



Student fees and recruitment to higher  
education:  
Parents' income, education, and the choice  
between private and public higher  
education in Norway.

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# ABSTRACT

This paper examines the influence of parental characteristics, specifically income and education, on the likelihood of a student attending a private institution such as BI Norwegian Business School. The analysis begins by identifying the factors that are relevant in the decision-making process for choosing a university, and it explores the impact of tuition fees on this decision. The primary focus of the study is to understand the influence of parents' education on their income and subsequently how parents' income affects the likelihood of attending BI. This relationship is established using a simple Linear Probability Model with Education Fixed Effects, as well as a Logit Regression Model to validate the results.

The study reveals a positive impact of parents' education on their income, with a more pronounced effect on fathers compared to mothers. On average, fathers tend to have higher levels of education and income. When examining the influence of parents' income on the probability of attending BI, it is once again found a positive relationship, with a stronger effect for fathers (3.1%) compared to mothers (0.9%) according to the LPM. Lastly, the thesis compares bachelor's students with master's students and finds that the latter group tends to have parents with higher levels of education and higher earnings in comparison to bachelor's students.

**Keywords:** Education, Private Education, Tuition Fees, Parental Effects, University

**Title:** Student fees and recruitment to higher education: Parents' income, education, and the choice between private and public higher education in Norway.

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# ABSTRATO

Esta tese examina a influência das características parentais, especificamente o rendimento e a educação, na probabilidade de um estudante frequentar uma instituição privada, como a BI Norwegian Business School. A análise começa por identificar os fatores relevantes no processo de tomada de decisão para a escolha de uma universidade e explora o impacto de propinas nessa decisão. O foco principal do estudo é compreender a influência da educação dos pais no seu rendimento e, posteriormente, como o rendimento dos pais afeta a probabilidade de frequentar a BI. Esta relação é estabelecida utilizando um modelo simples de probabilidade linear com efeitos fixos de educação, bem como um modelo de regressão logística para validar os resultados.

O estudo revela um impacto positivo da educação dos pais no seu rendimento, com um efeito mais pronunciado em pais em comparação com mães. Em média, os pais tendem a ter níveis mais elevados de educação e de rendimento. Ao examinar a influência do rendimento dos pais na probabilidade de frequentar a BI, constata-se mais uma vez que há uma relação positiva, com um efeito mais forte para os pais (3,1%) em comparação com as mães (0,9%), de acordo com o MPL. Por fim, a tese compara estudantes de licenciatura com estudantes de mestrado e constata que este último grupo tende a ter pais com níveis mais elevados de educação e maiores rendimentos.

**Palavras-chave:** Educação, Ensino Privado, Propinas, Efeitos Parentais, Universidade

**Título:** Taxas estudantis e recrutamento para o ensino superior: Rendimento dos pais, educação e a escolha entre ensino superior privado e público na Noruega.

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## 1. Introduction

Access to education and student fees is a very debated subject worldwide. What is the most effective way to subsidize education, particularly higher education? Should tuition fees be eliminated? How does this impact wealth distribution in the long run?

This topic holds great relevance in today's economic landscape as governments strive to comprehend the returns on investment in higher education and how such policies influence wealth distribution and equality.

Scandinavia is renowned for its providing of free tuition in high-quality public universities, which raises the question: If Norwegian students can obtain a quality education for free why do they choose to attend a private university like BI Norwegian Business School and how does the student's wealth motivate this choice?

Therefore, the research question for this study is: Are high school graduates coming from higher socio-economic strata more likely to enrol in BI's programs rather than in comparable programs offered by the state institutions?

To carry out this analysis, data from BI students who attended between 2003 and 2018 was gathered. The information includes the year they started and finished their studies, as well as the specific program they pursued. As well as, data from Statistics Norway, which provided details about the students' parents, including their educational background and annual income from 1999 to 2018. These variables will serve as the primary focus of the study. Furthermore, additional characteristics to serve as control variables were retrieved, such as the average secondary school grades achieved by the students and the number of siblings they have.

The empirical analysis starts by providing descriptive statistics to depict the sample, comparing both BI and non-BI students. Subsequently, it becomes crucial to establish whether there exists a correlation between higher education and higher income. To achieve this, a simple Linear Probability Model is employed for the analysis. The results of the model indicate a positive relationship between education and income for both parents, with the strength of this relationship increasing with each level of education. Specifically, for fathers, the education level with the greatest impact on income is level 7 (equivalent to a master's degree), while for mothers, it is level 8 (equivalent to a doctorate degree). In general, fathers' education has a more noticeable impact on their income compared to mothers.

Following this, it is utilized a Linear Probability Model with Education Fixed Effects to examine whether having parents with a higher income enhances the likelihood of a student enrolling at BI Norwegian Business School. The results of this model reveal a positive association, with a stronger effect observed for fathers than for mothers (3.1% compared to 0.9%).

To ensure the reliability and validity of our findings, it is also employed a Logistic Regression. By analysing the marginal effects, a consistent positive relationship is found, once again demonstrating a stronger impact for fathers compared to mothers (3.2% compared to 1.1%).

Lastly, this thesis aims to investigate whether there are notable distinctions among students at BI based on their level of education. To accomplish this, descriptive statistics are conducted to analyse the disparities between bachelor and master students. The results indicate that, on average, master students have parents with higher levels of education and higher incomes compared to bachelor students. Additionally, master students exhibit higher average grades in secondary school. By employing logistic regression, we can affirm the existence of this relationship, as all coefficients are positive and statistically significant.

The thesis is structured as follows. Chapter 2 details some previous studies on higher education and on how family's characteristics influence the choice of the type of higher education. Chapter 3 gives a definition of the sample and variables of interest followed by descriptive statistics in Chapter 4. Chapter 5 introduces the methodology utilized and Chapter 6 presents the main results of the parent's characteristics, education, and income on whether the student attends BI. Chapter 7 conducts robustness checks concluding in Chapter 8.

## **2. Literature Review**

Economics of education has been a very researched field in the last decades. Education has been proven to improve an individual's economic opportunities in their adult life (Mincer 1958), as well as some positive externalities as an improvement in nations' wealth and growth through progress in health, crime and vote turnout, (Lleras-Muney 2005) "The relationship between education and adult mortality in the United

States” and Milligan Moretti and Oreopoulos’s (2003) “Does education improve citizenship? Evidence from the United States and the United Kingdom”.

What is the right amount of education and when should we invest in this formation are some questions that emerged when economist first shed light on this topic. (Ben-Porath 1967) gave us some answers to these questions by creating the Ben-Porath model, where individuals will invest in education until their marginal costs equal their marginal gains, leading to the conclusion that there is an incentive to invest early as then each individual has more time to collect the returns to their investment.

Economics of education does not only study what are the effects of an educated population, but it also focuses on what leads each individual to choose different educational attainments and how their innate abilities and characteristics influence these choices.

Choosing the right university is something that every student endures and choosing a certain institution in detriment of another may have significant effects on the returns to education in the long run. To study the effects of generational wealth and parent’s education on the choice between public and private education we also need to acknowledge other factors that may influence the student’s decision.

(Coleman 1988) discusses the connection between social capital and educational attainment. He analyses multiple family characteristics and their influence in high school dropouts. One of the family characteristics Coleman focuses on is the number of siblings as a lack of social capital. The author argues that the number of siblings represents a dilution of the parent’s attention to the child as well as monetary resources. Using this view, we could argue that the number of siblings could have an impact on attending BI as having a high number of siblings would limit the resources each child has available.

Another deciding factor in this choice is the returns to higher education that students face, not only in earning but also in social returns that may vary with the choice of institution. Although there have been many studies on the returns to higher education, few have studied how the student’s background influences the choice between public and private higher education, which makes this research even more relevant.

Some authors have studied how family income has an impact on higher education, (Kinsler and Pavan, 2011) studied the relationship between family income and the quality of higher education in the United States and they found that family income has a strong impact on the quality of education, in a country where higher quality education is associated with higher tuition fees, they also found that over time this relationship has

been declining for high-ability individuals due to an increase in aid provided at these institutions.

Using the same data as (Kinsler and Pavan, 2011) of NLSY97, (Lovenheim and Reynolds, 2012) analyse how housing wealth affects college choice and they found that an increase in housing wealth would increase the likelihood of enrolling in a flagship university and would also decrease community college attendance, as also proven in the previous study, (Lovenheim and Reynolds, 2012) also found that the housing price change had a direct impact on the quality measures of the institutions that the post-secondary students attend.

To isolate the effect of student's wealth, an analysis of the impact tuition fees have on the choice of the higher education institution must be conducted. Although, this is not exclusive since there are other costs associated for some students, such as dislocation costs. (Dwenger et al., 2011) study the effects of tuition fees on the mobility of university applicants in Germany using a natural experiment. The authors take advantage of the fact that some German states have introduced tuition fees to see what happens to the student's choices, do they continue to choose an in-state university and pay more, or do they reallocate to a state with no tuition fees? Using a differences-in-differences approach the authors find out that *"applicants from fee states have a significantly lower probability of applying for a university in their home state once tuition fees have been introduced."* And they also find that students with higher grades have higher probability of staying in their state even with tuition fees.

On another study, (Sá 2014) studies the effect of tuition in university applications and acceptances in the UK and what she discovers is that an increase in tuition reduced applications by 30,3%. This is a very important result for this study as well, since we can understand that fees are indeed a big factor when enrolling in higher education. It is also important to note that although it is relevant the eminence can differ significantly between countries due to differences in aid and the magnitude of the fees.

It has been examined the influence of some factors in the choice of university but does attending a private quality university increase returns when compared to attending a public one? In a study conducted in 1996 by Dominics J. Brewer, the author investigates the presence of a significant premium associated with attending an elite private institution in the United States. The findings reveal a substantial premium linked to attending an elite private institution, surpassing the advantages conferred by lower-ranked private universities and even elite public institutions.

This research has generated some really interesting results and can be very valuable when doing this analysis in Norwegian data. Therefore, to understand more of the reasons behind this choice we need to understand the context of higher education students in Norway, what attending a private university implies on the student's financial strain and the accessibility to grants and loans.

## **2.1. Norwegian Context to Higher Education**

Norway offers multiple types of aid to their students. Beyond each university's own scholarships, Norway also provides grants and loans through Lånekassen, The Norwegian State Educational Loan Fund organized under the Ministry of Education and Research. Under this system all Norwegian students are eligible to receive financial support through student loans. A percentage of this loan can be converted into a grant if the student lives away from home, complete their educational programme and have income and assets below the limits. The system is very similar for both bachelor and master students.

This fund makes possible for all Norwegian students to attend the university of their choice, either public or private without having to be in financial strain during their studies.

It could be argued that although these loans don't provoke financial strain during their studies students could be worried about difficulties in payment later on in their life. (Opheim 2007) gives us a closer look to what the impact of student loan is on future households. The impact of student loans can be a very important factor in the decision of enrolling at a private institution. The author analyses two nationwide interview-based surveys on the financial position of Norwegian households where he can compare households with and without student loan repayments and their burden to repay these loans. The author concludes that the burden felt by households is not equal and it affect specially households without a higher education degree and higher loans do not mean higher burden of repayment, because higher loans tend to be related to higher levels of education that have higher returns in the future and lower probability to being unemployed.

These results could encourage us to claim that in the case of BI students the benefits of taking a student loan would surpass the possibilities of future burden, but it is also important to note that students from different economic backgrounds can react differently to the risk associated. (Callender and Jackson, 2008) study the relationship between debt aversion of students and their decision on to whether enrol or not in higher education

using survey data from the UK. They conclude that students from lower classes are more debt adverse and have a lower probability of enrolling in higher education even when controlling for other factors as career goals and family support.

Government provided student loans do not necessarily mean that every student has the same opportunity to private education and therefore there is still a relevant interest in understanding the true impact of parent's wealth and education on their child's decision between private and public education.

## **2.2. BI Tuition and Costs**

Attending BI Norwegian Business School can be a significant financial commitment for Norwegian students and their families.

For a Bachelor's degree, the tuition fee at BI Norwegian Business School is 94,800 NOK annually. This amount represents approximately 8.8% of the average combined income of a student with two working parents, which is 1,074,908 NOK annually.

For a Master's degree, the tuition fees can vary depending on the program. They range from 114,200 NOK to 123,000 NOK annually. If the applicant has completed a minimum of 120 credits at BI, the tuition fees are reduced for programs without an international component, ranging from 98,400 NOK to 123,000 NOK annually.

On average, choosing BI Norwegian Business School for a Master's degree represents around 10.6% to 11.4% of the average parents' annual income. This indicates that the cost of attending a Master's program at BI is relatively higher compared to a Bachelor's program.

It's worth noting that BI Norwegian Business School offers scholarships for different applicants and programs, which can cover the full tuition for the duration of the program. These scholarships are awarded based on the student's previous academic performance and can be renewed if the student maintains the required academic standards set by the university. Scholarships can significantly alleviate the financial burden of tuition fees for eligible students.

For this study, it was not possible to differ which students were awarded a scholarship and which students paid full tuition. However, the number of allocations for these scholarships is limited and it is not considered that these observations will have a significant impact on the overall sample of BI students (4,764 students).

### 3. Data Collection and Variables

In this analysis, I will utilize data from Statistics Norway and BI Norwegian Business School to examine observable time series data. The microdata obtained from Statistics Norway pertains to Norwegian individuals and provides information on their parents' economic situation and educational attainment. This data includes yearly income categorization spanning the period from 1999 to 2018. To assess the economic circumstances of each student at the time of their enrolment in higher education, I have created a new variable that aggregates the mean value of each parent income for the five years preceding the student's graduation from secondary school (SS) education. Therefore, our sample will only contain students that have commenced their studies in 2003 until 2018. To ease interpretation, the income variables were transformed into categorical variables represented by levels 1 to 5. Each parent's income level was assigned based on their respective personal income tax bracket.<sup>1</sup>

Additionally, I have retrieved other variables that will be valuable for controlling the analysis. These variables include the average secondary school grade, number of siblings, and number of academic points achieved. The focus of our analysis will be solely on business students. To identify business students, I will consider any student who has accumulated more than 120 business points, as this represents the minimum number of credits required to obtain a master's degree (compared to 180 business points for a bachelor's degree).

The dataset from BI provides clear information that allows the identification of enrolled individuals, determination of the program they are pursuing, ascertain the year they started and completed their studies, and track the number of points they have achieved at BI. This data enables the establishment of connections between these students and their parents' data, as well as their personal information.

After organising our dataset and cleaning the data there is a total of 17,360 observations, identified by students who finished secondary school from 2003 and 2018.

The variables can be defined as such:

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<sup>1</sup> Each income level is measured according to their personal income tax bracket as of March 2023. Level 1 comprehends all the individuals with income lower than 279,150 annually. Level 2 comprehends individuals with income higher than 279,150 and lower than 644,700 annually. Level 3 comprehends individuals with income higher than 644,700 and lower than 969,200 annually. Level 4 comprehends individuals with income higher than 969,200 and lower than 2,000,000 annually. Level 5 comprehends all the individuals with income higher than 2,000,000 annually.

*Father's Income:* Mean variable of father's income for the five years prior to the student's graduation year from secondary school, in Norwegian kroner.

*Father's Income Level:* Categorical variable that measures each father's income level according to their personal income tax bracket.

*Mother's Income:* Mean variable of mother's income for the five years prior to the student's graduation year from secondary school, in Norwegian kroner.

*Mother's Income Level:* Categorical variable that measures each mother's income level according to their personal income tax bracket.

*Father's Educational Level:* Categorical variable that measure the father's education attainment through levels 1-8.<sup>2</sup>

*Mother's Educational Level:* Categorical variable that measure the mother's education attainment through levels 1-8.

*Average Secondary School (SS) Grade:* Student's secondary school graduation grade, on a scale of 10-60.

*First Year with a SS Diploma:* Student's graduation year from secondary school.

*First Year with a University Diploma:* Student's graduation year from university.

*BI Program:* Level of education the student is acquiring at BI. Corresponds to 0 if the student is pursuing a bachelor's degree and 1 if the student is pursuing a master's degree.

*BI Student:* Dummy variable corresponding to 1 if the student has studied at BI Norwegian Business School and 0 otherwise.

#### **4. Descriptive statistics**

Examining the dataset, from the 17,360 observations of business students, approximately 27.4% (4,764 students) attended BI Norwegian Business School.

Table 1 presents summary statistics for the variables of interest, distinguishing between BI students and non-BI students. These statistics provide an understanding of the differences in characteristics between the two groups.

When analysing the average annual income of fathers for the five years prior to the student's graduation from secondary school (Income Level), it is observable that students

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<sup>2</sup> Educational attainment levels can be defined by Statistics Norway as: Primary education, level 1, Lower secondary education, level 2, Upper secondary education, level 3, post-secondary vocational education, level 4 and 5, Bachelor's degree, level 6, Master's degree, level 7, and Doctorate education, level 8.

attending BI have a 4.97% higher average father's income compared to non-BI students. Conversely, the average annual income of mothers for the same period is 4.66% lower for students attending BI. Both BI and non-BI students exhibit a significant disparity between the incomes of their fathers and mothers. Non-BI students have a father's income that is 76.8% higher than the mother's income, while BI students have a father's income that is 51.36% higher than the mother's income.

Regarding the educational level of parents, a notable observation is that fathers tend to possess a higher level of education in comparison to mothers. Non-BI students exhibit a higher educational attainment for both parents, in contrast to BI students.

Upon comparing the statistics of our control variables, Average SS Grade, Number of Siblings and , it is observed that non-BI students generally exhibit higher values when compared to BI students, although the differences are quite marginal.

Overall, these findings shed light on the distinctive characteristics between BI students and non-BI students, specifically in terms of parental income and educational level.

**Table 1: Summary Statistics**

	Non-BI Students			BI Students		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Father's Income	12596	683315.93	564892.22	4764	719030.08	706488.38
Father's Income Level	12596	2.477	.926	4764	2.52	.964
Mother's Income	12438	386507.27	262756.77	4701	369313.73	261666.6
Mother's Income Level	12596	1.858	.768	4764	1.813	.774
Father's Educational Level	12546	4.885	1.609	4746	4.854	1.638
Mother's Educational Level	12499	4.787	1.576	4744	4.66	1.595
Average SS Grade	12596	44.612	6.476	4764	42.29	5.64
Year with SS Diploma	12596	2010.946	3.204	4764	2009.807	2.601
Year with a University Diploma	12596	2015.597	3.119	4764	2014.526	2.606
Number of Siblings	12596	1.663	1.157	4764	1.572	.982
BI Program	0			4764	.183	.387

**Note:** Statistics based on the sample containing data on Norwegian business students and their parents characteristics composed by 17,360 observations collected between 1999-2018. Each income level is measured according to their personal income tax bracket. Level 1 comprehends all the individuals with income lower than 279,150 annually. Level 2 comprehends individuals with income higher than 279,150 and lower than 644,700 annually. Level 3 comprehends individuals with income higher than 644,700 and lower than 969,200 annually. Level 4 comprehends individuals with income higher than 969,200 and lower than 2,000,000 annually. Level 5 comprehends all the individuals with income higher than 2,000,000 annually. All monetary values expressed in Norwegian Kroner. Educational attainment levels can be defined by Statistics Norway as: Primary education, level 1, Lower secondary education, level 2, Upper secondary education, level 3, post-secondary vocational education, level 4 and 5, Bachelor's degree, level 6, Master's degree, level 7, and Doctorate education, level 8. Average Secondary School grading follows a scale of 10 to 60 points. BI Program distinguishes the level of education attained by the student at BI where 0 corresponds to a bachelor's degree and 1 corresponds to a master's degree. Data Source: *Statistics Norway* and *BI Norwegian Business School*.

## 4.1. Parents' Income Level

In Table 2, a detailed examination of the income level distribution is provided. It is apparent that income levels for both BI and non-BI students, as well as for both parents, are primarily concentrated around level 2. Each level is categorized according to the individuals' tax bracket of personal earnings, where 1 is the lowest level and 5 is the highest level.

Based on the statistics, we can conclude that there are no significant differences between the parents of BI and non-BI students in terms of income levels. However, a notable distinction emerges when comparing mothers and fathers. Mothers tend to have a greater concentration in income levels 1 and 2 (corresponding to an annual income lower than 279,150 for level 1 and annual income comprehended between 279,150 and 644,700 NOK for level 2), with 89.14% for non-BI students and 89.95% for BI students, whereas fathers exhibit a higher concentration in income levels 2 and 3 (corresponding to an annual income comprised between 279,150 and 644,700 for level 2 and annual income comprehended between 644,700 and 969,200 for level 3) with 74.38% for non-BI students and 72.15% for BI students.

**Table 2: Summary Statistics: Parents' Income Level**

	Mother's Income Level				Father's Income Level			
	Non-BI		BI		Non-BI		BI	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
1	3856	30.61	1623	34.07	1205	9.57	477	10.01
2	7372	58.53	2662	55.88	6503	51.63	2330	48.91
3	864	6.86	299	6.28	2866	22.75	1107	23.24
4	314	2.49	105	2.20	1721	13.66	704	14.78
5	190	1.51	75	1.57	301	2.39	146	3.06
Total	12596	100.00	4764	100.00	12596	100.00	4764	100.00

**Note:** Statistics based on the sample containing data on Norwegian business students and their parents characteristics composed by 17,201 observations collected between 1999-2018. Each income level is measured according to their personal income tax bracket. Level 1 comprehends all the individuals with income lower than 279,150 annually. Level 2 comprehends individuals with income higher than 279,150 and lower than 644,700 annually. Level 3 comprehends individuals with income higher than 644,700 and lower than 969,200 annually. Level 4 comprehends individuals with income higher than 969,200 and lower than 2,000,000 annually. Level 5 comprehends all the individuals with income higher than 2,000,000 annually. All monetary values expressed in Norwegian Kroner. Data Source: *Statistics Norway* and *BI Norwegian Business School*.

## 4.2. Parents' Educational Level

The disparity in income distribution between genders seen in Table 1 can be attributed to various factors, including career choices, work hours, years of experience in the labour market, and education.

Table 1 provides an overview of the mean educational level for both mothers and fathers, indicating some similarity between the two. However, a more detailed examination of the distribution of educational levels for fathers and mothers can be found in Table 3. This table offers a clearer perspective on how educational levels are distributed among parents for both BI and non-BI students.

Both parents tend to concentrate predominantly on level 6 of education, corresponding to a bachelor's degree level of education. Nevertheless, when it comes to pursuing a master's degree or higher (level 7 and 8), fathers have a higher percentage compared to mothers, 15.7% compared to 7.4%, respectfully, of all observations. When comparing BI students and non-BI, it is not found a relevant difference in the father's educational level (0.47% higher for non-BI fathers) but there is a slight increase in the three upper educational levels for mothers' of non-BI students compared to the mothers' of BI Students (3.74% higher for non-BI mothers).

This information suggests that there are discrepancies in the educational attainment between fathers and mothers, which could contribute to the observed income differences between genders. The relationship between education and income as well as differences between genders will be will be studied in more detail in Section 6.1..

**Table 3: Summary Statistics: Parents' Educational Level**

	Mother's educational level				Father's educational level			
	Non-BI		BI		Non-BI		BI	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
0	37	.30	17	.36	25	.20	9	.19
1	51	.41	26	.55	23	.18	21	.44
2	1374	10.99	598	12.61	1224	9.76	495	10.43
3	1218	9.74	488	10.29	1069	8.52	430	9.06
4	3049	24.39	1194	25.17	3533	28.16	1272	26.80
5	488	3.90	214	4.51	710	5.66	286	6.03
6	5316	42.53	1892	39.88	3991	31.81	1478	31.14
7	885	7.08	296	6.24	1783	14.21	690	14.54
8	81	.65	19	.40	188	1.50	65	1.37
Total	12499	100.00	4744	100.00	12546	100.00	4746	100.00

**Note:** Statistics based on the sample containing data on Norwegian business students and their parents characteristics composed by 17,201 observations collected between 1999-2018. Educational attainment levels can be defined by Statistics Norway as: Primary education, level 1, Lower secondary education, level 2, Upper secondary education, level 3, post-secondary vocational education, level 4 and 5, Bachelor's degree, level 6, Master's degree, level 7, and Doctorate education, level 8. Data Source: *Statistics Norway* and *BI Norwegian Business School*.

## 5. Econometric Model Estimation

After finishing secondary school education, a student has multiple post-secondary choices, such as vocational education, a three-year university degree or participating in the labour force, for example. In this study, only students that pursue a degree in higher education are considered, either a bachelor's degree or a master's degree in the business field. When deciding the higher education institution to apply to, each student has in consideration multiple aspects. These may be similar to the majority of students applying such as the quality of the education and labour force outcomes or more specific characteristics such as the campus distance to the student's home and the financial strain of tuition fees. This thesis studies how some of these individual characteristics affect the likelihood of a student attending BI compared to a different institution.

$$y_i = \begin{cases} 1 & \text{if the student attended BI,} \\ 0 & \text{if the student attended a different institution.} \end{cases}$$

This thesis focuses on the relationship between parents' education and income to evaluate how much of an impact these factors have on the student's choice, controlling for other individual factors that also influence this decision such as:

- Academic performance in secondary school, students with a stronger secondary school performance are more likely to be receivers of university given scholarships which leads to a lower sensitivity to tuition fees.
- Number of siblings, resource dilution within the family can prevent a student of having the possibility of enduring tuition costs.

In theory, considering that the dependent variable yields binary outcomes, an Ordinary Least Squares (OLS) model may not be ideal since it does not account for the discrete nature of our variable. A Linear Probability Model (LPM) can be utilized, but it can be argued that this linear model might produce values outside the range of interest,  $R_i \in [0; 1]$ , and these values would lack meaningful interpretation. There are other models available that could better suit this analysis, such as Linear Index Models, Logit and Probit. In this study, we will proceed with a deeper analysis of both an LPM estimation with Education Fixed Effect and a Logit estimation. The reason for this is because although a logit estimation would be more appropriate theoretically, in practice both models give similar significant estimations when compared (See Chapter 8) which is the main focus of this analysis.

### 5.1. Linear Probability Model

In this analysis, a Linear Probability Model (LPM) with Education Fixed Effects is employed to consider individual and time-specific effects that remain constant within the sample. The inclusion of education fixed effects enables the control of heterogeneity that may influence the dependent variable. By accounting for such effects, it is possible to better isolate and understand the impact of parents' income on the probability of being a BI Student.

Our Linear Probability Function with FE can be expressed as,

$$P(y = 1 | X) = \alpha + \beta_1 FI + \beta_2 MI + \beta_3 AG + \beta_4 NS + \gamma E + \varepsilon$$

Where  $\alpha$  is the constant,  $FI$  denotes Father Income,  $MI$  denotes Mother Income,  $AG$  stands for Average Secondary School Grade,  $NS$  stands for number of siblings and  $E$  represents the Education Fixed Effects.

## **6. Main Results**

This chapter examines the findings derived from the Linear Probability Model (LPM) and Logit Regression to determine the nature of the relationship between parental characteristics and the likelihood of a student attending BI Norwegian Business School. The primary objective is to assess whether having parents with higher levels of education and income increases the probability of a student enrolling in BI, which serves as the central research question of the thesis. Furthermore, an analysis will be conducted to assess any significant differences in the background of bachelor students and master students.

### **6.1. Impact of Education on Parents' Income Level**

Previous literature, such as the work by Mincer in 1958, has demonstrated that education plays a significant role in determining future earnings and may contribute to the observed income differences. Therefore, it is very relevant to assess if that is the case in the sample. Does education play a big role in income differences? And which level of education is it more beneficial for future earnings. Tables 4 and 5 provide the output of the linear regression model, incorporating education fixed effects, to assess the impact of obtaining an additional education level on the income levels of each parent.

**Table 4: Impact of Education on Fathers' Income Level**

Father's Income Level	Coef.	St. Err.	t-value	p-value	Sig
Father's Education					
1	-.009	.138	-0.07	.946	
2	.558	.113	4.94	0	***
3	.626	.113	5.53	0	***
4	.847	.112	7.55	0	***
5	1.044	.115	9.10	0	***
6	1.245	.112	11.08	0	***
7	1.604	.113	14.16	0	***
8	1.543	.124	12.44	0	***
Constant	1.441	.112	12.92	0	***
Mean dependent var	2.492	SD dependent var			0.935
R-squared	0.132	Number of obs			17292
F-test	351.285	Prob > F			0.000
Akaike crit. (AIC)	44332.637	Bayesian crit. (BIC)			44402.459

**Note:** This Table provides regression results of a simple Linear Regression of the father's education on his income level. Statistics based on the sample containing data on Norwegian business students and their parents characteristics composed by 17,292 observations collected between 1999-2018. Each income level is measured according to their personal income tax bracket. Level 1 comprehends all the individuals with income lower than 279,150 annually. Level 2 comprehends individuals with income higher than 279,150 and lower than 644,700 annually. Level 3 comprehends individuals with income higher than 644,700 and lower than 969,200 annually. Level 4 comprehends individuals with income higher than 969,200 and lower than 2,000,000 annually. Level 5 comprehends all the individuals with income higher than 2,000,000 annually. All monetary values expressed in Norwegian Kroner. Educational attainment levels can be defined by Statistics Norway as: Primary education, level 1, Lower secondary education, level 2, Upper secondary education, level 3, post-secondary vocational education, level 4 and 5, Bachelor's degree, level 6, Master's degree, level 7, and Doctorate education, level 8. Data Source: *Statistics Norway*. \*\*\* designates a variable significant at the 1% significance level, \*\* significant at the 5% significance level, and \* significant at the 10% significance level.

Based on both regression output, it appears that there is an overall positive relationship between the level of education attained by parents and their income levels, the impact of obtaining higher levels of education have a growing effect on income, indicating that the return on income increases with each level of education.

Table 4 displays the regression results for fathers, revealing notable patterns. It is observed that the average income level for individuals with no education is 1.441. As we progress through higher levels of father's education, the impact on the base level of income becomes more pronounced. The highest income level is observed at level 7 of education, corresponding to a master's degree, with an average income level of 3.045.

This level comprehends individuals with income higher than 644,700 and lower than 969,200 annually.

**Table 5: Impact of Education on Mothers' Income Level**

Mother's Income Level	Coef.	St. Err.	t-value	p-value	Sig
Mother's Education					
1	-.044	.102	-0.43	.665	
2	.387	.08	4.83	0	***
3	.468	.081	5.80	0	***
4	.482	.079	6.12	0	***
5	.472	.081	5.81	0	***
6	.599	.079	7.60	0	***
7	.77	.08	9.61	0	***
8	.852	.095	8.99	0	***
Constant	1.294	.078	16.56	0	***
Mean dependent var	1.846	SD dependent var			0.768
R-squared	0.026	Number of obs			17292
F-test	61.558	Prob > F			0.000
Akaike crit. (AIC)	39519.326	Bayesian crit. (BIC)			39589.148

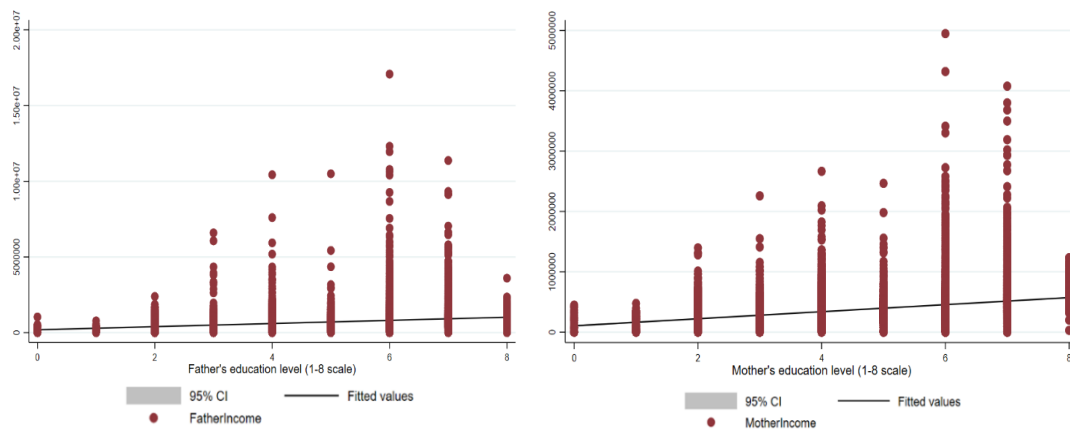
**Note:** This Table provides regression results of a simple Linear Regression of the mother's education on hers income level. Statistics based on the sample containing data on Norwegian business students and their parents characteristics composed by 17,292 observations collected between 1999-2018. Each income level is measured according to their personal income tax bracket. Level 1 comprehends all the individuals with income lower than 279,150 annually. Level 2 comprehends individuals with income higher than 279,150 and lower than 644,700 annually. Level 3 comprehends individuals with income higher than 644,700 and lower than 969,200 annually. Level 4 comprehends individuals with income higher than 969,200 and lower than 2,000,000 annually. Level 5 comprehends all the individuals with income higher than 2,000,000 annually. All monetary values expressed in Norwegian Kroner. Educational attainment levels can be defined by Statistics Norway as: Primary education, level 1, Lower secondary education, level 2, Upper secondary education, level 3, post-secondary vocational education, level 4 and 5, Bachelor's degree, level 6, Master's degree, level 7, and Doctorate education, level 8. Data Source: *Statistics Norway*. \*\*\* designates a variable significant at the 1% significance level, \*\* significant at the 5% significance level, and \* significant at the 10% significance level.

Table 5 presents the regression results for mothers, where an identical pattern is exhibit. The average income level for individuals with no education is 1.294. As we progress through higher levels of father's education, the impact on the base level of income becomes more pronounced although with a lower magnitude than for fathers. The highest income level is observed at level 8 of education, corresponding to a doctorate

education, with an average income level of 2.146. This level comprehends individuals with income higher than 279,150 and lower than 644,700 annually.

When comparing the influence of education on income of both fathers and mothers, it becomes apparent that fathers consistently attain a higher income level for each level of education. Furthermore, obtaining an additional level of education has a more notable impact on fathers compared to mothers.

**Figure 1: Impact of Parental Education on Income**



**Note:** This figure illustrates the distribution of income through the different education levels for both parents where each point corresponds to an observation in the sample of 17,292 observations collected between 1999-2018. A fitted line is added to measure the relationship. It is important to note that Father's Income is measured in a scale from 0 to 20,000,000 Norwegian kroner while Mother's Income is measured in a scale of 0 to 5,000,000 Norwegian kroner. Data Source: *Statistics Norway*.

Figure 1 illustrates the distribution of income through the different education levels for both parents. In this representation raw income is used instead of income level to better understand the relationship between education and income. From the figure it is possible to note how fathers' income tends to be higher than the mothers' income for the same levels of education.

Based on these findings, we are able to partially explain the income disparities between parents based on their education. However, it is important to note that a significant portion of these differences are due to unobserved factors within the sample such as innate ability, professional experience, hours worked, and career field.

## **6.2. Parents' Education and Income Level on Probability of Student Attending BI: Linear Probability Model**

This section presents the main results for the research question: do high school graduates coming from higher socio-economic strata are more likely to enrol in BI's programs rather than in comparable programs offered by the state institutions. To assess the student's socio-economic background, an analysis of the impact parents' income on the probability of attending BI Norwegian Business School will be conducted.

To achieve this, a Linear Probability Model is employed, with fixed effects applied to educational attainment. Controls for the average Secondary School graduation grade, the first year with a secondary school diploma, and the number of siblings are included.

The findings presented in Table 6 reveal that, for both parents, an increase in income level exhibits a positive trend in the probability of the student attending BI. For each additional level of the fathers' education, there is a 3.1% increase in the probability of the student attending BI. While, for each additional level of the mothers' education, the probability of the student attending BI increases by 0.9%.

**Table 6: Parents' Educational and Income Level on Student Attending BI, Linear Regression Model with Education Fixed Effects**

BI Student	Coef.	St. Err.	t-value	p-value	Sig
<i>(A) Key Variables</i>					
Father's Income Level	.031	.004	8.05	0	***
Mother's Income Level	.009	.005	1.87	.062	*
<i>(B) Control Variables</i>					
Average SS Grade	-.012	.001	-22.52	0	***
Year with SS Diploma	-.025	.001	-22.34	0	***
Number of Siblings	-.015	.003	-4.92	0	***
Constant	51.592	2.273	22.69	0	***
Education FE			YES		
Mean dependent var	0.275	SD dependent var			0.446
R-squared	0.059	Number of obs			17201
F-test	51.418	Prob > F			0.000
Akaike crit. (AIC)	20062.353	Bayesian crit. (BIC)			20232.913

**Note:** This Table presents the regression output from the LPM regression with Education fixed effects from our sample of 17,201 observations collected between 1999-2018. Robust standard errors are utilized in this regression. Education Fixed Effects are added to control for heterogeneity in education in our individuals. The dependent variable, BI Student, indicates whether the student has been enrolled at BI Norwegian Business School. The main independent variable of the study is Parents' Income Level. Each income level is measured according to their personal income tax bracket. Level 1 comprehends all the individuals with income lower than 279,150 annually. Level 2 comprehends individuals with income higher than 279,150 and lower than 644,700 annually. Level 3 comprehends individuals with income higher than 644,700 and lower than 969,200 annually. Level 4 comprehends individuals with income higher than 969,200 and lower than 2,000,000 annually. Level 5 comprehends all the individuals with income higher than 2,000,000 annually. Average Secondary School grading follows a scale of 10 to 60 points. Data Source: *Statistics Norway and BI Norwegian Business School.* \*\*\* designates a variable significant at the 1% significance level, \*\* significant at the 5% significance level, and \* significant at the 10% significance level.

Upon examining the control variables, it is observed that all of them have a negative influence on the probability of a student attending BI. Specifically, a one-unit increase in the average graduation grade from secondary school leads to a 1.2% decrease in the probability of being a BI student, holding everything else constant. This finding aligns with the observable data from our sample, where non-BI students exhibited higher average secondary school grades (44.612) compared to BI students (42.29). A one unit increase in the first year with a secondary school diploma will decrease the probability of being a BI student by 2.5%, holding everything else constant. Increasing the number of siblings by one will decrease the probability of being a BI student by 1.5%, holding everything else constant. This result is consistent with the existent literature on resource distribution in families with multiple children (Coleman 1988).

### 6.3. Logistic Regression Model and Marginal Effects

In this Section, the Logistic Regression Model with odds ratios will be considered. The regression coefficients can be interpreted as the change in odds of attending BI with a one-unit increase in the independent variables. If the coefficient is greater than 1, it indicates that an increase in the independent variable raises the odds of attending BI. In opposition, if the coefficient is less than 1, it suggests that an increase in the independent variable decreases the odds of attending BI. It's important to note that the odds ratio ( $\theta$ ) coefficient allows us to assess the direction of change but does not provide a precise quantification of the magnitude. The regression output is presented in Table 10 in Appendix I. To easily analyse and quantify this change, marginal effects will be considered, presented in the Table 7.

**Table 7: Estimation Results of Logistic Regression (Marginal Effects)**

	dy/dx	Delta-method std.	t-value	p-value	Sig
<i>(A) Key Variables</i>					
Father's Income Level	.032	.004	8.420	.000	***
Mother's Income Level	.011	.005	2.250	.024	**
Father's Educational Level	-.002	.002	-.980	.325	
Mother's Educational Level	-.007	.002	-3.090	.002	***
<i>(B) Control Variables</i>					
Average SS Grade	-.011	.001	-20.270	.000	***
Year with a SS Diploma	-.024	.001	-21.680	.000	***
Number of Siblings	-.013	.003	-6.770	.000	***
Number of Observations		17201	Model VCE		OIM

**Note:** This Table displays the marginal effects from the logistic regression of parents' educational and income level on the likelihood of the student attend BI from our sample of 17,201 observations collected between 1999-2018. The dependent variable, BI Student, indicates whether the student has been enrolled at BI Norwegian Business School. The main independent variable of the study is Parents' Income Level. Each income level is measured according to their personal income tax bracket. Level 1 comprehends all the individuals with income lower than 279,150 annually. Level 2 comprehends individuals with income higher than 279,150 and lower than 644,700 annually. Level 3 comprehends individuals with income higher than 644,700 and lower than 969,200 annually. Level 4 comprehends individuals with income higher than 969,200 and lower than 2,000,000 annually. Level 5 comprehends all the individuals with income higher than 2,000,000 annually. Average Secondary School grading follows a scale of 10 to 60 points. Data Source: *Statistics Norway and BI Norwegian Business School*. \*\*\* designates a variable significant at the 1% significance level, \*\* significant at the 5% significance level, and \* significant at the 10% significance level.

Interpretation of marginal effects follows:

For both parents, income level positively influences the likelihood of attending BI, as indicated by the positive marginal effects. However, the impact is more significant for fathers than for mothers. Increasing the father's income level by one unit results in an average increase of 3.2% in the probability of attending BI, after accounting for the influence of other variables on the probability of being a BI student. In contrast, analysing the marginal effects for mothers reveals an average increase of 1.1% in the probability of being a BI student, after controlling for the impact of other variables.

Attending BI is negatively affected by an increase in the average secondary school graduation grade, as indicated by the negative marginal effect. A one-unit increase in the average grade results in an average decrease of 1.1% in the probability of attending BI, after accounting for the influence of other variables on the probability of being a BI student.

The educational level of both parents has a negative impact on attending BI, as indicated by the negative marginal effect. The impact is relatively low for both fathers and mothers, with the effect being even lower for mothers. When considering the marginal effects of these variables, a one-unit increase in the fathers education level results in an average decrease of 0.7% in the probability of attending BI, after accounting for the influence of other variables on the probability of being a BI student. On the other hand, analysing the marginal effects for mothers reveals an average decrease of 0.2% in the probability of being a BI student, after controlling for the impact of other variables.

Attending BI is negatively influenced by an increase in the graduation year from secondary school, as indicated by the negative marginal effect. A one-unit increase in the secondary school graduation year results in an average decrease of 2.4% in the probability of attending BI, after accounting for the impact of other variables on the probability of being a BI student.

An increase in the number of siblings for the student has a detrimental effect on attending BI, as evident from the negative marginal effect. When analysing the marginal

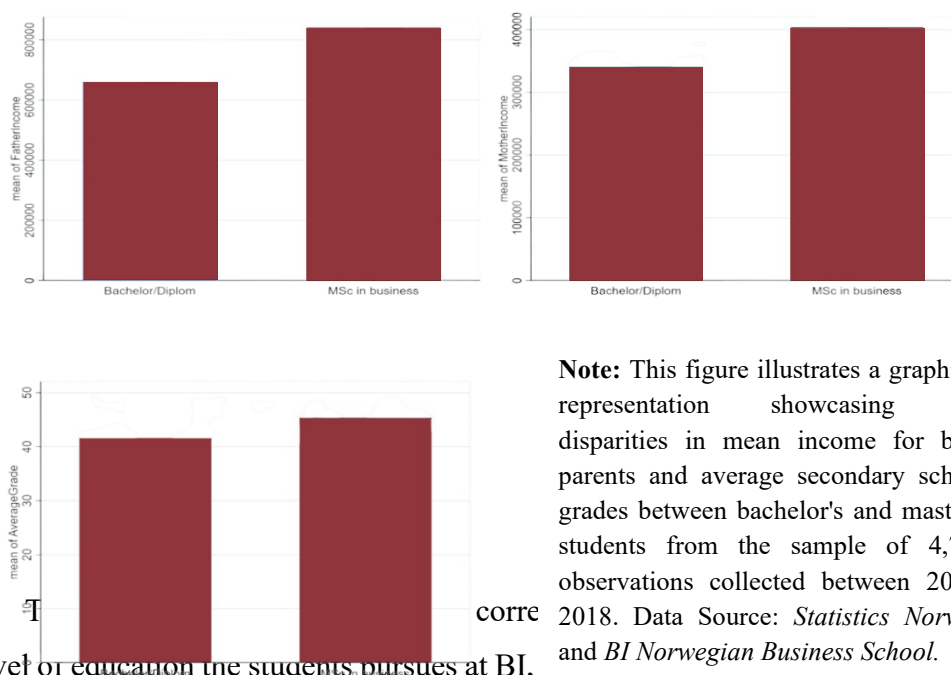
effects, it is observed that a one-unit increase in the number of siblings leads to an average decrease of 1.3% in the probability of attending BI, after controlling for the impact of other variables on the probability of being a BI student.

### 6.3. Effects on Bachelor’s Students and Master’s Students

An interesting approach to add to this study is to examine the influence of parental characteristics on the educational attainment levels of students at BI Norwegian Business School. Among the 4,764 students in the sample, about approximately 81.72% are pursuing a bachelor's degree, equivalent to 3,893 students, while 18.28% are enrolled in the master in business program, equivalent to 871 students. The BI Program variable is characterized as equal to 0 for bachelor's students and 1 for master's students.

Within the sample, master's students, on average, tend to have parents with higher incomes and achieve higher secondary school grade averages compared to bachelor's students. A graphical representation of the effects of parents’ income and average SS grade can be found in Figure 2.

**Figure 2: Parents' Income and Average SS Grade Differences Between Bachelor’s and Master’s Students**



**Note:** This figure illustrates a graphical representation showcasing the disparities in mean income for both parents and average secondary school grades between bachelor's and master's students from the sample of 4,726 observations collected between 2003-2018. Data Source: *Statistics Norway* and the *BI Norwegian Business School*.

corrected, and the level of education the students pursue at BI,

as presented in Table 11 in Appendix II. The marginal effects derived from this model are presented in Table 8.

**Table 8: Marginal Effects – Bachelor’s vs. Master’s Student**

	dy/dx	St.Err.	t-value	p-value	Sig
<i>(A) Key Variables</i>					
Father’s Income Level	.014	.006	2.440	.003	***
Mother’s Income Level	.015	.007	2.120	.001	***
Father’s Educational Level	.020	.004	5.330	.013	**
Mother’s Educational Level	.013	.004	3.220	.005	***
<i>(B) Control Variable</i>					
Average SS Grade	.019	.001	18.240	.017	**
Number of Observations	4,726		Model VCE		OIM

**Note:** This Table displays the marginal effects from the logistic regression of parents’ educational and income level on the likelihood of the student pursuing a master’s degree from our sample of 4,726 observations collected between 2003-2018. The dependent variable, BI Program, indicates whether the student is a Bachelor’s (0) or Master’s student (1). The main independent variable of the study is Parents’ Income Level. Each income level is measured according to their personal income tax bracket. Level 1 comprehends all the individuals with income lower than 279,150 annually. Level 2 comprehends individuals with income higher than 279,150 and lower than 644,700 annually. Level 3 comprehends individuals with income higher than 644,700 and lower than 969,200 annually. Level 4 comprehends individuals with income higher than 969,200 and lower than 2,000,000 annually. Level 5 comprehends all the individuals with income higher than 2,000,000 annually. Average Secondary School grading follows a scale of 10 to 60 points. Data Source: *Statistics Norway and BI Norwegian Business School*. \*\*\* designates a variable significant at the 1% significance level, \*\* significant at the 5% significance level, and \* significant at the 10% significance level.

All variables exhibit a positive impact on our dependent variable, indicating that having parents with higher education and income enhances the likelihood of the student being a master’s student. By increasing the father’s income level by one will increase the likelihood of being a master’s student by 1.4%, after controlling for the impact of other variables. Increasing the mother’s income level by one has a similar effect of 1.5%. When considering education, the father’s educational level has a stronger effect than the mother’s educational level by 0.7%. Increasing the father’s educational level by one will increase the likelihood of being a master’s student by 2% compared to 1.3% for mothers. When considering the average SS grade, a one unit increase will lead to an increase of 1.9% in the likelihood of being a master’s student.

This perspective is highly motivating in terms of comprehending the composition of BI students and their backgrounds. It presents encouraging results that deserve further investigation into the reasons for these relationships. This is particularly significant considering that the government's financial aid follows similar approaches for both bachelor's and master's education.

## **7. Robustness Check**

This Chapter performs some robustness checks on our initial model to assure the validity of the results. For this, a Linear Probability, Logit and Probit Model were conducted and compared. A Probit Regression Model was elaborated and the regression output and its respectively marginal effects are present in Table 12 and 13 in Appendix III.

Table 9 displays the estimations derived from all three computed models. The regression outputs consistently align with the observable data within the sample. The Linear Probability Regression Model demonstrates relatively lower effects of the key variables on the student's attendance at BI, while the Logit Model exhibits higher effects on the dependent variable. In the linear probability model (LPM), a one-unit increase in the Father's Income Level is associated with a 3.1% increase in the probability of being a BI student. However, when considering the Logit and Probit estimations, the increase in the likelihood is higher at 18.2% and 10.5%, respectively. For the Mother's Income Level estimation, the LPM indicates a 0.9% increase in probability, whereas the Logit and Probit estimates show a larger increase in the likelihood of 6% and 3.5%, respectively. All three models yield estimates that are statistically significant.

To evaluate the goodness of fit for each model, we can compare their AIC scores. The lower AIC suggests that the model provides a better trade-off between goodness of fit and model complexity, indicating a better fit to the data. The three models exhibit fairly similar results, with the Probit model being the best fit for our data, as showed in Table 9. Although, it provides the best fit, its assumptions and estimation might be harder to interpret when comparing with a Linear Probability Model.

**Table 9: Model Comparison: LPM, Logit and Probit Estimates of the Likelihood of Attending BI**

Dependent Variable: BI Student			
Independent Variable	LPM (OLS)	LOGIT (LME)	PROBIT (LME)
<i>(A) Key Variables</i>			
Father's Income Level	.031 (.004)	.182 (.025)	.105 (.012)
Mother's Income Level	.009 (-.005)	.060 (.026)	.035 (.015)
Father's Educational Level		-.010 (.012)	-.006 (.007)
Mother's Educational Level		-.039 (.012)	-.024 (.007)
<i>(B) Control Variables</i>			
Average SS Grade	-.012 (.001)	-.056 (.003)	-.034 (.002)
First year with a SS Diploma	-.025 (.001)	-.128 (.005)	-.077 (.004)
Number of Siblings	-.015 (.003)	-.084 (.016)	-.049 (.01)
Constant	51.592 (2.273)	258.131 (5.05)	156.563 (7.35)
Number of Observations	17201	17201	17201
Mean dependent var	.275	.275	.274
Pseudo R-squared	0.059	0.051	0.050
Akaike crit. (AIC)	20062.353	19542.725	19236.478

**Note:** This table shows the estimations for our main variables in three different models to access their differences. The dependent variable, BI Student, indicates whether the student has been enrolled at BI Norwegian Business School from a sample of 17,201 Norwegian business students from 1999-2018. The main independent variables of study are Parents' Income Level and Educational Level. Each income level is measured according to their personal income tax bracket. Level 1 comprehends all the individuals with income lower than 279,150 annually. Level 2 comprehends individuals with income higher than 279,150 and lower than 644,700 annually. Level 3 comprehends individuals with income higher than 644,700 and lower than 969,200 annually. Level 4 comprehends individuals with income higher than 969,200 and lower than 2,000,000 annually. Level 5 comprehends all the individuals with income higher than 2,000,000 annually. Educational attainment levels can be defined by Statistics Norway as: Primary education, level 1, Lower secondary education, level 2, Upper secondary education, level 3, post-secondary vocational education, level 4 and 5, Bachelor's degree, level 6, Master's degree, level 7, and Doctorate education, level 8. Average Secondary School grading follows a scale of 10 to 60 points. Data Source: *Statistics Norway and BI Norwegian Business School*. \*\*\* designates a variable significant at the 1% significance level, \*\* significant at the 5% significance level, and \* significant at the 10% significance level.

## 8. Conclusion

This thesis aims to provide insight into the background of BI students and examine whether their parents' characteristics influence their decision to attend a public or private institution. In Norway, the higher education system is supported by a financial aid system called Lånekassen, which offers grants and loans to all Norwegian students. This system allows Norwegian students to attend BI without facing as much financial strain as students from other countries, making it possible for individuals from lower socio-economic backgrounds to access the same education.

To determine if high school graduates from higher socio-economic backgrounds are more likely to enrol in BI programs compared to similar programs offered by state institutions, this study starts by analysing the impact of parents' education on their future income. The findings reveal a positive relationship between parents' education and income, with fathers exhibiting a stronger association than mothers. Fathers also tend to have higher levels of education and income overall. Subsequently, a simple Linear Probability Regression Model with Education Fixed Effects is employed to generate the main findings. The analysis shows that a one-unit increase in the Father's Income Level increases the probability of being a BI student by 3.1%, while a one-unit increase in the Mother's Income Level increases the probability by 0.9%. Additionally, a Logistic Regression Model is employed to validate the results, and similar relationships are observed.

In addition to the above, this thesis investigates potential differences between bachelor's and master's students. The research reveals that, on average, master's students have parents with higher education and higher income compared to bachelor's students. When conducting a logistic regression analysis, positive marginal effects are observed for both parents' education and income.

Overall, this thesis provides valuable insights into the influence of parents' characteristics on the decision of BI students to attend a public or private institution and explores potential distinctions between bachelor's and master's students.

## 9. Limitations and Further Research

It is important to note that some constraints can always occur when using a linear probability model. On one hand, A LPM model assumes a linear relationship and this assumption may not hold, potentially leading to biased or inconsistent estimates. On the other hand, we also have to account for the existence of missing variables. This analysis works with a relative small number of variables. The linear probability model (LPM) relies on the assumption that all relevant independent variables are accounted for in the analysis. Failing to include important variables in the model can lead to biased estimates and omitted variable bias. Working with microdata comes with certain limitations. Microdata, being a subset of a larger population, can potentially result in a misrepresentation of the overall population, thereby impacting the generalizability of the findings. Additionally, working with microdata often involves a limited set of variables, which, as mentioned earlier, can affect the accuracy of our estimates if the available variables are not the most appropriate for the analysis.

The subjects of education and the determining factors behind choosing higher education are highly captivating areas that can originate fascinating research. In order to enhance this study, it would be intriguing to explore the potential impact of the distance between a student's hometown and the university campus on their decision-making process when selecting a university. To investigate this aspect, it would be valuable to utilize the microdata available in the dataset, which includes information on the student's municipality of residence.

Additionally, it could be of interest to examine how business cycles and recessions influence admissions to private universities and whether education is affected by these economic fluctuations. Analysing this factor can provide valuable insights into the relationship between economic conditions and the educational sector.

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## **11. Appendix**

### **11.1. Appendix I**

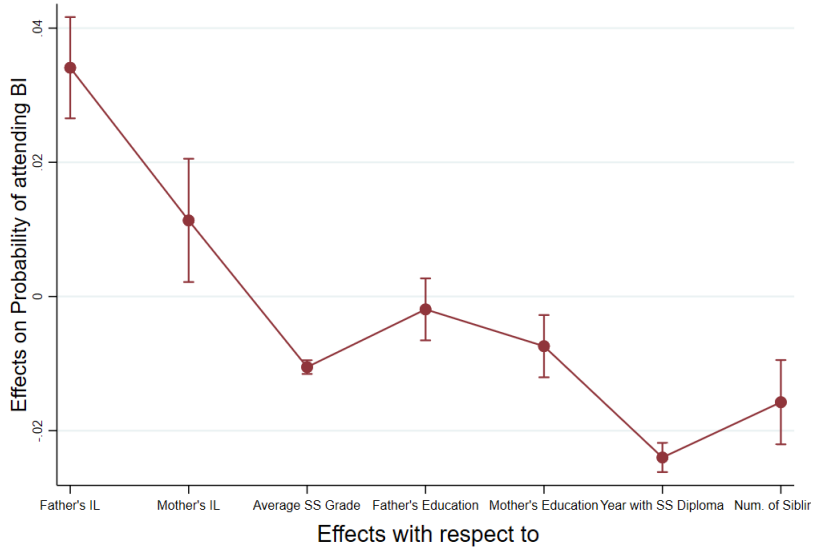
This appendix shows the logistic regression output, which demonstrates the impact of key variables on the likelihood of a student attending BI as seen in Table 10. The variables representing both parents' income levels exhibit a positive effect on the likelihood of being a BI student, as indicated by odds ratios greater than one. Contrarily, the variables representing both parents' educational levels have a negative effect on the likelihood of being a BI student, with odds ratios lower than one. Furthermore, upon examining the control variables, it is possible to note that they also employ a negative influence on the likelihood of being a BI student. Graphical representation of these marginal effects is present in Figure 3.

**Table 10: Logistic Regression with Odds Ratio on the Likelihood of Attending BI**

BI Student	Odds Ratio	St. Err.	t-value	p-value	Sig
<i>(A) Key Variables</i>					
Father's Income Level	1.189	.025	8.37	0	***
Mother's Income Level	1.058	.026	2.25	.024	**
Father's Educational Level	.988	.012	-0.98	.325	
Mother's Educational Level	.962	.012	-3.09	.002	***
<i>(B) Control Variables</i>					
Average SS Grade	.945	.003	-19.54	0	***
First year with a SS Diploma	.88	.005	-20.82	0	***
Number of Siblings	.931	.016	-4.18	0	***
Constant	4.09e+12	5.05e+13	20.97	0	***
Mean dependent var		0.275	SD dependent var		0.446
Pseudo r-squared		0.051	Number of obs		17201
Chi-square		1029.852	Prob > chi2		0.000
Akaike crit. (AIC)		19542.725	Bayesian crit. (BIC)		19602.384

**Note:** Constant estimates baseline odds. Robust standard errors are utilized in this regression. The dependent variable, BI Student, indicates whether the student has been enrolled at BI Norwegian Business School from a sample of 17,201 Norwegian business students from 1999-2018. The main independent variables of study are Parents' Income Level and Educational Level. Each income level is measured according to their personal income tax bracket. Level 1 comprehends all the individuals with income lower than 279,150 annually. Level 2 comprehends individuals with income higher than 279,150 and lower than 644,700 annually. Level 3 comprehends individuals with income higher than 644,700 and lower than 969,200 annually. Level 4 comprehends individuals with income higher than 969,200 and lower than 2,000,000 annually. Level 5 comprehends all the individuals with income higher than 2,000,000 annually. Educational attainment levels can be defined by Statistics Norway as: Primary education, level 1, Lower secondary education, level 2, Upper secondary education, level 3, post-secondary vocational education, level 4 and 5, Bachelor's degree, level 6, Master's degree, level 7, and Doctorate education, level 8. Average Secondary School grading follows a scale of 10 to 60 points. Data Source: *Statistics Norway and BI Norwegian Business School*. \*\*\* designates a variable significant at the 1% significance level, \*\* significant at the 5% significance level, and \* significant at the 10% significance level.

**Figure 3: Marginal Effects of Logistic Regression**



**Note:** This figure displays the effect from the Logistic Regression Model of each of the main variables on the likelihood of attending BI from the sample of 17,201 observations collected between 1999-2018. Each point corresponds to each marginal effect and a 95% confidence interval is displayed. Data Source: *Statistics Norway* and *BI Norwegian Business School*.

## 11.2. Appendix II

This appendix shows the logistic regression output of the key variables on the level of education attained by the student in Table 11. It is evident that all variables have positive effects on acquiring a master's degree, when BI Program equals 1, as all odds ratios are higher than one.

**Table 11: Logistic Regression Output on BI Program**

BI Program	Odds Ratio	St. Err.	t-value	p-value	Sig
<i>(A) Key Variables</i>					
Father's Income Level	1.11	.047	2.43	.015	**
Mother's Income Level	1.117	.058	2.12	.034	**
Father's Educational Level	1.165	.034	5.29	0	***
Mother's Educational Level	1.099	.032	3.21	.001	***
<i>(B) Control Variables</i>					
Average SS Grade	1.149	.009	16.95	0	***
Constant	0	0	-22.54	0	***
Mean dependent var	0.182	SD dependent var			0.386
Pseudo r-squared	0.103	Number of obs			4726
Chi-square	462.804	Prob > chi2			0.000
Akaike crit. (AIC)	4038.955	Bayesian crit. (BIC)			4077.720

**Note:** Constant estimates baseline odds. Robust standard errors are utilized in this regression. The dependent variable, BI Program, indicates whether the student is a bachelor or master student, from a sample of 4,726 BI students from 2003-2018. The main independent variables of study are Parents' Income Level and Educational Level. Each income level is measured according to their personal income tax bracket. Level 1 comprehends all the individuals with income lower than 279,150 annually. Level 2 comprehends individuals with income higher than 279,150 and lower than 644,700 annually. Level 3 comprehends individuals with income higher than 644,700 and lower than 969,200 annually. Level 4 comprehends individuals with income higher than 969,200 and lower than 2,000,000 annually. Level 5 comprehends all the individuals with income higher than 2,000,000 annually. Educational attainment levels can be defined by Statistics Norway as: Primary education, level 1, Lower secondary education, level 2, Upper secondary education, level 3, post-secondary vocational education, level 4 and 5, Bachelor's degree, level 6, Master's degree, level 7, and Doctorate education, level 8. Average Secondary School grading follows a scale of 10 to 60 points. Data Source: *Statistics Norway and BI Norwegian Business School*. \*\*\* designates a variable significant at the 1% significance level, \*\* significant at the 5% significance level, and \* significant at the 10% significance level.

### 11.3. Appendix III

This appendix shows the probit output and the marginal effects in Table 12 and 13 respectively, which demonstrates the impact of key variables on the likelihood of a student attending BI. The variables representing both parents' income levels exhibit a positive effect on the likelihood of being a BI student, as indicated by the positive coefficient of the marginal effects. Contrarily, the variables representing both parents' educational levels have a negative effect on the likelihood of being a BI student, with negative marginal effects.

Furthermore, upon examining the control variables, it is possible to note that they also employ a negative influence on the likelihood of being a BI student. Graphical representation of these marginal effects is presented in Figure 4.

**Table 12: Probit Regression Output on BI Student**

BI Student	Coef.	St. Err.	t-value	p-value	Sig
<i>(A) Key Variables</i>					
Father's Income Level	.105	.012	8.62	0	***
Mother's Income Level	.035	.015	2.36	.018	**
Father's Educational Level	-.006	.007	-0.87	.382	
Mother's Educational Level	-.024	.007	-3.15	.002	***
<i>(B) Control Variables</i>					
Average SS Grade	-.034	.002	-19.98	0	***
Year with SS Diploma	-.077	.004	-21.17	0	***
Number of siblings	-.049	.01	-4.91	0	***
Constant	156.563	7.35	21.30	0	***
Mean dependent var	0.275	SD dependent var			0.446
Pseudo r-squared	0.050	Number of obs			17201
Chi-square	1005.411	Prob > chi2			0.000
Akaike crit. (AIC)	19236.478	Bayesian crit. (BIC)			19298.500

**Note:** Robust standard errors are utilized in this regression. The dependent variable, BI Student, indicates whether the student has been enrolled at BI Norwegian Business School from a sample of 17,201 Norwegian business students from 1999-2018. The main independent variables of study are Parents' Income Level and Educational Level. Each income level is measured according to their personal income tax bracket. Level 1 comprehends all the individuals with income lower than 279,150 annually. Level 2 comprehends individuals with income higher than 279,150 and lower than 644,700 annually. Level 3 comprehends individuals with income higher than 644,700 and lower than 969,200

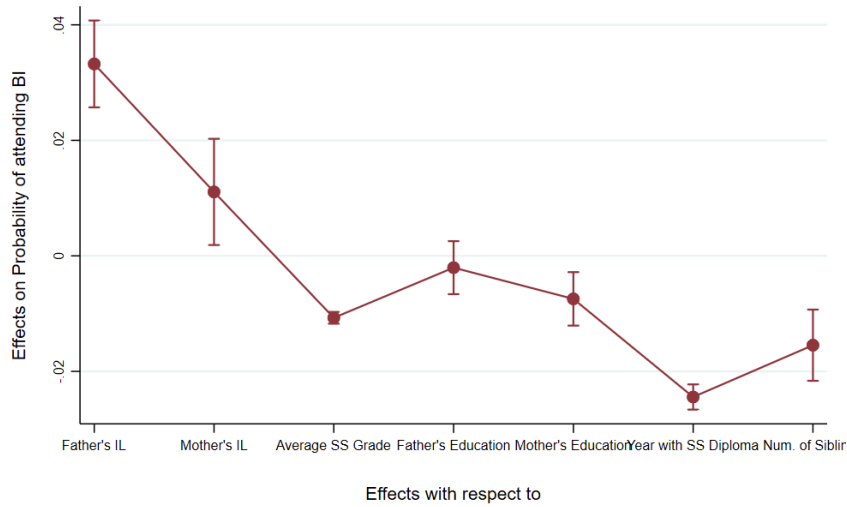
annually. Level 4 comprehends individuals with income higher than 969,200 and lower than 2,000,000 annually. Level 5 comprehends all the individuals with income higher than 2,000,000 annually. Educational attainment levels can be defined by Statistics Norway as: Primary education, level 1, Lower secondary education, level 2, Upper secondary education, level 3, post-secondary vocational education, level 4 and 5, Bachelor's degree, level 6, Master's degree, level 7, and Doctorate education, level 8. Average Secondary School grading follows a scale of 10 to 60 points. Data Source: *Statistics Norway and BI Norwegian Business School*. \*\*\* designates a variable significant at the 1% significance level, \*\* significant at the 5% significance level, and \* significant at the 10% significance level.

**Table 13: Marginal Effects of Probit Regression**

	dy/dx	std. err	t-value	p-value	Sig
<i>(A) Key Variables</i>					
Father's Income Level	0.033	0.004	8.660	0.000	***
Mother's Income Level	0.011	0.005	2.360	0.018	*
Father's Educational Level	-0.002	0.002	-0.870	0.382	
Mother's Educational Level	-0.007	0.002	-3.150	0.002	***
<i>(B) Control Variables</i>					
Average SS Grade	-0.011	0.001	-20.650	0.000	***
Year with SS Diploma	-0.024	0.001	-21.960	0.000	***
Number of Siblings	-0.015	0.003	-4.920	0.000	***
Number of Observations		17,201	Model VCE		OIM

**Note:** This Table displays the marginal effects from the logistic regression of parents' educational and income level on the likelihood of the student attending BI from our sample of 17,201 observations collected between 1999-2018. Data Source: *Statistics Norway and BI Norwegian Business School*. \*\*\* designates a variable significant at the 1% significance level, \*\* significant at the 5% significance level, and \* significant at the 10% significance level.

**Figure 4: Marginal Effects of Probit Regression**



**Note:** This figure displays the effect from the probit model of each of the main variables on the likelihood of attending BI from the sample of 17,201 observations collected between 1999-2018. Each point corresponds to each marginal effect and a 95% confidence interval is displayed. Data Source: *Statistics Norway* and *BI Norwegian Business School*.