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The Effect of the Dutch Student Loan System on Students' Reported Effort, Motivation and Satisfaction

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Master's thesis

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Abstract

This thesis will analyze the effect of the *2015 reform,* which restructured the Dutch student financial aid structure, on students' reported effort, motivation, and satisfaction. From September 2015 onwards, new Dutch students were not automatically eligible for a so-called *basic grant.* Instead, these students were now only able to loan this money. Prior research has shown how this has increased parental contributions to students and lowered student expenditure (Broeders, Been & Knoef, 2020). But since criticism in Dutch society rose due to unfulfilled promises of extra investments into the higher education system and reports stating that students are experiencing more stress due to stricter finances (NOS, 2019; ISO, 2019), it also seems appropriate to research if this reform affected students' effort and motivation and satisfaction.

The findings of this study are mainly in line with our expectations. This study finds that the *2015 reform* positively affects reported effort and motivation. We also find a decrease in reported satisfaction, but this result is not statistically significant. The coefficients of the effects are small, and therefore there are no major effects visible on reported effort and motivation.

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1. Introduction

1.1 Motivation and societal relevance

At the start of the academic year of 2015/2016, student financing in the Netherlands went through a reform, which has caused controversy in Dutch society over the past few years. In this thesis, we will call this the *2015 reform*. The so-called *basic grant* was abolished, and the Dutch *student loan system* was introduced (NOS, 2014). In the institutional design section of this thesis, we will detail the specific changes introduced in the *2015 reform*.

The *2015 reform* has been heavily criticized since it promised that the savings caused by the reform would be invested in the higher education system. Still, a report by the NOS (2019) showed that these investments did not happen. But the main criticism comes from a report that shows that students experienced more stress due to their stricter finances caused by the *2015 reform* (ISO, 2019). Support for the *2015 reform* has decreased in the past years to the point that another reform will happen in the academic year of 2023/2024 (Coalitieakkoord, 2021). We will call this the *2023 reform.* Essentially, the *2023 reform* means that the Dutch student finance system will almost revert to the situation before the *2015 reform,* albeit with less financial support for students; the same principles will apply again (Coalitieakkoord, 2021; Parool, 2022).

The Dutch Bureau for Statistics (CBS, 2021) published a report with their findings about Dutch student life since the introduction of the *2015 reform*. According to the CBS (2021), there is no difference in the amount of time students take to graduate from their bachelor's degree. The CBS (2021) also says there are fewer students that, after graduating from their bachelor's degree, directly start their master's degree. Furthermore, a higher percentage of students from lower welfare backgrounds finish their master's degree within the nominal duration (CBS, 2021). But the main criticism on the *2015 reform* comes from the financial perspective. In 2019, for example, CBS (2019) stated that the total amount of student debt in the Netherlands increased by 1.9 billion compared to 2018. CBS (2019) also illustrated how younger students have higher student debts than their peers had before the *2015 reform*.

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Van den Broek, Cuppen, de Korte & Warps (2020) did a policy review of the *2015 reform* commissioned by the Dutch cabinet. Van den Broek et al. (2020) found that the policy effectively reached its goals since there are very few differences between students from different backgrounds in their borrowing behavior and that there are no outstanding new trends in participation in higher education. However, the researchers urged to research if the *2015 reform* has an effect on the parental contributions to students (Van den Broek et al., 2020). Broeders et al (2020) has researched the effect of the *2015 reform* on parental contributions and concluded that there is a strong significant effect. Students studying after the *2015 reform* receive around 62 euros more each month as parental contributions (Broeders et al, 2020).

1.2 Research question and scientific relevance

The Studentenmonitor (n.d.) surveys Dutch students annually about their financial situation, but also about their motivation, satisfaction with their studies, and the effort they put into their studies. Dalhuijsen (2017) and Broeders et al (2020) have researched, respectively, the effect of the *2009 reform* and the *2015 reform* on employment, study results, parental expenditures and student expenditures using the Studentenmonitor (n.d.). Taking in mind that promised investments did not happen (NOS, 2019) and that students experienced more stress (ISO, 2019), it seems appropriate to not only research the effect of the *2015 reform* on students' financial situation but to also look at the effect of the *2015 reform* on their reported effort, motivation and satisfaction. In this way we create a broader understanding of the effect of the *2015 reform* on Dutch students.

Therefore the following research question has been formulated:

> *What is the effect of the introduction of the Dutch student loan system (2015 reform) on Dutch students' reported effort, motivation and satisfaction?*

To answer this research question, we will be using the data provided by the Studentenmonitor (n.d.) between 2011 and 2019. We will propose a difference-in-differences regression model and try to find the effect of the *2015 reform* on motivation, satisfaction and reported effort.

1.3 Rational choice theory

In this thesis we will use the rational choice theory as our main theoretical framework. Rational choice theory states that individuals make choices or behave in a certain way to achieve a self-interested goal (Hindmoor & Taylor, 2017). According to rational choice theory, individuals analyze situations and choose options that will give them the highest utility (Hindmoor & Taylor, 2017).

Due to the *2015 reform* students in the Netherlands are studying under different conditions as before. One of the reasons for the *2015 reform* was that studying should become more of an investment for students, in which students are more responsible for their own finances (Tweede Kamer der Staten-Generaal, 2014). There is now a financial incentive for students to graduate faster and therefore be more motivated and put in more effort. According to rational choice theory, to maximize their utility, students might now put in more effort and be more motivated.

1.4 Reading guide

Chapter two will elaborate on the institutional background to create some context for readers who might not be familiar with the Dutch institutional design of student financing. Chapter three will examine the existing literature on student effort, motivation and satisfaction. We will also identify different types of student financial aid systems and talk about rational choice theory. Lastly, our hypotheses will be presented in this chapter. The fourth chapter will set out the research design used for this thesis and introduce the dataset to the reader. The hypothesis will be tested in chapter five, where the regression results will be examined. In chapter six, we will answer the research question, discuss limitations of the study and provide suggestions for further research.

2. Institutional background

This chapter will provide some institutional background to the Dutch case of student financing. First, a description of the student financing before 2015 will be provided. Next, a description of the changes that the *2015 reform* brought about will be provided. The chapter will be concluded with a brief description of the information available at this time about the *2023 reform.*

2.1 Situation before the *2015 reform*

In the system before the *2015 reform,* student financing consisted of five parts: (1) *basic grant*; (2) *additional grant*; (3) *student travel product*; (4) *study loan* and (5) *tuition fee loan* (DUO, n.d.[a]). If students fail to graduate within ten years, the *basic grant, additional grant* and the value of their *student travel product* are transformed into a *study loan* (DUO, n.d.[a]). Therefore the student will be required to pay this amount back as a *study loan* (DUO, n.d.[a]).

2.1.1 Basic grant

Students following higher education in the Netherlands automatically qualify for the *basic grant* (DUO, n.d.[a]). A student who started studying before the *2015 reform* will still qualify for the basic grant after 2015 (DUO, n.d.[a]). The height of the *basic grant* provided to a student depends on whether they live with their parents or live independently (DUO, n.d.[a]). The *basic grant* in 2022 for students living with their parents, who started their studies before the *2015 reform*, would be €112.25 each month (DUO, n.d.[a]). If the student lives independently, the *basic grant* would provide them €312.52 each month (DUO, n.d.[a]).

2.1.2 Additional grant

The *additional grant* is meant for students whose parents have less financial capacity than an average student (DUO, n.d.[b]). If a student's combined parents' salary is less than €34,586, - each year, the student would qualify for the maximum amount of the *additional grant* (DUO, n.d.[b]). For students living with their parents, the maximum amount of the *additional grant* would amount to €275.86; and for students living independently, this would amount to €299.28 (DUO, n.d.[b]). If a student's combined parents' salary is more than the salary

mentioned above, the student would gradually be provided less money from the *additional grant* (DUO, n.d.[b]).

2.1.3 Student travel product, study loan and tuition fee loan

Dutch students acquire a *student travel product* (DUO, n.d.[c]). Students can choose between traveling freely with all Dutch public transport companies during the week or the weekend (DUO, n.d.[c]). If a student chooses to travel for free during the week, they will also be provided with a 40% discount during the weekend, and vice versa (DUO, n.d.[c]).

Next to the *basic grant,* students can also choose to borrow money (DUO, n.d.[d]). A student who started their study before the *2015 reform* and is still studying in 2022 can borrow a maximum of €620.35 each month, lowered by the *additional grant* they receive (DUO, n.d.[d]). This amount is specifically for students who live independently (DUO, n.d.[d]). For students living with their parents, this will amount to a maximum loan of €596.93 lowered by the *additional grant* they receive (DUO, n.d.[a]). At the latest, students must start paying back their loans two years after graduation and can take up to fifteen years to do so (DUO, n.d.[d]). If one's financial capacity to pay back their loan is relatively low, they will be eligible for a discount (DUO, n.d.[d]).

The *tuition fee loan* qualifies as a *study loan* and is meant for students so they can pay for their tuition (DUO, n.d.[a]). Students can loan 1/12th of their annual tuition fee each month to pay for their tuition. In 2022 this would amount to €184.08 per month (DUO, n.d.[a]).

2.2 *2015 reform*

Essentially, the *2015 reform* means that the *basic grant* has been abolished. Instead, former Minister of Education, Science and Culture Jet Bussemaker introduced the *study advance*, also called the *student loan system* (Staatsblad, 2015). Students can now also loan the amount of money a student living on their own would otherwise have received as a *basic grant* (Staatsblad, 2015)*.* Therefore students in 2022 can loan a maximum of €932.87 each month (Staatsblad, 2015). Instead of paying back their loan within fifteen years, students who started studying after the *2015 reform* can take up to thirty-five years to pay back their loans (Staatsblad, 2015).

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The *additional grant, student travel product* and *tuition fee loan* have stayed the same (Staatsblad, 2015).

2.3 *2023 reform*

The *2015 reform* has been heavily criticized since reports are emerging that students are experiencing more stress due to their financial situation (ISO, 2019). Also, promises by the government to invest the savings of abolishing the *basic grant* into the quality of higher education were not sufficiently fulfilled (NOS, 2019). After the general election in 2021, the new cabinet agreed to bring back the *basic grant* for all students and partially compensate students who have studied under the conditions of the *2015 reform* (Coalitieakkoord, 2021). The current Minister of Education, Science and Culture (2022) has recently proposed a basic grant where students who live on their own would receive a basic grant of €255 and students living with their parents would receive a basic grant of €91 (Parool, 2022).

The *2023 reform* does not fall under the scope of this thesis; however, it does exhibit how the *2015 reform* was not well received and shows the latest developments in study financing in the Netherlands.

3. Literature review

In this chapter, we will investigate the existing literature on student financing. First, we will identify different student financial aid structures. Secondly, we will explain rational choice theory. Next, we will look at the definition of student effort and motivation. We also attempt to find a definition of student satisfaction. Furthermore, we identify other research papers that have been conducted by using the Studentenmonitor (n.d.). This chapter will be concluded with two hypotheses based on the literature review.

3.1 Student financial aid structures

As stated in the introduction, Oosterbeek (1998) mentions two main reasons for government intervention in the student financial aid market: (1) capital market failure and (2) equity considerations. Oosterbeek (1998) and Johnstone (2008) also identify three types of student financial aid structures: (1) mortgage-type loans with income-dependent grants, (2) graduate tax and (3) income-contingent loans.

Mortgage-type student loans carry an annual interest rate of the total amount borrowed and state a repayment period (Johnstone, 2008). Mortgage-type loans supplemented by grants dependent on socio-economic background factors seem to match the two main reasons for government intervention (Oosterbeek, 1998). But, according to Oosterbeek (1998), this is not the case. In these structures, the loan only must be repaid when a graduate's income is higher than a certain threshold, and graduates can usually take 10 – 15 years to repay their loans (Oosterbeek, 1998). A short repayment period like this is usually not suitable, according to Oosterbeek (1998), since student loans should be seen as an investment in a student's human capital, and it usually takes multiple years before this investment is visible in a graduate's salary.

The problem with mortgage loans supplemented by socio-economic dependent grants is that these additional grants are usually dependent on a family's income at the time of enrollment (Oosterbeek, 1998). Oosterbeek (1998) suggests that it would be better if it depended on the lifetime family income, both from work and capital, but this is almost impossible to measure. If possible, Oosterbeek (1998) recognizes the risk that families might decide to save less

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money and spend more for their children to receive higher student grants. They might perceive that receiving a lower amount of student grants is seen as a tax on saving capital (Oosterbeek, 1998).

Another student financial aid structure is the graduate tax: each student receives the same grant, funded by taxes (Oosterbeek, 1998). Graduates pay the tax that funds the grants if their salary is higher than a specific threshold each year (Oosterbeek, 1998). In this structure, students do not go into debt (Oosterbeek, 1998). The amount of money graduates pay after graduation is only impacted by their salary (Johnstone, 2008). This tax is generally paid throughout a graduate's earning lifetime (Johnstone, 2008). Therefore, graduates with higher incomes will pay more towards this tax than graduates with a lower income (Johnstone, 2008). Important criticism by Oosterbeek (1998) is that this might disincentive labor and might also encourage high-ability individuals, who inherently will earn more money, not to study to avoid paying this tax.

According to Oosterbeek (1998), it is an advantage that students from different backgrounds have the same opportunities from the start under the structure of the graduate tax since they receive the same grant. But Oosterbeek (1998) states that this structure only creates this solidarity between students and not between non-students. According to Oosterbeek (1998), this does not create equality since non-students from high-income families still have more opportunities than non-students from low-income families. Therefore opportunities are now only created by choice of education for an individual (Oosterbeek, 1998).

Income-contingent loans are loans for which repayment depends on a graduate's salary (Oosterbeek, 1998; Johnstone, 2008). If a graduate's salary is below a certain threshold, they will not have to repay their loan during those specific years (Oosterbeek, 1998; Johnstone, 2008). If it surpasses the threshold, a graduate will have to pay a certain percentage of their salary until they pay off the entire loan (Johnstone, 2008). According to Oosterbeek (1998), in this structure, repayment of loans is more spread out over a graduate's professional career than it is with the mortgage loan, where the repayment period is set. Another advantage of this structure that Oosterbeek (1998) mentions is that a graduate pays back their loan during

the years that their investment into education pays off: a higher salary. The difference with the graduate tax is that a graduate will never pay more money than their actual loan was (Oosterbeek, 1998). According to Oosterbeek (1998), this is the preferable student financial aid structure if you want to promote efficiency and equity. Jacobs & Van der Ploeg (2006) agree on this and state that "an income-contingent loan scheme provides better incentives than a graduate tax, because it features less insurance" (p. 578).

3.2 Rational choice theory

Hindmoor & Taylor (2017) explain rational choice theory as follows: "(…) rational choice theorists employ an instrumental concept of rationality in which actions are judged as being rational to the extent that they constitute the best way of achieving some given self-interested goal" (p. 2). An important assumption of this rational choice theory is that an individual is completely rational and has access to all the information available (Simon, 1955). With this rationality and access to information, individuals should, according to rational choice theory, make decisions or show behavior that maximizes a individuals' utility (Hindmoor & Taylor, 2017). However, individuals are not entirely rational but can only be rational to a certain extent; we call this bounded rationality (Simon, 1990; Griggs, 2017; Hindmoor & Taylor, 2017). Within theories of bounded rationality cognitive limitations of the individual are taken into account (Simon, 1990).

Jones (1999) comes up with the following equation for a bounded rationality model: B = G + L. In this equation, B stands for observed behavior, G stands for rational goal attainment and L stands for limited rationality (Jones, 1999). In this equation we can see that decision-making amongst individuals consists of three elements. According to Jones (1999), observed behavior (B) is caused by certain rational goals (G) individuals have, but cognitive limitations (L) play a role as well, since individuals cannot be completely rational (Simon, 1990; Jones, 1999; Griggs, 2017; Hindmoor & Taylor, 2017).

Another important element of rational choice theory is the idea of utility curves, also called indifference curves (Hindmoor & Taylor, 2017). The Core Team (2017) explains that an indifference curve gives different combinations of two resources in which the utility for an

individual is the same. An example of an indifference curve is provided in Figure 1. Combinations of goods on the purple line give an individual the same amount of utility (The Core Team, 2017).

Figure 1 (EconGraphs, n.d.)
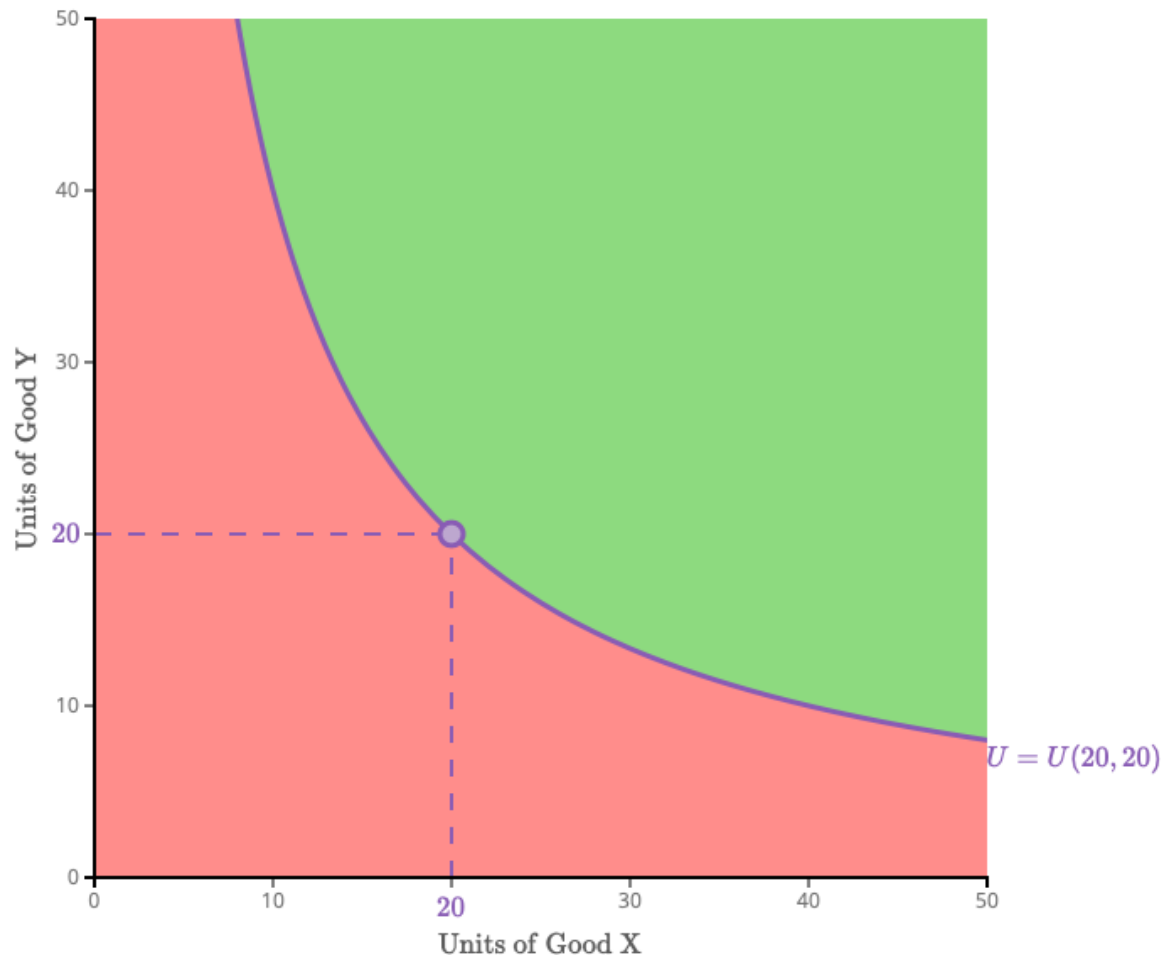
If, for an individual, options on an indifference curve exists that provides more of both goods, it should always give more utility than the previous curve (The Core Team, 2017). If, for an individual, options on an indifference curve exists that provides less of both goods, it should always give less utility than the previous curve (The Core Team, 2017). These areas have been given a red and green color respectively in Figure 1. An individual can choose between a plot of indifference curves that are parallel to each other (Hindmoor & Taylor, 2017). Rational choice theory then states that an individual chooses a combination of goods that is on the indifference curve that yields the most utility (Hindmoor & Taylor, 2017).

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3.3 Student effort and motivation

Natriello & McDill (1986) have looked at determinants of student effort like parents' education, gender, students' expectations and parents' standards. Here, effort was conceptualized as amount of time a student spent on their homework on average each day (Natriello & McDill, 1986). Parents' standards was one of the most significant determinants (Natriello & McDill, 1986). An important limitation of the study from Natriello & McDill (1986) for our research is that this was conducted under high school students. Needham (1978) defines student effort by looking at how a student allocates available time between activities like leisure, coursework and employment. Needham (1978) states that a student's utility is maximized when the utility derived from an extra unit of effort for each activity is equal. Krohn & O'Conner (2005) have researched how student effort and performance change over a semester. Student effort was measured as time spent on course activities and student performance over a semester (Krohn & O'Conner, 2005). Krohn & O'Conner (2005) found that students put in less effort after receiving higher midterm scores. According to Krohn & O'Conner (2005), after receiving a higher midterm score, the marginal utility for studying goes down.

Martin (2001) evaluates the Student Motivation Scale (SMS). Martin (2001) explains how the SMS measures motivation through five boosters: self-belief; value of schooling; learning focus; planning and monitoring; persistence; and four guzzlers: anxiety; low control; avoidance focus; and self-sabotage. For all students, each of these items has been tested with five questions in which students give ratings from 1 ('strongly disagree') to 7 ('strongly agree') (Martin, 2001). For each booster and guzzler, scores were converted on a scale from 1 to 100 (Martin, 2001). Martin (2001) concludes in his study that the SMS is a "reliable and valid measure of students' motivation" (p. 10). Since then, the SMS has been used in multiple studies to measure students' motivation (e.g., Chory-Assad, 2002 & Pribyl, Sakamoto & Keaten, 2004). In their review, Fulmer & Frijters (2009) identify multiple self-report measures of motivation developed by scholars. Most of those measures of motivation use a Likert-scale response format, just like the SMS (Fulmert & Frijters, 2009). Fulmert & Frijters (2009) mention that there is significant overlap between the different self-report methodologies. For example, academic self-concept and intrinsic motivation measures are two approaches of the

most important to measure motivation (Fulmert & Frijters, 2009). Academic self-concept measures how confident students are in their academic capabilities (Fulmert & Frijters, 2009). Intrinsic motivation is often measured through "attitudes, enjoyment, importance/value, and interest for a particular activity or learning domain" (Fulmert & Frijters, 2009, p. 221).

3.4 Student satisfaction

According to Elliott (2002), student centeredness and instructional effectiveness are vital determinants of student satisfaction. Student centeredness means that students need to have a feeling of belonging to their university Elliott (2002). Instructional effectiveness means that quality education should be provided to students to increase their satisfaction (Elliott, 2002) Furthermore, Clemes, Gan & Kao (2008) and Alves & Raposo (2007) show that service quality is an important predictor of student satisfaction. Alves & Raposo (2007) also state that students' expectations compared to their actual experienced institution quality is an essential factor for student satisfaction.

Student satisfaction is important for student retention. If students are not satisfied, they might drop out before graduating. This is costly for students and institutions (Schertzer & Schertzer, 2008).

3.5 Other research

Dalhuijsen (2017) and Broeders et al (2020) have both done research on reforms in the Dutch student financing system by using the Studentenmonitor (n.d.). The way these studies have been set up provides us with valuable insight.

Dalhuijsen (2017) researched whether student loans affect employment, parental contributions, and students' expenditure patterns. This was done by analyzing a policy change in which the default loan for Dutch students was lowered (Dalhuijsen, 2017). Dalhuijsen (2017) applied a differences-in-differences method to measure the effect of the policy change. In the regression model, Dalhuijsen (2017) controlled for age, gender and level of education (HBO/WO). Dalhuijsen (2017) researched whether the height of student loans, income from labor, parental contributions and student expenditure were affected by the policy change. The

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study showed that the average student loan decreased, parental contributions increased, and student expenditure decreased (Dalhuijsen, 2017). No significant results were found for labor income (Dalhuijsen, 2017).

Broeders et al (2020) analyzed the *2015 reform* just like this thesis intends to do. To be precise, Broeders et al (2020) researched the effect of the *2015 reform* on parental contributions, labor income, exam results and student expenditure. Broeders et al (2020) used a similar research design to that of Dalhuijsen (2017). A differences-in-differences model was used while controlling for age and gender (Broeders et al, 2020). HBO students were excluded from this research as Broeders et al (2020) argued that the percentage of HBO students living with their parents is significantly higher, lowering their expenditures and dependency on study loans. Broeders et al (2020) found that parental contributions increased, and student expenditure decreased due to the *2015 reform*. At the same time, Broeders et al (2020) found that students did not decide to work more, and no decrease in exam results was found.

3.6 Relevancy for our research

In our literature research, we have identified three main student financial aid structures: (1) mortgage-type loans with income-dependent grants; (2) graduate tax; (3) and income-contingent loans (Oosterbeek, 1998; Johnstone, 2008; Jacobs & Van der Ploeg, 2006). Income-contingent loans appear to be the preferred way of offering student financing, as it provides equity and an incentive to perform well and graduate (Oosterbeek, 1998; Jacobs & Van der Ploeg, 2006).

We have looked at rational choice theory, and why individuals are not completely rational (Simon, 1990; Griggs, 2017; Hindmoor & Taylor, 2017; Jones, 1990). We have also explained how indifference curves work (Hindmoor & Taylor, 2017; The Core Team, 2017).

Furthermore, we have identified that scholars mostly operationalize student effort as the amount of time allocated to coursework (Natriello & McDill, 1986; Needham, 1978; Krohn & O'Conner, 2005). Motivation is usually conceptualized by self-reported Likert-like scales where academic self-concept and intrinsic motivation measures are two essential measures

(Fulmert & Frijters, 2009). Student satisfaction is commonly defined by terms like student centeredness and instructional effectiveness (Elliott, 2002). Alves & Raposo (2007) argue that a student's expectation of quality compared to their experience is an important determinant of student satisfaction as well.

3.7 Hypotheses

In our literature review we have looked at indifference curves and the rational choice theory. Suppose an indifference curve for individual students is created where free time is on the x-axis and speed of graduation is on the y-axis. Due to the *2015 reform,* students are now financially incentivized to graduate quicker (Tweede Kamer der Staten-Generaal, 2014), we therefore argue that the indifference curve for students change, since they now might prefer graduating quicker more than they prefer free time. We can see this change in a sketch made in Figure 2.

In Figure 2 we can see two indifference curves. Again, this is a theoretical sketch and should not represent reality but should be visual support for the explanation of theory. The indifference curve that yields U = 2 for an individual student is the situation before the *2015 reform*. This individual student would choose a certain point on the indifference curve, which would yield U = 2. The indifference curve that yields U = 1 for an individual student is the situation after the *2015 reform*. A student now values speed of graduation more and therefore prefers this more than free time when compared to the situation before the *2015 reform*. This indifference curve has moved to the left and become flatter since speed of graduation is now more valued for an individual student than free time. We can now see that for a certain combination, which yields U = 1, an individual student now is willing to give up fewer units of "speed of graduation" to gain an extra unit of "free time" when compared to the situation before the *2015 reform.* The marginal rate of substitution has changed (The Core Team, 2017; Hindmoor & Taylor, 2017).

As we have seen in figure 1, the indifference curve after the *2015 reform* now falls in the red area, which means that utility for this indifference curve is lower (The Core Team, 2017).

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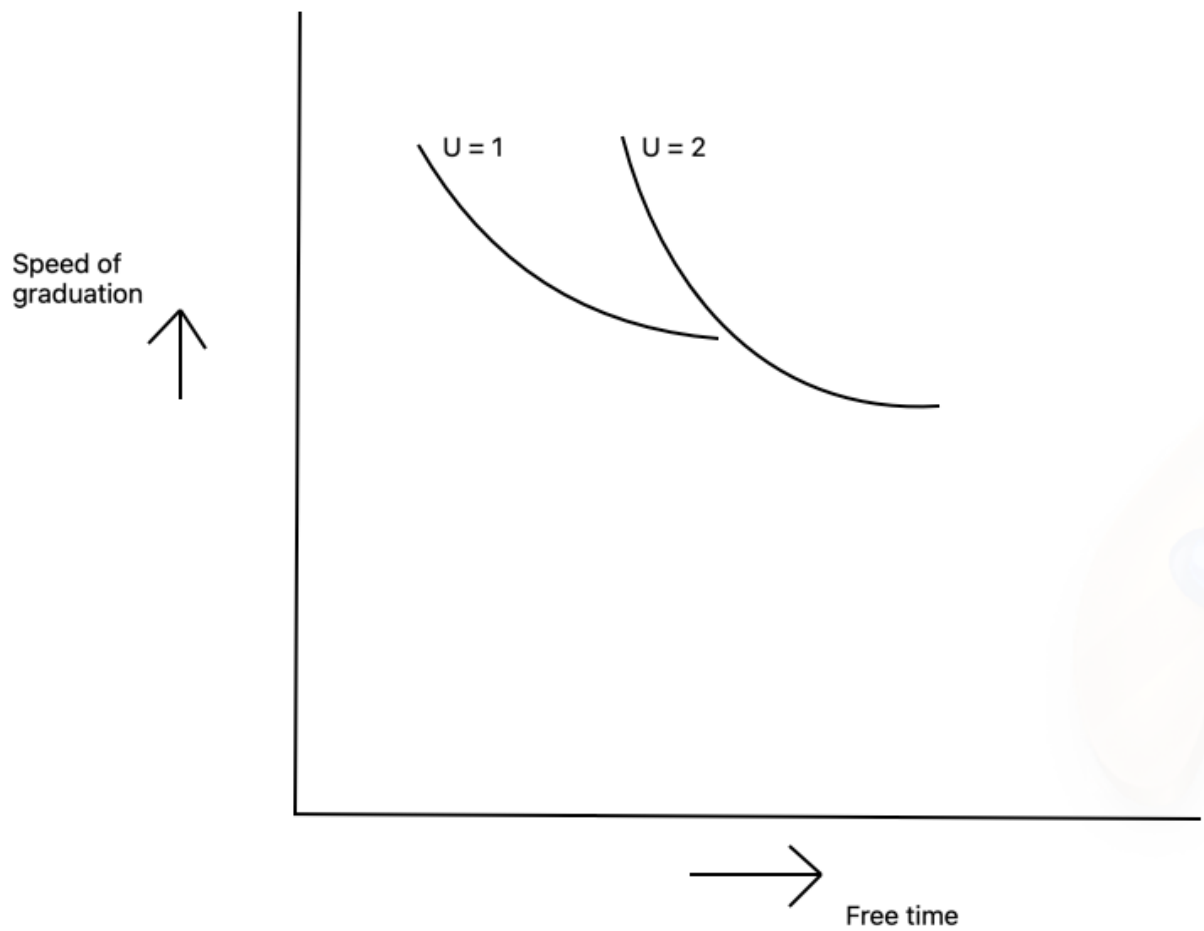
Figure 2

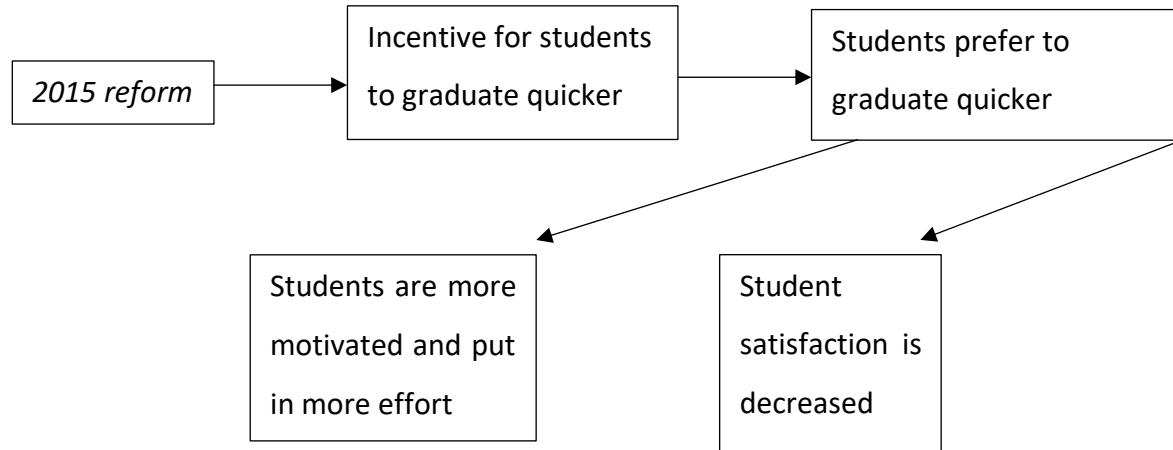We can see in our sketch in figure 2 that students value free time less than before, which might indicate an increase in effort and motivation. At the same time, we have also noticed how utility has gone down. This might be an indication that students are now also less satisfied than they were before.

In Figure 3, we illustrate the theoretical model of this thesis.

Figure 3

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┌──────────────┐      ┌─────────────────┐      ┌─────────────────┐
│ 2015 reform  │─────▶│ Incentive for   │─────▶│ Students prefer │
│              │      │ students to     │      │ to graduate     │
└──────────────┘      │ graduate quicker│      │ quicker         │
                      └─────────────────┘      └─────────────────┘
                             ┌────────────────┐      ┌──────────────┐
                             │ Students are   │      │ Student      │
                             │ more motivated │      │ satisfaction │
                             │ and put in     │      │ is decreased │
                             │ more effort    │      │              │
                             └────────────────┘      └──────────────┘
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As we have seen in our section on institutional background, the *2015 reform* means that students do not receive a *basic grant* anymore, but instead have to loan more money. The situation changes from a grant to an income-contingent loan as described by Oosterbeek (1998), Johnstone (2008) and Jacobs & Van der Ploeg (2006).

Based on our literature review, we expect that this change to an income-contingent loan, causes students to become more motivated and put in more effort into their studies. We therefore formulate our first hypothesis as follows:

H0 = No increase in student effort and motivation

H1 = Increase in student effort and motivation due to the *2015 reform*

Our second hypothesis is related to student satisfaction. We expect satisfaction to decrease due to the *2015 reform* since we expect utility to decrease. Furthermore, we have seen that expectations of quality of education can be an important predictor for student satisfaction (Alves & Raposo, 2007). Students might have higher expectations due to promised investments into the higher education, but since these promises were not sufficiently fulfilled

(NOS, 2019), students' higher expectations might therefore lead to a lower satisfaction. Our second hypothesis is formulated as follows:

H0 = No decrease in student satisfaction

H1 = Decrease in student satisfaction

4. Research design

First, this chapter will provide a brief introduction to our dataset. Next, the operationalization of our main concepts, effort, motivation and satisfaction, will be provided. Our operationalization of the treatment and control groups will be provided together with our regression models. This chapter will conclude with descriptive statistics of our dataset. In this chapter we will attempt to explain our research design as extensively as possible, to increase the replicability of our research. Furthermore, to increase the replicability, the researcher will preserve the scripts used on the dataset so that the researcher can provide these upon request.

4.1 Dataset

The Studentenmonitor is part of the Eurostudent project. Eurostudent is a research project that provides comparable data on the social-economic status of students, accessibility to higher education and internationalization across thirty-one European countries. The Studentenmonitor (n.d.) is a dataset updated annually by the Dutch Ministry of Education, Culture and Science about Dutch students' study progress and living conditions. The goal of the Studentenmonitor (n.d.) is to monitor the accessibility of Dutch higher education and to see if specific groups need attention. A large-scale survey is distributed among Dutch students annually around May/June (Studentenmonitor, n.d.). A stratified sample selection is used to select students for this survey (Studentenmonitor, n.d.). Students are surveyed about the following topics (Studentenmonitor, n.d.):

- Motivation
- Study behavior
- Time use
- Satisfaction
- Income and expenses
- International mobility

Our dataset only consists of Dutch respondents and does not consist of respondents from other Eurostudent countries. Therefore the generalizability of this research is not very high.

Furthermore, the reform that is analyzed, is very specific to the Dutch case, which does not increase the generalizability.

4.2 Operationalization of effort, motivation and satisfaction

Our dataset consists of cross-sectional data. This means that our dataset consists of observations from different individuals and that individuals are not tracked over multiple years.

For reported effort, respondents received eleven statements in which they answered how much they agreed with each statement on a scale of 1 to 5, where a score of 1 would be "does not apply at all," and a score of 5 would be "applies exactly". The eleven statements were as follows:

1. I use all available as much as possible to graduate quickly
2. I always try to get grades as high as possible
3. I find it hard to study independently
4. Activities outside of my study prevent me from being completely absorbed in my study
5. Why would I want to graduate as quickly as possible, it is the best time of my life
6. I can only study well at times
7. I am satisfied with my academic performance so far
8. I find it hard to make an effort for study parts I do not find that interesting
9. I tend to procrastinate my study obligations
10. My self-discipline is good
11. I should put more time into my studies

Answers to statements 3, 4, 5, 6, 8, 9 and 11 were recoded so that a score of 5 would mean that a respondent puts more effort into their studies, and a score of 1 would mean that a respondent puts in less effort for their studies. Then each student would be given an average score for reported effort from 1 to 5 based on the answers to statements. We will use this average score in our analysis.

For motivation, respondents were asked how they classify their motivation at this moment in time on a scale from 1 to 5. A score of 1 means "very low" and a score of 5 means "very high".

For satisfaction, respondents were asked to classify their general satisfaction on a scale from 1 to 5. A score of 1 means "very unsatisfied" and a score of 5 means "very satisfied".

4.3 Treatment group and regression models

The *2015 reform* went into effect for students starting their studies on or after September 1st, 2015. Students who attend university and students who attend applied sciences education (HBO) are both included in the sample. Broeders et al (2020) omitted HBO students since their expenditures are usually lower and therefore are less dependent on study loans. HBO students are included in this thesis since they are still a big part of student life in the Netherlands, but we will control for students following HBO education within our regression model. We only include bachelor students in the sample size since master students might have enjoyed studying before the *2015 reform* and therefore have already established levels of effort, motivation and satisfaction, which are less affected by the *2015 reform*. Only students in the first three years of their bachelor studies are selected since students studying longer than three years might be experiencing a delay in their studies. They might therefore be different kind of students. Furthermore, we have only selected full-time students since part-time students might have a full-time job next to their studies, and therefore the *2015 reform* affects these types of students less. For the same reasons, we have also only selected students from the ages 17 through 25.

A complication in our dataset is that respondents self-reported if they are a first-, second- or third-year student. In combination with the fact that the survey is distributed during the summer, this could lead to respondents misreporting the year they are studying in. For example, if a student just finished their first year, they might report that they are already a second-year student in the summer, whilst other students in the same situation still report they are a first-year student. Therefore, in our dataset, we have constructed a second variable which calculates the year a respondent is in by taking the year the respondent started studying and subtracting it with the year they filled in the survey. If the constructed study year does not match the reported study year, we have disregarded the observation. We have also disregarded the observation if a student misreported their system of financial aid. For example, a second-year student in 2016/2017 should not report that they are able to receive

the *basic grant*, since they started studying after the *2015 reform*. Furthermore, respondents reported the first year they started studying in the Dutch higher education system, and the first year they started studying their current program. In order to exclude respondents who are on their second study program, we have disregarded observations where these two variables did not match. Our working dataset has now become a lot smaller due to disregarding observations where misreporting is a possibility. In our section on descriptive statistics it will become apparent we still have enough respondents in each group to continue with our research design. In total, we end up with n = 18,830.

Table 1 visualizes our treatment and control group. The light blue color denotes respondents who are part of our treatment group. First-year students in the academic year of 2015/2016 are the first students to study under the new rules of the *2015 reform* and are therefore the first group of students to be part of our treatment group. In 2016/2017, students in the first and second year of their education study under the rules of the *2015 reform* and are therefore part of our treatment group. At the same time, in 2016/2017, third-year students started their studies at least before the *2015 reform* and are therefore part of our control group. Therefore, the group of students in our treatment group gets bigger, with one cohort of first-year students each year. From 2017/2018 onwards, all students in our sample are part of the treatment group.

Table 1

Group / year	13/14	14/15	15/16	16/17	17/18	18/19
3rd year students					■	■
2nd year students				■	■	■
1st year students			■	■	■	■

Visualization of the treatment (light blue) and control group (white)

Multiple regressions are executed to answer our hypotheses formulated in the literature review. We will be using a difference-in-differences model. An essential assumption of a difference-in-differences model is that different groups, the control group and the treatment

groups, follow similar trends until the reform. This is called the common trends assumption. We will test visually if this assumption is not broken in our section on descriptive statistics.

Important to note is that in our section on descriptive characteristics it becomes apparent that there is a lagged effect on the dependent variable satisfaction. Therefore, in all our regressions on satisfaction, we will lag our treatment dummy with one year.

Our regression models are inspired by the work of Wooldridge (2019). Wooldridge (2019) has created a framework for policy analysis in which we can use multiple control and treatment groups over more than two time periods, in which different groups can be treated in different time periods. We will run the regressions to determine the average treatment effect on the three dependent variable outcomes effort, motivation and satisfaction.

First, we will run regressions that estimate treatment effects across all groups, then we will run regressions estimating heterogeneous effects across our first-, second- and third-year groups. In this way we measure the treatment effect in multiple ways and by getting the same results we increase the reliability of our findings.

4.3.1 Regressions estimating treatment effects across all groups (1)

Firstly, we will run regressions in which we do not yet differentiate between the heterogeneous average treatment effects of first-, second- and third-year students, but we will determine the average treatment effect across all treatment groups. We will use a pooled OLS regression to estimate the effects using the following model:

$$DepVar_{igt} = \lambda_t + \alpha_g + \beta x_{gt} + \gamma_1 Age_{igt} + \gamma_2 Gender_{igt} + \gamma_3 Education_{igt} + \epsilon_{igt},$$
$$i = 1, \dots, N_{gt}; \ g = 1 \ (first - years), 2 \ (second - years), 3 \ (third - years);$$
$$t = 2014, \dots, 2019$$

$DepVar_{it}$	Dependent variable outcome
λ	Time fixed effects
α	Group effects

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x	Treatment dummy
β	Effect of treatment
γ_1	Effect of age
γ_2	Effect of gender
γ_3	Effect of level of education (WO or HBO)
ϵ_{it}	Error term

Table 2 shows the values of our treatment dummy x_{gt} in this regression model.

Table 2

Group / year	13/14	14/15	15/16	16/17	17/18	18/19
3rd year students	0	0	0	0	1	1
2nd year students	0	0	0	1	1	1
1st year students	0	0	1	1	1	1

Values of x_{gt} in regressions (1)

Our main variable of interest is β, since this is an estimation of the average treatment effect. Furthermore, in this model we also control for age (γ_1), gender (γ_2), and level of education (γ_3).

4.3.2 Regressions estimating heterogeneous treatment effects across groups (2)

Secondly, we will run regressions in which we will determine the average heterogeneous treatment effects for each group (first-, second- and third-year students). A pooled OLS regression will be used to estimate the effects using the following model:

$$DepVar_{igt} = \lambda_t + \alpha_g + \beta_1 x_{gt1} + \beta_2 x_{gt2} + \beta_3 x_{gt3} + \gamma_1 Age_{igt} + \gamma_2 Gender_{igt}$$
$$+ \gamma_3 Education_{igt} + \epsilon_{igt},$$
$$i = 1, \dots, N_{gt}; \ g = 1 \ (first - years), 2 \ (second - years), 3 \ (third - years);$$
$$t = 2014, \dots, 2019$$

$DepVar_{it}$	Dependent variable outcome

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	Time fixed effects
λ	Time fixed effects
α	Group effect
x	Treatment dummy
β_{1-3}	Effect of treatment (1 = first-year, 2 = second-year, 3 = third-year)
γ_1	Effect of age
γ_2	Effect of gender
γ_3	Effect of level of education (WO or HBO)
ϵ_{it}	Error term

We can observe that this regression model is more complex than the previous regression model, as we now have three variables estimating the treatment effect. This is one of the advantages of the model we are using, since it can estimate the average treatment effect where treatment is staggered across groups (Wooldridge, 2019). For example, first-year and second-year students are not treated at the same time. First-year students are treated from 2015/2016 onwards, whereas second-year students are treated from 2016/2017 onwards. Tables 3, 4 and 5 show the values of our treatment dummies x_{gt1}, x_{gt2} and x_{gt3} respectively.

Table 3

Group / year	13/14	14/15	15/16	16/17	17/18	18/19
3rd year students	0	0	0	0	0	0
2nd year students	0	0	0	0	0	0
1st year students	0	0	1	1	1	1

Values of x_{gt1} in regressions (2)

Table 4

Group / year	13/14	14/15	15/16	16/17	17/18	18/19
3rd year students	0	0	0	0	0	0
2nd year students	0	0	0	1	1	1
1st year students	0	0	0	0	0	0

Values of x_{gt2} in regressions (2)

Table 5

Group / year	13/14	14/15	15/16	16/17	17/18	18/19
3rd year students	0	0	0	0	1	1
2nd year students	0	0	0	0	0	0
1st year students	0	0	0	0	0	0

Values of x_{gt3} in regressions (2)

In this regression model we have three main variables of interest, namely β_1, β_2 and β_3. β_1 estimates the average treatment effect on first-year students. β_2 estimates the average treatment effect on second-year students, and β_3 estimates the average treatment effect on third-year students. Just like our other models, we also control for age, gender and level of education.

4.3.3 Robustness check

We will also run a robustness check in our analysis. This will be done by running a placebo test. This means that we will estimate a treatment effect for a period in which no treatment was present. This will be done for the period between 2013/2014 and 2014/2015. Since no treatment effect was present in this period, we should not be finding significant results. This placebo test will complement our visual data on testing if the common trends assumption is not broken.

Table 6 shows us the values of our treatment dummy in our placebo test.

Table 6

Group / year	2013/2014	2014/2015
Third-year students	0	0
Second-year students	0	1
First-year students	0	0

Values of x_{gt} in placebo test

In our visual data, presented in the section on descriptive statistics, it becomes apparent that second-year students in 2014/2015 might follow a different trend and therefore break the common trends assumption. This is the reason why we chose to estimate the treatment effect with a placebo test for second-year students in 2014/2015.

4.4 Descriptive statistics

Here, we will look at the descriptive statistics of our sample. Table 7 gives an overview of the number of respondents distributed by study year and calendar year, distinguishing between the control group (treatment = 0) and the treatment group (treatment = 1).

Table 7

	Treatment	13/14	14/15	15/16	16/17	17/18	18/19	TOTAL
First-year	0	1466	1859	-	-	-	-	3325
	1	-	-	1253	557	1003	1213	4026
Second-year	0	810	1391	758	-	-	-	2959
	1	-	-	-	567	860	999	2426
Third-year	0	1209	1076	665	910	-	-	3860
	1	-	-	-	-	1071	1163	2234

We can see that it is impossible for a specific year of students to have students in both the control and treatment groups. This is quite logical when looking at the definition of our treatment group. If someone is a first-year student in 2015/2016, they are by definition in the treatment group and cannot be part of the control group. In Table 7, we can observe that there are more first-year students in our treatment group than in our control group and that there are more second-year students and third-year students in our control group than our treatment group. We have a high number of respondents within each group, so this should be no issue.

In 2015/2016 we can see a considerable drop in students in our control group. This is simply because this year there were less respondents to the Studentenmonitor (n.d.) than in other years. For example, in 2016 there were 10.857 respondents who completed the survey, whilst the 2017 survey gathered 13.588 respondents and the 2018 survey gathered 15.693 respondents (Studentenmonitor, n.d.). In Table 8 we can observe that during 2015/2016 there

was a considerable difference in percentage of respondents following WO education between the treatment and control group. This might be caused by the fact there were less respondents in our control group during this year due to a lower number of respondents. We control for level of education in our regression model, but our graphical evidence might therefore show more unexpected results for second- and third-year students in 2015/2016 (control group) due to the difference in level of education compared to first-year students in 2015/2016 (treatment group).

In table 7 in 2016/2017 we can also recognize a substantial lower number of respondents in our treatment groups (first- and second-year students). This can be explained by the fact that in this survey a high percentage of respondents misreported either their system of student financing or the year in which they are studying. As stated before, these observations have been disregarded, since there is no way to correctly determine in which study year these students are. When looking at Table 8, we see a noticeable difference in the percentage of male respondents and respondents following WO-education when comparing the treatment and control group in 2016/2017. This might be caused by the fact that we have less observations in our treatment group in 2016/2017 due to misreporting. In our regression model we control for gender and level of education, but our graphical evidence might show some unexpected results for first- and second-year students in 2016/2017 (treatment group) when compared to third-year students in 2016/2017 (control group).

Table 8

	Treatment	13/14	14/15	15/16	16/17	17/18	18/19	Total
N	0	3485	4326	1423	910	-	-	10144
	1	-	-	1253	1124	2934	3375	8686
Age (avg)	0	20.53	20.33	20.96	21.40	-	-	20.58
	1	-	-	19.50	20.02	20.52	20.50	20.30
Male %	0	28.55	32.22	27.20	28.90	-	-	29.96
	1	-	-	29.13	33.19	33.88	32.56	32.59
WO %	0	50.22	59.13	50.25	61.87	-	-	52.29
	1	-	-	56.50	57.65	61.28	56.15	55.99

We can observe in Table 8 that we have a pretty low number of total male respondents. This was also the case in the research done by Broeders et al (2020) and Dalhuijsen (2017). We

should encounter no problems with this since we have a high number of respondents and control for gender in our regression model. There also seems to be no extreme difference in gender between the control and treatment group**.**

There is a more considerable difference in age between the treatment and control group in 2015/2016 and 2016/2017. This has a very logical explanation. In 2015/2016, only first-year students were included in the treatment group; in 2016/2017, only first- and second-year students were included in the treatment group, and from 2017/2018 onwards, third-year students were added. Therefore, our treatment group is expected to be quite a bit younger in 2015/2016 and 2016/2017. When observing the overall average age, we can see that the difference between the treatment and control group is quite small. Furthermore, we also control for age in our regression analysis.

In Figures 4, 5 and 6, graphs have been provided that show the average reported effort, the average reported motivation and the average reported satisfaction respectively for first-, second- and third-year students between 2010/2011 and 2018/2019. The moment the treatment went into effect has been visualized in the graph by darkening the line in the graph for each group of students.

An important assumption for implementing a difference-in-differences model is the common trend assumption (Angrist & Pischke, 2015). This means that the different groups should follow similar trends in absence of treatment (Angrist & Pischke, 2015). Angrist & Pischke (2015) explain that figures like Figure 4, 5 and 6 can be used as evidence for the common trends assumption. We will therefore use these figures to determine if the common trends assumption is not broken.

In Figure 4, we can observe how reported effort moves along parallel trends for first-, second- and third-year students from 2010/2011 until the policy is implemented in 2015/2016 for first-year students. In Figure 4, we can clearly see how the common trends assumption is upheld. We do see second-year students increase a drop in reported effort in 2014/2015 and therefore move away from the trend. As stated before, we will use our data on second-year

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students in 2014/2015 as a placebo treatment in our robustness check to see if we should invalidate our results.

The moment the reform is implemented in 2015/2016, we should see that first-year students break this common trend as this group is now the only treated group. We can see this happen in Figure 4. In 2016/2017, both first- and second-year students were treated. We can see here how reported effort increases for second-year students, but not nearly as much as it did for first-year students when they were treated for the first time. Therefore, we might not find a significant result for this group of students. One year later, in 2017/2018, also third-year students are treated, and we can see that this group of students is now also enjoys an increase in their reported effort.

Our visual data here is in line with our first hypothesis which states that we expect an increase in reported effort in our treatment group.
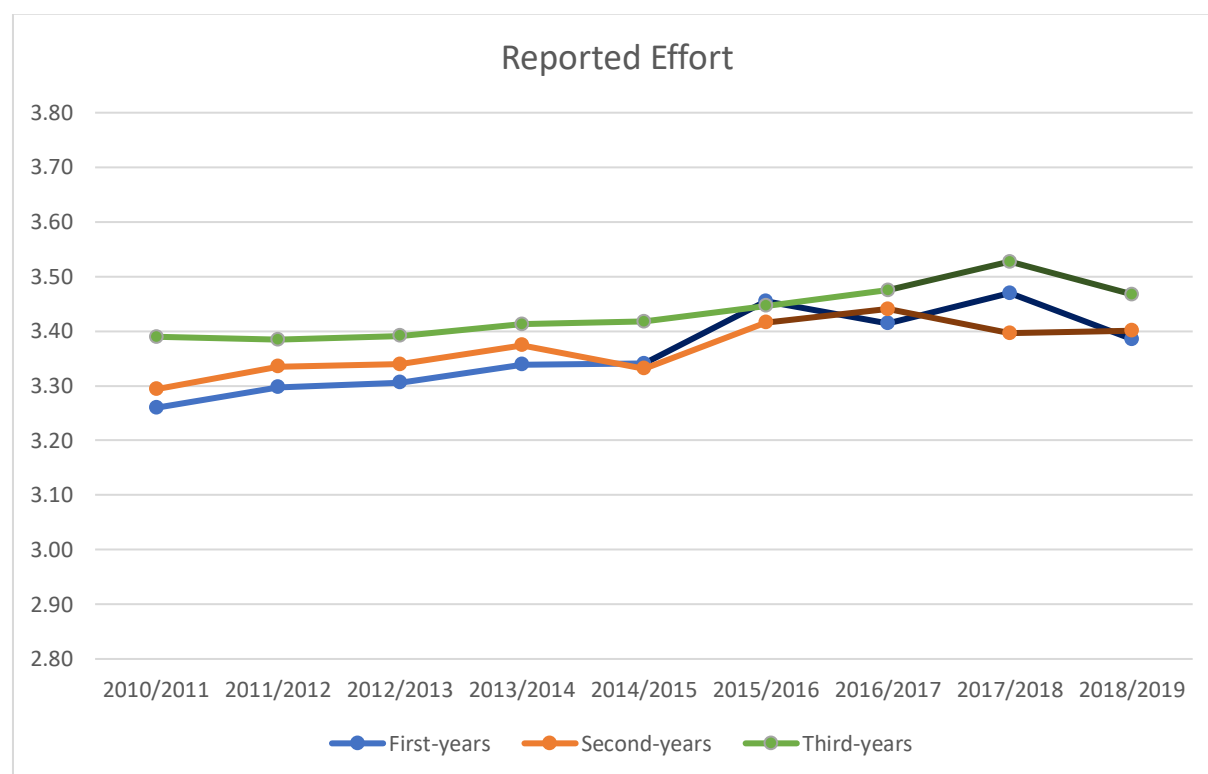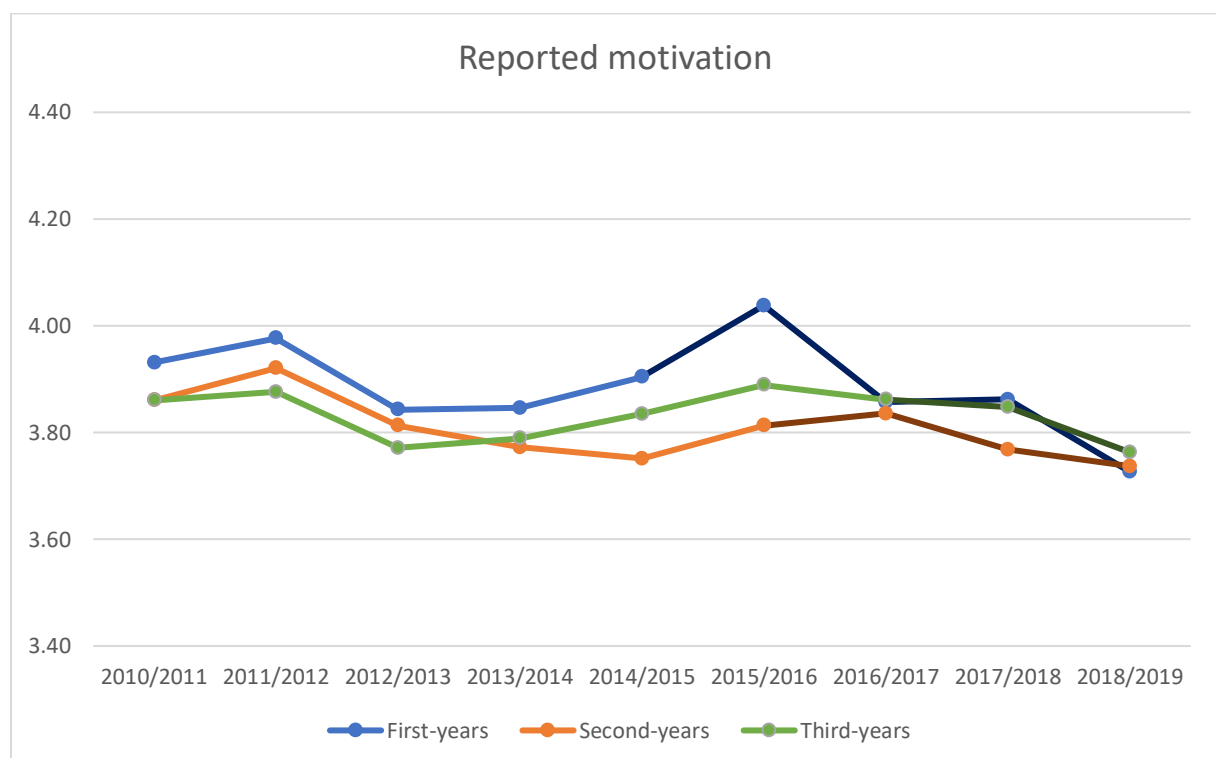
Figure 4

Figure 5 provides us with a graph for the reported motivation of students. We can see clearly how a common trend is visible between first- and third-year students. But, especially for the after 2013/2014 we can observe how second-year students follow a different trend. We will test in our robustness check if this different trend invalidates our regression results.

It is visible how first-year students enjoyed a considerable increase in motivation between 2014/2015 and 2015/2016, the moment the *2015 reform* went into effect. But we can also see that second- and third-year students also see an increase in reported motivation simultaneously. It is therefore interesting to see if this yields a significant result. One year later, when second-year students also get treated, it becomes apparent that they enjoy the highest increase among the different groups in reported motivation. In 2017/2018, third-year students get treated as well, but we do not see an increase in motivation.

Again, our visual date here is in line with our second hypothesis, which states that we expect to see an increase in reported motivation upon treatment.

Figure 5

Reported motivation

A graph of the average reported satisfaction amongst the different groups is provided in Figure 6. When looking at our visual data, we can observe that satisfaction decreases for all groups one year after treatment is implemented for these groups, which is in line with our second hypothesis. As stated before, for satisfaction we will use a lagged treatment dummy, to measure average treatment effect one year after implementation of the reform. Once again, we can see how after 2013/2014 second-year students follow a different trend then first- and third-year students do. Our robustness check will therefore decide if a different trend for second-year students is actually present.

Figure 6
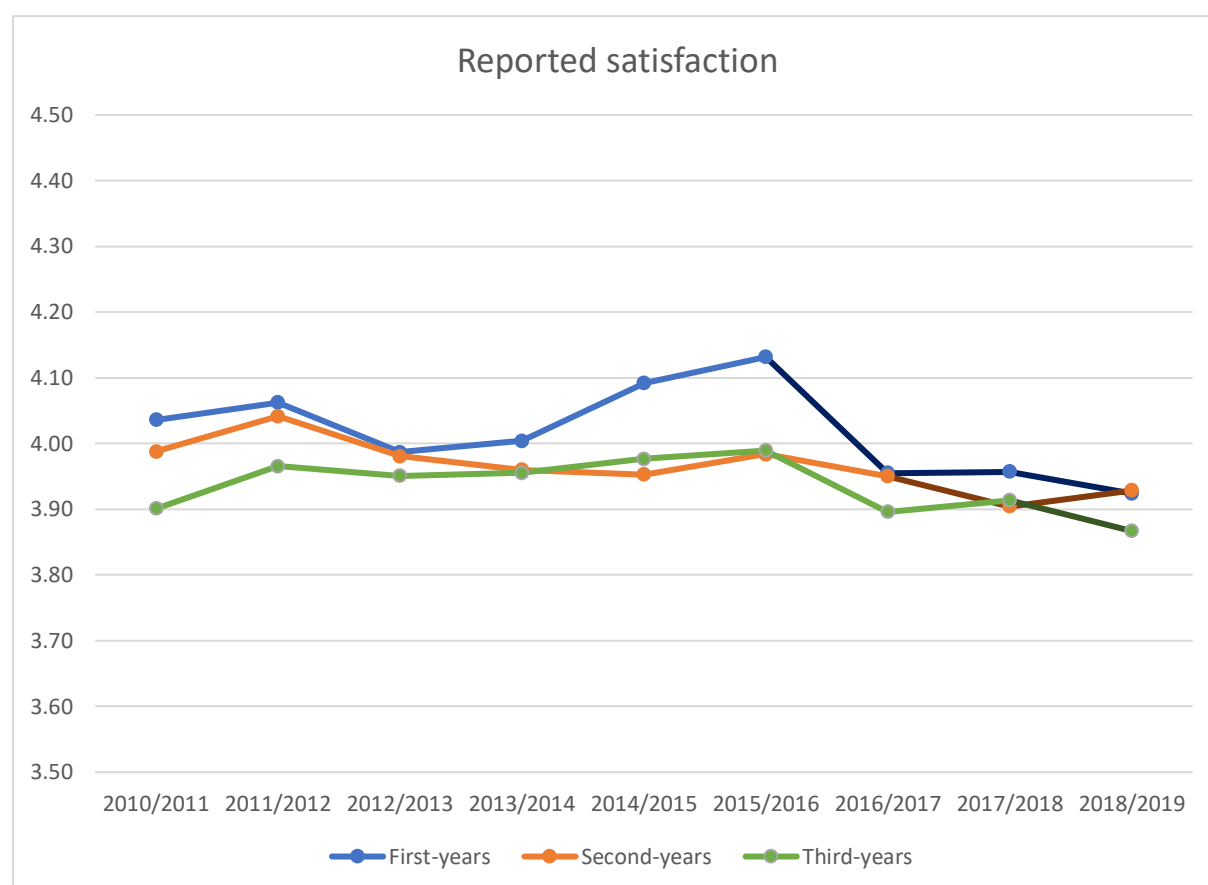
In Figures 4, 5 and 6 we have observed how our three groups follow parallel trends. This is especially the case for first- and third-year students. We do notice some different trends for second-year students mainly in 2013/2014 and 2014/2015. As stated multiple times before, our robustness check should give us more insight if there actually is a different trend present here.

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5. Results

In this chapter we will show our regression results on the dependent variables reported effort, motivation and satisfaction in tables 9, 10 and 11 respectively. Coefficients shown in the columns under (1) are results from our regressions that estimate effects across all our groups. Coefficients shown in the columns under (2) are results from our regressions that estimate heterogeneous effects for each treatment group. We will connect our findings with our hypotheses. Furthermore, we will also look at results from our robustness check.

5.1 Reported effort

Table 9 shows the results of our regressions for the dependent variable reported effort.

In column (1) in table 9 we can observe that we have found a significant positive effect across all treated groups. We have found an average treatment effect of 0.046 ($p < 0.05$) across all treated observations. This means that students in our treatment group reported 0.046 more effort on average due to being treated. Reported effort is measured on a scale of 1 to 5. Furthermore, we find that age has a small negative effect on reported effort, whilst gender has a more substantial effect on reported effort. Being female also affects reported effort positively by 0.134 ($p < 0.01$).

When looking at column (2), we have also found heterogeneous significant positive effects for treated first- and third-year students. Treated first-year students report 0.049 ($p < 0.05$) more effort, whereas third-year students report 0.055 ($p < 0.05$) more effort. No significant effect was found for treated second-year students. Furthermore, we can also see that third-year students in general report more effort (0.101, $p < 0.01$).

To put our results for treated students in perspective, the average reported effort through the years in our entire dataset was 3.410. This means that an increase of 0.049 ($p < 0.05$) that treated first-year students experienced is a 1.44% portion of the average reported effort in our entire dataset. This percentage would be 1.61% for treated third-year students.

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Table 9	Reported effort	
	(1)	(2)
Treatment dummy	0.046**	
	(0.022)	
Treatment dummy first-years		0.049**
		(0.025)
Treatment dummy second-years		0.028
		(0.27)
Treatment dummy third-years		0.055**
		(0.027)
Age	-0.018***	-0.017***
	(0.004)	(0.004)
Gender (female)	0.134***	0.136***
	(0.011)	(0.011)
WO Education	0.015	0.014
	(0.010)	(0.010)
Second-year students	0.013	0.023
	(0.013)	(0.018)
Third-year students	0.102***	0.101***
	(0.015)	(0.019)
2014/2015	-0.007	-0.008
	(0.015)	(0.015)
2015/2016	0.052***	0.049**
	(0.020)	(0.021)
2016/2017	0.045**	0.048**
	(0.022)	(0.023)
2017/2018	0.054**	0.054**
	(0.027)	(0.027)
2018/2019	0.004	0.004
	(0.027)	(0.027)
Intercept	3.439***	3.437***
	(0.091)	(0.091)
N	**18,647**	**18,647**
Standard errors in parantheses		*p<0.10; **p<0.05; ***p<0.01

5.2 Reported motivation

Table 10 shows us the results of our regressions for the dependent variable reported motivation.

In table 10 under column (1) we can see that we have found a significant positive effect across all groups. The average treatment effect across all treated observations is 0.065 ($p < 0.05$). This means that students in our treatment group report 0.065 more motivation than students in our control group. Reported motivation has been measured on a scale of 1 to 5.

When looking under column (2) we can observe that we find positive significant effects for second-year and third-year students. Treated second-year students report 0.110 ($p < 0.01$) more motivation than second-year students in our control group. Treated third-year students report 0.091 ($p < 0.05$) more motivation than third-year students in our control group. Treated first-year students report 0.015 more motivation, but this result is not significant.

Next to these results, we can also observe under both columns that being female and being educated on WO-level has positive significant effects on students' motivation. Furthermore, second-year and third-year students report less motivation in general. Second-year students report -0.104 ($p < 0.01$) less motivation, whilst third-year students report -0.102 ($p < 0.01$) less motivation.

When putting our results into perspective again we can see that the average reported motivation is 3.830, which means that the average treatment effect of 0.110 for our treated second-year students is a 2.87% increase when comparing it to the average reported motivation across our entire dataset. For third-year students this would be 2.38%.

Since we have found statistically significant results in Table 9 and Table 10 which indicate an increase in reported effort and motivation the null hypothesis for our first hypothesis can be rejected.

Table 10 **Reported motivation**

	(1)	(2)
Treatment dummy	0.065**	
	(0.030)	
Treatment dummy first-years		0.015
		(0.034)
Treatment dummy second-years		0.110***
		(0.037)
Treatment dummy third-years		0.091**
		(0.038)
Age	-0.014**	-0.014**
	(0.006)	(0.006)
Gender (female)	0.049***	0.046***
	(0.015)	(0.015)
WO Education	0.115***	0.116***
	(0.014)	(0.014)
Second-year students	-0.083***	-0.130***
	(0.018)	(0.025)
Third-year students	-0.012	-0.048**
	(0.022)	(0.027)
2014/2015	0.023	0.024
	(0.021)	(0.021)
2015/2016	0.093***	0.115***
	(0.027)	(0.028)
2016/2017	0.005	0.012
	(0.031)	(0.032)
2017/2018	-0.050	-0.052
	(0.038)	(0.038)
2018/2019	-0.132***	-0.134***
	0.038	(0.038)
Intercept	3.880***	3.899***
	(0.135)	(0.135)
N	**18,628**	**18,628**

Standard errors in parantheses   *p<0.10; **p<0.05; ***p<0.01

5.3 Reported satisfaction

Table 11 shows us the results of our regressions for the dependent variable reported satisfaction.

Under column (1) in table 11 we can find that treated students report 0.041 less satisfaction, but the result is not significant. Under column (2) we only find a significant result for treated first-year students with an average treatment effect of -0.078 ($p < 0.01$). This means that treated first-year students report 0.078 less satisfaction on a scale of 1 to 5 than students in our control group. For treated second- and third-year students we do not find a significant result.

We also find that female students report 0.013 ($p < 0.05$) less satisfaction than males, and that students following WO education report 0.215 ($p < 0.01$) more satisfaction than HBO students. Second and third-year students both report less satisfaction than first-year students in general.

Again, we will put our results in perspective. The average reported satisfaction in our entire dataset was 3.971. The decrease in satisfaction that treated first-year students experience is a 1.96% portion of the average reported satisfaction in our dataset.

For our second hypothesis, we cannot reject our null hypothesis since we have only found a significant result for treated first-year students in table 11. We have also not been able to find a significant result across our entire treatment group.

Table 11	Reported satisfaction	
	(1)	(2)
Lagged treatment dummy	-0.041	
	(0.027)	
Lagged treatment dummy first-years		-0.078***
		(0.030)
Lagged treatment dummy second-years		0.016
		(0.033)
Lagged treatment dummy third-years		-0.026
		(0.039)
Age	-0.013**	-0.013**
	(0.005)	(0.005)
Gender (female)	-0.044***	-0.043***
	(0.012)	(0.012)
WO Education	0.214***	0.215***
	(0.012)	(0.012)
Second-year students	-0.070***	-0.104***
	(0.015)	(0.018)
Third-year students	-0.084***	-0.102***
	(0.018)	(0.020)
2014/2015	0.016	0.017
	(0.017)	(0.017)
2015/2016	0.063***	0.063***
	(0.018)	(0.018)
2016/2017	-0.047**	-0.034
	(0.023)	(0.023)
2017/2018	-0.046*	-0.048**
	(0.025)	(0.026)
2018/2019	-0.042	-0.048
	(0.033)	(0.033)
Intercept	4.05***	4.06***
	(0.113)	(0.113)
N	**18,616**	**18,616**
Standard errors in parantheses		*p<0.10; **p<0.05; ***p<0.01

5.4 Robustness check

Table 12 shows us the results of our robustness check.

For our robustness check, we used a placebo as treatment. Since our visual data showed that second-year students in 2014/2015 might follow a different trend, we introduced a placebo treatment for second-year students in 2014/2015 in our robustness check.

In table 12 we can see that we do not find a significant result for reported effort. We also do not find a significant result for reported satisfaction. We can therefore assume that second-year students do not follow a different trend in 2014/2015 for these dependent variables, and we have therefore been able to interpret our coefficients in table 9 and table 11 correctly.

We do find a significant result for reported motivation. Our placebo treatment group reports 0.070 ($p < 0.05$) less motivation than our control group. We should therefore interpret our coefficients from table 10 with regards to second-year students more carefully. Since this placebo effect (-0.070) is smaller than the positive significant treatment effect we have found in table 10 (0.110), it is still very possible that there is a positive effect. But since our robustness check tells us that second-year students in 2014/2015 follow a different trend when it comes down to motivation, we should not make hasty conclusions about second-year students when looking at motivation.

Table 12	Reported effort	Reported motivation	Reported satisfaction
Treatment dummy	-0.015	-0.070**	
	(0.025)	(0.034)	
Lagged treatment dummy			-0.028
			(0.033)
Age	-0.018***	-0.015**	-0.013**
	(0.004)	(0.006)	(0.005)
Gender (female)	0.136***	0.045***	-0.044***
	(0.011)	(0.015)	(0.012)
WO Education	0.016	0.117***	0.213***
	(0.010)	(0.014)	(0.012)
Second-year students	0.010	-0.074***	-0.063***
	(0.014)	(0.020)	(0.016)
Third-year students	0.091***	-0.027	-0.073***
	(0.014)	(0.021)	(0.017)
2014/2015	-0.003	0.043*	0.016
	(0.017)	(0.023)	(0.017)
2015/2016	0.072***	0.122***	0.072***
	(0.017)	(0.023)	(0.020)
2016/2017	0.071***	0.042	-0.059***
	(0.018)	(0.026)	(0.021)
2017/2018	0.100***	0.015	-0.072***
	(0.016)	(0.023)	(0.020)
2018/2019	0.050***	-0.068***	-0.083***
	(0.016)	(0.023)	(0.019)
Intercept	3.444***	3.881***	4.044***
	(0.091)	(0.135)	(0.113)
N	18,647	18,628	18,616

Standard errors in parantheses   *p<0.10; **p<0.05; ***p<0.01

6. Conclusion & discussion

In this section of the thesis, we will draw conclusions, discuss academic and practical implications, discuss the limitations of this research and make suggestions for future research.

6.1 Conclusions

This thesis introduced the *2015 reform* and showed the criticism this reform has received within Dutch society. The main criticism is that the *2015 reform* caused extra stress for students due to stricter finances. Another point of criticism was that the reform promised to invest the money saved by abolishing the *basic grant* back into the higher education system. Reports showed that this happened insufficiently. Therefore we phrased the following research question: *What is the effect of the Dutch 2015 study grant reform on Dutch students' reported effort, motivation and satisfaction?*

Our first hypothesis stated that we expected treated students to report an increase in effort and motivation. This hypothesis was based on rational choice theory, which states that individuals show rational behavior to reach their own goals (Simon, 1990; Griggs, 2017; Hindmoor & Taylor, 2017). Due to an extra financial incentive, we expected that students would prefer to graduate quicker. According to rational choice theory (Simon, 1990; Griggs, 2017; Hindmoor & Taylor, 2017), we then expected that students would choose to put in more effort and be more motivated to graduate quicker. The marginal rate of substitution (Hindmoor & Taylor, 2017; The Core Team, 2017) would change in such a way that students now would give up less units of "speed of graduation" in order to gain extra units of "free time". We have indeed seen in our analysis how treated students reported significantly more effort and motivation. When looking at heterogeneous effects across our groups, we noticed that first- and third-year students reported significantly more effort and that second- and third-year students reported more motivation. These results were in line with our first hypothesis.

Important to note is that the effects in our findings are quite small. The increases in reported effort and motivation are only 2.87% at the most when compared to the average score in our entire dataset through the years.

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Our second hypothesis stated that reported satisfaction for treated students would decrease due to the *2015 reform*. Our argumentation here was that utility would go down due to the shift of indifference curves. Furthermore we expected satisfaction to decrease since Alves & Raposo (2007) stated that expectations of quality of education is a predictor for satisfaction. Reports (NOS, 2019) stating that promised investments did not happen might therefore lower student satisfaction. Our results do not show a significant result for our treatment group regarding our second hypothesis. We did find a significant result for first-year students, which stated that first-year students are less satisfied with their studies. But this is not enough to reject our null hypothesis.

Our analysis has answered the research question by demonstrating that treated students have reported slightly more effort and motivation which is an effect of the *2015 reform.* Therefore, the introduction of the Dutch loan system (*2015 reform*) has had a positive effect on students' effort and motivation.

6.2 Academic & practical implications

This research paper is one of the first to research the effect of a change in student financial aid structures on students' reported effort, motivation and satisfaction in the Netherlands. This research design has been successful in identifying these effects, and it is therefore recommendable to research if changes in financial aid structures in other countries have the same effect using this research design.

For policymakers, we can conclude that changing a student financial aid structure from a grant-like structure to a structure that is more in line with an income-contingent loan structure might increase students' effort and motivation. Since student's effort and motivation increased, it seems that this goal of the *2015 reform* has been reached. Therefore this thesis gives valuable insight for governments from other countries that contemplate a change in student financial aid structure.

6.3 Limitations & suggestions for further research

Our research has some important limitations. First, we have only been able to analyze four years after the implementation of the *2015 reform*. This means that we only have two data points for third-year students. Therefore, we cannot conclude if the effects we have found are long-term effects. It might be possible that future research that can include five extra years of data after the *2015 reform* finds different results. Therefore, it is recommended to do further research on this subject in some years.

A second limitation is that our similar trends assumption does not 100% hold for second-year students in 2014/2015. Therefore there might be a mistake in the dataset for second-year students in 2014/2015, causing a break in this trend.

Another limitation is that the Studentenmonitor (n.d.) started using different datasets after 2016. The survey stayed the same, but the datasets were coded differently. In our research, we are confident that everything has been recoded accordingly in order to compare the same variables across the datasets. But this may also mean that the survey was distributed differently, using different software or channels to spread the survey. If this is the case, then our data from 2015/2016 onwards may be less comparable to the data from before 2015/2016.

Furthermore, we have used self-reported measures for each measure used in this analysis. It is, of course, quite hard to measure effort, motivation and satisfaction differently, but this might be a threat to the internal validity. For example, when a respondent fills out the survey, the time of day and weather might influence their answers. A student might feel less motivated for their studies and less satisfied with their studies when answering the survey late at night or during bad weather. These variables have not been recorded, and we can therefore not control for them in our analysis.

It is suggested to do more research on this topic in the future by looking at different countries that are part of the Eurostudent project. Countries within the Eurostudent project use comparable variables. Therefore, it is interesting to see if we can find similar results in other

countries that change their student financial aid structure. This will create more understanding of the effect of student financial aid structures on students' effort, motivation and satisfaction.

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