UNIVERSITY OF AGDER

The Financial Benefits of Not Getting an Education

An Exploratory Study of the Opportunity Cost of Higher Education

Fredrik Aidar Gurrik

Supervisor

Kjetil Andersson

This master's thesis is carried out as a part of the education at the University of Agder and is therefore approved as a part of this education. However, this does not imply that the University answers for the methods that are used or the conclusions that are drawn.

University of Agder, 2016

School of Business and Law

Department of Economics and Finance

PREFACE

I would like to express my gratitude to Kjetil Andersson for providing great feedback throughout the process of writing this thesis. His suggestions and comments were very helpful, as I explored a somewhat untraditional research problem. Curiosity, combined with what I have learned throughout my education, resulted in the topic of this thesis. Education is interesting in that it constantly switches between answering and raising questions one may have. Reflections regarding my learning journey is included as an appendix.

University of Agder, June 1, 2016

Fredrik Aidar Gurrik

ABSTRACT

The present study aimed to explore the financial opportunities of a person without higher education in Norway. It consists of simulations of different investment strategies, and compares the earnings of an individual without higher education, to the earnings of a person with five years of education. The underlying assumption is that they both have equal consumption while the student is getting his/her degree – i.e. equal to the student income. Averages and estimates where used to establish income figures. The investment amount was the accumulated surplus the person without higher education had compared to the student during his/her education. Two different simulations of investment strategies were applied; investments in a savings account and in a passive index fund. None of the simulations put the person without education ahead in nominal lifetime earnings. The study showed that a person without education could alter his/her income profile in a meaningful way, and reduce the lifetime earnings gap to an educated person, by adjusting his/her consumption in the initial years of his/her work life and by making favorable investment decisions.

TABLE OF CONTENTS

1. INTRODUCTION AND BACKGROUND

Higher education is typically associated with high incomes and being well off financially. The opportunity cost of getting an education is the income one would get from working instead of studying. The student *invests* in education, expecting returns in the form of higher income at a later point. The sacrifice comes in the form of a lower standard of living during his/her education. However, there seems to be limited awareness of the person without higher education's opportunity to make a similar sacrifice. By choosing a lower standard of living initially, he/she has investment opportunities other than education.

The purpose of this study is to explore the financial opportunities of people who choose not to get an education. By adjusting his/her consumption in the initial years, it is possible for him/her to attain a variety of different income profiles. This study will explore the financial benefits of not getting an education in Norway, by comparing the typical person who gets a full-time job straight out of high school, with the typical person who gets a five-year education. The underlying assumption for the study is that the worker and the student have equal consumption from year 1-5 (while the student is studying), equal to the funds the student has at his/her disposal.

The number of students in Norway is continuously increasing. In the fall of 2015 the number of students in Norwegian universities and colleges, including Norwegian students abroad reached an all-time high of 283,115 (Statistics Norway, 2016a). This was an increase of 10,600 students from the previous year. A third of all Norwegians between age 19 and 24 were students and the same goes for nearly half of all 21 year old women. The media is giving the popularity of higher education a lot of attention, and the term "master sickness" is commonly known, referring to the increase in people getting master degrees, and the alleged over-supply of people with master degrees in the job market[1]. There may be many different reasons for why so many people choose higher education; more job opportunities, better job security, more interesting

[1] Examples can be seen at either «http://www.dn.no/talent/2013/09/22/-altfor-mange-tar-en-mastergrad-samfunnet-ikke-har-bruk-for» or «http://www.aftenposten.no/jobb/Hva-skal-vi-med-alle-mastergradmasterene-7526469.html»

jobs and better work environments, to name a few. These reasons may all be important, however, this article will focus on the financial reward of choosing, or not choosing, higher education. With so much focus on the students – I will focus on the people who choose *not* to get higher education, and explore what financial opportunities present themselves for these individuals.

DEFINITIONS

For this article, it is beneficial to have a clear understanding of certain words and expressions. Certain concepts and terms that I mention frequently does not have a short, suitable description. Therefore, I have operationalized my own definitions that I will use consistently throughout the article:

Worker: A person without higher education, who started working immediately after graduating high school, at age 18.

Student: A person with 5 years of higher education, who started working immediately after graduating college or university, at age 23.

Income: Money obtained in return for labor, *before tax.*

Net income: Money obtained in return for labor, *after tax.*

Interest income: Realized gains from financial investments, *after tax.*

Earnings: Net income plus interest income.

Income Profile: How an individual's income, interest income included, is distributed throughout the individual's work life.

Cash Flow: In the following, cash flow is meant to describe an individual's disposable cash, *before* any expenditures, i.e. cash flow *before* consumption.

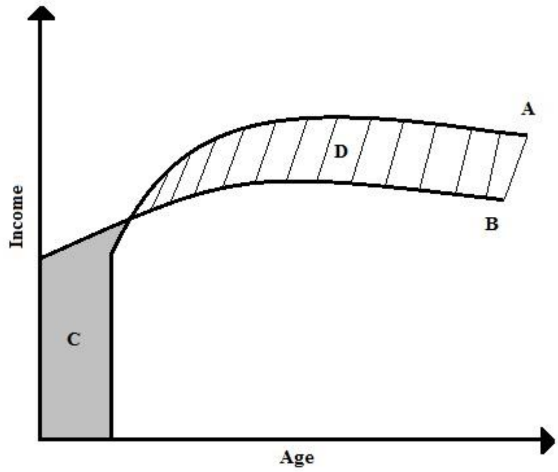
2. THEORY

Traditionally, the comparison between students and workers has normally been from the student's perspective, by calculating the profitability of education. To calculate the returns to education, it is common to look at education as an investment in human capital. Gary Stanley Becker introduced the term in 1964 in his book "Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education", and it has since become a commonly used term (Becker, 1964). In the context of human capital, education is something you pay for today, with the expectation of future gains. These gains come in the form of higher income than you would have without the education. The common practice to use when examining the returns of this investment is to aggregate and discount the lifetime income of those who have higher education, and comparing this with the discounted lifetime income of those who do not have higher education. The underlying question in this comparison then becomes "Does the higher income, as a result of education, make up for the lack of income in the x amount of years of education?"

In prior studies (page 16) on the profitability of education in Norway, it is estimated that many types of educations will result in higher lifetime income when compared to those who start working after high school. Figure 1 shows a typical illustration of this comparison[2].

[2] See page 170 of Erling Barth's publication for Statistics Norway, "Den samfunnsøkonomiske avkastning av utdanning" (2005), for an example.

Figure 1. Income profile with and without higher education



In this illustration, one can see how the income typically develops through a lifetime, where A represents the income of a person with higher education, and B represents the income of a person without higher education. If the striped area, D, is larger than the grey area, C, then the person with higher education has higher lifetime income, before discounting, than the person without higher education.

THE TWO-PERIOD MODEL

The two-period model is an inter-temporal model used to explain consumer preferences, and choices, between consumption and saving. It is highly applicable to this study, as it illustrates the dynamics between consumption and saving in two periods. In the context of this study, period one is during the student's education, and period two is what comes after, until retirement age. The model is taught in various courses in microeconomics, and thus, is found in several textbooks. The following derivation is partly based on "Moderne Mikrøkonomi" by Christian Riis and Espen R. Moen (2011, pp. 103-107).

In the two-period model, period one is today, or this year, and period two is the future. Let us first imagine that there are no credit markets. The consumer cannot borrow money, and potential savings will be at zero interest rate. His/her range of consumption is bound by her income, m_1, and the cost of consumption, $p_1 x_1$. He/she may save at zero interest rate, but cannot borrow, as there are no credit markets. Thus, we get:

$$p_1 x_1 = m_1 - s \quad , \qquad s \geq 0$$

s cannot be negative as that would imply borrowing. The equation simply shows that consumption today is equal to the income minus savings. We get a similar equation for period two:

$$p_2 x_2 = m_2 + s$$

Consumption in period two is equal to the income in period two plus whatever is saved in period one. As we currently have zero interest income, income in period one and two equal consumption in period one and two:

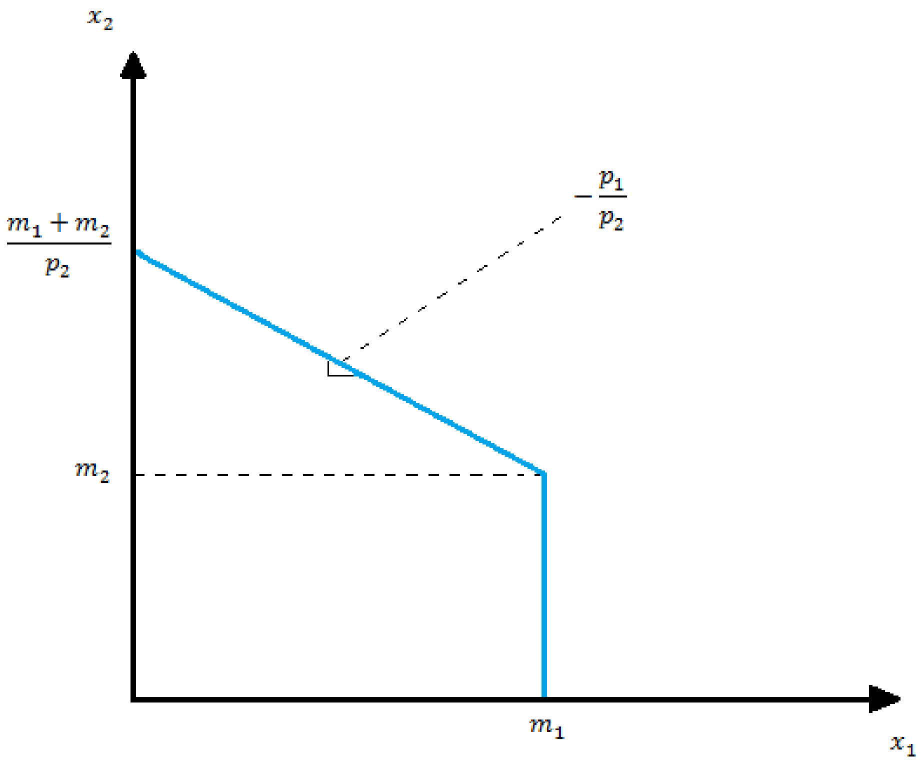
$$p_1 x_1 + p_2 x_2 = m_1 + m_2$$

This is the budget line without credit markets and it can be illustrated after putting x_2 on the left side of the equation:

$$x_2 = \frac{m_1 + m_2}{p_2} - \frac{p_1}{p_2} x_1 \ , \qquad x_1 \leq m_1$$

$x_1 \leq m_1$ is a consequence of there not being a credit market – the consumer cannot consume more than he/she earns. We get the following illustration:

Figure 2. Two-period model without credit markets



The blue line is the budget-line illustrating the maximum range of consumption. The rational consumer will consume somewhere along the budget-line (equal to, or above m_2), depending on her preferences. With no credit markets, one could argue that the rational consumer would consume m_1 in period one. At the very least, the fact that there is no credit markets will shift consumer preferences towards consumption in period one.

Let us now introduce credit markets into the model. The consumer has the option to consume more than he/she earns in period one by borrowing money at an interest rate, *r*. In addition, he/she has the opportunity to consume more than he/she earns, because his/her savings will give him/her interest income, which enables consumption higher than m_2. Similar to the previous example, we get:

$$p_1x_1 = m_1 - s$$

However, s can now be a negative number, which would mean that the consumer is borrowing money. In period two, interest rate has been introduced into the equation:

$$p_2x_2 = m_2 + (1+r)s$$

Whatever is saved in the first period will have grown because of the interest rate, meaning the individual will consume more in the second period. If he/she has borrowed money in period one (negative r), the interest rate will result in the individual consuming less than m_2 in period two. Dividing with $1+r$ on both sides of the equation, gives us:

$$\frac{p_2x_2}{1+r} = \frac{m_2}{1+r} + s$$

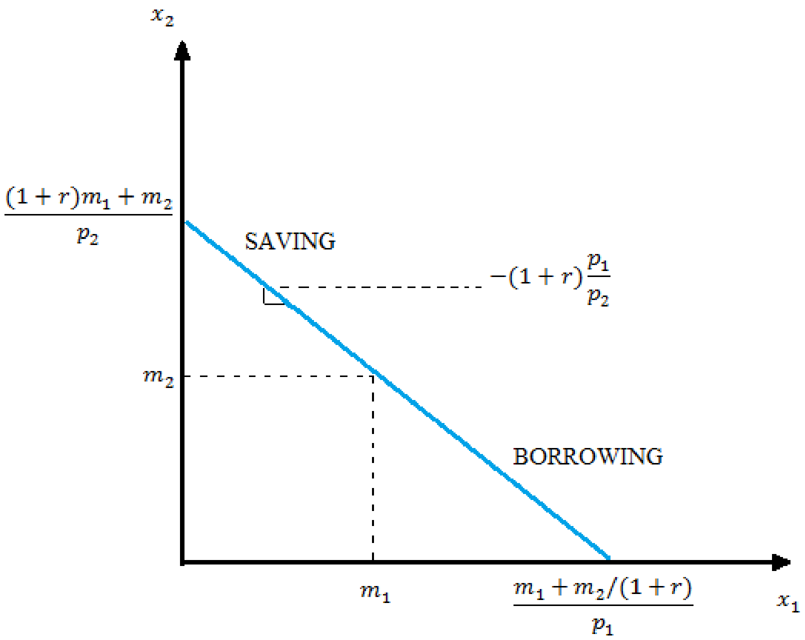
We summarize both sides of the equations from period one and period two, and get:

$$p_1x_1 + \frac{p_2x_2}{1+r} = m_1 + \frac{m_2}{1+r}$$

Expressed in words, this equation tells us that the *present value* of the expenditures from consumption is equal to the *present value* of the income – from both periods. This is the long-term budget line. As we did without credit markets, we can illustrate the budget-line by solving the equation for x_2:

$$x_2 = \frac{(1+r)m_1 + m_2}{p_2} - (1+r)\frac{p_1}{p_2}x_1$$

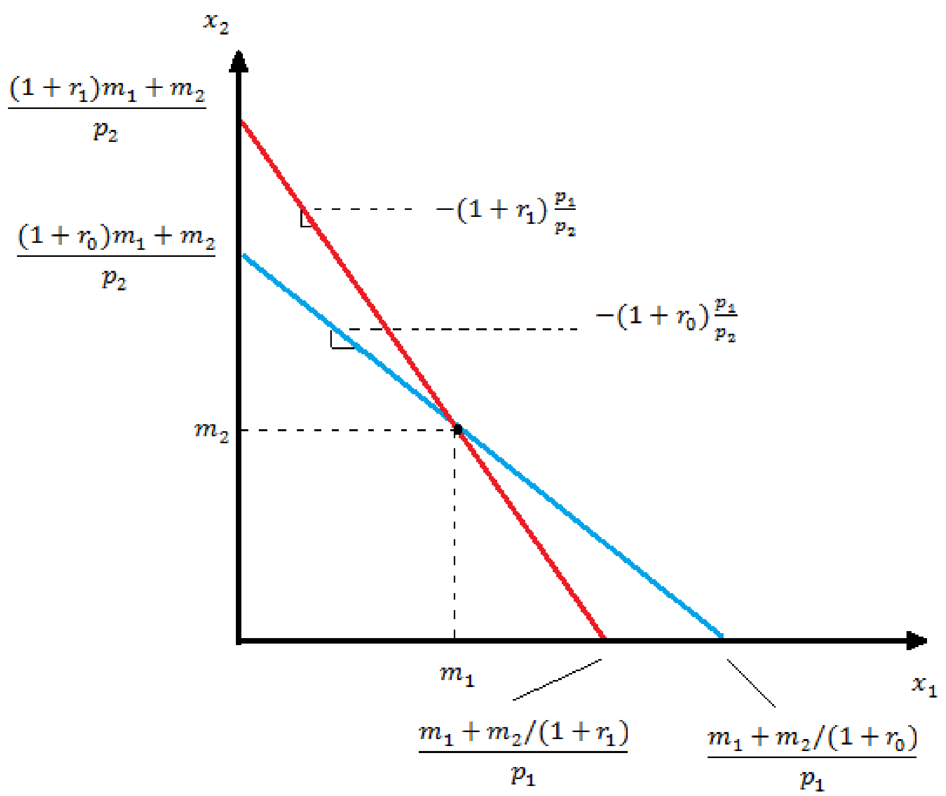
Figure 3. Two-period model with credit markets



If the individual neither saves, nor borrows, he/she will consume at the point (m_1, m_2). Similar to the previous example, the individual has the opportunity to save in the first period to increase her consumption in the second period. However, there is an important difference, which can be understood by looking at the point where the budget-line crosses the y-axis. At this point, the individual has zero consumption in period one, and uses the whole income for consumption in period two. The difference from the previous example is that his/her consumption is higher than $m_1 + m_2$, because his/her savings gives a return equal to $r * m_1$. On the other side, the individual can choose to consume as much as possible in the first period. This is at the point where the budget-line crosses the x-axis. The individual uses the whole income from period one for consumption, as well as borrowing as much as he/she can afford to pay back with the income from the second period. The borrowed amount is equal to $m_2/(1+r)$. If the individual consumes any amount that is placed on the budget-line to the right of (m_1, m_2), he/she is borrowing. Any point on the budget-line to the left of (m_1, m_2) means the individual is saving.

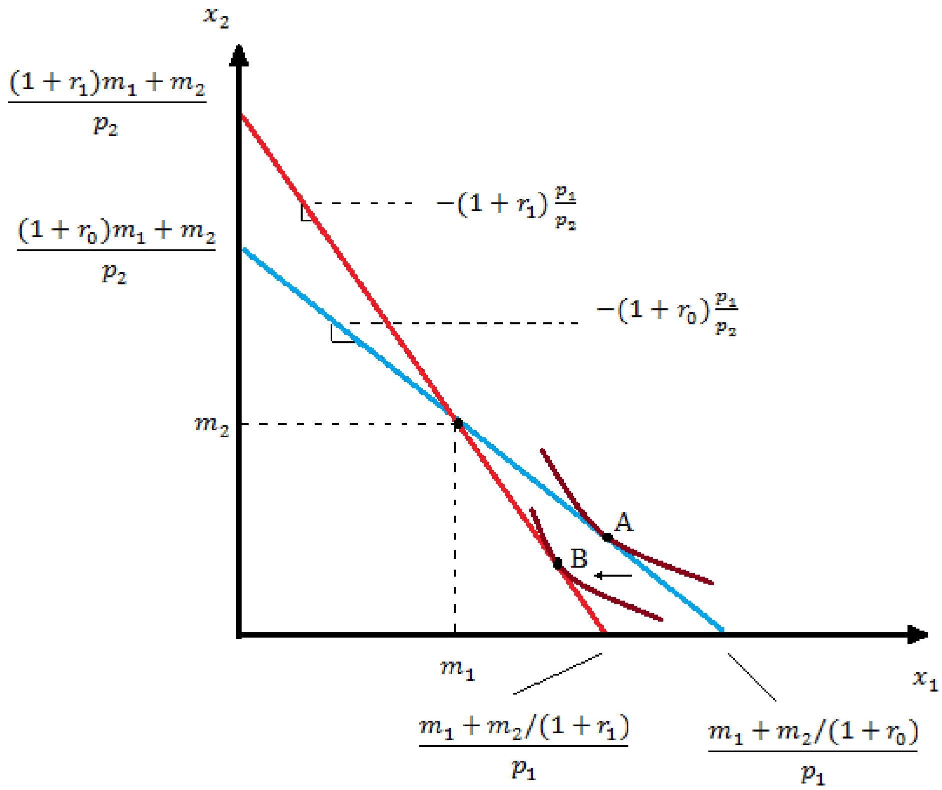
For anyone that is not consuming exactly what he/she earns in both periods, the interest rate will affect her decision regarding consumption and saving. Let us use an interest rate increase to illustrate how it affects the consumption. The incline $-(1+r_1)\frac{p_1}{p_2}$ has now become steeper, as r has increased:

Figure 4. Two-period model with interest rate increase



The interest rate increase has made future consumption relatively cheaper. For any individual not located on (m_1, m_2), consumption will have changed as a consequence of the increase. By introducing an indifference curve we can look at the preferences for savers and borrowers. Let us start by looking at the borrower, for whom consumption has become more expensive:

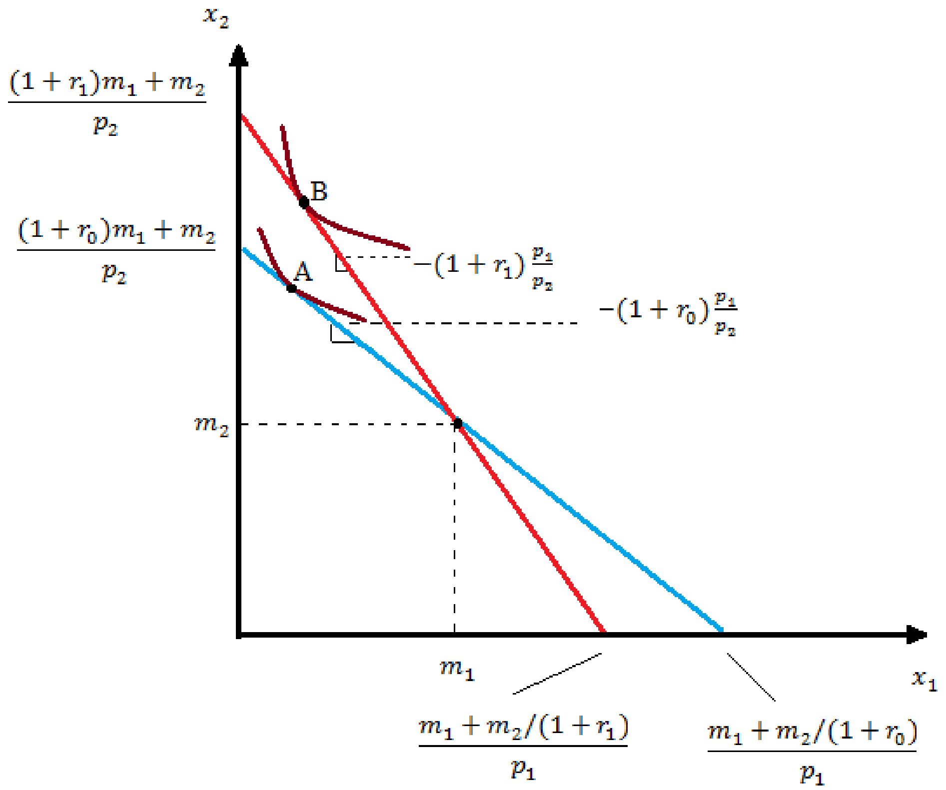
Figure 5. Two-period model with interest rate increase – borrower preferences



The borrower was initially at point A, where he/she was optimizing his/her consumption. After the interest rate increase, A is no longer possible, and the individual has to adjust. As consumption higher than m_1 in period one has become more expensive, consumption in the first period is reduced. Regarding consumption in the second period, there are two different forces pulling in opposite directions. *The substitution effect* pulls towards consuming more in period two, as consumption in period two has become relatively cheaper than consumption in period one. On the other hand, the individual has decreased purchasing power because of the interest rate increase. *The income effect* pulls towards less consumption in the second period. In the illustration above, the income effect is stronger than the substitution effect. The consumption in period two has decreased.

For an individual who saves, the situation is different:

Figure 6. Two-period model with interest rate increase – saver preferences



Before the interest rate increase, the individual had optimized her consumption in point A. After the increase, the saver has a larger range of consumption and may now achieve a higher level of utility. Both the income effect and the substitution effect pulls towards increased consumption in the second period. As for the first period, the two effects pull in opposite directions. The individual has increased purchasing power, and thus, the income effect pulls toward more consumption in the first period. The substitution effect pulls toward less consumption in period one, as it has become relatively more expensive.

The two-period model can be seen in the context of the financial benefits that present themselves for workers, where the first period is year 1-5 after high school. Education can be viewed as an investment in human capital (Becker, 1964). Students typically have low consumption in the first period - and the reward comes in the form of high income in the second period. However, if we only look at the credit market, most students are (forced) borrowers. The workers on the other hand, have the opportunity to be either savers or borrowers, depending on their preferences. In the later sections of this article, I will explore the financial possibilities for the workers who have equal consumption to the students in period one, and hence, are savers in the two-period model.

PRIOR STUDIES

In Norway, there has been a limited number of studies on the profitability of education. In recent years, there are three larger studies in Norway where the profitability of different types and lengths of education has been explored. In all three studies, the researchers use the measure discounted lifetime income to compare the profitability of different types of education, with high school as the reference group.

The first was a study carried out by Espen R. Moen and Lone Semmingsen. The report "Utdanning og livsløpsinntekt" (Education and lifetime income) was released by the foundation for social- and business research in Norway with the results (1996). The researchers based their calculations on data from population counts made in the years 1980 and 1990. The second study, "Utdanning og livsinntekt i Norge", was carried out by Oddbjørn Raaum, Tom Erik Aabø and Thomas Karterud (1999). Lifetime income was calculated based on the actual income of individuals born in 1936, 1944 and 1953. They got the figures from credited pension points from 1971 to 1995. The third was a study by Lars J. Kirkebøen, published by Statistics Norway (2010). It was financed by the Norwegian government and is named "Forskjeller i livsløpsinntekt mellom utdanningsgrupper" (Differences in Lifetime Earnings for different types of Education). Kirkebøen used a variation of the Mincer earnings function to estimate earnings (Mincer, 1974), eventually ending up with discounted lifetime income as the measure for comparison:

$$LE = \sum_{s=0}^{S} \delta^s \hat{Y}\,(s) = \sum_{s=0}^{S} \left(\frac{1}{1+r}\right)^s \hat{Y}(s)$$

The results from the three studies were, to some extent, coinciding. An overview can be seen in the table below:

Table 1. Prior Studies - Main Results

	Discount Rate	Lifetime Income Rank of High School	Lifetime Income Percentile of High School	Top 3 Educations
Moen and Semmingsen	2% (and 5%)	17 of 23 (17 of 23)	26% (26%)	1. MBA 2. Law 3. Medical school
Raaum et.al	3,5%	Men 11 of 26 Women 13 of 21	Men 58% Women 38% (Average 48%)	1. MBA 2. Medical school 3. Law
Kirkebøen	2,5%	32 of 50	36%	1. Medical school 2. Postgraduate, Health 3. MBA

The second and third column is how high school (as the highest completed education) performed in lifetime income, compared to other types of education. As we can see, it outperforms 26% to 48% of the other educations. The top performers are MBA (Master of Business Administration), five-year law degree, and six years of medical school. Additionally, the present value of the lifetime income for people with high school ranges between 60% and 75% of that of the top performer in each study.

3. CALCULATIONS AND ESTIMATES

This study aims to examine the significance of early investment decisions when calculating the profitability of working instead of studying after high school. One could go about this in many different ways. By starting on a micro-level and looking at specific examples of an individual's investment decisions, one can later look at the macro-level, and examine if it is possible to make general conclusions regarding the results.

First, let us establish the income of a full-time student. As previously mentioned, a full-time student in Norway is entitled to 100 902 Norwegian Kroner (NOK) per school year. 40 percent of this is given as a scholarship if the student passes all exams, which equals 40 361 NOK. The rest is a low-interest loan, which has to be paid back after the student has completed his/her degree. Given that most students work, to some degree, in addition to their studies (Lunde, Thorsen, & Barstad, 2012) – the question is whether their wages should be included in a comparison with the fulltime workers, or not. The normal workload estimate, calculated by the universities/colleges, for a student in Norway is 1600 hours per two semesters[3]. This almost amounts to a normal work year for a Norwegian worker. Many employees in Norway are regulated by a collective agreement, where it is established that they will work 37.5 hours per week, and get five weeks of vacation. After factoring in weekends and holidays, this amounts to 1695 hours a year. Therefore, a reasonable approach is to give the students an income based on 95 hours of work, in addition to their scholarships and student loans. The average hourly pay for a part-time worker in Norway is 220 NOK[4] (Statistics Norway, 2016b). 95 hours of work for 220 NOK per hour equals 20,900 NOK.

Based on these assumptions, we can give the student a yearly income of 121,802 NOK, where 60,541 comes in the form of a loan with good terms. For practical reasons, let us round these numbers up to 122,000 and 61,000. The size of the student income is very important in the following discussion. It is not only the funds the student has at his/her disposable, but it will

[3] An example of this can be seen at http://www.uia.no/student/semesterregistrering/utdanningsplan for University of Agder.

[4] Based on 162,5 hours of work per month.

also be the consumption of the worker, thus, dictating his/her savings. This means that a person who chose to work instead of studying will have his/her net income, minus 122,000 NOK, to save or invest. In the following paragraph, I will find an estimate for the net income of an uneducated worker in Norway.

Average income for all employees in Norway in 2015 was 518,100 NOK (Statistics Norway, 2016b). In 2015, average income for people with high school as their highest completed education, was 510,000 NOK[5] (Statistics Norway, 2016b). However, it is likely that the income is considerably lower for the relevant age group in this case (18-23), but there are certain limitations to the available data. People at the age of 18 earn 66-84% of the overall average[6]. In lack of a better alternative, I will assume that for people with high school as their highest completed education, 18-year-olds earn 75% of the overall average, 510,000 NOK. 75% of 51,000 is 382,500 NOK. The taxation for someone who earned 382,500 NOK in 2015, is approximately 25%, giving net income of 287,000 (rounded off). This means that a worker will have a surplus of 165,000 NOK at 18 years old, when compared to a student:

[5] From average monthly earnings of 42 500*12. https://www.ssb.no/statistikkbanken/selecttable/hovedtabellHjem.asp?KortNavnWeb=lonnansatt&CMSSubjectArea=arbeid-og-lonn&checked=true

[6] Age group 0-24 earn 66% of average earnings while age group 25-29 earn 84% of average earnings (https://www.ssb.no/statistikkbanken/selecttable/hovedtabellHjem.asp?KortNavnWeb=lonnansatt&CMSSubjectArea=arbeid-og-lonn&checked=true)

Table 2. Income Overview - Year 1-5

Year	1	2	3	4	5
WORKER					
Income	382500	395123	408162	421631	435545
Tax	-95500	-101431	-106021	-110762	-115660
Net Income	**287000**	**293692**	**302141**	**310869**	**319885**
STUDENT					
Income	21000	21693	22409	23148	23912
Scolarship	40000	40852	41722	42611	43519
Loan	61000	62299	63627	64982	66366
SUM	**122000**	**124845**	**127758**	**130742**	**133797**
SURPLUS WORKER	**165000**	**168847**	**174383**	**180127**	**186087**

The table above is an overview of the cash flows of a typical worker and student from age 18 to 23. The yearly income increase is based on the average increase since 2008 for people whose highest completed education is high school (Statistics Norway, 2016b). Similarly, the yearly increase in scholarship and student loans is based on the historic average since 2008 (Forvaltningsdatabasen, 2016).

To calculate averages for different age groups and education, I will assume that the general percentage-difference in income for different age groups is close to equal to the percentage-difference when looking at income specifically for the educated and non-educated groups. Data from Statistics Norway (2016b) gives us the following table:

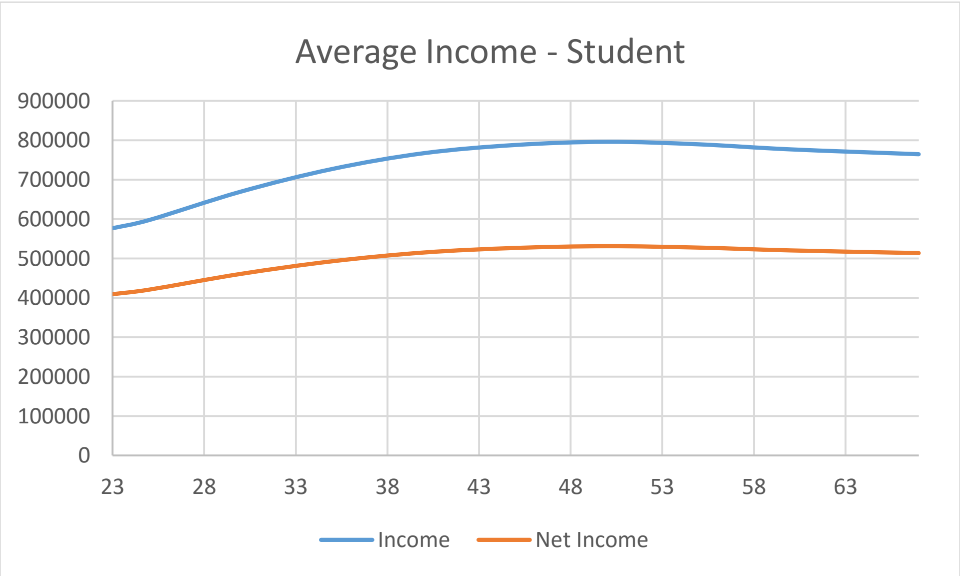
Table 3. Calculation Ratios

Age	Monthly Wages	Percentage Ratio of average
0-24	29300	0,651
25-29	37300	0,829
30-34	41800	0,929
35-39	45400	1,009
40-44	47900	1,064
45-49	49200	1,093
50-54	49700	1,104
55-59	49300	1,096
60+	48500	1,078

Average monthly income for all age groups was 45,000 NOK. The ratios above will be used when calculating income profiles for the educated and non-educated groups. For example, right after graduating, a person with a master's degree will have an income equal to:

Average income for people with 4+ years of education * 0,829

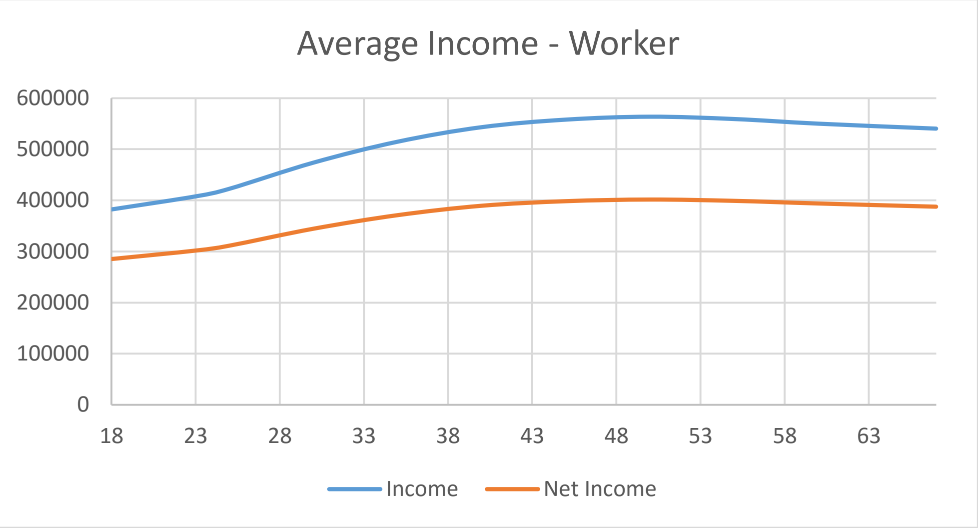
Figure 7 – Average Income - Student



The graph shows average income from age 23-67 for a person with four or more years of education. We can see that income is at its highest around age 50, and that there is limited variation for net income, as taxation increases with higher income.

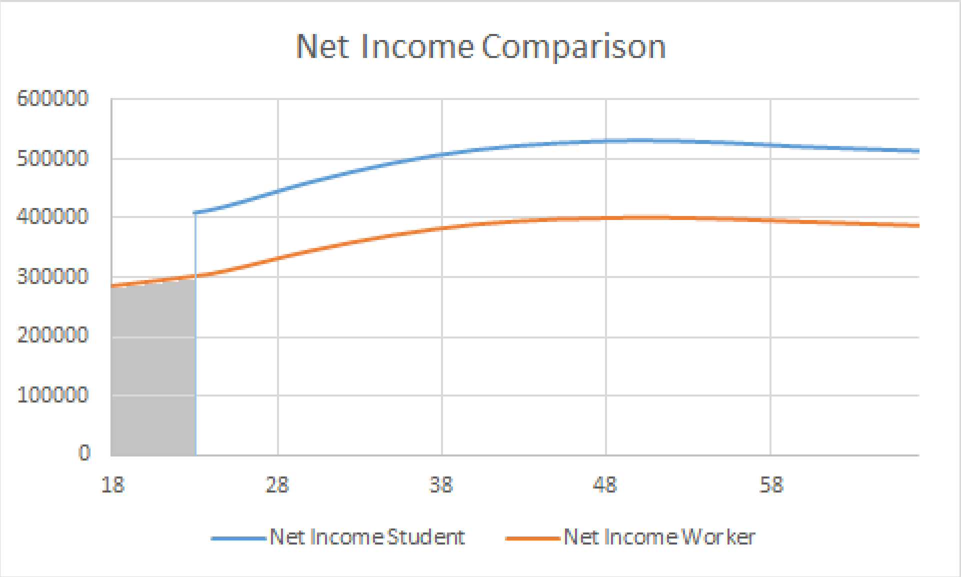
Similarly, we can look at average income for a person without education:

Figure 8 – Average Income - Worker



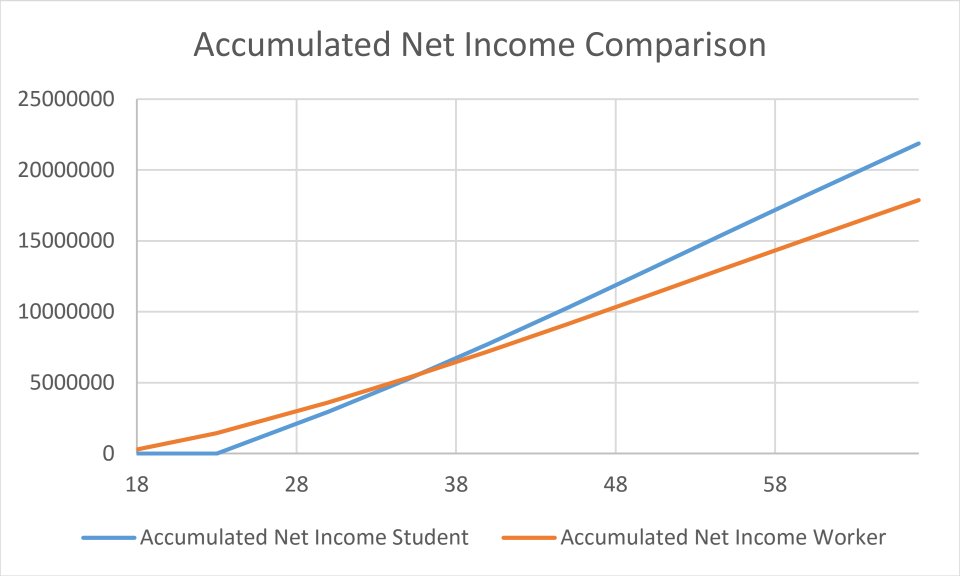
As we can see, the shape of the income profile is similar to that of people with a longer education. When comparing the average net income between those with education and those without, we get a graph, similar to the illustration in figure 1:

Figure 9. Net Income Comparison



The surplus that the worker gets while the student is at college/university is represented by the grey area. When the student gets a job, he/she will quickly get higher income than the worker. Calculating nominally, the average student will accumulate a higher lifetime (net) income than the average worker:

Figure 10. Accumulated Net Income Comparison



By age 36, the student will pass the worker in accumulated net income. When retiring, the surplus will have accumulated to approximately 4 million NOK. However, in present value, this figure would be lower, and the student would bypass the worker at a later stage.

An average master student will have accumulated student debt of 318,000 NOK by the time he/she graduates. With the current interest rate at 1,913%, and with the indicative down-payment-plan of the Educational Loan Fund, the loan will be paid back over 20 years, with a monthly sum of 1,652 NOK. This means a yearly sum of 19,824 NOK. In the following sections, I will include interest payments/income, and explore how different financial decisions made by the worker may affect the results.

4. SIMULATION 1: SAVINGS ACCOUNT

In most cases, a person who chooses to work instead of getting an education will have higher income for a certain amount of years, than a person who chooses higher education. There are obviously a lot of variation as to how much higher that income is, and at what time the student starts earning more. However, we do know that most students receive financial aid from the Norwegian State Educational Loan Fund: In 2014, there were 272,504 students in higher education (Statistics Norway, 2015c). Of these, 227,389 received financial aid, which is roughly 83% of all students (Lånekassen, 2016). Therefore, when trying to depict a typical situation, a student income of 122 000 (included loan), like described in detail in the previous section, is a good figure.

As for worker income, there is probably more variation than for the student during her education. Different professions will give different incomes. However, we do have a figure for average income for people with high school as their highest completed education, which gives a net income of 287,000.

With the figures mentioned above, the worker will have a surplus of 165,000 NOK in year 1, compared to the student. After four more years with a similar surplus, the worker gets certain financial opportunities that the student does not get. I will mainly look at investments into a savings account and an index fund. As we want to discover the financial opportunities of workers, we will look at one of the extreme examples, were the worker saves all excess income he/she has compared to the student. The advantage with a savings account is that it is safe, and provides steady returns, and thus, the savings are available for the individual to withdraw at any given time without taking a loss. The downside of a savings account is that it has lower potential for returns than more volatile investments like stocks or funds.

It is normal that the interest rates in saving accounts fluctuate and vary between different banks. April 22th, 2016, the highest deposit rate you could get in Norway was 4,35% when including saving accounts for young people buying a residency (BSU), and 3% in regular savings accounts (Forbrukerrådet, 2016). The last 14 years, it has fluctuated between 1% and 5%

(Statistics Norway, 2016b). Therefore, I will calculate interest income for the first five years for every whole number deposit rate between 1% and 5%. However, I will mainly use 3% as the main savings interest rate when doing more intricate calculations.

When adding interest income to lifetime income, it is important to have a clear understanding as to *when* it can be registered as income. There are mainly two options: unrealized gains or realized gains. Reporting unrealized gains as income would favor the worker with savings when calculating the lifetime income. This would mean that he/she could let the interest compound, and still get it registered as income. With this option, the worker's income would be overestimated. When earning a salary, the money is yours to do with what you please, be that saving or consuming. However, automatically reinvested interest income is not available for the individual to spend as he/she pleases. Therefore, I will only count interest income as earnings when it is available for consumption. In table 2, I calculated the average surplus the worker had to save or invest, compared to the student. After year 5, the worker has many different options of how he/she chooses to continue saving. Therefore, I will start by establishing how the interest income will affect the accumulated savings for the first 5 years:

Table 4. Surplus Worker with different interest rates

Year	1	2	3	4	5
SURPLUS WORKER	165000	168847	174383	180127	186087
Accumulated savings 1%	165000	335497	513235	698494	**891567**
Accumulated savings 2%	165000	337147	518273	708765	**909028**
Accumulated savings 3%	165000	338797	523344	719171	**926834**
Accumulated savings 4%	165000	340447	528448	729713	**944989**
Accumulated savings 5%	165000	342097	533585	740391	**963498**

After 5 years, the accumulated savings will range between 891,000 – 964,000 NOK, depending on the interest rate. As I will only register capital gains as income when it is available for consumption, the income profile of the worker may have a lot of variation depending on his/her choices. A worker with preference for consumption could choose to start withdrawing the savings after year 5, or stop reinvesting the interest income. If he/she prefers saving, he/she may reinvest all the interest income until his/her forty's, fifties, or even retirement age. I will start by looking at the option where the worker withdraws the savings evenly over the span of his work life, as a pre-tax annuity. In 2015, the tax rate on capital gains was 27%, and this is the rate I will use (Skatteetaten, 2014). In Norway, there is also a wealth tax. In 2015, this was 0.85% for sums larger than 1,200,000 NOK. This will not be relevant for this simulation.

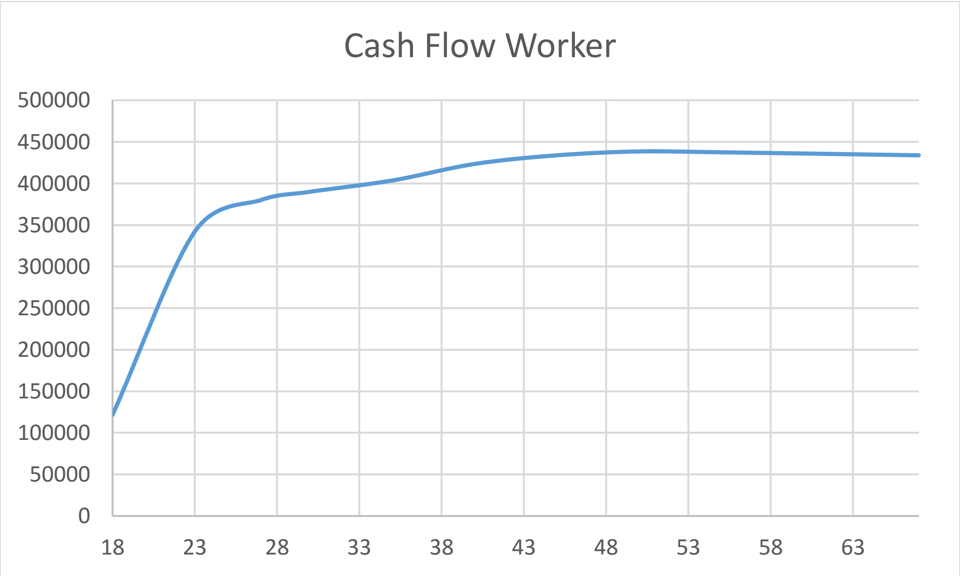
WITHDRAWALS AS ANNUITIES

Let us assume that the worker has a fixed rate of 3% on his/her savings throughout his/her lifetime. He/she wishes to get interest income and withdraw his/her savings as an annuity. The formula for the annuity is:

$$A = \frac{Si}{1 - \frac{1}{(1+i)^n}}$$

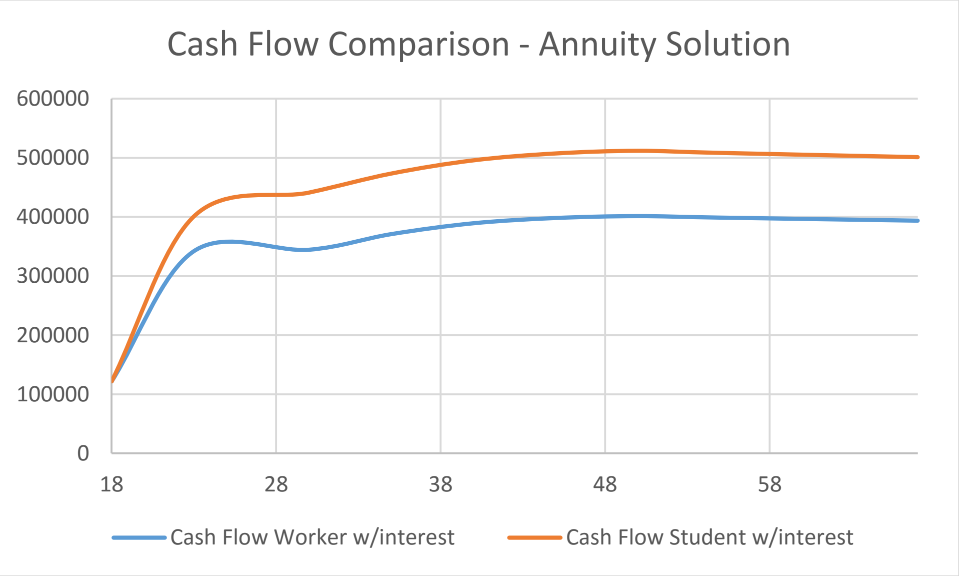
The amount of savings is S, and i is the interest rate. Using the annuity formula, the pre-tax sum is 38,000 NOK (rounded down) per year in interest income and withdrawals. Tax-costs on interest income will decrease over the period. Wealth tax does not come into play as savings never exceed 926,834 NOK. The cash flow from the investment is 30,000 NOK in year 1 and gradually increases until 40,000 NOK at the end of her work life. With these new adjustments, we get the following income profile for the worker:

Figure 11. Cash Flow Worker



As we can see, the shape of the income profile is now more similar to that of a student. The income is identical in the first 5 years, and gets a substantial increase at age 23. The worker has *postponed* his/her income, and will have higher income for the rest of his/her work life than he/she would have without saving from age 18 to 23. When comparing the student and worker income profile, I will include the scholarship and student loan from age 18 to 23 as income, and subsequently also include the interest cost and down payment after age 23:

Figure 12. Cash Flow Comparison – Annuity Solution



The worker's income profile is very similar to the income profile of the student; but the worker is still earning less than the student is. The interest income will have amounted to 747,000 NOK, which does contribute to closing the gap in nominal income.

ONLY WITHDRAWING INTEREST INCOME

If we, for now, exclude the possibility of reinvesting interest income, the way to maximize interest income would be not withdraw any part of the initial investment base – only the interest income. When using a fixed interest rate we get a fixed amount added to the income each year until the savings are withdrawn at retirement age. Based on previous calculations, the yearly interest income for different interest rates is presented in table 5:

Table 5. Yearly Interest Income

	PRE-TAX	AFTER-TAX
Yearly interest income 1%	8916	6508
Yearly interest income 2%	18181	13272
Yearly interest income 3%	27805	20298
Yearly interest income 4%	37800	27594
Yearly interest income 5%	48175	35168

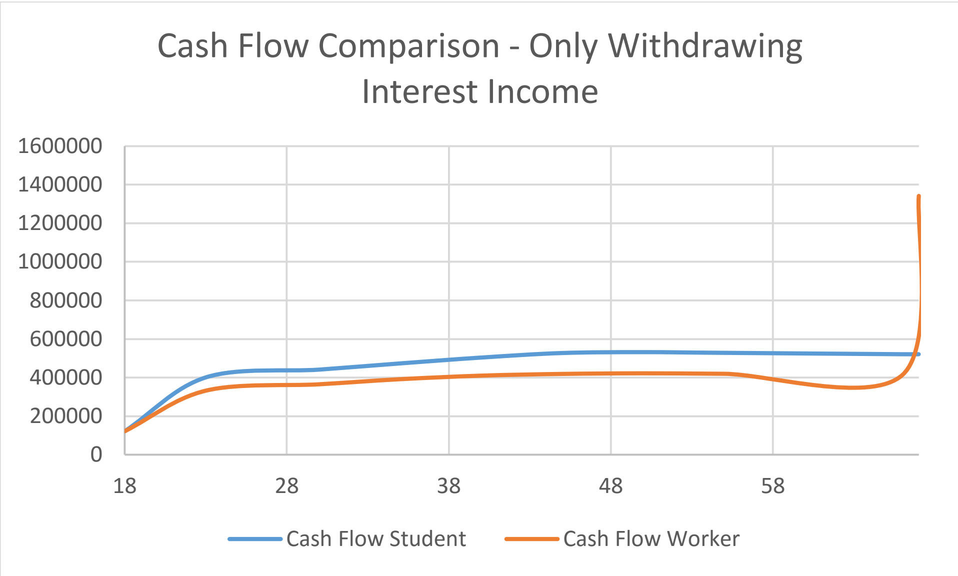
The interest income could range between 6 508 to 35 168 depending on the interest rate on savings. Assuming withdrawal at retirement age, 67, we get the following accumulated interest income:

Table 6. Lifetime Interest Income

	LIFETIME INTEREST INCOME
1% Interest rate	286371
2% interest rate	583960
3% Interest rate	893097
4% Interest Rate	1214122
5% Interest Rate	1547378

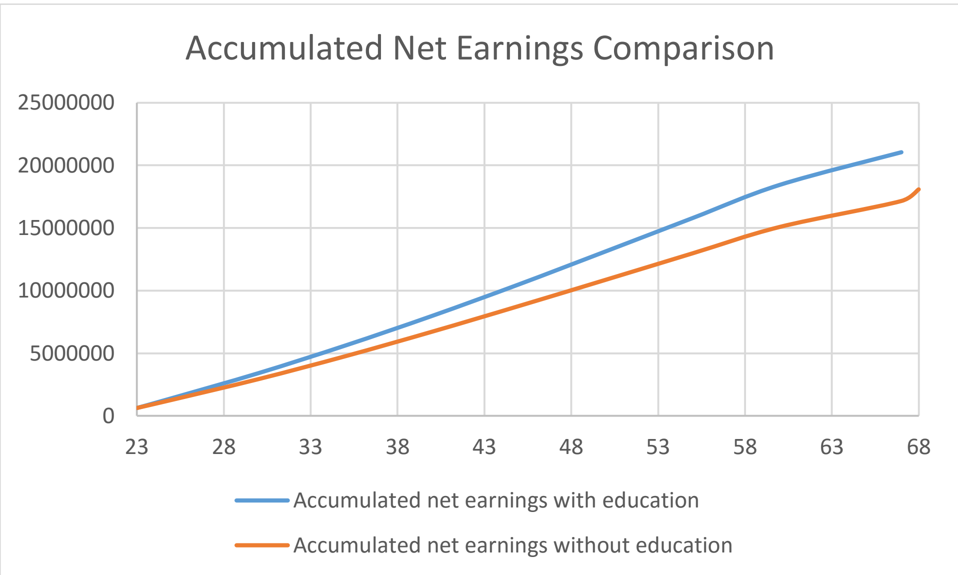
The table above shows the power of the interest rate. At 5% interest rate, one would get triple the lifetime interest income than that of 1% interest rate. With 3% interest rate, the yearly cash flow will be somewhat lower than the previous example with the annuity. However, the advantage here comes in form of the withdrawal at age 67. The individual sacrifices some of the yearly cash flows to get higher lifetime interest income, which he/she will get the full benefits from at retirement age when he/she withdraws the base of approximately 900,000 NOK:

Figure 13. Cash Flow Comparison – Only Withdrawing Interest Income



The sudden increase at the end for workers is because of the withdrawal of the savings. The difference in yearly cash flow will be slightly larger than in the previous example. However, the upside of this method comes in the cash infusion the worker gets when retiring. Accumulated net earnings will now look very different from the example without savings:

Figure 14. Accumulated Net Earnings Comparison



At no point does the worker have higher accumulated earnings than the student. However, the difference in accumulated earnings have shrunk from the example without savings, from approximately 4 million to 3 million NOK. Using 3% as an interest rate, higher education still looks like the more profitable option. However, one could argue that a savings account is an unnecessarily low-yield investment option for such a long timeline. Other options may offer better returns.

5. SIMULATION 2: INVESTING IN STOCKS/FUNDS

Doing calculations with stock returns offers some challenges. While the savings rate is close to risk-free with little fluctuation, stock investments are volatile and fluctuate a lot. It does not necessarily make sense to operate with average returns either, as average returns does not equal actual returns. A simple example that illustrates this is if you invest 100 NOK and get a return of 100% the first year and 0% the second year. You will then have 200 NOK after two years, and the average return per year would be 50%. However, if you had a return of 50% in the first year and 50% in the second year, the average return per year is still 50% but you would have 225 NOK after two years.

It would be beneficial to exclude personal investment skills in a simulation of a typical investment example. With individual stocks, the specter of possible results is extreme. One could go broke, or become a multi-millionaire, in just a few years. Therefore, it is beneficial to use a set of various stocks. This way, the risk is diversified, and chance plays less of a factor. A passive index fund is therefore a good investment option for simulating investment returns. There could obviously be a lot of discussion concerning which index fund to use, however, that is not the purpose of this article. I will use the Morgan Stanley Capital International World Index (MSCI World Index). This is the index replicated in the passive index fund of Norway's largest bank, DNB (Finans Norge, 2015). It is commonly used as a benchmark for global returns, and should therefore be a good option for a simulation.

MSCI WORLD INDEX FUND

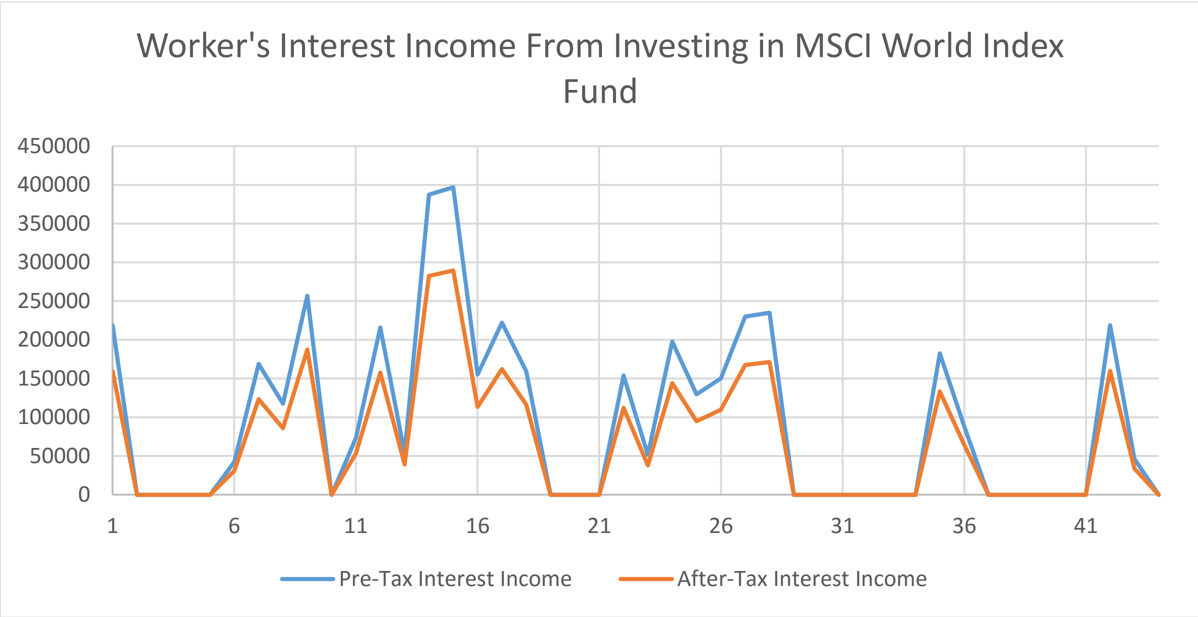
Like in the previous simulation, reinvestments above the initial base after the student have started working will try to be avoided. The purpose is to isolate the effect of the surplus the worker gets in year 1-5, and by allowing the worker to reinvest her interest income, one would have to allow the student to invest as well. Therefore, the only deposits are made in year 1-5. The exception, in this instance, is after a year with negative returns, the worker is allowed to reinvest interest income up until the initial base.

Index funds are quite volatile, and best suited for a long-term investment. One could argue that five years is short-term in this context, and the amount accumulated in the five years would vary a lot based on the economic climate. With that in mind, I will use the savings rate from the previous example in year 1-5, so that the worker gets a guaranteed base for further returns. After year 5, the worker invests the accumulated savings into an index fund representing the MSCI World Index.

From the calculations section we have accumulated savings of 926,834 NOK with an interest rate of 3% after five years, for a worker on a student-budget. In this simulation, historical returns of the MSCI index will be used to calculate the returns. This means that if the MSCI Index will perform identical the next 44 years, as it did the previous 44 years, this is what the returns will be for the worker. The index has been calculated since 1969. Historical returns from 1972 until 2015 will be used to calculate the returns for the 44 years that makes out the time period in this simulation.

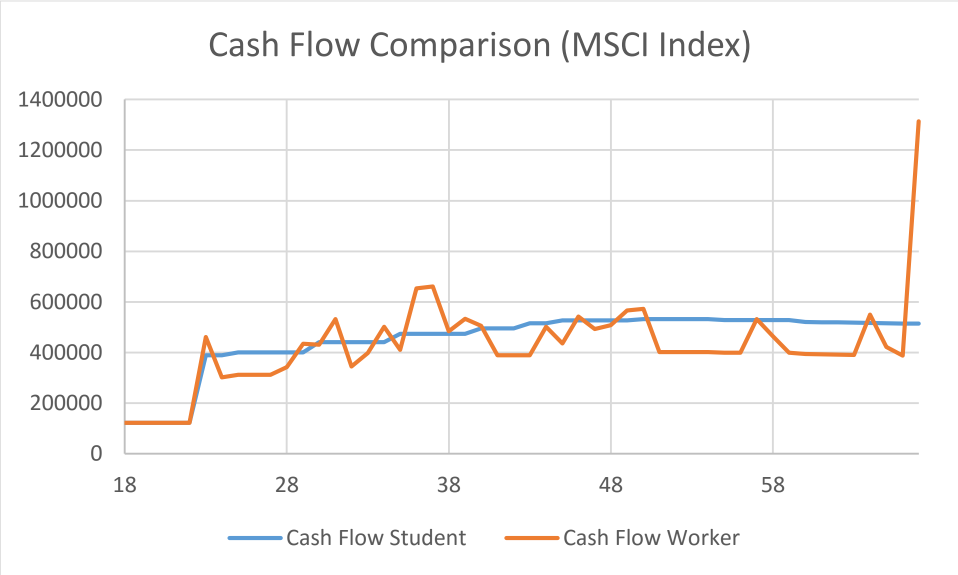
The strategy of the worker can be expressed in the following way: "I will withdraw all returns that exceed the base of 926 834. Whenever there is a year with negative returns, the following positive returns will be reinvested until the base is back to 926,834 NOK". This strategy prevents the base from continuously decreasing over the course of the worker's work life. The consequence of this is that the worker will never get a negative cash flow from the investment. However, some of the years, when the index has performed well, he/she will not experience increased cash flow, as the returns are reinvested into the fund. Based on the historical returns from the last 44 years, the chart for interest income would look like this (Morgan Stanley Capital International, 2016):

Figure 15. Worker's Interest Income From Investing in MSCI Word Index Fund



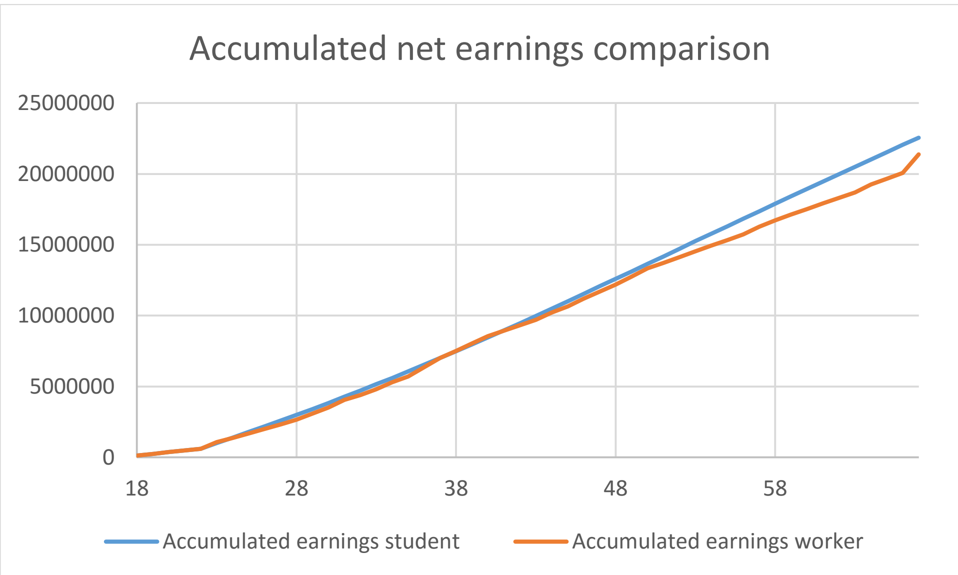
This is quite the contrast from the example with a regular savings account. The return varies a lot, and the worker could have yearly interest income of 150,000 NOK, followed by several years without any interest income, as we see from year 1 to 5. The accumulated interest income seems to be substantial in this simulation, amounting to more than 4.1 million NOK pre-tax, and roughly 3 million NOK after-tax. This is close to what we previously had as the difference between accumulated student- and worker income. By adding the interest income to their income profile, we can see how their cash flows compare:

Figure 16. Cash Flow Comparison between Worker and Student with MSCI Index Returns for Worker



Here, the worker may experience certain periods with higher cash flows than the student. The disadvantage is the relatively high level of uncertainty the worker experiences. After age 23, the worker ranges between yearly cash flows of 300,000 and 660,000 NOK, which is a difference of more than 100%. The advantage is that accumulated earnings has increased:

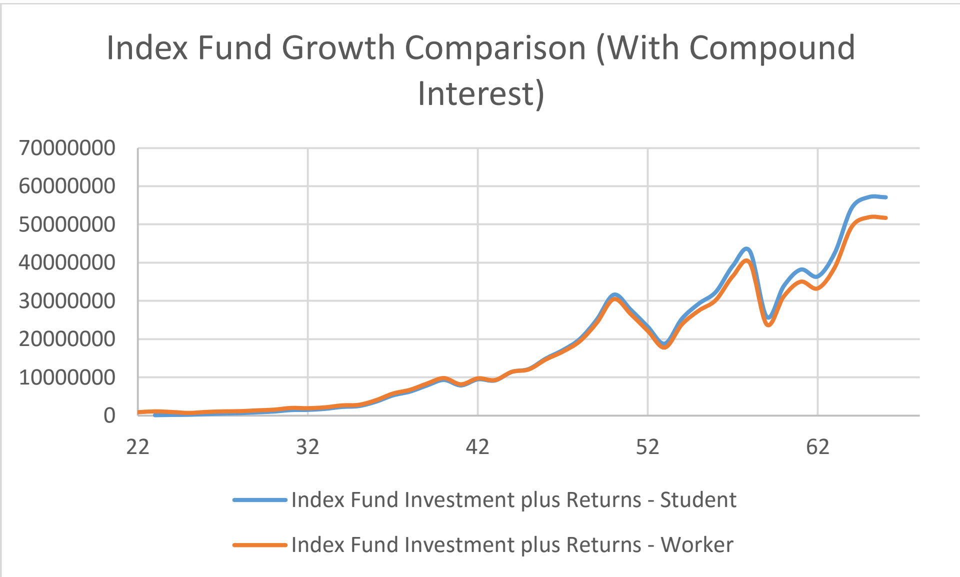
Figure 17. Accumulated net earnings comparison (with interest income from index fund for Worker



Accumulated net earnings has become quite similar. After age 50, the graph favors the student. This was when we entered the 21st century, and the global economy has experienced some instabilities since then. However, the worker nearly closes the gap at retirement age, when the base of more than 900,000 NOK is withdrawn. At retirement age, the student will have made less than 1.2 million more than the worker throughout her work life.

In the previous simulations, the student has not been able to save or invest, to isolate the effect of the early income of the worker. In reality, it is likely that many people do save or invest to some extent. Another way to compare the profitability of education versus no education is to take the assumption of equal consumption one step further. Instead of it only applying to year one through five, it now applies for their whole work life. I will assume that all returns are reinvested into the index fund, and that both the student and worker will have consumption equal to the worker's income from age 23-67. The student will then have a surplus each year that is invested into the index fund, as well as the reinvested interest income:

Figure 19. Index Fund Growth Comparison (With Compound Interest)



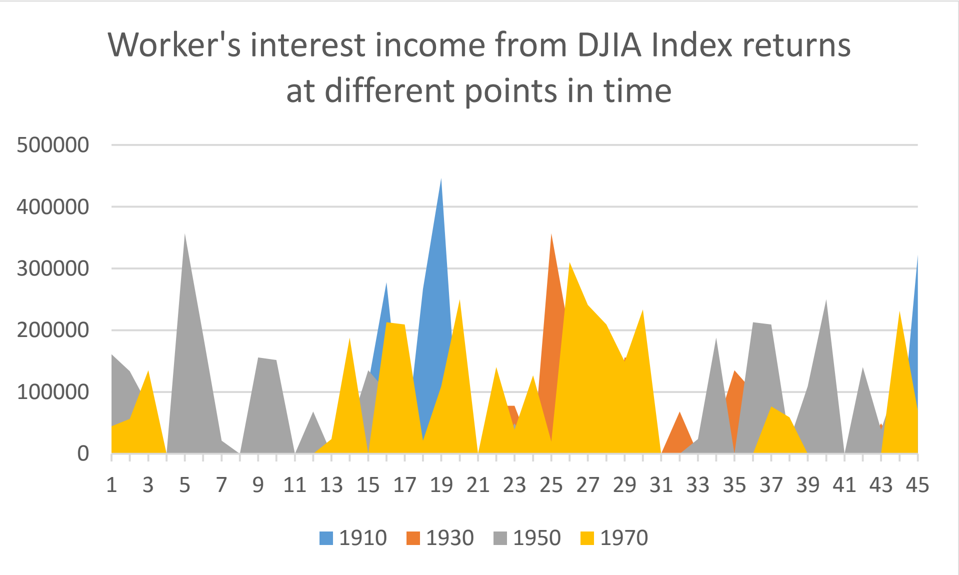
At age 45, the student will pass the worker in total savings in the fund. At retirement age, the student will have a surplus of 5.36 million NOK over the student.

HISTORICAL PERSPECTIVE ON MARKET PERFORMANCE – DJIA INDEX

With such a volatile investment as an index fund, it is easy to argue that coincidences in the market has either overrated or underrated the returns. Although this investment was made right before the market crash of 1973-1974 (Morgan Stanley Capital International, 2016), it was made before a period with high economic growth. Therefore, it may be beneficial to compare with other periods in time. As the MSCI World Index only has been calculated since 1969, I will use the Dow Jones Industrial Average (DJIA) to get a historical perspective (ForecastChart, 2015). It is important to be aware that the DJIA Index seems to have been underperforming compared to the MSCI World Index since 1972[7].

Below is the returns the worker would have throughout her work life, at different points in time, with the same investment strategy as the example above.

Figure 18. Worker's interest income from DJUA Index returns at different points in time



The chart shows returns for an investment at four different points in time between 1910 and 1970. The worker invests 926,834 NOK, and withdraws positive returns above that. After a year with negative returns, all following positive returns are reinvesting until reaching the base

[7] The MSCI World Index had average returns of 11,72% while DJIA Index had 8,72% between 1972-2014

of 926 834. The index is performing better in 1950 and 1970 than in the previous years. This becomes clearer in the table below where the accumulated pre-tax interest income is shown for an investment at every decade since 1900.

Table 7. Accumulated pre-tax interest income for worker with different investment timings (DJIA)

Accumulated pre-Tax Interest income for worker with different investment timings (DJIA)	
1901	1548218
1910	1508108
1920	2197256
1930	1429257
1940	2156754
1950	2987284
1960	2879066
1970	3158336

Each row shows the accumulated interest income an investment of 926,834 NOK would give at different points in time, with the investment strategy from above. For example, investing 926,834 NOK with the returns from 1901-1945 would have given the worker interest income of 1.55 million NOK before tax (excluded the initial investment amount). The equivalent from 1972 in the example with the MSCI World Index was 4 million NOK. The table tells us that based on historical market performance, 4 million NOK in accumulated interest income before tax, may be in the upper range of what the worker can expect with the above investment strategy.

THE PRESENT VALUE

The prior studies on the profitability of education in Norway have used the present value of the income as a measurement of the profitability. To get the present value, one has to divide the cash flow with a discount rate. The main reason for this is that an invested or saved Norwegian krone this year will be worth more than a Norwegian krone next year because of the interest rate. That makes discounting somewhat complicated in this instance, as I have looked at examples of what the actual interest income could look like. From the example with a savings account, depositing 926,000 NOK in a savings account at 3% interest will have accumulated

953,780 NOK next year. However, the present value of 953,780 NOK is 926,000 NOK when using a discount factor of 3%. Therefore, when using the present value of the earnings as the measurement, the added value of saving is zero in this example.

The index fund is a far more volatile investment, where the return could be anything from +40% to -40%. In the example when the worker withdrew the positive returns, he/she got some considerable-sized cash flows in certain years. Although it is interest income, it is still significant at what point the positive cash flows occur. In the example where the worker withdraws the positive returns, the 160,000 NOK return at age 23 is obviously more valuable than the 160,000 NOK return at age 42. Impatience will contribute to the individual preferring earlier payouts and inflation means the 160 000 NOK at age 23 has stronger purchasing power. In addition, the 160,000 NOK could offer additional interest income if reinvested. Therefore, I believe it is highly relevant to calculate the present value of the cash flows in the simulation where the worker withdraws the positive returns from the index fund.

The Norwegian Treasury recommends using a discount rate between 3.5% and 8%, depending on how much risk is involved (Finansdepartementet, 1999). Statistics Norway published the latest Norwegian study on differences in lifetime earnings based on education, in 2010 (Kirkebøen, 2010). When taking into account taxes and growth in real wages, the researcher came up with a discount rate of 2.5%, which was the equivalent of the 6% option from the Norwegian Treasury. I have already included taxation of 27% in my calculations, and will use 2.5% as a discount rate.

Previously, it was calculated that the worker could earn approximately 3 million NOK after tax in interest income throughout her work life by investing in a passive index fund. The present value of the interest income is calculated using the following formula:

$$PV\ of\ interest\ income = \sum_{t=0}^{T} \left(\frac{1}{1+r}\right)^{t} CF(t)$$

The cash flows (realized financial gains) are multiplied with a discount factor that decreases in time. The discount rate, r, is 0.025 in this instance.

The present value of all the cash flows from interest income using 2.5% as a discount rate is 1.95 million NOK. The present value of net earnings for the worker is 12 million NOK and the present value of net earnings for the student is 12.7 million NOK**.** This is a difference of roughly 5%.

6. LIMITATIONS

The simulations in this article are of a theoretical nature and are highly dependent on the related assumptions. Although there were logical reasons for each assumption, the number of assumptions makes it likely that there are certain discrepancies with reality. Some discrepancies are to be expected, but they should be limited, and the reasoning behind the calculations should be on point. With that mentioned, it is important to assess potential weaknesses to the calculations.

Average income measures were used to calculate income profiles for the worker and the student, whereas the median income probably would have been a more suiting measure for depicting the typical situation. However, data for the median income for different levels of education was not available, and thus, average income was used. An option would have been to make an approximation from the overall median income. This was the method used for the different age groups, but I wanted to avoid it as much as possible as it opens up for miscalculations and misinterpretations. As a result, the income figures, both for the worker and the student, are probably a bit overrated compared to the median income. The overall average income was approximately 10% higher than the median income before tax (Statistics Norway, 2016b).

It was challenging to find data on wage increases. I decided to use the data on income for different age groups. The data only showed the overall income for different age groups, and I decided to use the same growth percentage for both the student and the worker. In reality, it is likely that the student has a steeper income profile in the first half of her career than the worker. Therefore, it is possible that the student has a relatively overrated income in the first working years and an underrated income later on. The opposite may be true for the worker.

The income (or cash flow) for the student during her education was set to 122,000 NOK, based on loan and scholarship from the Norwegian State Educational Loan Fund as well as 95 hours of work. As the estimated amount of work for a full-time student was 1600 hours a year, they had 95 hours to spare when compared to a full-time worker. In reality, this is very circumstantial. Many students probably spend less than 1600 hours studying, while some spend more. There is also a lot of variation in terms of financial help from parents and work hours. I had to make a decision, and I found this to be a good estimate when assuming the student did as much work as a full-time worker. It is probable that an average student has more funds available than 122 000 NOK per year, as this seems like a somewhat low figure considering the cost of living in Norway[8]. A report from Statistics Norway showed that salaries accounted for 53% of students' disposable funds in 2010, which points towards a substantially higher figure than 122,000 NOK (Lunde, Thorsen, & Barstad, 2012). It may also indicate that some students' workload, when combining studies and work, is larger than 1695 hours a year.

[8] A regression model from Statistics Norway found that the average monthly rent for a 20 square meter apartment in Oslo was 6975 NOK in 2012. This would be nearly 70% of the student's funds, which seems high. https://www.ssb.no/statistikkbanken/selectvarval/saveselections.asp

7. DISCUSSION

The purpose of this study was to explore the financial benefits of not getting an education. What financial opportunities does the worker have that the student does not, and how significant are these opportunities? The underlying assumption used to answer these questions was equal consumption for the student and the worker between age 18-23. The study was mainly a comparison between people with a master's degree and people without higher education. Average income figures from 2015 from Statistics Norway's data bank were used for calculating income profiles. Based on these, it was calculated that a worker would have a surplus of approximately 900,000 NOK compared to the student. What was later explored in the study was to what extent this surplus could equalize the financial advantage the student eventually gets from having higher income. The types of investments that were looked at was at opposite ends of the volatility spectrum, where the savings account has close to zero risk, and the index fund has a very high degree of risk.

Looking solely at the lifetime income without considering any interest rate, the average student earned approximately 4 million NOK more than the average worker in net lifetime income, and in the study, I aimed to explore whether or not this gap could be closed if one assumed equal consumption between age 18-23.

The first investment that was explored was a regular savings account, where the interest rate could vary between 1 and 5 percent. A fixed interest rate of 3 percent was used for the two different investment strategies. In the first simulation, the worker aimed for a steady cash flow throughout her work life, by withdrawing the savings as an annuity. This led to the shape of the income profile being similar to that of the student, and gave the worker 747,000 NOK in interest income that was spread throughout her work life, most of it paid out in the first half (interest income became a decreasing portion of the total payout throughout the work life). How significant is this amount? With the total gap being 4 million, 747,000 NOK means a reduction in the lifetime income gap of approximately 19%. For the worker, the interest income will mean 17,000 NOK extra net earnings per year on average, which means 3-5% higher earnings yearly for the worker.

In this simulation, the worker also withdraws portions of the initial investment each year, adding to the yearly cash flow. The cash flow (interest income + withdrawals) after age 23 ranges between 30,000 and 40,000 each year, which is an increase of approximately 10%. However, parts of this amount is merely a postponement of the income from age 18-23, but it is still relevant information for a worker who has a preference for consumption in the second period[9]. The yearly cash flow of the student will be between 70,000-80,000 NOK higher than that of the worker.

The second simulation with the savings account was quite similar to the first, the only difference being that the initial investment base remained untouched until retirement age. The consequence of this is that yearly cash flow throughout the work life is a bit lower, but the interest income and net lifetime earnings is higher. The accumulated interest income is approximately 1 million with this strategy, which means reducing the nominal lifetime income gap by 25%. The downside is that the 926,834 NOK that is withdrawn at retirement age has lost a lot of its value because of inflation.

One could criticize the significance of this simulation, as one could argue that the present value of the investments is zero. On the other hand, this article is an exploration of the worker's financial opportunities. The simulations with the savings account show an alternative for the worker with low risk-tolerance and a preference for later consumption. Additionally, it shows the benefit of early income in a different and practical way. The simulations give insight into *why* the difference in lifetime income is smaller when calculating in present value, and what the practical implications of this actually are.

The other simulation that was conducted was an investment into an index fund. As the lifespan of the investment was 44 years, it was appropriate to simulate the outcome of a risky investment. The stock market is known for being quite volatile; however, its volatility may fluctuate over time (Schwert, 1989). It was logical then, to simulate an investment into an index (fund). The

[9] In the two-period model, this would be an individual with indifference curves located to the (far) left, which favors spending in the second period

MSCI World Index seemed like a good option, as it is both a common benchmark for world stock funds, as well as the subject of one of Norway's biggest index funds (Finans Norge, 2015).

In the simulations, the aim was to look at the isolated effect of the worker's income surplus between age 18 and 23. The question arose of whether or not to allow compound interest for the worker, without allowing the student to invest. In one way to look at it, the compound interest comes as a result of the income surplus, and thus, should be allowed. On the other hand, it can be viewed as additional investments after age 23, in a period when the student has sufficient capital to invest himself/herself. Therefore, I decided to try to avoid reinvesting interest income as much as possible. However, in this simulation, years with negative returns were quite frequent. Without reinvesting interest income, the initial base would decrease significantly during the 44 years. Consequently, I allowed for reinvestments of interest income after years with negative returns, up until the initial base of 926,834 NOK. At no point would the base exceed 926,834 NOK, nor would the worker have net earnings lower than her net income.

The first simulation was made on the basis that the market would perform identical the next 44 years, as it did the previous 44 years. This will obviously not be the case in practice, but seemed like a good option for a simulation, especially considering that the MSCI World Index only has been calculated for 46 years. After doing the same simulation with the DJIA Index and returns at different timings, it seems that the MSCI World Index simulation was at a particularly well performing time in history, and should possibly be looked at as a well-performing scenario. Yet, the investment timing was right before the market crash of 1973-1974, so it was not the optimal timing.

The simulation ended in the worker earnings 3 million NOK in interest income, after tax. This amount is close to equalizing the difference between the student and worker in net lifetime earnings. 1.2 million NOK is now what separates them, a difference of approximately 5%. Calculated in present value, with a discount rate of 2.5%, the difference was 700,000 NOK. Historical data could point towards the returns being overrated, as the simulation was conducted with returns from a time with high growth in the economy. On the other hand, the simulation was conducted with returns from the most recent time possible (the last 44 years). One could argue this is the period that is most indicative of the next 44 years. This is of course only speculation, and it is impossible to know how the index will perform going forward. It is indeed a risky investment, although, the same simulation with the DJIA index for every decade between 1900 and 1970 could point towards it being less risky than one would think. The accumulated interest income ranged between 1.4 million and 3.16 million NOK with the same investment strategy. In other words, based on DJIA Index returns from every decade between 1900 and 1970, the worker would make at least 1.4 million NOK in interest income in 44 years from an investment of 926,834 NOK. It is important to remember that this is without reinvesting positive returns that exceeds the initial investment base.

Up until now, the student had not been allowed to invest in any of the simulations. I wanted to explore what would happened if both the student and the worker were allowed to invest. In the simulation, they had equal consumption between age 18 and 67 which was the student income between age 18 and 22, and the worker income between 23 and 67. The person with the highest income invested their surplus in the MSCI Index fund, and all the interest income was also reinvested into the fund. The result was that the student had a fortune of 57.06 million NOK at age 67, while the worker had a fortune of 51.7 million NOK. The student passed the worker at age 45, which is halfway through the student's work life. The difference of 5.4 million is 10% of the student's fortune, and seems significant. Yet, it is small enough that the difference could have been equalized with better market performance. The early years is when the worker has the advantage over the student, but the worker was barely ahead of breaking even between age 23 and 26. This shows the coincidental nature of such a volatile investment, and why it may be hard to draw conclusions from it.

In practice, it is unlikely that many people have the risk tolerance to invest 100% of their savings into an index fund. On the other hand, it is unlikely that they have such low risk tolerance that they would prefer putting 100% of their savings into a regular savings account. A combination of the two is probable, possibly combined with other investments such as property or bonds.

8. CONCLUSION

The purpose of this study was to explore the financial opportunities of a person without higher education. However, in some ways, it has also been about the practical implications of income today versus income tomorrow (whereas present value shows the theoretical implications). The study was never meant to end in an assertive conclusion of whether or not education is the most profitable choice. Nor is it designed to do so. Nevertheless, in none of the simulations did the worker come out ahead of the student. Thus, if one were to conclude anything, it would be that on average, starting working straight out of high school is not *more* profitable than getting a 5-year education in Norway. On the other hand, in one of the simulations the difference in lifetime earnings was only five percent, which some could argue, is within the margin of error. Therefore, I would be more careful concluding that getting a 5-year education, on average is *more* profitable than starting working straight out of high school. However, it is impossible to draw any conclusions on the profitability of education versus no education without more research on the topic.

It is worth mentioning that, based on previous studies on lifetime income, 5-year educations (typically master degrees) seemed to be considerably more profitable than shorter education (i.e. bachelor degrees). Hence, a comparison between a worker and a person with shorter education might show results that are more favorable for the worker. Similar comparisons with specific types of education would also be interesting, and would probably allow for more precise calculations and conclusions. It would also be interesting to see similar studies with different types of investments.

Lastly, I hope this article shows that people without higher education have many possibilities for altering their income profile. By adjusting their initial consumption, workers can also achieve a higher standard of living later in their lives. Abstaining from getting an education does not necessarily equal drawing the financial short straw.

REFERENCES

Barth, E. (2005). Den samfunnsmessige avkastning av utdanning. ss. 168-188.

Becker, G. S. (1964). *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education.* The University of Chicago Press, Third Edition.

Bjørnstad, R., Fredriksen, D., Gjelsvik, M. L., & Stølen, N. M. (2008). *Tilbud og etterspørsel etter arbeidskraft etter utdanning, 1986-2025.* Statistics Norway.

Finans Norge. (2015). *Markedsandeler.* Retrieved from Finans Norge: https://www.finansnorge.no/statistikk/bank

Finansdepartementet. (1999, December 22). *Behandling av diskonteringsrente, risiko, kalkulasjonspriser og skattekostnad i samfunnsøkonomiske analyser*. Retrieved from Regjeringen: https://www.regjeringen.no/globalassets/upload/fin/vedlegg/okstyring/rundskriv/arlige/1999/r_14_1999.pdf

Forbrukerrådet. (2016). *Bankinnskud*. Retrieved from Finansportalen, April 22, 2016: https://www.finansportalen.no/plassere-penger/bankinnskudd/

ForecastChart. (2015, April). *Dow Industrial Average Stock Market Historical Graph*. Retrieved from ForecastChart: http://www.forecast-chart.com/historical-dow-industrial.html

Forvaltningsdatabasen. (2016). *Statens lånekasse for utdanning*. Retrieved from Forvaltningsdatabasen: http://www.nsd.uib.no/polsys/data/forvaltning/enhet/21688/aarsmelding

Kirkebøen, L. J. (2010). *Forskjeller i livsløpsinntekt mellom utdanningsgrupper.* Statistisk Sentralbyrå.

Lunde, E. S., Thorsen, L. R., & Barstad, A. (2012, December 14). *Studenters levekår: Mange jobber ved siden av studiene*. Retrieved from Statistisk Sentralbyrå: https://www.ssb.no/sosiale-forhold-og-kriminalitet/artikler-og-publikasjoner/mange-jobber-ved-siden-av-studiene

Lånekassen. (2016). *Lånekassen i 2015.* Retrieved from Lånekassen: https://www.lanekassen.no/Global/Arsrapporter/LK_a%CC%8Arsrapport_2015_web.pdf

Mincer, J. A. (1974). *Schooling, Experience and Earnings.* New York: Colombia University Press.

Moen, E. R., & Semmingsen, L. (1996). *Utdanning og livsløpsinntekt.* Oslo: Stiftelsen for samfunns- og næringslivsforskning.

Morgan Stanley Capital International. (2016). *Index Tools*. Retrieved from MSCI, May 3, 2016: https://www.msci.com/index-tools#TOTALRET

Raaum, O., Aabø, T. E., & Karterud, T. (1999). *Utdanning og Livsinntekt i Norge.* Oslo: Frischsenteret.

Riis, C., & Moen, E. R. (2011). Sparing eller forbruk? In C. Riis, & E. R. Moen, *Moderne Mikroøkonomi* (pp. 103-107). Oslo: Gyldendal Norsk Forlag AS 2011.

Schwert, G. W. (1989, December). Why Does Stock Market Volatility Change Over Time? *The Journal of Finance*, pp. 1115–1153.

Skatteetaten. (2014). *Hvordan blir skatten for 2015.* Skatteetaten.

Statistics Norway. (2015a, December 14). *Leiemarkedsundersøkelsen 2015*. Retrieved from Statistisk Sentralbyrå 2015: https://www.ssb.no/lmu

Statistics Norway. (2015c, May 4). *Studenter ved universiteter og høgskoler*. Retrieved from Statistisk Sentralbyrå: http://ssb.no/utuvh/

Statistics Norway. (2016a, April 14). *Studenter ved universiteter og høgskoler*. Retrieved from Statistisk Sentralbyrå: https://ssb.no/utdanning/statistikker/utuvh

Statistics Norway. (2016b, March 3). *Lønn, alle ansatte, 2015*. Retrieved from Statistisk Sentralbyrå: https://www.ssb.no/arbeid-og-lonn/statistikker/lonnansatt/aar/2016-03-03#content

Statistics Norway. (2016b, May 13). *Renter i banker og kredittforetak*. Retrieved from Statistisk Sentralbyrå: https://www.ssb.no/statistikkbanken/selecttable/hovedtabellHjem.asp?KortNavnWeb=renter&CMSSubjectArea=bank-og-finansmarked&checked=true

APPENDICES

Appendix 1: Reflection Paper

The main theme of my thesis was the financial opportunities of a person without higher education, which could also be seen as the opportunity cost of higher education. It was explored by simulating investments for a person without higher education, who lives on a student budget for five years after high school. The results showed that by making good investment choices in the initial years, a person without higher education can get substantial returns that could be considered in the same realm as the returns to education.

Internationalization

In today's globalized world, it is easier than ever before to get work and education abroad. For the universities and colleges, this means more competition. Not only do people weigh the pros and cons of education in their own country – they also compare the education in their own country to education, and jobs, in different countries. Not too long ago, one could hear about highly educated people from Sweden coming to Norway for work where no higher education was required, such as waiters or storage workers. This means that the educational institutions need to make sure that they always bring value – compared to the opportunities in today's globalized world. One thing I have learned throughout my education is that people tend to invest in whatever gives the best return.

Innovation

There have been made incredible advances in technology in the last 100 years, and it has affected our society in a major way. The internet has only been a part of people's lives for 20-30 years, and has already changed our society greatly. It has facilitated two things that offer threats to educational institutions. The first is entrepreneurship. It has become easier to find alternate sources of income through the Internet, e.g. through blogs, online sales, YouTube channels, etc. There are people making more money on filming themselves playing video games, and posting it on YouTube, than they ever could as an employed consultant, engineer, surgeon etc. Educational institutions could possibly look into integrating internet entrepreneurship into their courses, and need to make sure they bring value other than attractiveness for employers.

The other phenomena that offers a threat to traditional educational institutions, is access to information. 50 years ago there was not really an alternative to education if you wanted to learn about microeconomics. Today, you google microeconomics, and you get 9,180,000 results in 0.49 seconds. There is free information everywhere, as well as paid online courses. Educational institutions need to make sure they bring value that the internet does not bring.

Responsibility

In Norway, colleges and universities are mainly funded by the government. I believe part of the funding is based on how many students are able to attend, and pass their courses. This offers some ethical challenges in that the institutions get less funding when failing students and/or limit the number of students they allow to get in. The college or university should make sure that they have systemic processes in place to prevent actions that compromises the integrity of the institution.