational system sorts individuals in two ways: by admission requirements and by grading. (Groot & Hartog, 1995, 35.) The first screening mechanism sorts individuals to groups of different abilities, e.g. vocational school and high school. This gives information of individuals' abilities to the employers. The groups which into individuals are sorted, gives some information about the individual to the firms (Stiglitz, 1975, 293).

The second mechanism is educational achievement: within homogenous educational program standard test yields information by which individuals can be compared (Groot & Hartog, 1995, 35). Failure to pass a course in college, or failure to pass a grade in elementary and secondary schools, conveys a great deal of information, which adversely affects the wages received by those individuals (Stiglitz, 1975, 293). Also the second mechanism gives information about the individuals' abilities to the employers.

The third screening mechanism is self-selection of individuals (Groot & Hartog, 1995, 35). Individuals have understanding of their own abilities and individuals act rationally when choosing a job that matches their abilities. The third mechanism's information is only known by the individuals that mean there is asymmetry of information. Education's primary function is to provide skills and knowledge to individuals, it is acknowledged in the screening model, which is reviewed in this thesis. The by-product of education towards the society is to screen individuals and find appropriate slot for everyone. (Stiglitz, 1975, 293–294.)

When the screening and signaling theories were developed in the 1970's they were competing theories to human capital theory. Therefore a lot of empirical research was done to prove one or another right. The problem, as Hämäläinen & Uusitalo (2008, 755) state is difficult to resolve because in most cases both theories have identical predictions. It is particularly difficult as both theories predict that earnings rise with education. Even though both theories have similar predictions to individuals, they fundamentally differ for policy conclusions. According to pure screening or signaling theory, education has no effects on productivity and, even though investments in education may be profitable for the individuals pursuing education, they are not beneficial for society as a whole. Question of how much, in monetary terms, society should involve into education would naturally arise. Screening and signaling theories consider only earning increments and not the external benefits of education that can also calculate in monetary terms, therefore the total benefit of education is out of reach. Nevertheless, earning increments form substantial and direct part of the effects of education, whether it is productivity augmenting or productivity identification.

Evidence of empirical research comes more of the conclusion that the controversy is not an either or question. That is, education has both productivity augmenting and productivity identification aspect. Groot & Hartog, (1995, 38) states that research do not conclusively discount the screening theory and education seems to have signaling aspects also. Most likely the significance between human capital and screening effect in education varies due to level of education and type of education. But as already mentioned, both theories predict that earnings rise with education, therefore empirical data is hard to find, where such a distinction can be done. Luckily, there is some amount of data available from natural

experiment. Hämäläinen & Uusitalo (2008) examined Finnish polytechnic reform's implications to the earnings of graduates before and after the reform.

The Finnish polytechnic reform took place in the 1990's as in merging several vocational colleges and vocational schools. The reform was done in several years, the other macroeconomic changes and general changes in the return to education can be controlled. Gradual implementation also allows controlling for any permanent differences across schools by adding school fixed effects to the estimate. There are several fields in the polytechnics. The research was done in the business and administration field that had major changes in the reform. One of the biggest was that pre-reform programmes lasted two years and after-reform programmes lasted three-and-a half years. Also, the new graduates received new degree titles that distinguished them from the earlier graduates. (Hämäläinen & Uusitalo, 2008, 759–761.)

Both human capital and screening or signaling models would predict that graduates from polytechnics would receive higher earnings than graduates from the same schools before reform. The crucial difference between the two models is their prediction about what happens to those graduates from vocational colleges after some schools have undergone the reform, but before their own college is upgraded to a polytechnic. Human capital theory implies that their earnings are not affected, because they get similar education as before. Also, their relative position compared with university and secondary-level vocational school graduates should not be changed. The signaling and screening model implies that those who graduate from vocational colleges after the reform suffer a loss in earnings. If the most able of those who, before reform, would have graduated from vocational colleges now enter polytechnics, the average ability of those who remain in vocational colleges after the reform decreases. If this is how employers perceive the sorting process and if employers use education as a signal of productivity, the average wage offers to vocational college graduates also decreases. (Hämäläinen & Uusitalo, 2008, 764–765.)

Hämäläinen & Uusitalo (2008, 771–773) states about the results that the increase in the fraction of polytechnics graduates in the graduating cohort reduces the earnings of vocational college graduates, hence rejecting the pure human capital model and supporting the signaling model. Important part for signaling hypothesis is that when polytechnic

graduates and vocational graduates are merged together the earning increases of polytechnic graduates and earning decreases of vocational graduates should cancel each other. They do not, the results implies that the reform increased the earnings of polytechnic graduates greater amount than it decreased the earnings of vocational graduates. Therefore, results do not provide evidence for pure signaling model either. One way to quantify the relative magnitude of the effects human capital and signaling is to compare the positive effects on the polytechnics graduates to the negative effects on the remaining vocational college graduates. Estimation gives a value of 29 percent of the increase in the earnings of polytechnics graduates are due to human capital and the remaining 71 percent is contributed to the signaling effect of education.

Empirical evidence is hard to come by for providing evidence either human capital theory or screening and signaling theories. Changes in education programmes are good natural experiments to test both hypothesis and the magnitude of the effects if neither one proves to be solely attributed to changes in earnings. In this chapter I have reviewed the basic idea of human capital, how it affects individual earning increments as well as economic growth in many different direct and indirect ways. Human capital's influence to economics as one of the explanation for higher economic growth than the calculations indicated in the 1950's was also reviewed here. Screening theory that has a different view than human capital of education's role was explained and the main differences between also explained. The view how education is seen in both theories was examined and the difference of who are beneficiary was explained also here. The beneficiary aspect of education is particularly important when education is planned. The human capital theory has had an influence to education planning. The various ways how to plan and forecast what kind of education is needed in the future are the topic of the next chapter.

3. Educational Planning

I will start this chapter with Philip H Coombs (1970, 14) definition of educational planning that it is in the broadest generic sense the application of rational, systematic analysis to process of educational development with aim of making education more effective and efficient in responding to the needs and goals of its students and society.

Coombs (1970, 14–15) continues and emphasizes the continuousness of planning as educational planning deals with the future, drawing enlightenment from the past. It is the springboard for future decisions and actions, but it is more than a mere blueprint. Planning is a continuous process, concerned not only with where to go but with how to get there and by what best route. Its work does not cease when a plan gets on paper and has won approval. Planning, to be effective, must be concerned with its own implementation – with progress made or not made, with unforeseen obstacles that arise and with how to overcome them. Plans are not made to be carved in stone but to be changed and adapted as the occasion warrants. As plans for one period move into action, planning for the next must be under way, nourished by feedback from the first.

Coombs (1970, 12) gives also his cautionary notes that as definitions exists there still at that time was not one generally accepted definition of educational planning, and much less an acceptable general theory. This cautionary arises from the view that educational planning was still young and growing rapidly, and was far too complex and diversified a subject, to be encased in any hard and fast definition, good for all time.

Farrell (1997, 280) also reveals the difficulties to define educational planning as he lists the problems. Writing that part of the difficulty in demarcating the ‘boundaries’ of the field is that there is a notable lack of agreement among scholars and practitioners regarding its definition. There is considerable confusion over who should be called, or call themselves, ‘educational planners’, what such individuals do or should do when engaged in educational planning, and what bodies of literature apply to its study. What some authors refer to as ‘educational planning’ others identify as ‘policy analysis’, ‘policy making’, ‘management’, ‘administration’, ‘research’, ‘decision making’, or more broadly, ‘politics’.

Farrell (1997, 282) writes that his personal view broadly and simply, is that educational planning involved determining, however and by whomever, what is to be taught (and hopefully learned), and often what is not to be taught, to whom, how, when, where, by whom, to what purposes and at whose cost. Farrell reiterates his stand of how he sees educational planning a decade later (Farrell, 2011, 66).

Educational planning has been nations' central theme for hundreds of years and for international organization educational planning has been important from 1950's. Some researcher emphasizes the importance of the middle part of last century as when education got its attention of nations and international organizations. Economists played their part for noticing education as reader might remember from the previous chapter. In this chapter I will review how educational planning has been conducted, what the tools to do it are and how some of these tool and techniques have fallen short when time has gone and technology has been developed.

Even though general theory has been hard to form and definition vary on situation basis there still should have a definition before is planning done. Forty years after the Coombs (1970) initial proposes of what educational planning is researchers in the same institute, International Institute for Educational Planning, stated their definition of educational planning which is an intervention by the public authorities to direct and align educational development with the requirements of other sectors to ensure economic and social progress. It is based on an optimistic and normative notion that education is good for both individuals and society at large. Educational planning helps governments and other actors to set priorities, direct interventions, and extend funding support to achieve economic and social objectives. (Bray & Varghese, 2011, 22.)

Varghese (2011, 91) also contemplates and arguments about why educational planning takes place on society-level and not so much on the level of individuals. Educational planning takes place as part of the public intervention strategies to change public policies, priorities, and individual choices in a direction considered desirable for social progress. A belief that education has social objectives, and that they can be more successfully achieved when decisions are taken at the aggregate rather than the individual level, shifts the focus of decision-making in education from individual and household levels to macro levels.

Consequently, the public authorities (government) assumed the power and authority to design and deliver educational programmes to their people in all countries. Since the education sector consumes a large share of public resources, it is important that the resources are allocated adequately and utilized properly.

Economists took part to the conversation of educational planning early on when international agencies like OECD and IIEP started to examine the problems of education. This started around the same time as the idea human capital in economic growth was discovered. The economists came to preoccupied with two central problems. The first of these is called “allocation problem”. That means how to divide the limited economic pie among various competing uses to get the best over-all results. The second is called “efficiency problem”. That means how to use these resources in the best way, once they are allocated, to get maximum output. (Coombs, 1970, 36.)

Varghese (2011, 92) explains the allocative efficiency so that it is achieved when the social returns from investment in education are equal to or more than that from other forms of investment. Internal efficiency is achieved when any alternative mode of delivery or production process yields less output of comparable quality for a given level of investment in education. The question of external efficiency, say, for example, the employment of school and university graduates, was an assumption taken for granted since this was not a major problem in the 1960’s.

Varghese (2011, 91–92) explains how the allocation problem is important at two levels of decision-making. First, at the intersectoral level, the challenge is to decide on the share of resources to be allocated to education in comparison with other sectors. Second, at the intrasectoral level, the need is to decide on the share of resources to be allocated to different levels of education. The major attempt of ducational [sic] planning has always been to achieve allocative efficiency and internal efficiency in the use of public resources in education.

Varghese (2011, 89–90) points out the importance of education and training in building up skills as they are decisive factors in transformation process of skills and inherent talents into a pool of skills and competencies that have greater value in use and in exchange. This

is an argument for educational planning to facilitate such a transition and human development and the argument stems also from an egalitarian view of educational planning.

As a reader has already read in so many comments from different researchers educational planning has had all kind of problems and obstacles to overcome. The problems vary from argument and rationale why society intervenes to individuals decisions for education to technical analyses of how much to spend for education. For tackling these problems a couple of techniques were development to help educational planners. In this chapter I will review some of these tools that have had an impact in educational planning and this is done in historical perspective; how were the techniques developed and what problems have been encountered by using them.

Before going in detail I like to remind the reader that I have not forgotten the multiple purposes the education has, but as the purpose of this thesis is not to problematize the contradicting objectives that has been given education. Rather this thesis' purpose is to view education as a mechanism for occupation, skills and their impact on economy nationwide and private. Bertrand (2004, 13) writes that it is evident that the purpose of education and training, in the widest sense, is not merely to prepare young people for employment. Education must first and foremost help to develop the individual's personality and enable him or her to fit into society. It should also, as far as possible, help to provide equality of opportunity. But this does not mean that it doesn't take into account the occupational future of young people. This aspect is of prime importance in establishing the direction to be taken by occupational training. In most countries, this is an increasingly pressing need, and criticism is frequently leveled at the inadequate matching of training to economic requirements, especially in cases where unemployment among qualified workers co-exists with a shortage of skilled workforce.

The criticism towards to educations inability to "produce" more professionals for example to mining industry or that education is "producing" too many engineering is something that Finland has heard too in the past decade. On many cases this criticism rises when times have changed and education should have foreseen these changes.

3.1 Manpower Approach

Manpower approach was developed in the 1950's and it was used studied and used many decades. Lately it is not so widely developed but one may still find traces of the technique or idea in nations' future workforce projections such as Hanhijoki et al (2004), (2009), (2011) and (2012). Coombs (1970, 40) described the basic argument of manpower approach that as economic growth is the mainspring of a nation's over-all development and thus should be the prime consideration in allocating its scarce resources. Economic growth, however, requires not only physical resources and facilities but also human resources to organize and use them. Thus the development of human resources through the educational system is an important pre-requisite for economic growth and a good investment of scarce resources, provided the pattern and quality of educational output is geared to the economy's manpower needs. The above mentioned reasoning by Coombs is what drives all economical decisions. Resources are scarce therefore they should be used the best way to contribute economical wellbeing as well as social wellbeing.

Although educational planning in general, and the manpower requirements approach in particular, was very common in the Soviet Union, the Mediterranean Regional Project popularized this approach to prepare national educational plans in countries that were not centrally planned. This approach was more relied upon in planning for technical and professional education, which were more closely aligned to the productive sectors of the economy than general education. (Bray & Varghese, 2011, 25.)

Even though former Soviet Union is attributed for the manpower approach like Bray & Varghese mention above. Some researchers have found development done in other part of the world like Hughes (1993, 10) writes that to meet the need for evaluation of the future demand for labor the manpower requirements method was developed by the United States Bureau of Labor Statistics in the 1950s.

Putting aside who developed what in what part of the world, not that I would not think it is important to give credit where it belongs, this just shows that manpower approach was thought to be a solution for a problem that variety of countries experienced from 1950's onward; how to educate in the most efficiently and teach the right kind of skills.

The manpower supposes that it is possible to estimate future manpower (and particularly skilled manpower) needs on the basis of assumptions concerning the evolution of the economy and its occupational structure. These needs can then be set against the expected output of the training system in order to bring the two as closely line as possible. (Bertrand, 2004, 17.)

The approach starts from economics projections, up to some given future date. Then the level of national production is figured out and it is done by sector or branches of activity. The approach makes assumptions as to the evolution of productivity in each sector, thus giving estimates of the number of people employed. Then it breakdowns those numbers by occupations, occupational categories or socio-occupational categories. It is necessary to know the present structure by sector and to estimate how this structure will change over the period in question. The application of these structural coefficients to the estimated number per sector gives the breakdown of numbers by sector and by occupation. The recapitulation of all sectors gives an estimate of the total employment available by occupation for the final year of the period. (Bertrand, 2004, 17.)

Now, after the manpower demand is estimated it is necessary to estimate the manpower resources for meeting the available employment. The resources are drawn from the numbers at present employed, making allowance for deaths, retirements and occupational mobility. And secondly from the expected output of the training system over the whole period from start to finish. (Bertrand, 2004, 17.)

After this, what one just needs to do is to set these estimated needs of the economy against predictable resources so as to produce balance-sheet of shortfalls and surpluses, and establish the training policy accordingly (Bertrand, 2004, 18). The approach seems to be fairly simple and it is kind technical exercise. The problem arise mostly from technological advancement, therefore linear extrapolation of past can not predict future far away. As Psacharopoulos (1991, 460) writes this that the desire to forecast manpower needs in order to prevent bottlenecks or excess labor supply is very natural and appears sensible. Why then has manpower planning failed? The reason has to be sought in the inability of human beings to anticipate future development accurately. Linear extrapolation of past trends in technological change is doomed to certain failure. In every aspect of life we operate under

uncertainty. Such uncertainties, and the adjustments needed to cope with it, are impossible to incorporate fully into manpower planning.

We can not predict the future; we only may have well argued guesses for not so far into the future. Neither should we trust into one type approach. This criticism was dealt with two ways as Hinchliffe (1995, 374) notes that two trends can be distinguished in the early 1990s: first, a move away from an emphasis solely on techniques of planning to one which stresses the importance of planning as a process; and second, a shift from concentrating on a single approach and technique to a wider use of several modes of labor market analysis.

3.2 Cost-Benefit Analysis

The idea of cost-benefit analysis is to seek a better economic basis for establishing training employment relations. The advocates of the cost-benefit approach find this basis in the theory of human capital, according to which education and training are an economically worthwhile investment from the standpoint of both the individual and the nation. The approach lies in an economic perspective, with emphasis on the mechanisms of natural regulation which operate on the labor market through wages and incomes. In this perspective, when individuals choose a course of action they implicitly analyze what it is going to cost them and what benefit they will derive from it. For instance if a young person decides to continue his or her studies, say at a university, the cost of doing so can be measured in terms of fees, and especially in terms of opportunity costs; that is to say the loss of earnings resulting from not having entered remunerative employment instead of attending a university. (Bertrand, 2004, 29.)

The cost-benefit analysis usually analyzes individual gains in earnings through education. This leaves a substantial amount of benefits, which can be calculated into monetary terms out of equation that education has an effect on. This was explained in Education and benefits chapter. Therefore, neither this method nor any other method should take for granted. A person who attends a university can hope to enjoy a higher income for the whole of his or her working life, which will more than compensate for the initial loss of earnings, in other words the opportunity cost. Taking into account the interest rates applicable to these different periods of active life, it is possible to establish a balance-sheet in terms of return on investment. This analysis can be transposed from the individual level

to the community level, provided it is accepted that individual remuneration is equivalent to the benefit the community derives from the individual's activity. In this way one could evaluate the cost and benefit to a country of different types of training or their future development. (Bertrand, 2004, 29.)

Compared to the previously explained manpower approach that tries to estimate how many workers in various sectors are needed in some point of time in the future, the cost-benefit analysis does not give a number of how many electric engineers we should educate for the future. What it does, is that it enables a direct comparison of the costs and benefits of an alternative or a comparison of their magnitudes with those of other types of social investments in education or in other sectors. Not only is it possible to ascertain which educational investment has the largest benefits relative to costs; it is also possible to compare these results with investments in health transportation, physical capital such as plant and equipment, and other sectors. In this way governmental units can use cost-benefit analysis to compare the desirability of alternative educational investments, as well as in determining the balance between investing in education and other sectors. (Levin, 1995, 360.)

Here we come to the allocation and efficiency problem that were explained in the beginning of this chapter. Resources are scarce and therefore they need to use in a proper manner. Therefore cost-benefit analysis gives tools to do intersectoral and intrasectoral comparison. Former being comparison of education to other sectors of society like healthcare and latter being comparison inside the education sector of for example higher education and vocational education.

Since cost-benefit analysis requires that benefits be measured in monetary units, it is only possible to apply it to subjects where that is feasible. This means that cost-benefit analysis lends itself especially well to those alternatives or interventions in which the outcomes are market-oriented, this being usually wages and earnings. Many educational projects and investments are dedicated to raising labor force productivity and income. The most typical method of measuring the benefits of intervention, such as education and training, is to compare the earnings of similar persons with different amounts of education. Under assumptions of the competitive marketplace, long-run differences in earnings associated

with education are equivalent to the higher productivity of such persons. (Levin, 1995, 361.)

It should be noticed that it is also reasonable to expect that persons who have more education are in position to have connections in labor markets. Also they may have higher ability, discipline and persistence, factors which are associated with greater educational attainments and which should also make a difference in labor markets. Therefore, the measurement of benefits in cost-benefit analysis must attempt to control statistically for noneducational differences that may affect earnings and those that are associated with education. (Levin, 1995, 361.)

The costs of an intervention, this case education or training, are defined as the value of the resources that are given up by society. The analysis sets out systematically to identify and ascertain the value of the ingredients that are used in intervention. The costs of an action or intervention are determined by the value of the resources that are entailed in their best alternative use. This is known in economics as "opportunity cost," it is the value of the forgone opportunities that must be considered when one refers to the cost of an endeavor. (Levin, 1995, 362.)

There are three stages to estimate the costs. First is the identification of ingredients for the intervention. Second is to determinate the value or cost of the different parts of intervention and the overall cost. Third one is an analysis of costs in appropriate decision-maker. This means that as there might be alternative ways to achieve same benefits the burden of the costs may differ between municipals and national government. After the benefits and costs are estimated and calculated one needs to compile all data to meaningful information. The most common forms of cost-benefit comparison are rate of return, cost-benefit ratios and net present value. In general, no investment should be undertaken that does not have a rate of return that is at least equal to that of other alternatives. (Levin, 1995, 362–363.)

The rate of return in education is a measure of the future net economic payoff to an individual or to society of increasing the amount of education taken. As a measure of profitability, the rate is equivalent to the interest paid on savings or the rate of return to

some other form of capital. The rate of return is found by setting the discounted value of costs and benefits over time equal to zero and solving for the implicit discount rate, discount rate being usually inflation. (Carnoy, 1995, 364.)

A more typical cost-benefit analysis takes the form of a comparison of cost-benefit ratios among alternative endeavors. The necessary condition for considering an educational investment is that its benefits exceed costs where both benefits and costs represent present values, that is, benefit and cost streams that are properly discounted. The third way to analyze the data acquired for costs and benefits is calculation of net present values of investment. Net present value is simply the difference between the present benefits and present costs, using the same discount rate to ascertain present values of each. The necessary condition for considering an investment is that its net present value is positive. (Levin, 1995, 363.)

But again researchers and planners alike have to face the reality future can not be predicted and there is no one tool or technique that gives us the ultimate way to do things. Bertrand (2004, 32) gives his insights to the problem of future saying that assuming that cost-benefit-analysis does indeed reflect the existing relationships between training and income, it tells us nothing about how these relationships may change in the future. But training must be planned sufficiently far ahead, and the balance of factors can change over this period of time. Many newly independent countries started off with a serious shortage of skilled manpower to fill the senior posts previously held by expatriates. But there were few such jobs, and the shortage of qualified personnel soon became a surplus.

Bertrand (2004, 32–33) continues his argument and pointing out relationship of skills taught and skills needed in labor market, writing that an increasing number of countries have realized that there is little point in trying to forecast and plan training requirements without knowing the outcome; that is to say what becomes of the young people who are trained, how they enter the working world, and the relationship between the training they have received and the jobs they hold. This knowledge can be acquired in several ways; observation over period of time, surveys of transition from school to work and retrospective surveys.

Also one aspect that has an effect to educational planning as well into economics is politics. Varghese (2011, 92) points this when saying that while optimization is a major concern for the economists and technocrats, prioritization is a more important concern for the political decision-making process. The decisions on resource allocation to and within education reflect a trade-off between what is optimal as presented by the planners and what is desirable as presented by the political process.

3.3 Anticipating Models

In the end of 1980s educational planning was losing ground to solve the problems of education, which particularly were faced in developing nations as Caillods (2011, 291) explains that it was widely recognized by this time that educational planning no longer enjoyed an enviable position as an issue of central concern as was the case in the 1960s. Part of the reason was related to methodological and structural issues. Traditional educational planning placed too much trust in forecasting methods, and it focused too strongly on theoretical debates and not enough on acquiring knowledge about the conditions of education and the changes in education as a social process. Planning was also criticized for not paying enough attention to implementation. In the following decade the cost-benefit and rate of return approaches gained much of ground for decision making. Educational planning was also moving from amount of need of manpower to what are the relation between what is taught in schools and how these skills correlate with the skills needed in work places.

When it is a question of setting up or adjusting a programmes of initial training, it is necessary to consider future implications for the education system and to train learners for a sufficiently long period. It therefore becomes necessary to consider that the jobs for which trainees are being prepared will undergo significant changes in the future. For anticipating future there is no scientific method. It mainly involves trying to identify factors that will probably affect future trends. In this respect, the first thing that usually comes to mind is technical change, particularly the role of the new information and communication technologies (ICTs). Other factors such as company organization, heightened competition and globalization may also be relevant. (Bertrand, 2004, 52.)

Bertrand (2004, 57) argues that skills needed in the work have changed and researchers should give attention to quantitative studies and therefore methodologies of analysis are tending to shift from the study of tasks to the study of skills and abilities, and the skills and abilities in which firms in the modern sector are interested are no longer what they were. Nowadays, employers are interested less in technical knowledge and know-how than in behavior-related skills: the ability to analyze, to engage in rational discussion, to work as one of a group, to show evidence of creativity, adaptability, autonomy and a sense of responsibility. These elements are given prominence in work currently in progress on the forward-looking management of human resources. Whether the claim that the need of technical skills are diminishing compared to the need of softer skills in work, is true or not, it still underlines the need of studies about skills.

Training must be designed so that trainees are capable of holding certain types of jobs. It is therefore essential to analyze the abilities required for this. Is it necessary to start from an analysis of specific jobs and the skills they require? In that case, how can job requirements be expressed in terms of the skills that must be imparted through training? (Bertrand, 2004, 49.)

Here I will summarize Bertrand's propose of four stages model for the analysis of work and training content. Firstly, one needs to determinate the training content either according to expert authority or simply according to tradition without regard for any direct connection with the working world. There is risk to this as the working world is constantly changing; therefore experts have only limited and partial view of it. Therefore in the second stage it is necessary to bring occupation into the picture. This can be done merely by asking employers what skills are required to perform a given job. More rigorous approach is to analyze jobs in terms of the activities they involve and deduce the skills required to perform those activities and the training programmes that will inculcate those skills. (Bertrand, 2004, 49–50.)

Thirdly, the definition of training objectives in function is not for particular job and a specific skill, but of a group of jobs and a diversified activity. This could then lead to an attempt to identify occupational families or groups, which could be constituted in three ways. They could group job circumstances which are homogeneous in respect of the way

they fit into the productive system (i.e. into the activities of business or industrial undertakings), but they would be liable to be heterogeneous in respect of job content and level of skill. The second way is to group together, on the basis of the analysis of job content, those which are common to different job circumstances, even though they may lie in very different sectors and individual firms. Third way is to observe the career paths of individuals, and group together the successive jobs which an individual can hold if he has received a given type of training. Fourth one is *transferability of skills*. This means training for a specific type of occupation, but with the inclusion of components that will enable the trainee him-/herself to transfer what he/she has learned to a different context or a different technology (Bertrand, 2004, 50–51.)

After this kind of analysis of the skills, it is matched with economic forecasts. The purpose of quantitative anticipation of educational needs is to offer justified views on the future and its alternative development scenarios as a basis for educational planning, decision-making and operations. Anticipation of demand for labor and educational needs produces information about how the education system could support goal-oriented development of the economic structure. Anticipation is about preparing for alternative future scenarios. (Hanhijoki, Katajisto, Kimari & Savioja, 2012, 16.)

Bertrand criticizes this kind of trend for that while job analysis and the analysis of technical knowledge is amenable to quite well identified and recognized methodologies, the analysis of these new abilities is more difficult, for it covers more subjective and less clearly defined elements. (Bertrand, 2004, 57.)

3.4 Social Demand Approach

Educational planning, economics and education itself all fall into the hand of political processes in some point or in another. In the field of educational planning that process could be called social demand approach. This thesis is not about education policy, this is about relationship of education and economics, but nevertheless as social demand approach is a concept in educational planning I will introduce it here briefly.

Coombs (1970, 37–38) explains social demand approach rather being a theoretical formulation of how planning should be approached it is a more of description of what

educator normally does. Social demand approach is most commonly used to mean aggregate “popular” demand for education, that is, the sum of total of individual demands for education at a given place and time under prevailing cultural, political and economic circumstances. If there are fewer classrooms and places than there are serious candidates to occupy then, one can say that social demand exceeds supply.

Klees (1989) gives a much more blunt description social demand approach by noting that even it is not a scientific and objective way of estimating training needs, it is an essential factor which has to be borne in mind by planners in so far as planning is not academic desk-top exercise but a largely political process of reconciling conflicting interests and priorities.

The social demand is best explained by examples. Coombs (1970, 39) gives us one from France. Even though it is an old example it nevertheless gives an insight of what social demand is. The rule in France is that any student who passes the *baccalauréat* at the end of the secondary school can automatically enter the university. The sky-rocketing of French university enrolments since the early 1950s has provided clear evidence of a sharply rising social demand for higher education.

Some Finnish examples from a more recent years includes demand for more engineers in the beginning of the millennium, demand to constrain training of engineers at the end of last decade, demand for more doctors and the ever on-going debate about Swedish language and its relevance as a mandatory subject for every Finnish citizen. Compared to the example from France where the demand for education came from individuals, these Finnish examples described above represents more of interest groups of having a say to education, the interest group being a student association, labor union or certain sector of business. Either way, the social demand is something that is described by this kind of demand for more education or restricting education. It is not scientific approach but it is a part democratic process and should be noticed in educational planning.

Bertrand (2005, 27–28) writes that if instead of regarding the question from the theoretical and methodological point of view, this being some other form of analysis than social demand, we consider the practical conditions under which educational decisions are made.

It has to be recognized that while the decision-makers are faced with extremely difficult task of evaluating economic needs, they are also subjected to social pressure which takes the form of a demand for more education. Unlike the former task, this social demand is fairly amenable to planning.

In the chapter three I have reviewed the methods, which have been used to plan education and how these methods have evolved in the past 60 years. Nations' interest to developed education grew when the idea of human capital was discovered. This meant in one hand that nations had economic reason to invest in education but also on the other hand that education was scrutinized by economists. Educational planning started by manpower approach, which was criticized by economists for its unrealistic linear projection it made. This was followed economists' suggestion of cost-benefit analysis, which took account two of the economics basic problem; allocation and efficiency problem. From here on educational planning was developed to anticipation models, which not only took quantitative analysis, this being the number of workers in specific sector or the best rate of return, but also qualitative analysis. This being the skills needed in the future work places. Also the policy domain of educational planning was examined. The reality is that education as well a part of economy too is part of political processes, which needs to take into consideration, therefore educational planning can not be just an academic calculation exercise.

The anticipation model is more of combination of different kind approaches. There is no single approach to planning, so there must be made allowance for differences between national contexts and between types of education and training (Bertrand, 2004, 62). This can be seen in the Finnish Board of Education's publications done by Hanhijoki et al. (2004, 2009, 2011, 2012), which are based in different economic scenarios and they take account both qualitative and quantitative analysis. Also, these projections are updated in couple of years' interval, which underlines nature of process in planning what Coombs (1970, 14.) also emphasized.

The economies are in ever changing movement. The changes are slow by their nature and this makes them difficult to notice let alone predict into the future. Yet, education is always future orientated. Skills and knowledge should be useful when the children and students of

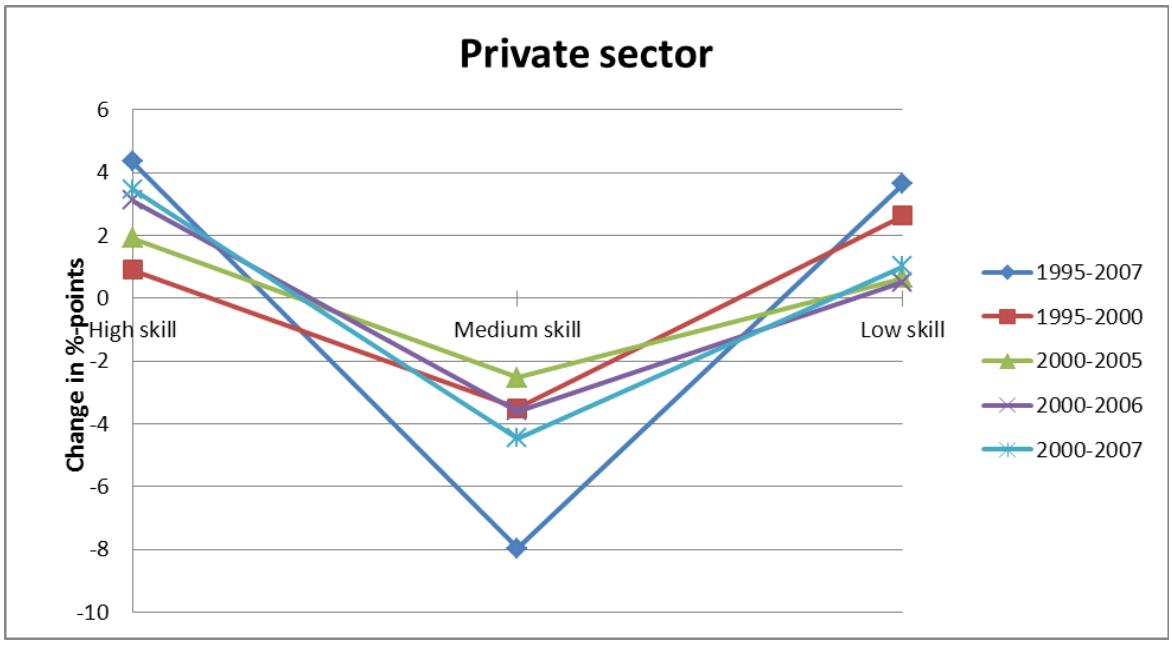
today enter the work life in five to twenty years. As a case, for pointing out the effects of recent economic change, I will analyze data of Finnish occupational structure that is affected by technological change in the next chapter. This technological change is an advantage for some skills that are needed in the work and a disadvantage to others.

4. Changes in Occupational Structure in Finland

The data analyzed and described here is the Finnish Longitudinal Employer-Employee Data (FLEED) from Statistics Finland also the classification used here is their Classification of Occupations 2001. The changes in the occupational structure described in this research are relative between the years displayed in the figures. So that the numbers in the figures represent per cent point changes in different skill level occupation between the first year and the second year written in right-hand side in the figures. Description of the Classification of Occupations 2001 (CO2001) and formation based on CO2001 of high-skill, medium-skill and low-skill categories are in Appendix 1.

The general trend of the change in Finnish occupational structure between years 1995-2007 is presented in the figure 1. It shows that in the private sector the occupational structure has been polarized. Medium-skill occupations have decreased relatively in favor of high-skill and low-skill occupation. The increase of low-skill and high-skill occupations is not evenly distributed in time, which can be seen also in the figure 1.

Figure 1. Change in different level of occupation in private sector

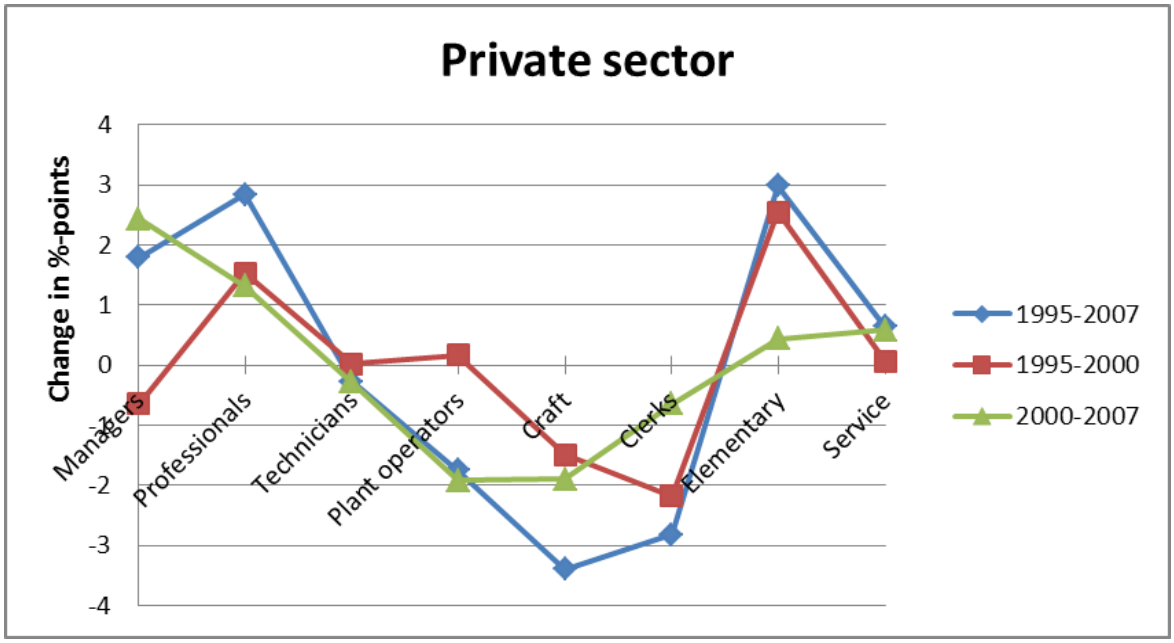


The low-skill occupations increased more compared to high-skill occupations in the time period of 1995-2000. Between the years 2000-2007 the high-skill occupations increased more than low-skill occupations. The figures of different sectors (manufacturing,

construction and services) will actually show that low-skill occupations decreased between years 2000 and 2007, but when sectors are aggregated in to private industry it shows a small increase as in the figure 1 points out.

Figure 2 shows the changes of Finnish occupational structure in the private sector in more detail by using the Classification of Occupations 2001. All over private sector the increase in high-skill occupations comes through the increase of manager and professional occupations. The technician occupations have stayed almost the same relatively speaking between the years 1995 and 2007. Naturally there exist industries where technician occupations have increased relatively to the others, but even when examined industry level the technician occupations stays the same throughout the time period observed in this study.

Figure 2. Change in occupations using CO2001 in private sector

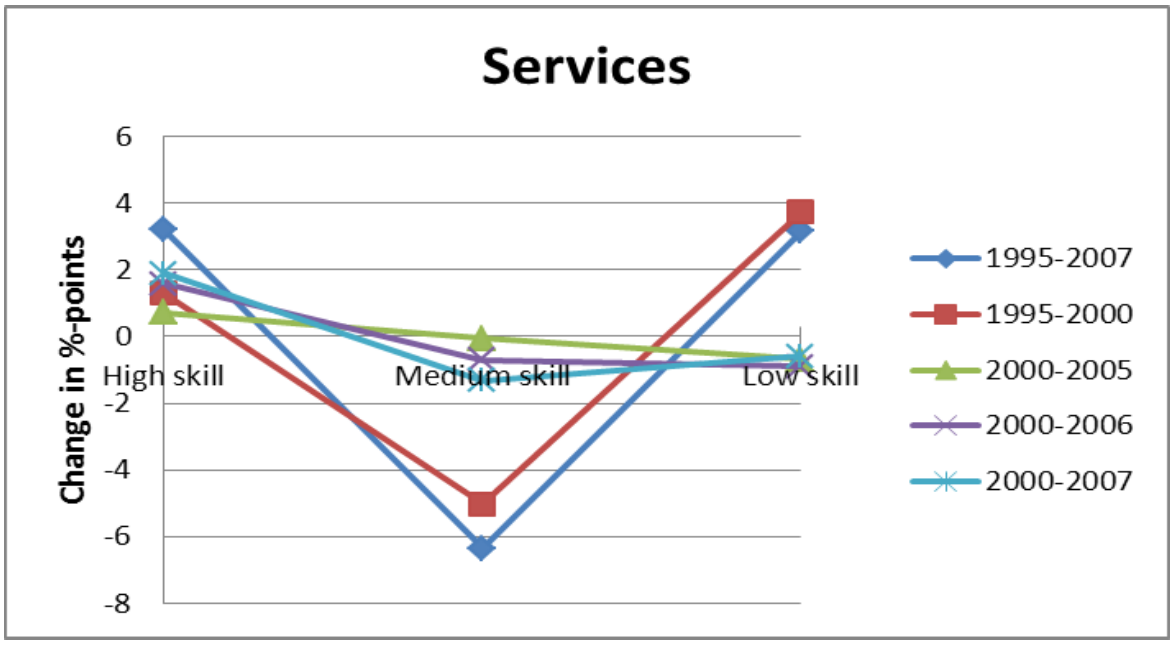


International literature suggests three reasons for the polarization of occupational structures in the developed nations; technological change, globalization and the desire of service. The technological change has increased the amount of high-skill occupations and the salary of high-skill workers. This increase has contributed to the growth of low-skill occupations as more people can afford different kind of services. The services are non-routine, so that they are not easily computerized. The argument that technological bias affects the growth of high-skill occupations and relationship between the growth of high-skill and low-skill occupations is presented with empirical evidence for example in the researches of

Acemoglu & Autor (2010), and for Britain see for Goos & Manning (2007). For the routinization theory see the research done by Autor, Levy, & Murnane, (2003). Routinization theory refers to idea proposed by Autor et all that some part of the jobs can be coded, there for computers will do the task more efficiently than human workers.

The increase of low-skill occupations in the whole private industry between years 1995-2000 is not uniformly increased in all three sectors (manufacture, construction and services). Most of the increase in low-skill occupations can be attributed to the service sector which is shown in the figure 3. Service sector represented 45 per cent of the occupations in the year 1995 and 52.8 per cent in the year 2007 of the private industry

Figure 3. Change in different level of occupation in services

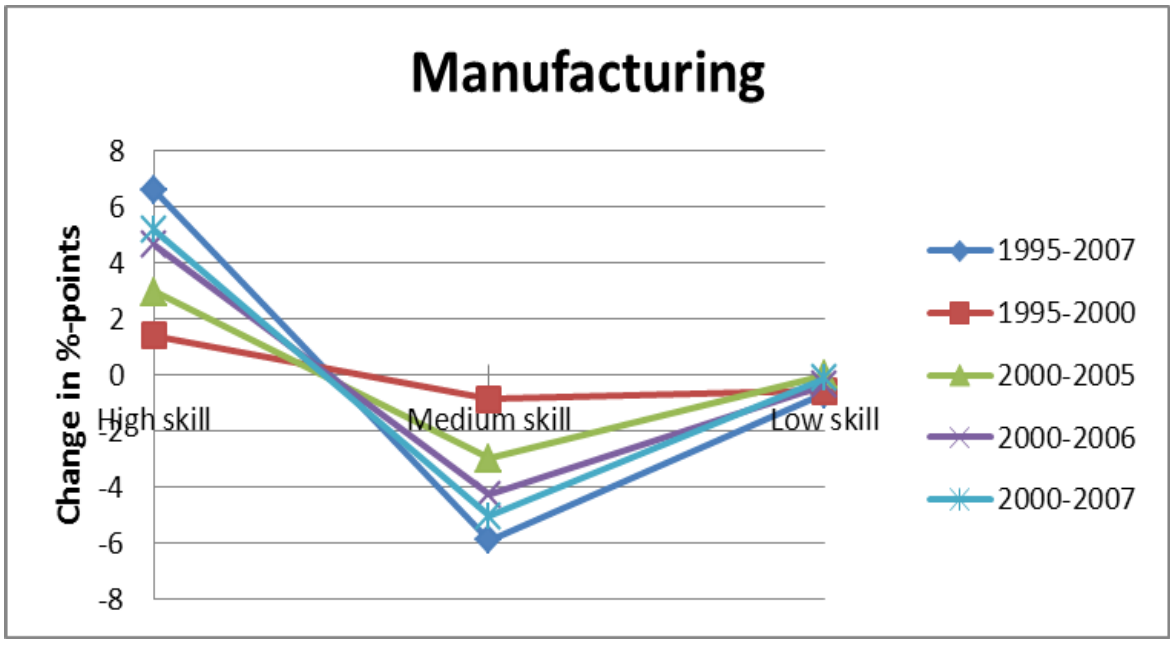


Construction sector contributed also to the increase of low-skill occupations between years 1995 and 2000. Also in the figure 4 one can observe that high-skill occupations' increase in the years 2000-2007 did not compensate the decrease of high-skill occupation from year 1995 to the year 2000.

Figure 4. Change in different level of occupation in construction

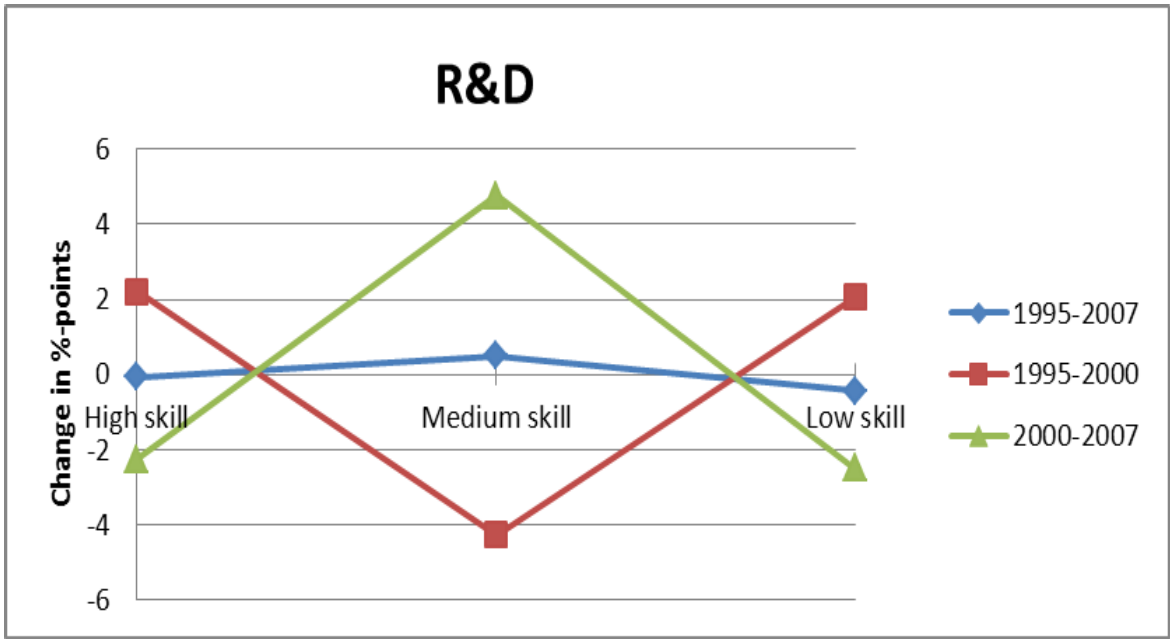
The figure 5 illustrates the changes in the occupational structure in the manufacturing sector. The low-skill occupation has remained almost in the same level through the years 1995 and 2007. But there has been significant change between medium-skill and high-skill occupations. The change between medium-skill occupations and high-skill occupations has been steady throughout the years 1995 and 2007.

Figure 5. Change in different level of occupation in manufacturing



When looking in to industry level, the picture of changes in the occupational structure is much more complex, and certain particularities of different industries plays substantial role in the changes of occupational structures. However, there is one evident change that can be found from almost every industry regardless of the sector. The high-skill occupations have increased from the year 2000 to the year 2007. The one and only exception is research and development-industry, which is shown in the figure 6.

Figure 6. Change in different level of occupation in R&D

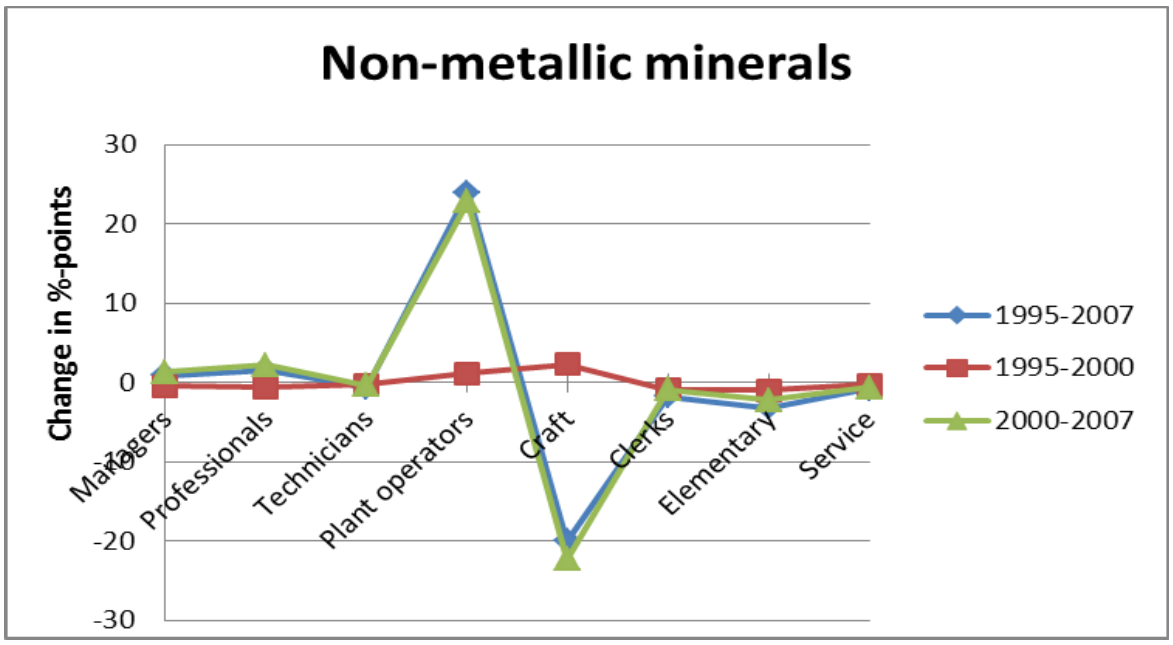


Another evident change, which can be found from any industry in the construction sector and in the service sector, is that low-skill occupations have increased from the year 1995 to year 2000. The change in the construction sector (Figure 4.) and in the service sectors seems to contribute to the increase of low-skill occupations in the overall private sector. Trade industry, which's share of service industry as in terms of workers is substantial is a good example.

Looking into more detailed description of the changes in the occupational structure by using the Classification of Occupations 2001 one will find there are few industries, especially in the manufacturing sector, which have within the medium-skill category clear shift from occupation to another, as figure 7 points out in the industry of non-metallic minerals. The shift from craft to plant operators almost equals each other; such a shift is remarkable and interesting. Even though the shift is within the medium-skill group, it may

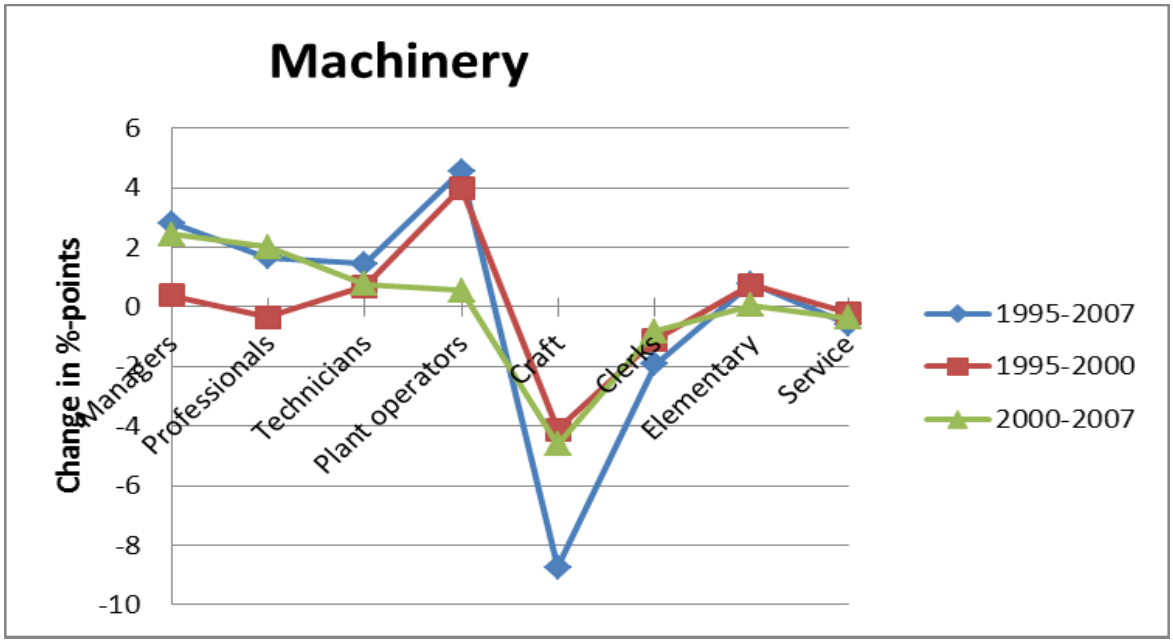
be due to some sort of local technological change. The other industries with the same kind of shift within the medium-skill group and exactly between the same occupations, though not in the same scale or as simultaneous, are paper-industry, vehicle industry and basic metals.

Figure 7. Change in occupations using CO2001 in non-metallic minerals



The shift between skill groups as a change between plant operators and technicians would also be interesting. Similar pattern to the figure 7 between skill-groups does not come up in any of the industries. This could be interpreted in such a way that if there is bias due the changes in the classification and/or, it may not have large effect between skill-group changes. Figure 8 shows the changes in the occupational structure in the machinery industry that represents the manufacturing sector accurately. Between the years 1995 and 2000 (red-line) the craft workers have been replaced by plant operators. Between years 2000 and 2007 (green line) the shift from craft occupations has continued but the increase has not come within the medium-skill occupation, it has increased in a distributed manner in the high-skill occupations (Managers, Professionals, Technicians).

Figure 8. Change in occupations using CO2001 in machinery



These changes in occupational structure reflect the trend in rest of the developed world. The occupations and skills needed in the workplace have been polarized through the technological change, which is biased toward the high skills. Even the timeframe with this data is just a 12 years and though some industries show a retreat from polarizing and a lot have happened in Finland after the year 2008 as it has happened in the rest of the world, these changes underline the problem that educational planners have to consider when planning education.

I have shown in this chapter how Finnish occupational structure has changed in skills needed in the workforce in private sector. Also some industry level changes have been shown and as some industry have gone against the trend; the aggregate in sector level has been polarized. Educational planning needs to take into consideration these trends in through both qualitative and quantitative analysis. One thing is certain future can not be predicted therefore we need people with skills to learn new and motivation to endure disappointments.

I have reviewed historically economics of education and educational planning, also how these two are in relation to each other. I have showed data of the changes in Finnish occupational structures. This last chapter is first of all for discussion what these changes in

occupational structure mean for educational planning. Secondly, it is for reflection about being in between sciences, something what I mentioned in the beginning of this thesis.

5. Discussion

“Man seeks unity only to escape from dissipating and confusing diversity. In order not to become lost in infinity, empty and unfruitful, he creates a single circle, visible at a glance from any point. In order to attach the image of the ultimate goal to every step forward he takes, he seeks to transform scattered knowledge and action into a closed system, mere scholarship into scholarly Bildung, merely restless endeavour into judicious activity.” (von Humboldt, 2000, 60.).

Perhaps my journey to this topic has been something what above are stated, a search of unity and clarity from diversity and complexity. Perhaps this has been even a search of patterns from where there is none. Anyway, here in the last chapter, I will try to get all ideas to unified conclusion.

I start this chapter by reflection some of what is has been in being between something. It has been somewhat frustrating journey to learn all this. That is not to say it has not been interesting. It has been very interesting and still is, but looking this thesis now it feels doubly disappointing. If looking it by eyes of economics it feels feeble attempt of a study. It is true that I am not student of economics and this thesis is done for the faculty of education, but then again if I look this from the point of view of education science it seems somehow one-sided.

Perhaps this falls into the theme of meaningful discussions between education and economics, though it seems that educationalist have a lot of homework to do to learn basic concepts and terms of economics, basic supply-demand curve, elasticity and diminishing returns to name few. Education starts from individuals, a student or a child and tries to figure it out what is best for this particular student. Economics starts it’s thinking from aggregated level, this being a class, a school or age group depending on the study. This is a sort of micro-macro problem, even though not strictly economical one. The want to offer the best possible education is only humane behavior, but as in every other field the diminishing return prevails. I give an example, which might sound trivial but nevertheless points out the idea in diminishing returns. Teacher-pupil ratio in elementary school in Finland is 1:28. Let say that this ratio is put to 1:2, so there would be one teacher to every two students. The students might get better results but the costs would be enormous,

therefore the benefits would not replace the costs. The example is of course absurd but who would not want the best for your children? That is what is stake in educational planning; the want of good education for everyone against what is economically rational. And just there lies the tension of education and economics.

Educationalists would certainly benefit by studying economics in the context described in this thesis. But how about the other way around; is there something in education that could give something new to economics of education? One starting point might be continental thought of education and Bildung. Bildung relates to education philosophy. The concept itself is somewhat unclear as Klafki (2000, 86) observes that when one begins problematisation of contemporary problems in light of Bildung. First, no present-day attempt to interpret the concept of Bildung afresh can sidetrack the history of the problem. *Each* and *every* contemporary contribution to our problem would have to make sure of its own historical implications in order to be fully informed. But, second, in whatever way concepts of Allgemeinbildung that are developed in the light of the tasks of the present day and the foreseeable future may turn out, the quality of such drafts will depend, *inter alia*, on whether the problem level and the degree of sophistication of reflection regarding a theory of Bildung that has already been achieved has been maintained.

As Klafki above suggests that for fully understand what Bildung means one should research the historical implications of the concept. This kind of study is out of reach for this thesis, but it might be interesting research for postgraduate studies for finding mutual ground between education and economics. However, I will contemplate shortly about this topic with the tentative understanding I have about Bildung.

It seems that the concept of Bildung is quite multidimensional and holistic and therefore it is hard to bend to just one kind of definition as the following excerpt from Wimmer (2003, 168) shows. On the one hand, there is a dominant understanding of *Bildung*—even if featuring various shades of grey and highlights—that portrays it as a central element and instrument to equip the individual with relevant knowledge, competences and skills to cope with the dynamism of societal change and expectations; and to simultaneously create a general acceptance of new forms of labor. With reference to the theory of globalization, *Bildung* is thereby seen as a social and economy-political local criterion, and the

colonialisation of the discourse on *Bildung* through an economic mode of thought is aimed at by describing the productivity of *Bildung* preferably as enabling individuals to adapt—with the required flexibility and assimilation—to unpredictable societal changes and new expectations at the workplace. Central criteria to evaluate educational institutions as well as the educational 'products' they generate are quality, efficiency and performance. In short, *Bildung* is seen by the mainstream's education political reform discussions as a technocratic-economic investment in the future; these days, though, with a clear expectation of a measurable return of investment.

Wimmer (2003, 169) continues on Bildung's adaptable nature that on the other hand, great concern is expressed in regard to the understanding of *Bildung* as being solely the attainment of skills and knowledge as a means to promote one's own interests within global competition (see Peukert, 2000). Not only are the foundations of arguments for various education-political demands questionable, but even the possibility to predict is doubted, as well as its underlying diagnosis of present relations. Also, reforming concepts refer to the tradition of the classical notion of *Bildung*, which sees its aim as humanity's actual goal, i.e. the 'proliferation and self-enlightenment of the human spirit and the freedom of willing and action from social and natural pressures' (Ruhloff, 1997, p. 24). So, the idea of Bildung is more general than only adaptation to the labor markets.

On the other hand, the process of *Bildung* is solely measured in terms of gaining socially and economically useful qualifications. Here, it is reduced to instruction, identified with knowledge, and short-circuited with learning. In opposition to an economic mode of thought that dominates not only education-political, but also pedagogical, social and cultural issues, the critical and resistant elements of the term *Bildung* are insisted upon—without which, within this perspective, one would not be able to talk about *Bildung* in the first place. Yet it is simultaneously acknowledged that the traditional idea of *Bildung* as an attempt to idealise and define the 'humanitarianism' of mankind, and its illusions of 'bettering' humanity have become unsustainable. (Wimmer 2003, 169.)

I one more thought of the definitional problems. The processes of Bildung through social relations are described in presupposition of liberty. Only in a state of freedom individuals assert their independence which, as has been shown, is a condition for formative

acquisition or repulsion of foreign influences. Therefore Humboldt postulated freedom as a precondition of Bildung and this challenges for example the “mechanical view” of education that characterizes the production function. According to the idea of Bildung the medium of the process of learning – when it is based on freedom or spontaneity of the individual – is self-activity and assembly-line model of educational production has difficulty to take this into consideration. The second external condition for Bildung, in addition to freedom, is “diversity of situation”. This diversity represents the potential stimulus for the further development of the individual. (Humboldt, 1792, Vol. 1, 64 via Lüth, 2000, 76.)

Liberty and freedom are both powerful ideas to strive for and both education and economics tries to achieve that on their own way. Most likely the two are intertwined in their pursuit of liberty. But the complex definition and maybe even condition for Bildung does not go well with economics, were definition should be clear and testable in most of the instances. This is again occasion where we stumble upon the differences of the two disciplines.

Bildung is, in the English literature and dictionaries, sometimes referred to the terms of edification, cultivation or general education. Using this rather simple definition of general education could be used to relate to a study of earning differentials of graduates applied university who have done vocational students and high school students in Finnish context. High school students in Finland studies more general education than vocational school students. This kind of study would be quite well in line with economics of education research.

Before getting into what does occupational changes mean for the educational planning I like to discuss about social demand. As I explained in the chapter 3.4 about social demand is something that educational planners need to be aware of. It even might be the largest part of the discussion about education that is done public. Therefore it surely should be in under some sort of academic discussion. As social demand, whether it originating from individuals or interest-groups is something that is difficult to quantify, it might be natural to do qualitative research perhaps do interviews with workers of Board of Education and the Ministry of Education and with interest-groups involved.

In the introduction I stated that the leading question for this thesis arises from the polarization of occupations in Finland. The questions were that are the skills now taught in the schools required in the future? Is the education system adapting itself to these changes?

The second question is easier to answer so I will tackle that one first. I am convinced of the researches done by Hanhijoki et al. (2004, 2009 & 2011) that we have people in the Board of Education and other research institutes who are interest in evaluating that what future will bring about. It is not easy task and certainly not gratifying one. For the moment it is certain that what Coombs (1970, 14) underlined as planning is continuous process is realized in Finland. Continuous process is an aspect that is important when considering adaptability.

Are we then teaching the skills that are needed in the future? If it was hard to predict future in quantitative terms (manpower approach), it is hard to predict the future in qualitative terms too. But that too has been studied with co-operation with construction industry; see a paper by Finnish Board of Education (2011). Perhaps the strong point for Finland is that even teachers are guided by curriculums of the schools' or city's they work. And these curriculums are planned by the guide lines that the Finnish Board of Education determines to be important for different subjects. Still these curriculums leave a lot of room for individual teachers to teach the way they feel. I do not yet have a good formulation for research or scientific backing that liberty in the way of teaching brings better results for learning skills needed in the future. It is my educated guess that diversified experiences prepare youngsters for the future.

It has been learning process to write Master's thesis and I am sure it is that to all of us. I have learned a lot about economics of education, educational planning and how these two are intertwined, also about the job polarization and the reason to it. Am I able to answer satisfactorily for the questions that I myself asked? I am not sure that there is the answer for the questions but I learned how to search answers and understood that there are partial answers. The one thing that brings most joy to me, in this thesis, is to find out that I am able to find new questions. As this discussion shows, there is already stated one qualitative,

one quantitative question and one philosophical related to economics of education and educational planning. Some questions might be easier to answer than others.

Hopefully this thesis has brought the gap narrower between education and economics. Do I believe that educationalist take part to the conversation about economics of education? Yes, absolutely, but that means that the terminology and the concepts of economics are familiar. There will be no meaningful discussion if participants are not familiar with terminology other is using. And in economics of education the terminology comes from economics. If there is demand for something there will always be a supply too and, in this instance, economists have been supplying.

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Appendix 1

Classification structure

1 Legislators, senior officials and managers

2 Professionals

3 Technicians and associate professionals

4 Clerks

5 Service and care workers, and shop and market sales workers

6 Skilled agricultural and fishery workers

7 Craft and related trades workers

8 Plant and machine operators and assemblers

9 Elementary occupations

0 Armed forces

With a few exceptions, Finland's national Classification of Occupations 2001 is based down to the 4-digit level on the EU's classification of occupations ISCO-88(COM), which is a European version of the international classification of occupations ISCO-88 of the International Labour Organisation (ILO). National circumstances are taken into account by adding 5-digit occupational groups, when necessary. (Statistics Finland.)

In this thesis occupation groups 6 (Skilled agricultural and fishery workers) and 0 (Armed forces) are not included in the data. Groups 1, 2 and 3 form high-skill group. 4, 7 and 8 are the medium-skill group. 5 and 9 are low-skill group.