



university of  
 groningen

faculty of economics  
 and business

## The effect of parental financial education on overall and study loan borrowing behavior

Rens Hendrik Bieze<sup>1</sup>

Thesis MSc. Finance

Supervisor: Dr. S. Sovago

June 2019

Words: 13,700

### ABSTRACT

This paper uses the Household Survey of De Nederlandsche Bank to study the effect of parental financial education on overall and study loan borrowing behavior. We find a negative relationship between this form of financial education on both overall and study loan borrowing behavior. Interestingly, our findings report that the effect of parental financial education is greater in overall borrowing behavior compared to study loan borrowing behavior. Also, we tested the effect of the four different parental teaching mechanisms separately and find that a combination of all mechanisms is the most effective in influencing both overall and study loan borrowing behavior. Furthermore, we tested the effect of parental financial education received during childhood among different age groups and found that respondents who received continuous education are the most influenced in their borrowing behavior.

**Keywords:** financial decision making, financial behavior, parental financial education, financial literacy, borrowing, study loan, debt.

**JEL classifications:** A290, D120, D140, D190, D830, I220, J100

---

<sup>1</sup> University of Groningen  
Faculty of Economics and Business  
Student number: s3370321  
E-mail: RensBieze@gmail.com

## **1 Introduction**

People nowadays have more freedom in financial decision making and face a financial environment that has become more difficult over the last decade. Despite the fast spread of financially complex products, many of these have proven to be challenging to understand for financially unsophisticated consumers (Boshara, Gannon, Mandell, Phillips, and Sass, 2010). Financial innovation has its advantages, but they also give households a much greater responsibility to borrow, save, and invest (Lusardi and Mitchell, 2014).

Evidence is the recent figures of the Federal Reserve Bank of New York (2019) who report that households reached a record level of debt of \$13.5 trillion at the end of 2018 (a seven percent increase compared to the third quarter of 2018). Among the different types of loans, study loans are the fastest growing segment of U.S. household debt with a growth of almost 157% since the Great Recession (Bloomberg, 2018). Dwyer, McCloud, and Hodson (2012) see study loans as a ‘double-edged sword.’ The positive effect is that study loans can be used by young people to bridge the gap between their resources and the rising college fees. The negative effect is that study loan debt comes with inherent risk, which can limit students’ opportunities and choices after college. Lewis and van Venrooij (1995) state that young people do not have very solid ideas about credit and often underestimate the repayment of their debt: throwing students in the financial deep end. These risks are especially high in the current economy where graduated young adults do not easily find full-time employment, resulting in problems repaying the debt (Godofsky, van Horn, and Zukin, 2011). This development and findings are worrisome as over-indebtedness could lead to detrimental effects on consumers’ long-term financial welfare (Betti, Dourmashkin, Rossi, and Yin, 2007)

The currently low financial literacy levels (Garg and Singh, 2018) could be at the origin of the perilous development concerning debt behavior and study loans. Meyer (2017, p. 384) defines financial literacy as “a measure of understanding financial concepts and the ability to manage finances both for short-term decision-making and long-term financial planning in the context of changing economic conditions and life events.” Lusardi and Mitchell (2007) expect financially literate people to be more aware of the risks involved with borrowing, causing an aversion towards it. The expected relationship between financial literacy and study loan borrowing is less clear because of the positive and negative characteristics of study loans described by Dwyer et al. (2012).

The current developments in households’ debt behavior make it highly relevant to study the effect of financial literacy on overall and study loan borrowing behavior. Lusardi (2019) argues that financial education is an important foundation for raising financial literacy. Except for financial education in school and workplaces, many other financial education methods are under-researched. Based on Lewis and Scott (2000) their statement that parents can have a big influence on the economic understanding of children, we deem it important to study the puzzle whether parental financial education received during childhood affects overall and study loan borrowing behavior. Especially, since this form of financial education is available to the

majority of people. The study closely related to ours is the one of Bucciol and Veronesi (2014), who looked at the effect of parental financial education on saving behavior. In this study, we use the same data source and similar key variables, but there are five ways in which our study distinguishes itself from related research. First, we focus on the effect of parental financial education on borrowing behavior. Second, we specifically study the effect of parental financial education on study loan borrowing behavior. Third, we study the different parental teaching mechanisms separately to look for any difference of effect between these mechanisms on overall and study loan borrowing behavior. Fourth, this study tries to determine the age group at which parental financial education is most effective concerning borrowing behavior. Fifth, we use the most recent data of the De Nederlandsche Bank (DNB) Household Survey. We use this information to answer the following research question:

*Does parental financial education in childhood have a significant effect on overall borrowing behavior and study loan borrowing behavior?*

To analyze the research question, we use data from the year 2005 up to and till 2018 of the DNB Household Survey. In this study, we find that parental financial education has a significant and negative relationship concerning overall and study loan borrowing behavior. Our findings signal that a high degree of parental financial education significantly leads to nine percentage points fewer loans and four percentage points fewer study loans compared to respondents with a low degree of parental financial education. We thus find that the effect of parental financial education is higher in overall borrowing behavior compared to study loan borrowing behavior. Furthermore, our findings suggest that a combination of the four parental teaching mechanisms tested in this study has the greatest impact on both overall and study loan borrowing behavior. Also, we find that continuous parental financial education has the most effect on borrowing behavior compared to respondents who only received parental education either in the group aged between 8-12 or aged between 12-16.

These findings are relevant for policymakers who aim to decrease the amount of debt among households and to decrease the amount of study loan debt. In addition, parents can use these findings to their advantage to stimulate an aversion towards borrowing among their children.

The remainder of this paper is organized as follows: Section 2, provides an overview of related literature and the tested hypotheses. Section 3, briefly describes the Dutch study loan system. Section 4, discusses the methodology. Section 5, provides a description of the data and a table with descriptive statistics. Section 6, provides the results of our univariate and multivariate analyses. Section 7, concludes and discusses the paper.

## 2 Literature review

The literature review lists important studies and results that form the theoretical basis for this research.

Cunha, Heckman, and Schennach (2010) studied the effect of early childhood education and found that educational investments during childhood are important for the formation of cognitive skills in adulthood. Put differently, early childhood financial education could affect peoples' financial behavior when they grow older. The underlying theory is Ajzen's (1991) theory of planned behavior (TPB). The TPB of Ajzen (1991) argues that three psychosocial factors influence individuals' behavior: attitudes, subjective norms, and perceived behavioral control. Attitudes are viewed as a person's general opinion towards an object, person or place; influencing the behavioral intentions of the person. The subjective norm is the social influence on decision-making by people that are close to the individual (e.g. parents and friends). In other words, a child is expected to take the beliefs and choices of his parents into consideration before making his own choice. Perceived behavioral control is a person's beliefs to what extent he can influence the situation depending on his knowledge, resources, and time. Parents can influence their child's perceived financial control since they can control their child's expenditures (e.g. by stimulation or denying certain purchases) (López-Mosquera, 2016).

Financial education is an important foundation for raising financial literacy (Lusardi, 2019). Most studies which examined the effect of financial education during childhood on financial behavior at a later age focused on the same methods of financial education: school (OECD, 2017) and workplaces (Clark, Lusardi, and Mitchell, 2017). The most common finding is that financial education during childhood does influence financial behavior at a later age. However, there is a greater variety of methods to which financial education can be offered. Many of these methods and their effectiveness are under-researched (Lusardi, 2019). This paper looks at one of these other methods: the contribution of parents' financial education in financial literacy. The reader may think why we focus only on parental financial education and not on other methods? Many papers mention the importance of parents in financial education, but research is scarce. Lewis and Scott (2000) argue that parents can have a big influence on the economic understanding of children. In addition, Mishra, Serido, Shim, and Tang (2010) add that parents are the most important predictor of children their financial behavior and is greater than any other form of education. The reasoning for this is that children continue to seek their parents' approval and financial guidance during their lifetime (Smollar and Youniss, 1989). Therefore, we focus on the impact of parental financial education received during childhood on overall borrowing behavior and study loan borrowing behavior.

Although the literature on the effect of parental financial education on borrowing behavior is scarce, this study is not the first who tries to examine this effect. The study of Fornero, Rossi, and Sansone (2018) looked into this effect before us. They used the same data source to look at informal parental financial education, like giving pocket money, and its effect

on financial behavior. Their study reports robust results and shows a long-lasting effect of informal education for children to acquire a better understanding of financial concepts. A major limitation of their study is that they only used data of the year 2015 for their analysis. In addition, Lewis and Scott (2000) mentioned in their study that pocket money is a good way to increase financial literacy among children as they show a better financial competence at the age of 16 – 18 compared to children who did not receive pocket money. Please note that the above studies report about overall financial understanding and that no distinction is made between saving and borrowing behavior. The rapid increase in household debt (Federal Reserve Bank of New York, 2019) and the detrimental effect of over-indebtedness (Betti et al., 2007) makes it relevant to narrow the focus of this study to borrowing behavior only.

Another important study for this research is the one of Buccioli and Veronesi (2014). They studied the effect of parental financial teaching on the propensity to save and the amount saved during adulthood. They made use of the DNB Household Survey and found that parental financial education increases the propensity to save by 16 percent and the amount saved by 30 percent. They found that the best strategy of financial education of parents involves a combination of all the different teaching methods studied (e.g. pocket money, giving budget advice, etc.). The study of Sayılır, Sevim, and Temizel (2012) who looked at “the effect of financial literacy on the borrowing behavior of Turkish financial consumers” argue that an increase of financial literacy may have an important influence in the prevention or reduction of excessive borrowing. The reduction of excessive borrowing seems to become an issue that is growing in importance since materialism and consumerism becomes more dominant in modern life. This may lead to a reluctant attitude towards borrowing and people can get themselves in huge debts (Richins, 2011). This is a perilous development as Persson’s (2010) study finds that over-indebtedness could lead to physical and mental health problems (like a depression). This finding is of great interest, referring to the news of a growing amount of burn-outs under Millennials (Bloomberg, 2019). The papers that investigate the effect of parental financial education during childhood on borrowing behavior do not investigate the mechanisms behind this influence. To be of more relevance to the existing literature, this research analyses the separate effect of the parental financial education mechanisms to arrive at a better understanding.

In contrast with the other studies, Fernandes, Lynch, and Netemeyer (2014) do not see early aged financial education as a necessity to help people understand the increasing complexity of financial decisions. They found that interventions, like pocket money, to improve financial literacy only explain 0.1% of the variance in financial behaviors studied. Even large educational programs would have negligible effects on financial behavior after more than 20 months after the intervention. Hastings, Madrian, and Skimmyhorn (2013) looked into the uncertainty whether financial education actually increases financial literacy and if it actually improves financial behavior. They analyzed several studies, and their findings report that some

studies found almost no relationship between financial education and individual performance on financial literacy tests. Therefore, the evidence regarding the effect of financial education on financial behavior is more limited and not as conclusive as one might expect based on the earlier described studies. That makes this study a relevant addition to the existing literature.

## 2.1 Hypotheses

Based on the literature review, this study tests the following hypotheses:

*Null hypothesis I:* Parental financial education received during childhood has no significant influence on overall borrowing behavior (/study loan borrowing behavior).

*Alternative hypothesis I:* Parental financial education received during childhood has significant influence on overall borrowing behavior (/study loan borrowing behavior).

*Null hypothesis II:* Continuous parental financial education in childhood has a significant greater impact on overall borrowing behavior (/study loan borrowing behavior) than when only received in a particular age group.

*Alternative hypothesis II:* Continuous parental financial education in childhood does not have a significant greater impact on overall borrowing behavior (/study loan borrowing behavior) than when only received in a particular age group.

*Null hypothesis III:* Each of the different parental financial education mechanisms has a significant effect on overall borrowing behavior (/study loan borrowing behavior).

*Alternative hypothesis III:* Each of the different parental financial education mechanisms has no significant effect on overall borrowing behavior (/study loan borrowing behavior)

### 3 Dutch study loan system

In this section, we briefly describe the Dutch study loan system since the DNB Household Survey uses a sample of the Dutch population.

Dienst Uitvoering Onderwijs (2019), in short DUO, provides the study loans in The Netherlands. College students can request a study loan as soon as they start studying. However, students who are studying for a so-called '*Middelbaar Beroeps Onderwijs*' degree can apply when they are 18 years or over. The study loan for Dutch students is a flexible loan. Students can adjust the amount of money received from DUO every month. Students can always borrow less money, but there is a maximum amount of around €1050 a month (without any supplementary grant). A study loan can be requested for studies that are fulltime, dual, recognized, and have a duration of at least one year. To receive a study loan from DUO, students need to have a Dutch nationality or a Dutch residence permit type II – V. After two years, when students finished or quit their studies, they are required to repay their study loan. There are different structures via which the study loan can be repaid: all-in-one time or periodic installments. The amount of monthly debt collection may not be more than 4% of the monthly seizure-free rate. The full amount of debt has to be repaid in either 15 or 35 years. This is a choice a student can make themselves. One worth to mention policy change regarding the Dutch study loan system happened around September 2015. Before September 2015 every student of The Netherlands received a study grant. When living at the parents' house, students received €100,- every month and when students did not live at their parents' house, they received almost €300,- every month. This study grant was not considered as a loan as it was turned into a gift when students received their degree within ten years. The new and current policy does not provide a study grant anymore. It is most likely that The Netherlands stopped providing the study grant because of the increasing tuition costs and rapid increase in enrollments in higher education in recent years that put considerable strains on the budgets of countries that used to have free or low-cost public higher education (Bollag, 2015).

Schonewille, Stoof, and van der Werf (2017) found that in The Netherlands, 73% of the students had a study loan in 2017. In reflection of 2015, only 46% of the students had a study loan: the amount of students with debt has almost doubled over just two years. The policy change of 2015 may be the leading cause of this increase. The paper of Schonewille et al. (2017) mentions several reasons why students take on a study loan. The top three reasons are: (1) they need a study loan to cover unnecessarily high costs, (2) their parents' contribution is insufficient to cover their study expenses, and (3) the loan terms are favorable enough to take on a study loan. The total amount of study loan debt reached in The Netherlands was in 2017 11.2 billion euros (NRC, 2018). Study loans are intended to reduce the pain of rising college fees and to provide more people with the opportunity to study (Sylwester, 2002), but it also puts students in a risky position when they cannot repay their study loan debt (Lewis and van Venrooij, 1995)

## 4 Methodology

In this section, we provide a description of the research methodology, the econometric model, and the key variables of this study. Please refer to Appendix I for the survey questions underlying the key variables.

### 4.1 *Model specification test*

In this study, we use data from the year 2005 up to and till 2018 of the DNB Household Survey. We want to exploit the panel dimension of the data and use the Lagrange Multiplier (LM) test of Breusch and Pagan (1980) to find the appropriate model. The LM test helps us decide between a random-effect regression and an ordinary least squares (OLS) regression. The null hypothesis in the LM test states that there is no significant difference across individuals. Insignificant results on the LM test mean that we can use a simple OLS regression in our study.

The significant results of the LM test for each of our regression models mean that there is significant difference across individuals (i.e., there is a panel-effect present) (Torres-Reyna, 2007). Therefore, we select a generalized least square random-effect model over OLS to study our panel data.

### 4.2 *Research methodology and econometric model*

In this study, we use a research approach that is similar to the study of Bucciol and Veronesi (2014). We use a generalized least square random-effect model to study the effect of parental financial education on overall and study loan borrowing behavior within our panel dataset. A major drawback of the random effects approach arises from the fact that it is only valid when we assume all explanatory variables to be exogenous concerning the error term. It is reasonable to assume that children did not have any influence on the way how their parents provided financial education. However, it is important to point out that we cannot completely exclude that some unobserved factors may have affected both parents' decision in financial education and the borrowing behavior of individuals who received parental financial education in childhood (Bucciol and Veronesi, 2014). The parameter estimates will be biased and inconsistent if the assumption of the explanatory variables to be exogenous concerning the error term does not hold<sup>2</sup> (i.e. it leads to an omitted variable bias) (Hill, Griffiths, and Lim, 2012). This potential omitted variable bias can be solved by using a fixed-effect model instead of a random-effect model. However, our parental financial education variables of interest are time-invariant. Since the fixed-effect model removes the effect of time-invariant variables, we would not be able to study the effect of parental financial education on the dependent variables when

---

<sup>2</sup> We performed a Hausman test (Hausman, 1978) to test the validity of this assumption. The Hausman test is significant and signals that a fixed-effect model is more suitable to use than a random-effect model.



we use a fixed-effect model. For this reason, we use random-effect models for our analyses. To deal with the potential omitted variable bias, we include many relevant control variables within the regression model. Standard errors in this study are robust using White's heteroskedasticity-consistent standard error estimation procedure (Hill et al., 2012). In this study, we use the following regression:

$$Y_{i,t} = \beta_0 + PFE_i \beta_1 + X_{i,t} \beta_2 + G_{i,t} \beta_3 + v_{i,t}, v_{i,t} = (u_i + \varepsilon_{i,t}) \quad (1)$$

Where  $Y_{i,t}$  is a latent variable,  $PFE_i$  is the degree of parental financial education received in childhood,  $X_{i,t}$  are socio-demographic control variables,  $G_{i,t}$  are year and region dummy variables, and  $v_{i,t}$  is the error term: where  $u_i$  is the individual-specific error term and  $\varepsilon_{i,t}$  is the idiosyncratic error term. In this study, the latent variable takes two different variables: overall borrowing behavior and study loan borrowing behavior.

#### 4.3 Overall borrowing behavior variables

We measure borrowing behavior in three ways: first, by the presence of any loan; second, by the aggregated total amount of debt on the eight different loans; and third, we calculate a debt ratio. The eight different loans are private loans; extended lines of credit; credits by mail-order companies; finance credit; loans from family, friends, or acquaintances; study loans; credit cards; and other loans. The presence of a loan is included as a dummy variable taking the value one if present and zero otherwise. The debt ratio is calculated as the total amount of debt divided by the yearly net income (on an individual level). This is in line with the study of Nyhus and Webley (2013).

#### 4.4 Study loan borrowing behavior variables

Next to measuring the effect of parental financial education on overall borrowing behavior, we zoom in on study loan borrowing behavior. We measure study loan borrowing behavior in three ways: first, by the presence of a study loan; second, by the total amount of study loan debt; and third, we calculate a study loan ratio. The presence of a study loan is included as a dummy variable taking the value one if present and zero otherwise. The study loan ratio is calculated as the total amount of study loan debt divided by the yearly net income (on an individual level).

Study loans are included as one of the eight loans that are aggregated to measure overall borrowing behavior. The Pearson correlation coefficient test provides the correlation between study loan borrowing behavior and overall borrowing behavior (please refer to Appendix II). We observe that the correlation between the total amount of debt and study loan debt is positive but small ( $\rho=0.16$ ). Therefore, we believe in gaining different insights when we test the effect

of parental financial education on overall borrowing behavior and study loan borrowing behavior separately.

#### 4.5 *Parental financial education variables*

This study uses four questions of the DNB Household Survey to study parental financial education. This is similar to the study of Bucciol and Veronesi (2014). Please refer to Appendix I where the four questions are numbered from I to IV for identification. The questions are reversed in Appendix I from its original structure so that the questions of ordinal scale can be aggregated to measure the degree of received parental financial education in childhood. The total degree of parental financial education received can take values from 4 to 17. Ranging from having received a low degree of parental financial education (4) to a high degree of parental financial education (17). As 98% of the respondents received some form of parental financial education during childhood (see Table I), a dummy variable would not capture any mentionable variance. Therefore, a measurement of ordinal degree is preferred in this study. This scale of measurement is in line with the study of Homan (2016).

Note that the questions in the DHS survey regarding parental financial education cover two age groups (please refer to Appendix I). This makes it possible to check for any difference in the effect of parental financial teaching between these two age groups. First, a dummy variable of the 'between 8 and 12 years of age' group is included in the regression to test for parental financial education effect in their early childhood. The dummy variable takes the value zero if question '*pocket money (I)*' have been answered with 'No' and/or question '*spending advice (II)*' with 'I could decide on all my expenditures', and one otherwise. Second, a dummy variable is included of the 'between 12 and 16 years of age' group to test for parental financial education effect in their youth. The dummy variable takes the value zero if question '*saving advice (III)*' have been answered with 'No' and/or question '*stimulation to save (IV)*' with 'No, not at all', and one otherwise. Third, there is a dummy variable included that covers parental financial education in both age ranges. The dummy variables take the value one if they have received financial education in both age groups and zero otherwise. This method is in line with Bucciol and Veronesi (2014).

Limitation of this approach is that the questions related to the different age groups do not test the same mechanisms of parental financial education and that no distinction is made between the degree of financial education received. Therefore, the results of this test may be biased since the observed effect may be due to the functioning of the teaching mechanism and not through the age category in which teaching is received. However, the above-described methodology is considered as most suitable to test for any difference in the effect of parental financial teaching between the two age groups since the dataset does not contain other information to test for this.

#### 4.6 *Control variables*

As described in the literature overview, financial literacy is believed to impact financial decision-making, and that ignorance of basic financial concepts can lead to poor borrowing behavior. Previous studies that looked into the effect of financial literacy and financial behavior revealed that financial capabilities vary by gender, age, education and income level (Nyhus and Webley, 2013). In addition, Lusardi (2008) found that women, Afro-Americans, Hispanics and those with low education have particularly low levels of financial literacy. The CentERpanel does not contain information about peoples' nationality, limiting the study in this regard. Lusardi (2008) also found that financial literacy declines by age. This is an important finding taking the fact that people need to make financial decisions throughout their entire lives and that especially seniors are prey in digital financial scams (Association of Certified Fraud Examiners, 2019). Furthermore, Ali, Anderson, McRea, and Ramsay (2016) found that living in an urbanized region positively affects people their degree of financial literacy.

Based on the short discussion above, we include the following control variables in the multivariate analysis: gender, age, occupation, living region, education, presence of a partner, the presence of children, and the log of net income per year for each respondent.

### **5 Data**

This study uses the data of the DNB Household Survey to analyze the effect of parental financial education received during childhood on overall borrowing behavior and study loan borrowing behavior. The property holder, CentERdata, provides free access to this database. The DNB Household Survey, hereafter DHS (for Dutch Household Survey) is a longitudinal survey that is collected every year since 1993. CentERdata collects the data to make it possible to study the economic and psychological determinants of the saving and borrowing behavior of households. The data holds in-depth information about work, pension, living, income, loans, personal characteristics, and economic and psychologic concepts. Each year around 1500 households participate in the DHS representing the Dutch population. The questionnaire is an online survey. The survey invites every household member aged 16 or over to fill in the questionnaire. For several reasons, households may drop out of the survey panel. These households are replaced by households with the same characteristics to prevent attrition (Teppa and Vis, 2012).

At present, the DHS contains data waves of the years 1993 up to and till 2018. This study uses the data waves of 2005 up to and till 2018. The data sets before 2000 are not used since CentERdata then used a different questionnaire, and the wealthier households were over-represented in the sample (Buccioli and Veronesi, 2014). Moreover, the questionnaire is kept much the same from 2005 onwards. The advantage of a panel dataset is that it allows us to follow the same individual over a couple of years and to minimize measurement errors in some key time-invariant variables. This rich dataset makes it possible to study our research objective.

One data wave of the DHS is divided into eight data sets characterized by their type of information. In this study, we use information from four of these data sets: (1) general information on the household, (2) economic and psychological concepts, (3) aggregated data on income, and (4) aggregated data on assets, liabilities and mortgages. We merged all data by a unique personal index number and then appended all the data of the years 2005 up to and till 2018. This original dataset contained 65,453 observations<sup>3</sup> of individuals over time. From this dataset, we use 27,401 observations for analyses in this study. First, we delete 26,090 observations from respondents who did not fill in the questions regarding parental financial education. Second, we remove another 10,451 observations from respondents who did not answer on their liabilities regarding loans. Third, we delete 1,511 observations of one occasion participants: repeated observations are needed to track the influence of the time-varying characteristics of the respondent.

The questions regarding parental financial education refer back to the past and should not change over time, but this was not always the case within the survey. In this study, the first response on the parental financial education questions (please refer to Appendix I) is considered the most accurate, as it is closest to the respondents' childhood. We also impute these answers for years the respondent did not respond on the four questions related to parental financial education.

After cleaning the dataset, we are left with 27,401 observations consisting of 4,683 unique individuals. From these individuals, 65% is the head of household, 26% the spouse, 5% is a partner, and another 5% is a child living at home. The dataset contains, on average 5.85 observations per individual, which is sufficient to reveal patterns in individuals' borrowing behavior and to identify mechanisms that might explain them. The panel data is unbalanced in the number of observations per individual.

Table I presents the descriptive statistics of the pooled sample. The dataset is well represented by each gender since 46% of the individuals in the dataset is female and 54% is male. The average age is 53 years, but the average age of respondents with a study loan is much lower, with an average of 31 years. Within the dataset, 26% of the individuals are retired. Around 17% of the individuals have a loan, and the average amount of debt is €3219 among all individuals, which is on average 13% of their yearly net income. On average, respondents with a study loan received a higher degree of financial education compared to respondents who do not have a study loan. Furthermore, we notice that individuals with a study loan are most represented in the three largest cities: Amsterdam, Rotterdam and The Hague.

---

<sup>3</sup> With an observation we mean data of one individual in a certain year (data of individual 'A' in year 'B'). Since we analyze data of the years 2005 up to and till 2018 one individual can have at most fourteen observations within the dataset.

**Table I. Descriptive statistics – pooled sample**

This table provides an overview of the descriptive statistics of the pooled sample. Borrowing behavior and study loan behavior refer to three variables, which measure the debt behavior of individuals. The degree of parental financial education received refers to the degree to which individuals received parental financial education throughout their whole childhood. Parental financial education received in age 8-12, parental financial education received in age 12-16, and parental financial education received throughout the whole childhood are dummy variables taking value one if parental financial education is received in the specific age category, and zero otherwise. The presence of the four parental financial education methods refers to four ordinal variables reflecting what degree parental financial education was received. Control variables refer to socio-demographic characteristics of individuals. Most descriptive statistics are split among respondents having a study loan and by those who do not (SL = Study Loan). Please refer to Appendix I for more information about the variables.

Variable	Range	Obs.	Mean	Std. Dev
<b>Borrowing behavior</b>				
Presence of any loan	0 – 1	27,401	0.17	0.38
Total debt (€)		27,401	3219.06	25100.44
Total debt to net income		18,236	0.13	4.24
<b>Study loan behavior</b>				
Presence of study loan	0 – 1	27,401	0.04	0.19
Study loan (€)		27,398	14082.29	13719.01
Total study loan to net income		18,234	0.04	0.92
<b>Parental financial education</b>				
Degree of Parental financial education received	4 – 17	27,401	11.25	2.78
SL		999	12.27	2.71
No SL		26,402	11.21	2.77
Parental financial education received in age 8-12	0 – 1	27,401	0.98	0.12
SL		999	0.98	0.13
No SL		26,402	0.98	0.12
Parental financial education received in age 12-16	0 – 1	27,401	0.88	0.32
SL		999	0.95	0.22
No SL		26,402	0.88	0.32
Parental financial education received throughout the whole childhood	0 – 1	27,401	0.88	0.33
SL		999	0.94	0.23
No SL		26,402	0.87	0.33
<b>Response on the four parental financial education mechanisms</b>				
Pocket money (I)	1 – 4	27,401	2.70	1.34
SL		999	3.35	1.09
No SL		26,402	2.67	1.34
Spending advice (II)	1 – 5	27,401	3.35	1.35
SL		999	2.80	1.16
No SL		26,402	3.37	1.35
Saving advice (III)	1 – 4	27,401	2.50	1.10
SL		999	2.77	1.04
No SL		26,402	2.49	1.11
Stimulation to save (IV)	1 – 4	27,401	2.70	1.33
SL		999	3.35	1.08
No SL		26,402	2.67	1.34
<b>Control variables</b>				
Age (in years)		27,388	53	16.26
SL		999	31	6.60
No SL		26,389	54	15.92
Net income (€) (per year)		18,461	23649.47	19894.29
SL		704	22274.50	13424.12
No SL		17,757	23703.98	20106.28
Paid occupation	0 – 1	27,401	0.51	0.50

SL		999	0.74	0.44
No SL		26,402	0.50	0.50
No paid occupation	0 – 1	27,401	0.18	0.38
SL		999	0.23	0.42
No SL		26,402	0.18	0.38
Retired	0 – 1	27,401	0.26	0.44
SL		999	0.00	0.00
No SL		26,402	0.27	0.44
Other occupation	0 – 1	27,401	0.05	0.22
SL		999	0.04	0.19
No SL		26,402	0.05	0.22
Woman	0 – 1	27,401	0.46	0.50
SL		999	0.54	0.50
No SL		26,402	0.46	0.50
Three largest cities	0 – 1	27,401	0.15	0.35
SL		999	0.24	0.42
No SL		26,402	0.14	0.35
Other West	0 – 1	27,401	0.28	0.45
SL		999	0.22	0.42
No SL		26,402	0.28	0.45
North	0 – 1	27,401	0.12	0.33
SL		999	0.13	0.33
No SL		26,402	0.12	0.33
East	0 – 1	27,401	0.20	0.40
SL		999	0.19	0.39
No SL		26,402	0.21	0.40
South	0 – 1	27,401	0.24	0.43
SL		999	0.22	0.42
No SL		26,402	0.24	0.43
High education	0 – 1	27,401	0.37	0.48
SL		999	0.71	0.46
No SL		26,402	0.36	0.48
Middle education	0 – 1	27,401	0.58	0.49
SL		999	0.29	0.45
No SL		26,402	0.59	0.49
Low education	0 – 1	27,401	0.04	0.20
SL		999	0.00	0.04
No SL		26,402	0.04	0.20
Other education	0 – 1	27,401	0.00	0.08
SL		999	0.00	0.06
No SL		26,402	0.00	0.08

## 6 Results

In this section, we provide the results of this study concerning the effect of parental financial education received during childhood on overall and study loan borrowing behavior. The results are presented in univariate and multivariate analyses, respectively.

### 6.1 Univariate results

To get a feeling of the dynamics between the key variables and the dependent variable, we start our result section by running several univariate analyses. First, we look at the effect of parental financial education; second, we analyze the different mechanisms behind parental financial education; and third, we analyze the effect of parental financial education in different age

categories. We test the effect of parental financial education on the presence of a loan and the amount of debt (€) involved. The results of the univariate analyses are given in Table II.

Panel A describes the effect of overall parental financial education. The degree of parental financial education takes on values between 4 (low) and 17 (high). The degree of parental financial education is separated in quartiles to simplify the interpretation of the results. The separation is based on the sample distribution. According to the ANOVA statistic, there is a significant difference in the presence of a loan between the different degrees of parental financial education: respondents in the highest quartile of parental financial education significantly have two percentage points fewer loans compared to the lowest quartile. Furthermore, respondents in the highest quartile have a significantly lower amount of debt of €356 compared to the lowest quartile. Respondents with a high degree of parental financial education have three percentage points more study loans and a €1597 higher amount of study loan debt compared to people with a low degree of parental financial education. Only the last result is not significant. In Panel A, we thus observe a negative relationship between parental financial education and overall borrowing behavior. However, we find a positive relationship with respect to study loan borrowing behavior. This result may be explained by the ‘double-edged sword’ theory of Dwyer et al. (2012) concerning the positive side of study loans.

Panel B describes the effect of the parental financial education mechanism ‘pocket money (I)’. A high degree of pocket money significantly results in seven percentage point more loans and five percentage point more study loans compared to respondents who did not receive pocket money, according to the ANOVA statistics. These findings are in contrast to the study of Bucciol and Veronesi (2014) who did not find a significant effect of pocket money, but they studied the effect of ‘pocket money’ on saving behavior. Moreover, it results in €575 higher amount of debt and €2306 more study loan debt, but both results are not significant.

**Table II. Univariate results**

The tables provide the univariate results of parental financial education (A), the different mechanisms of parental financial education (B-E), and parental financial education in different age categories (F) on the following indicators of borrowing behavior and study loans: presence of a loan (Column 1), total debt (€) (Column 2), presence of a study loan (Column 3), and total amount of study loan (€) (Column 4). In Panel A the degree of parental financial education is split into quartiles: 1=[4-7]; 2=[8-10]; 3=[11-14]; and 4=[15-17]. P-values of the ANOVA statistic smaller than 0.01, 0.05 and 0.10 are indicated by \*\*\*, \*\*, and \*, respectively.

	Presence of a loan	Total debt (€)	Presence of a study loan	The total amount of study loan (€)
	(1)	(2)	(3)	(4)
<b>Panel A: Degree of parental financial education (divided into quartiles)</b>				
1 (low)	0.19	3,636	0.03	12,731
2	0.14	2,629	0.02	12,290
3	0.19	3,572	0.05	14,659
4 (high)	0.17	3,280	0.06	14,328
P-value ANOVA test statistics	0.00***	0.04**	0.00***	0.21
<b>Panel B: Pocket money (I)</b>				
No	0.13	2,873	0.01	12,435
Occasionally	0.16	3,431	0.03	12,426
Yes, but it was sometimes forgotten	0.17	2,735	0.04	12,887

Yes	0.20	3,448	0.06	14,741
P-value ANOVA test statistics	0.00***	0.30	0.00***	0.14
<b>Panel C: Spending advice (II)</b>				
I could decide on all my expenditures	0.22	2,825	0.04	10,956
Mostly, I could decide on how I spent my money	0.20	3,674	0.06	15,721
Part of my expenditure was decided by me, the rest was decided by my parents	0.19	3,499	0.05	13,562
My parents decided on how I spent most of my money	0.16	3,566	0.03	14,642
My parents decided on how I spent all my money	0.12	2,564	0.01	12,433
P-value ANOVA test statistics	0.00***	0.05**	0.00***	0.01**
<b>Panel D: Saving advice (III)</b>				
No	0.17	2,919	0.02	14,847
Yes, but to a certain extent	0.17	3,262	0.03	14,227
Yes, they gave me some advice and practical help	0.18	3,008	0.05	13,190
Yes, they gave me advice and practical help	0.15	3,703	0.05	14,534
P-value ANOVA test statistics	0.00***	0.27	0.00***	0.53
<b>Panel E: Stimulation to save (IV)</b>				
No, not at all	0.13	2,874	0.01	12,435
Yes, but to a certain extent	0.16	3,431	0.03	12,426
Yes, they told me how important saving is	0.17	2,735	0.04	12,887
Yes, they emphasized the necessity of saving	0.20	3,448	0.06	14,741
P-value ANOVA test statistics	0.00***	0.30	0.00***	0.14
<b>Panel F: Parental financial education received by age group</b>				
Parental financial education received in age 8-12	0.13	2,179	0.01	11,329
Parental financial education received in age 12-16	0.26	3,742	0.03	23,285
Parental financial education received throughout the whole childhood	0.17	3,340	0.04	14,058
P-value ANOVA test statistics	0.00***	0.06*	0.00***	0.09*

Panel C studies the effect of the parental financial education mechanism ‘spending advice (II)’. Respondents who received a high degree of spending advice have ten percentage point fewer loans and three percentage point fewer study loans compared to a low degree of spending advice. Spending advice seems to lower the overall amount of debt by €261 but increases the amount of study loan debt by €1477. All results are significant, according to the ANOVA statistic. Based on these findings, we may argue that spending advice decreases the willingness to take on loans.

Panel D describes the effect of the parental financial education mechanism ‘saving advice (III)’. Respondents who received a high degree of saving advice have two percentage point fewer loans and three percentage point more study loans compared to respondents who received no saving advice, both results are significant. A higher degree of saving advice leads to €784 higher amount of debt compared to respondents who did not receive saving advice and €313 fewer study loan debt, but both results are not significant.

Panel E provides results on the effect of the parental financial education mechanism ‘stimulation to save (IV)’. Respondents who received much stimulation to save significantly have seven percentage point more loans and five percentage point more study loans. These results are surprising, as we would expect that people have fewer loans if they have been taught to save. To have received more stimulation to save seems to result in higher amounts of debts and a higher amount of study loans, but neither of these results is significant.



Panel F describes the effect of parental financial education when only received in a specific age group. Respondents who received parental financial education throughout childhood seems to significantly have four percentage point more loans and three percentage point more study loans compared to respondents who only received parental financial education when aged between 8-12. Also, they significantly have a higher amount of overall debt of €1161 and a higher amount of study loan debt of €2729. These are surprising findings as we would expect the willingness to take on loans and the amount of debt to decrease by continuous parental financial education since they are exposed the most to the advantages of this form of education.

## 6.2 Multivariate results on overall borrowing behavior

Tables III and IV provide the results of the effect of parental financial education on overall borrowing behavior.

Table III, Panel A, shows the degree of parental financial education received in quartiles and its effect on the presence of a loan, total debt (€) (log), and the debt ratio (log). When the received degree of parental financial education is above ten, it seems to influence an individual their overall borrowing behavior. Column 3 shows that individuals in the highest quartile have around nine percentage points fewer loans than people in the lowest quartile (1% significance level). This result confirms our expected negative relationship between parental financial education and overall borrowing behavior and is in line with the study of Brown, Grigsby, van der Klaauw, Wen, and Zafar (2015). They studied the effect of financial education on debt behavior and found an increase in debt aversion when individuals were more financially educated. Based on our result, we reject the *null hypothesis I* with respect to overall borrowing behavior. Parental financial education also seems to lower the total amount of debt with 9 percent and the debt ratio with 0.4 percent, but these latter results are not significant.

**Table III. Multivariate analysis – overall borrowing behavior**

This table provides an overview of the multivariate results of the effect of parental financial education on different indicators of overall borrowing behavior: the presence of a loan (column 1-3), total debt (€) (column 4), and the debt ratio (log) (column 5). Please refer to Appendix I for information about the dependent and independent variables. 0.01, 0.05 and 0.10 levels of significance are indicated by \*\*\*, \*\*, and \*, respectively. Robust standard errors reported in parentheses. FE = Fixed Effect. RE = Random Effect.

VARIABLES	(1) Presence of a loan	(2) Presence of a loan	(3) Presence of a loan	(4) Total debt (log) (€)	(5) Debt ratio (log)
<b>Panel A: Parental financial education</b>					
Degree of parental financial education (base group: 4-7)					
8-10	-0.056*** (0.021)	-0.038* (0.020)	-0.033 (0.022)	0.159 (0.205)	0.021 (0.022)
11-14	0.004 (0.020)	-0.024 (0.020)	-0.050** (0.022)	0.072 (0.192)	0.015 (0.020)
15-17	-0.020 (0.023)	-0.064*** (0.023)	-0.088*** (0.025)	-0.091 (0.222)	-0.004 (0.023)
Age		-0.004*** (0.000)	-0.006*** (0.000)	-0.026*** (0.005)	-0.002*** (0.000)

Woman		-0.036***	-0.036***	-0.271***	-0.036***
		(0.010)	(0.011)	(0.100)	(0.010)
Net income (log)			0.003	0.087**	-0.107***
			(0.003)	(0.044)	(0.006)
<i>Education dummy variables</i> (base group: other education)					
High education			0.143***	0.455**	0.033
			(0.049)	(0.219)	(0.025)
Middle education			0.090*	0.265	0.006
			(0.048)	(0.221)	(0.025)
Low education			0.057	-0.263	-0.041
			(0.049)	(0.375)	(0.044)
<i>Occupation dummy variables</i> (base group: retired)					
Other occupation			0.042	-0.082	-0.012
			(0.029)	(0.239)	(0.024)
Paid occupation			-0.003	0.106	0.018
			(0.013)	(0.199)	(0.020)
No paid occupation			-0.019	-0.095	-0.008
			(0.014)	(0.225)	(0.023)
Children			-0.008	-0.140	-0.011
			(0.013)	(0.089)	(0.009)
Partner			-0.041***	0.170	0.018
			(0.013)	(0.108)	(0.011)
Constant	0.212***	0.456***	0.456***	8.450***	2.002***
	(0.019)	(0.027)	(0.068)	(0.625)	(0.076)
Rho	0.678	0.667	0.663	0.599	0.604
Observations	27,401	27,388	17,755	3,148	3,148
Number of respondents	4,683	4,683	3,981	1,142	1,142
Region FE	NO	NO	YES	YES	YES
Year FE	NO	NO	YES	YES	YES
RE	YES	YES	YES	YES	YES

Table IV, Panels B-E, provide the effect of the different parental financial mechanisms on borrowing behavior. Panel F shows the effect of parental financial education on borrowing behavior among different age groups. All panels are controlled for socio-demographic, year, and region fixed effects.

Panel B provides the results of the parental financial education mechanism ‘pocket money (I)’. Respondents who received pocket money have 23 percent less total amount of debt and a two percent lower debt ratio compared to respondents who have not received pocket money (10% significance level). These results are in line with the study of Lewis and Scott (2000), who argue that pocket money increases financial literacy. However, pocket money does not have a significant effect on the propensity to take on a loan or not.

Panel C reports the results of the parental financial education mechanism ‘spending advice (II)’. Respondents who received spending advice have around five percentage points fewer loans compared to respondents who did not (1% significance level). Respondents who said they could spend money as they pleased during childhood do not have a significant different total amount of debt or debt ratio compared to people who were limited in their spending behavior.

Panel D shows the effect of the parental financial education mechanism ‘saving advice (III). Saving advice only has a significant effect on the propensity to take on a loan (1% significance level). Respondents who received saving advice have five percentage points fewer loans compared to respondents who did not. When people are taught to save, it is expected that they are less needy towards loans, which is in line with our result. However, it is surprising that ‘saving advice’ increases the total amount of debt and the debt ratio, but these results are not significant.

**Table IV. Multivariate analysis – overall borrowing behavior (continued)**

This table provides an overview of the multivariate results of the effect of parental financial education on different indicators of overall borrowing behavior: the presence of a loan (column 1), total debt (€) (column 2), and the debt ratio (log) (column 3). Panel B-E report on the different mechanisms of parental financial education; dummy variable takes the value [1] when received, and [0] otherwise. Panel F provides the results of parental financial education in different age categories. Dummy variables take value [1] if parental financial education is received in the specific age category (base group: parental financial education received in age 8-12). Please refer to Appendix I for information about the dependent and independent variables. 0.01, 0.05 and 0.10 levels of significance are indicated by \*\*\*, \*\*, and \*, respectively. Robust standard errors in parentheses. FE = Fixed Effect. RE = Random Effect.

VARIABLES	Presence of a loan (1)	Total debt (log) (€) (2)	Debt ratio (log) (3)
<b>Panel B: Pocket money (I)</b>			
Received pocket money	-0.008 (0.012)	-0.234* (0.125)	-0.023* (0.013)
Constant	0.404*** (0.066)	8.722*** (0.609)	2.035*** (0.075)
Observations	17,755	3,148	3,148
Number of respondents	3,981	1,142	1,142
Rho	0.662	0.597	0.602
Region FE	YES	YES	YES
Year FE	YES	YES	YES
Socio-demographic controls	YES	YES	YES
RE	YES	YES	YES
<b>Panel C: Spending advice (II)</b>			
Received spending advice	-0.050*** (0.019)	0.204 (0.138)	0.022 (0.015)
Constant	0.435*** (0.066)	8.356*** (0.602)	1.999*** (0.074)
Observations	17,755	3,148	3,148
Number of respondents	3,981	1,142	1,142
Rho	0.662	0.598	0.603
Region FE	YES	YES	YES
Year FE	YES	YES	YES
Socio-demographic controls	YES	YES	YES
RE	YES	YES	YES
<b>Panel D: Saving advice (III)</b>			
Received saving advice	-0.046*** (0.013)	0.001 (0.120)	0.001 (0.012)
Constant	0.440*** (0.066)	8.464*** (0.620)	2.010*** (0.076)
Observations	17,755	3,148	3,148

Number of respondents	3,981	1,142	1,142
Rho	0.661	0.598	0.604
Region FE	YES	YES	YES
Year FE	YES	YES	YES
Socio-demographic controls	YES	YES	YES
RE	YES	YES	YES
<b>Panel E: Stimulation to save (IV)</b>			
Received stimulation to save	-0.008 (0.012)	-0.234* (0.125)	-0.023* (0.013)
Constant	0.404*** (0.066)	8.722*** (0.609)	2.035*** (0.075)
Observations	17,755	3,148	3,148
Number of respondents	3,981	1,142	1,142
Rho	0.662	0.597	0.603
Region FE	YES	YES	YES
Year FE	YES	YES	YES
Socio-demographic controls	YES	YES	YES
RE	YES	YES	YES
<b>Panel F: Parental financial education received by age group</b>			
Parental financial education received in age 12-16	0.083 (0.067)	0.126 (0.467)	0.012 (0.047)
Parental financial education received throughout the whole childhood	-0.035** (0.017)	-0.075 (0.169)	-0.009 (0.018)
Constant	0.382*** (0.064)	8.593*** (0.639)	2.028*** (0.078)
Observations	17,619	3,121	3,121
Number of respondents	3,946	1,129	1,129
Rho	0.662	0.598	0.604
Region FE	YES	YES	YES
Year FE	YES	YES	YES
Socio-demographic controls	YES	YES	YES
RE	YES	YES	YES

Panel E provides the results of the parental financial education mechanism ‘stimulation to save (IV)’. Respondents who were stimulated in their saving behavior have 23 percent less amount of debt and a two percent decrease in debt ratio compared to respondents who did not (10% significance level). The stimulation to save mechanism has no significant effect on the existence of loans. Since Panel E is the last panel reflecting on the different parental financial education mechanisms, we can reflect on *hypothesis III*. All parental financial education mechanisms have some significant influence on the different indicators of overall borrowing behavior; most often having a significant effect on the presence of a loan. Consequently, we can reject the *null hypothesis III*. Furthermore, we observe that the best strategy to influence overall borrowing behavior is a combination of all parental financial education mechanisms. This result is in line with the study of Bucciol and Veronesi (2014) who found a similar outcome on saving behavior.

Panel F goes into the results of parental financial education on borrowing behavior by age group. Respondents who received parental financial education throughout childhood have

around four percentage points fewer loans compared to respondents who only received parental financial education when aged between 8-12 (5% significance level). This result is in contrast with our findings in the univariate analysis and is more in line with our expectations. As continuous parental financial education seems to impact overall borrowing behavior the most, we can reject the *null hypothesis II*. We also find a negative relationship between continuous parental financial education and the total amount of debt and debt ratio, but the results are not significant.

The control variables are in line with the study of Bucciol and Veronesi (2014). Please refer to Appendix I for a description of the control variables. Becoming one year older leads to 0.6 percentage point fewer loans, a decrease of 2.6 percent in the amount of debt, and a 0.2 percent decrease in the debt ratio (1% significance level). These results can be explained by the study of Sayılır et al. (2012) who argue that young individuals are more likely to have excessive consumption compared to older individuals. Gender seems to have an impact on borrowing behavior as the results show that women have 3.6 percentage point fewer loans, 27.1 percent lower amount of debt, and 3.6 percent lower debt ratio compared to men (1% significance level). These results are different from the study of Lusardi (2008), who found that women have an increasing effect on borrowing behavior. However, our results can be explained by the study of Calcagnini, Giombini, and Lenti (2015) who argue that women can experience negative gender discrimination in the access of loans. Furthermore, a one percentage change in the log of the yearly net income seems to increase the total amount of debt with nine percent and to lower the debt ratio with 11 percent (1% significance level). This to some surprising result can be explained by the Dutch bank policies being more willing to provide higher sums of money to people with a higher income. Respondents who finished a high educational degree have 14 percentage point (1% significance level) more loans and 46 percent (5% significance level) higher amount of debt compared to respondents in the category 'other education'. The significantly higher amount of debt can be partly explained by study loan debt, which is more present among the higher educated (please refer to Table I). Furthermore, respondents who finished a middle education degree have nine percentage points more loans than respondents who completed 'other education' (10% significance level). To have a partner decrease the propensity to take on a loan with 4.1 percentage points (1% significance level). We also find that respondents in the three largest cities have 1.8 percentage point more loans compared to respondents in the South, which suggest no homogeneity of overall borrowing behavior across the Dutch regions (1% significance level). The children dummy and occupation dummies do not have a significant impact on borrowing behavior.

### 6.3 *Multivariate results on study loan borrowing behavior*

Tables V and VI present the results of the effect of parental financial education on study loan borrowing behavior.

Table V, Panel A, shows the degree of parental financial education received in quartiles and its effect on the presence of a study loan, total study loan debt (€) (log), and the study loan ratio (log). Adding the control variables changes the positive relationship that we observed in the univariate results between parental financial education and study loan borrowing behavior to a negative relationship. The same negative relationship we observed in overall borrowing behavior. Respondents in the highest quartile have four percentage points fewer study loans compared to the respondents in the lowest quartile (5% significance level). The observed effect of parental financial education on study loan borrowing behavior is twice as less compared to the nine percentage point decrease we observed in overall borrowing behavior. This decrease of effect can be explained by the study of Dwyer et al. (2012), who argue that study loans are not necessarily bad loans. Because of the observed significant effect of parental financial education in study loan borrowing behavior, we can reject the *null hypothesis I* concerning study loans. However, parental financial education does not have a significant effect on the total amount of study loan debt or the study loan ratio.

**Table V. Multivariate analysis – Study loan borrowing behavior**

This table provides an overview of the multivariate results of the effect of parental financial education on different information indicators of study loan borrowing behavior: study loan presence (column 1-3), total study loan debt (log) (€) (column 4), and the study loan ratio (log) (column 5). Please refer to Appendix I for information about the dependent and independent variables. 0.01, 0.05 and 0.10 levels of significance are indicated by \*\*\*, \*\*, and \*, respectively. Robust standard errors in parentheses. FE = Fixed Effect. RE = Random Effect.

VARIABLES	(1) Study loan presence	(2) Study loan presence	(3) Study loan presence	(4) Total study loan debt (€) (log)	(5) Study loan ratio (log)
<b>Panel A: Parental financial education</b>					
<i>Degree of parental financial education</i> (base group: 4-7)					
8-10	-0.025** (0.012)	-0.018 (0.011)	-0.005 (0.012)	0.154 (0.330)	0.014 (0.036)
11-14	0.020 (0.012)	0.005 (0.012)	-0.019 (0.013)	0.317 (0.282)	0.037 (0.030)
15-17	0.017 (0.014)	-0.007 (0.014)	-0.037** (0.015)	0.343 (0.298)	0.037 (0.032)
Age		-0.002*** (0.000)	-0.005*** (0.000)	-0.046*** (0.011)	-0.003*** (0.001)
Woman		0.007 (0.006)	0.003 (0.007)	-0.068 (0.129)	-0.011 (0.013)
Net income (log)			0.002 (0.001)	0.148*** (0.054)	-0.108*** (0.010)
<i>Education dummy variables</i> (base group: other education)					
High education			0.049*** (0.018)	-0.083 (0.482)	-0.002 (0.045)
Middle education			-0.006 (0.018)	-0.324 (0.495)	-0.034 (0.046)
Low education			-0.057** (0.023)	-1.643*** (0.502)	-0.162*** (0.047)
<i>Occupation dummy variables</i> (base group: retired)					
Other occupation			0.007	-0.064	-0.007

			(0.009)	(0.142)	(0.015)
Paid occupation			-0.012***	0.098	0.011
			(0.003)	(0.117)	(0.013)
No paid occupation			-0.012**	-	-
			(0.006)		
Children			-0.022***	-0.165	-0.016
			(0.006)	(0.129)	(0.014)
Partner			-0.008	0.068	0.007
			(0.005)	(0.128)	(0.014)
Constant	0.051***	0.157***	0.282***	8.474***	2.020***
	(0.011)	(0.016)	(0.033)	(0.826)	(0.114)
Rho	0.847	0.835	0.857	0.850	0.829
Observations	27,401	27,388	17,755	689	689
Number of respondents	4,683	4,683	3,981	289	289
Region FE	NO	NO	YES	YES	YES
Year FE	NO	NO	YES	YES	YES
RE	YES	YES	YES	YES	YES

Table VI, panels B-E, provide the effect of the different parental financial mechanisms on study loan borrowing behavior. Panel F shows the effect of parental financial education on study loan borrowing behavior among different age groups. All panels are controlled for socio-demographic, year, and region fixed effects.

Panel B provides the results of the parental financial education mechanism ‘pocket money (I)’. Respondents who received some degree of pocket money have 1.6 percentage points fewer study loans compared to people who did not receive pocket money at all (1% significance level). Furthermore, they have a 32.7 percent higher amount of study loan debt and a three percent higher debt ratio compared to respondents who did not receive pocket money, but both results are insignificant.

Panel C reports the results of the parental financial education mechanism ‘spending advice (II)’. Spending advice does not have a significant influence on any of the dependent variables of study loans. This is in contrast with the results on overall borrowing behavior, where spending advice does have a significant effect on the presence of any loan. Therefore, study loan borrowing behavior seems to be less influenced by spending advice.

Panel D shows the effect of the parental financial education mechanism ‘saving advice (III)’. Respondents who received some form of advice in saving have 1.7 percentage points fewer study loans compared to respondents who did not receive any form of saving advice (5% significance level). Saving advice does not show a significant result on the total amount of study loan debt or the study loan ratio. These results are similar to what we found in overall borrowing behavior.

**Table VI. Multivariate analysis – study loan borrowing behavior (continued)**

This table provides an overview of the multivariate results of the effect of parental financial education on different information indicators of study loan borrowing behavior: study loan presence (column 1), total study loan (log) (€) (column 2), and the study loan ratio (log) (column 3). Panel B-E reports on the different mechanisms of parental financial education; dummy variable takes the value [1] when received, and [0] otherwise. Panel F reports the results on the of parental financial education in different age categories. Dummy variables take value [1] if parental financial education is received in the specific age category (base group: parental financial education received age 8-12). Please refer to Appendix I for information about the dependent and independent variables. 0.01, 0.05 and 0.10 levels of significance are indicated by \*\*\*, \*\*, and \*, respectively. Robust standard errors in parentheses. FE = Fixed Effect. RE = Random Effect.

VARIABLES	(1) Study loan presence	(2) Total study loan debt (log) (€)	(3) Study loan ratio (log)
<b>Panel B: Pocket money (I)</b>			
Received pocket money	-0.016*** (0.006)	0.307 (0.196)	0.032 (0.021)
Constant	0.275*** (0.032)	8.549*** (0.752)	2.030*** (0.108)
Observations	17,755	689	689
Number of respondents	3,981	289	289
Rho	0.857	0.849	0.829
Region FE	YES	YES	YES
Year FE	YES	YES	YES
Socio-demographic controls	YES	YES	YES
RE	YES	YES	YES
<b>Panel C: Spending advice (II)</b>			
Received spending advice	0.004 (0.011)	0.160 (0.221)	0.014 (0.023)
Constant	0.253*** (0.031)	8.639*** (0.853)	2.041*** (0.115)
Observations	17,755	689	689
Number of respondents	3,981	289	289
Rho	0.857	0.849	0.829
Region FE	YES	YES	YES
Year FE	YES	YES	YES
Socio-demographic controls	YES	YES	YES
RE	YES	YES	YES
<b>Panel D: Saving advice (III)</b>			
Received saving advice	-0.017** (0.007)	-0.087 (0.190)	-0.007 (0.020)
Constant	0.274*** (0.031)	8.808*** (0.842)	2.054*** (0.114)
Observations	17,755	689	689
Number of respondents	3,981	289	289
Rho	0.857	0.850	0.829
Region FE	YES	YES	YES
Year FE	YES	YES	YES
Socio-demographic controls	YES	YES	YES
RE	YES	YES	YES
<b>Panel E: Stimulation to save (IV)</b>			
Received stimulation to save	-0.016*** (0.006)	0.307 (0.196)	0.032 (0.021)
Constant	0.275*** (0.032)	8.549*** (0.752)	2.030*** (0.108)
Observations	17,755	689	689
Number of respondents	3,981	289	289
Rho	0.857	0.849	0.829
Region FE	YES	YES	YES



Year FE	YES	YES	YES
Socio-demographic controls	YES	YES	YES
RE	YES	YES	YES
<b>Panel F: Parental financial education received by age group</b>			
Parental financial education received in age 12-16	-0.014 (0.035)	0.455 (0.899)	0.027 (0.104)
Parental financial education received throughout the whole childhood	-0.038*** (0.009)	0.265 (0.249)	0.023 (0.028)
Constant	0.297*** (0.032)	8.469*** (0.835)	2.027*** (0.113)
Observations	17,619	682	682
Number of respondents	3,946	286	286
Rho	0.856	0.849	0.828
Region FE	YES	YES	YES
Year FE	YES	YES	YES
Socio-demographic controls	YES	YES	YES
RE	YES	YES	YES

Panel E provides the results of the parental financial education mechanism ‘stimulation to save (IV)’. Respondents who received some form of stimulation to save have 1.6 percentage points fewer study loans compared to respondents who did not receive any form of saving stimulation (1% significance level). Furthermore, they have a 30.7 percent higher amount of study loan debt compared to respondents who did not receive stimulation to save, but the result is insignificant. The relationship of the latter result is surprising. We expect that if people have learned to save, they will need a lower amount of study loan debt to cover their study expenses. However, our result may be explained by the statement of Schonewille et al. (2017). Their report found that the loan terms are favorable enough to take on a study loan and that the money received from the study loan is often put aside for other purposes. We can reflect on *hypothesis III* since panel E is the last panel testing the different parental financial education mechanisms. We observed that ‘spending advice’ did not have some significant influence on the different indicators of study loan borrowing behavior. Therefore, we cannot reject the *null hypothesis III*.

Panel F reflects on the effect of parental financial education on study loan borrowing behavior by looking at different age groups. Respondents who received parental financial education throughout childhood have a 3.8 percentage point fewer study loans compared to respondents who only received parental financial education when aged between 8-12 (1% significance level). Continuous parental financial education has more effect on study loan borrowing behavior than when only received at the age group of 8-12 or 12-16. Consequently, we can reject the *null hypothesis II* concerning study loan borrowing behavior. There is no significant difference in effect in parental financial education among the different age groups with respect to the amount of study loan debt or the study loan ratio.

The control variables are similar to the variables used by Bucciol and Veronesi (2014). Appendix I provides a complete description of the control variables. Becoming one year older leads to a 0.5 percentage point fewer study loans, five percent lower amount of study loan debt, and a decrease of the study loan ratio of 0.3 percent (1% significance level). These results were expected as most individuals study at their younger years, and consequently, the need for study loans reduces with age (please also refer to Table I). Nevertheless, the magnitude of effect with

respect to the presence of loans is lower than expected. Compared to overall borrowing behavior, women lost their significance of effect when looking solely at study loans. Study loans might be less prone to the gender discrimination effect in the access of loans that was described by Calcagnini et al. (2015). Furthermore, a one percentage increase in the log of net income increases the amount of study loan debt with 14.8 percent and decreases the study loan ratio with 11 percent (1% significance level). It is not surprising that respondents with a higher net income have a higher amount of study debt since it is known that people with a high education more often end up in high paid jobs (Graham and Paul, 2011). High education increases the presence of study loans with five percentage points (1% significance level) compared to other education. Compared to other education, low education decreases the presence of a study loan with six percentage points (5% significance level) and decreases the study loan ratio with 16 percent (1% significance level). Respondents in the category paid occupation, and no paid occupation both significantly have 1.2 percentage points fewer study loans compared to respondents who are retired. The presence of children decrease the presence of study loans with 2.2 percentage points (1% significance level). However, the control variable occupation does not have a significant effect on the amount of study loan debt or the study loan ratio. Analyzing the region fixed effects, respondents in the three largest cities have 1.3 percentage point more study loans compared to respondents in the South (5% significance level), which suggest no homogeneity of study loan borrowing behavior across the Dutch regions. Please refer to Table I to notice that respondents with a study loan are most present in the three largest cities.

#### *6.4 Heterogeneity analysis: gender differences*

In our additional test, we study whether there is any difference in the effect of parental financial education between males and females concerning the dependent variables (please refer to Appendix III for the test results).

Our results show that men with a high degree of parental financial education have eight percentage points fewer loans compared to men with a low degree of parental financial education (5% significance level). With women, this difference is minus ten percentage points (1% significance level). We notice that parental financial education has a greater effect on women their overall borrowing behavior compared to men, but this difference is only minor (2 percentage points). Furthermore, we do not find a significant effect of parental financial education on the total amount of debt nor the debt ratio for both men and women. Overall, these results are fairly similar to what we found in Table III.

The effect of parental financial education on study loan borrowing behavior differs substantially among men and women (please refer to Appendix III). Our findings signal only a significant effect of parental financial education on study loan borrowing behavior among women. Women who received a high degree of parental financial education have five percentage points fewer study loans compared to women who received a low degree of parental

financial education (10% significance level). With men, this difference is minus three percentage points, but this result is not significant. This additional test shows that women mostly drive our results of Table V. These findings are in line with the study of Alessie, Dinkova, Kalwij, Schonewille, Van der Schors, and Van der Werf (2019) who reported that the results of females primarily drove their significant effects of financial education on financial literacy. It is difficult to explain this gender gap result as the teaching methods are homogeneous. Furthermore, our findings do not find a significant effect of parental financial education on the study loan debt nor the study loan ratio, which is in line with our results in Table V.

## **7 Conclusions and discussion**

The data of the DNB Household Survey from the year 2005 up to and till 2018 is used to study the effect of parental financial education on overall and study loan borrowing behavior. Moreover, we looked into the individual effect of the different parental financial education mechanisms on overall and study loan borrowing behavior. Also, we investigated the effect of parental financial education on borrowing behavior among different age groups. We measured the effect of parental financial education on three key indicators of overall and study loan borrowing behavior: the propensity to take on a loan, the total amount of debt (€), and a ratio of debt divided by yearly net income.

In the univariate results, we found that respondents with a high degree of parental financial education significantly lead to two percentage points fewer loans and three percentage points more study loans compared to respondents with a low degree. The negative relationship between parental financial education and overall borrowing behavior is in line with the study of Lewis and Scott (2000). The positive relationship between parental financial education and study loan borrowing behavior provides evidence for the ‘double-edged sword’ theory of Dwyer et al. (2012). They point out that study loans are not necessarily a bad loan because study loans are meant to bridge the gap between students' resources and rising college fees.

In the multivariate results, we controlled for socio-demographic characteristics, region fixed effects, and year fixed effects. The inverse relationship between the effect of parental financial education on overall borrowing behavior and study loan borrowing behavior that we observed in the univariate results is lost when we control for other variables. We find that parental financial education has considerably less influence on study loan borrowing behavior compared to overall borrowing behavior. This result can also be seen as evidence of Dwyer et al. (2012), their ‘double-edged sword’ theory that study loans do have a major positive effect. Our findings signal that a high degree of parental financial education significantly leads to nine percentage points fewer loans and four percentage points fewer study loans compared to respondents with a low degree of parental financial education. These results are in line with the theory of planned behavior of Ajzen (1991). Furthermore, we conducted a heterogeneity analysis where we controlled for the gender effect. We find that our results concerning the effect

of parental financial education on study loan borrowing behavior are mainly driven by women, while our results on overall borrowing behavior remain fairly the same.

Another objective of this study was to test whether each of the different teaching mechanisms had a significant impact on borrowing behavior. We find that parental teaching is the most effective to decrease the propensity to take on a loan when the four teaching methods are combined. We observe this result for both overall and study loan borrowing behavior. All teaching methods had some significant impact on overall borrowing behavior. Only spending advice did not have any significant impact at all on study loan borrowing behavior. These results are similar to the study of Bucciol and Veronesi (2014) who studied the effect of parental financial education on saving behavior. However, there are more teaching methods parents can use to improve their child's financial behavior than the four tested in this study. Further research is needed to identify more of these teaching methods to assess better the impact of the four teaching methods tested in this study.

Furthermore, we controlled for the effect of parental financial teaching between the groups aged between 8-12 and 12-16. In this study, we find that parental financial education received throughout childhood (both age groups) is most effective in both overall and study loan borrowing behavior. This result is not surprising as these respondents have been exposed the most to the advantages of parental financial education. However, this result may be biased as this study did not exclude other forms of teaching among the age groups since this data was not available. Also, information on financial socialization after childhood was missing in the dataset.

The results presented in this study cannot be interpreted as causal effects. The treatment variables measuring parental financial education are not exogenous like it would be in an ideal setting. Therefore, our findings could suffer from the omitted variable bias as there may be unobserved characteristics that are correlated with the teaching methods (e.g. parents' education). Information to control for this effect was missing within the dataset. Furthermore, Lusardi (2008) found in his study that borrowing behavior may be subject to cultural influences. The dataset did not contain information about individuals' cultural background, making it impossible to test for Lusardi's observed effect of cultural influences. In addition, we did not control for the effects of other forms of financial education. For example, previous studies found that financial education in school improves financial behavior (Brown, Collins, Schmeiser, and Urban, 2018). For further research, it is interesting to compare the influence of parental financial education to other forms of financial education on borrowing behavior. Furthermore, we briefly touched upon the policy change with respect to study loans within The Netherlands. It would be interesting to test whether this policy change affects the role of parental financial education on study loan borrowing behavior as presented in this study. Our dataset does not show a notable increase in the number of respondents having a study loan after 2015. Therefore, the policy change had no or only minor effect on the current survey respondents. As this policy

change happened in 2015, we need more years of data to be able to analyze the effect of this policy change. We leave this for further research.

Despite these limitations, this study suggests that parental financial education during childhood is important to reduce overall and study loan borrowing behavior. This result is in line with the study of Sayılır et al. (2012). They argue that an increase in financial literacy may reduce borrowing behavior. Consequently, it may reduce the detrimental effects involved with over-indebtedness as described in the study of Persson (2010). In addition, this study provides new insights into the influence of the different parental financial education mechanisms on overall and study loan borrowing behavior. Furthermore, this study provides a closer look at the effect of parental financial education among different age groups. However, further research in this topic is needed to arrive at more reliable results and better explanations behind the results.

The results of this study are especially relevant for policymakers. The knowledge that parental financial education during childhood may play an important role in an individual's later borrowing behavior may help policymakers to reduce overall borrowing behavior and to limit the growth of study loan debt. Policymakers may achieve this by stimulating parents to provide their children with financial education.

## 8 References

- Ajzen, I., 1991. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
- Alessie, R., Dinkova, M., Kalwij, A., Schonewille, G., Van der Schors, A., Van der Werf, M., 2019. The effects of financial education on financial literacy and savings behavior: evidence from a controlled field experiment in Dutch primary schools. *Journal of Consumer Affairs*, (20190219).
- Ali, P., Anderson, M.E., McRea, C.H., Ramsay, I., 2016. The financial literacy of young people: socio-economic status, language background, and the rural-urban chasm. Centre for the Study of Higher Education, University of Melbourne.
- Association of Certified Fraud Examiners, 2019. Elderly fraud scams: how they're being targeted and how to prevent it. Accessed on the 26<sup>th</sup> of March 2019: <https://www.acfe.com/fraud-examiner.aspx?id=4294997223>
- Betti, G., Dourmashkin, N., Rossi, M., Yin, Y.P., 2007. Consumer over-indebtedness in the EU: measurement and characteristics. *Journal of Economic Studies*, 34(2), 136-156.
- Bloomberg, 2018. The student loan debt crisis is about to get worse. Accessed on the 17<sup>th</sup> of February 2019: <https://www.bloomberg.com/news/articles/2018-10-17/the-student-loan-debt-crisis-is-about-to-get-worse>
- Bloomberg, 2019. Millennial burnout: young adults need careers not jobs. Accessed on 29<sup>th</sup> of January 2019: <https://www.bloomberg.com/opinion/articles/2019-01-09/millennial-burnout-young-adults-need-careers-not-jobs>
- Bollag, B., 2015. Student loans: a slippery lifeline. *International Higher Education*, 27(27).
- Boshara, R., Gannon, J., Mandell, L., Phillips, J.W.R., Sass, S., 2010. Consumer trends in the public, private, and nonprofit sector. Working paper, National Endowment for Financial Education, Denver.
- Brown, M., Grigsby, J., van der Klaauw, W., Wen, J., Zafar, B., 2015. Financial education and the debt behavior of the young. Federal Reserve Bank of New York staff reports, staff report no. 634.

- Brown, A., Collins, J. M., Schmeiser, M., Urban, C., 2018. The effects of high school personal financial education policies on financial behavior. *Economics of Education Review*.
- Breusch, T. S., Pagan, A. R., 1980. The Lagrange Multiplier test and its applications to model specification in econometrics. *The Review of Economic Studies*, 47(1), 239-239.
- Buccioli, A., Veronesi, M., 2014. Teaching children to save: what is the best strategy for lifetime savings? *Journal of Economic Psychology*, 45, 1-17.
- Calcagnini, G., Giombini, G., Lenti, E., 2015. Gender differences in bank loan access: an empirical analysis. *Italian Economic Journal*, 1(2), 193-217
- Clark, R., Lusardi, A., Mitchell, O.S., 2017. Employee financial literacy and retirement plan behavior: a case study. *Economic Inquiry*, 55(1), 248-259.
- Cunha, F., Heckman, J., Schennach, S., 2010. Estimating the technology of cognitive and noncognitive skill formation. Working Paper Series, 15664 (15664).
- Dienst Uitvoering Onderwijs (DUO), 2019. Studiefinanciering. Accessed on the 17<sup>th</sup> of February, 2019: <https://duo.nl/particulier/studiefinanciering/>
- Dwyer, R.E., McCloud, L., Hodson, R., 2012. Debt and graduation from American universities. *Social Forces*, 90(4), 1133-1155.
- Federal Reserve Bank of New York, 2019. Quarterly report on household debt and credit. 2018:Q4. Available at: [https://www.newyorkfed.org/medialibrary/interactives/householdcredit/data/pdf/hhdc\\_2018q4.pdf](https://www.newyorkfed.org/medialibrary/interactives/householdcredit/data/pdf/hhdc_2018q4.pdf)
- Fernandes, D., Lynch, J.G., Jr., Netemeyer, R.G., 2014. Financial literacy, financial education, and downstream financial behaviors. *Management Science*, 60(8), 1861-1883.
- Fornero, E., Rossi, M., Sansone, D., 2018. Four bright coins shining at me: financial education in childhood, financial confidence in adulthood. *Journal of Consumer Affairs*.
- Garg, N., Singh, S., 2018. Financial literacy among youth. *International Journal of Social Economics*, 45(1), 173-186.

Godofsky, J., van Horn, C., Zukin, C., 2011. Unfulfilled expectations: recent college graduates struggle in a troubled economy. New Brunswick, NJ: Edward J. Bloustein School of Planning and Public Policy, Rutgers University.

Graham, B., Paul, C., 2011. Does higher education really lead to higher employability and wages in the RMI? Pacific Web. Accessed on the 6th of May 2019:  
<http://www.pacificweb.org/DOCS/rmi/pdf/Education%20and%20wages.pdf>

Hastings, J.S., Madrian, B.C., Skimmyhorn, W.L., 2013. Financial literacy, financial education, and economic outcomes. *Annual Review of Economics*, 5, 347-373.

Hausman, J.A., 1978. Specification test in econometrics. *Econometrica*, 46(6), 1251-1251.

Hill, C., Griffiths, B., Lim, G., 2012. *Principle of Econometrics*. International Student version, John Wiley & Sons, Inc., fourth edition.

Homan, A. M., 2016. The influence of parental financial teaching on saving and borrowing behavior. University of Groningen. Available at:  
<https://www.centerdata.nl/en/publications/the-influence-of-parental-financial-teaching-on-saving-and-borrowing-behavior>

Lewis, A., Scott, A.J., 2000. The economic awareness, knowledge and pocket money practices of a sample of UK adolescents: a study of economic socialisation and economic psychology. *Citizenship, Social and Economics Education*, 4(1), 34-46.

Lewis, A., van Venrooij, M., 1995. A note on the perceptions of loan duration and repayment. *Journal of Economic Psychology*, 16(1), 161-168.

López-Mosquera, N., 2016. Gender differences, theory of planned behavior and willingness to pay. *Journal of Environmental Psychology*, 45, 165-175.

Lusardi, A., Mitchell, O.S., 2007. Baby boomer retirement security: the roles of planning, financial literacy, and housing wealth. *Journal of Monetary Economics*, 54(1), 205-224.

Lusardi, A., 2008. Financial literacy: an essential tool for informed consumer choice? Working Paper Series, 14084 (14084).

Lusardi, A., Mitchell, O.S., 2014. The economic importance of financial literacy: theory and evidence. *Journal of Economic Literature*, 52(1), 5-44.



- Lusardi, A., 2019. Financial literacy and the need for financial education: evidence and implications. *Swiss Journal of Economics and Statistics*, 155(1).
- Meyer, M., 2017. Is financial literacy a determinant of health? *Patient -Adis-*, 10(4), 381-387.
- Mishra, A., Serido, J., Shim, S., Tang, C., 2010. Financial parenting, financial coping behaviors, and well-being of emerging adults. *Family Relations*, 59(4), 453-464.
- NRC, 2018. Nationale studieschuld stijgt verder naar 11.2 miljard. Accessed on the 29<sup>th</sup> of January 2019: <https://www.nrc.nl/nieuws/2018/08/30/nationale-studieschuld-stijgt-verder-naar-112-miljard-a1614713>
- Nyhus, E. K., Webley, P., 2013. Economic socialization, saving and assets in European young adults. *Economics of Education Review*, 33, 19-30.
- OECD, 2017. PISA 2015 results: students' financial literacy (volume IV). Paris: PISA, OECD Publishing.
- Persson, A.H., 2010. Over-indebtedness-a growing problem. *Scandinavian Studies in Law*, 50, 463-476.
- Richins, M.L., 2011. Materialism, transformation expectations, and spending: implications for credit use. *Journal of Public Policy & Marketing*, 30, 141–156.
- Sayılır, O., Sevim, N., Temizel, F., 2012. The effects of financial literacy on the borrowing behaviour of Turkish financial consumers. *International Journal of Consumer Studies*, 36(5), 573-579.
- Schonewille, G., Stoof, R., van der Werf, M., 2017. *Studentenonderzoek 2017*. Nibud, september 2017.
- Smollar, J., Youniss, J., 1989. Transformations in adolescents' perceptions of parents. *International Journal of Behavioral Development*, 12(1), 71-84.
- Sylwester, K., 2002. Can education expenditures reduce income inequality? *Economics of Education Review*, 21(1), 43-52.
- Teppa, F., Vis, C., 2012. The centERpanel and the DNB household survey: methodological aspects. *DNB Occasional Studies*, 10(4).

Torres-Reyna, O., 2007. Panel data analysis fixed and random effects using Stata. Accessed on the 8<sup>th</sup> of May 2019: <http://www.princeton.edu/~otorres/Panel101.pdf>.

## Appendix I: Survey questions<sup>4</sup> and variables description

Overall borrowing behavior	<p><b>Presence of loan:</b> the presence of loan is retrieved with the following question: “Did you, on &lt;date&gt;, have one or more &lt;type of loan&gt;?” The dummy variable takes the value one when this question is answered with “Yes”. The survey takes into account the following eight different loans: private loans; extended lines of credit; credits by mail-order companies; finance credit; loans from family, friends, or acquaintances; study loans; credit cards; and other loans.</p> <p><b>The total amount of debt (€):</b> The total amount of debt is aggregated per respondent, not per household. The sum of the amount of debt is calculated by aggregating the total amount of debt for each loan. This value is derived from the following question: "What was the total balance of your &lt;type of loan&gt; on &lt;date&gt;? Type -99 if you don't know the answer." Outliers are removed in regressions by taking the log of the total amount of debt.</p> <p><b>Debt ratio:</b> Ratio of total amount of debt (€) divided by yearly net income. The log is taken in the regressions to deal with the skewness of the distribution.</p>
Study loan borrowing behavior	<p><b>Presence of study loan:</b> the presence of loan is retrieved with the following question: “Did you, on &lt;date&gt;, have one or more study loans?” The dummy variable takes one when this question is answered with “Yes”.</p> <p><b>The total amount of study loan debt (€):</b> The amount is derived from the following question: “How much was the total remaining debt of your STUDY LOAN on &lt;date&gt;? Express the amount to the nearest Euro. Type -99 if you don’t know the answer.” Outliers are removed in regressions by taking the log of the total amount of debt.</p> <p><b>Study loan ratio:</b> Ratio of total amount of study loan debt (€) divided by yearly net income. The log is taken in the regressions to deal with the skewness of the distribution.</p>
Parental financial education	<p><b>Pocket money (independence) (I):</b> When you were between 8 and 12 years of age, did you receive an allowance from your parents then? By allowance, we mean a fixed amount received on a regular basis. [4] Yes; [3] Yes, but it was sometimes forgotten; [2] Occasionally; [1] No.</p> <p><b>Spending advice (II):</b> When you were between 8 and 12 years of age, could you spend your money as you pleased? [5] My parents decided on how I spent all my money; [4] My parents decide on how I spent most of my money; [3] part of my expenditure was decided by me, the rest by my parents; [2] Mostly, I could decide on how I spent my money; [1] I could decide on all my expenditures.</p> <p><b>Saving advice (III):</b> Did your (grand) parents try to teach you how to budget when you were between 12 and 16 years of age? [4] Yes, they gave me advice and practical help; [3] Yes, they gave me advice and some practical help; [2] Yes, but to a certain extent; [1] No.</p>

<sup>4</sup> All survey question are from the codebooks of the DNB household survey. Accessible at: <https://www.dhsdata.nl/site/users/login>

	<p><b>Stimulation to save (IV):</b> Did your (grand) parents stimulate you to save money between the age of 12 and 16? [4] Yes, they emphasized the necessity of saving; [3] Yes, they told me how important saving is; [2] Yes, but to a certain extent; [1] No, not at all.</p> <p><b>Degree of parental financial education received:</b> The questions I – IV above are aggregated to make a measurement of the degree to which parental financial education is received. This variable can take values of 4 – 17. Ranging from having received a low degree of parental financial education (4) to a high degree of parental financial education (17). This measurement is then divided into quartiles within the regressions: 1=[4-7]; 2=[8-10]; 3=[11-14]; and 4=[15-17].</p> <p><b>Parental financial education received in age 8-12:</b> Dummy variable to check the effect of parental financial education during childhood (8 and 12 years of age). Dummy variable takes the value ‘zero’ if the question I and/or question II have been answered other than ‘No’ or ‘I could decide on all my expenditures’, respectively.</p> <p><b>Parental financial education received in age 12-16:</b> Dummy variable to check the effect of parental financial education during childhood (12 and 16 years of age). Dummy variable takes the value ‘zero’ if question III and/or question IV have been answered other than ‘No’ or ‘No, not at all’, respectively.</p>
Gender	Dummy variable takes the value one if the respondent is a woman and zero otherwise.
Age	Age of the respondent calculated from the year of birth.
Occupation	<p><b>Paid occupation:</b> Dummy variable takes the value one if the respondent is employed on a contract, self-employed, or working in own business, and zero otherwise.</p> <p><b>No paid occupation:</b> Dummy variable takes the value one if the respondent is looking for its first job, lost its job, a student, works in his own household, works as a volunteer or has unpaid work, and zero otherwise.</p> <p><b>Retired:</b> The Dummy variable takes the value one if the respondent is retired and zero otherwise.</p> <p><b>Other:</b> Dummy variable takes the value one if the respondent selected ‘other’ as a premier occupation or disabled, and zero otherwise.</p>
Living region	Dummy variable takes the value one if living in one of the region of choice and zero otherwise. The geographical region question in the survey has the following answer options: [1] Three largest cities; [2] Other West; [3] North; [4] East; and [5] South. The three largest cities are Amsterdam, Rotterdam and The Hague.
Education	<p><b>High education:</b> The dummy variable takes the value one if the respondent completed vocational college or university education as the highest education, and zero otherwise.</p> <p><b>Middle education:</b> The dummy variable takes the value one if the respondent completed pre-vocational education, pre-university</p>

	<p>education, or senior vocational training as the highest education and zero otherwise.</p> <p><b>Low education:</b> The dummy variable takes the value one if the respondent completed special education, kindergarten/primary school, or no form of education as the highest education and zero otherwise.</p> <p><b>Other education:</b> The dummy variable takes the value one if the respondent completed ‘other sort of education/training’ and zero otherwise.</p>
Net income <sup>5</sup>	Yearly net income of the respondent. We use the net income as calculated by DHS. The log is taken in the regressions to deal with the skewness of the distribution.
Partner	Dummy variable takes the value one if respondent has a partner and zero if the respondent does not have a partner.
Children	Dummy variable takes the value one if children are present in the household and zero otherwise.
Year	The year in which the respondent filled in the questionnaire.

---

<sup>5</sup> Please refer to the codebooks of the DNB household survey for a precise explanation of their calculation. Accessible at: <https://www.dhsdata.nl/site/users/login>

## Appendix II: Pearson correlation coefficient test

**Table A. Pearson correlation coefficient matrix**

Table A, provides the results of the Pearson correlation coefficient test. P-values smaller than 0.01, 0.05 and 0.10 are indicated by \*\*\*, \*\*, and \*, respectively.

	The total amount of debt (€)	Study loan debt (€)	Presence of any loan	Presence of study loan
The total amount of debt (€)	1.000			
Study loan debt (€)	0.1643***	1.000		
Presence of any loan	0.2835***	0.3053***	1.000	
Presence of study loan	0.1396***	0.7100***	0.4300***	1.000

### Appendix III: Gender heterogeneity analysis

**Table B. Gender heterogeneity analysis**

Table B, provides the results of the gender heterogeneity test. This table shows the results of overall borrowing behavior (column 1-6) and study loan borrowing behavior (column 7-12). These results are split by gender: male and female. This is indicated below the column header. For information about the dependent and independent variables, please see Appendix I. P-values smaller than 0.01, 0.05 and 0.10 are indicated by \*\*\*, \*\*, and \*, respectively. Robust standard errors in parentheses. The results are controlled for region and year fixed-effects.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	OVERALL BORROWING BEHAVIOR						STUDY LOAN BORROWING BEHAVIOR					
	Presence of a loan (male)	Presence of a loan (female)	Total debt (log) (€) (male)	Total debt (log) (€) (female)	Debt ratio (log) (male)	Debt ratio (log) (female)	Study loan presence (male)	Study loan presence (female)	Total study loan debt (log) (€) (male)	Total study loan debt (log) (€) (female)	Study loan ratio (log) (male)	Study loan ratio (log) (female)
Degree of parental financial education (base group: 4-7)												
8-10	-0.049*	-0.012	-0.085	0.497	-0.005	0.058	-0.007	-0.003	0.217	0.148	0.025	0.010
	(0.029)	(0.033)	(0.241)	(0.373)	(0.024)	(0.041)	(0.013)	(0.021)	(0.450)	(0.446)	(0.048)	(0.050)
11-14	-0.030	-0.074**	-0.090	0.321	-0.004	0.046	0.001	-0.044**	0.075	0.363	0.012	0.040
	(0.029)	(0.033)	(0.222)	(0.362)	(0.022)	(0.040)	(0.015)	(0.022)	(0.431)	(0.367)	(0.046)	(0.040)
15-17	-0.080**	-0.098***	-0.304	0.229	-0.025	0.029	-0.027	-0.049*	0.238	0.357	0.031	0.034
	(0.036)	(0.037)	(0.268)	(0.394)	(0.027)	(0.044)	(0.019)	(0.025)	(0.453)	(0.385)	(0.048)	(0.041)
Age	-0.005***	-0.008***	-0.030***	-0.020***	-0.003***	-0.002**	-0.004***	-0.006***	-0.050***	-0.034*	-0.004***	-0.002
	(0.001)	(0.001)	(0.006)	(0.007)	(0.001)	(0.001)	(0.000)	(0.000)	(0.013)	(0.019)	(0.001)	(0.002)
Net income (log)	0.003	0.002	0.104*	0.075	-0.097***	-0.118***	0.003	0.001	0.131*	0.165**	-0.113***	-0.099***
	(0.005)	(0.004)	(0.057)	(0.070)	(0.008)	(0.009)	(0.003)	(0.001)	(0.072)	(0.075)	(0.016)	(0.011)
Education dummy variables (base group: other education)												
High education	0.038	0.205***	0.772*	-0.033	0.070*	-0.025	0.006	0.062***	0.902**	-0.314	0.098***	-0.012
	(0.055)	(0.065)	(0.407)	(0.203)	(0.042)	(0.024)	(0.030)	(0.023)	(0.370)	(0.413)	(0.038)	(0.045)
Middle education	-0.009	0.146**	0.707*	-0.441*	0.060	-0.080***	-0.034	-0.012	0.903***	-0.765	0.092***	-0.065
	(0.056)	(0.061)	(0.403)	(0.241)	(0.041)	(0.027)	(0.031)	(0.023)	(0.345)	(0.488)	(0.036)	(0.054)
Low education	-0.032	0.102*	-0.370	-0.389	-0.051	-0.058	-0.112**	-0.036	-	-1.963***	-	-0.187***
	(0.073)	(0.058)	(0.521)	(0.494)	(0.053)	(0.061)	(0.047)	(0.023)	-	(0.513)	-	(0.056)
Occupation dummy variables (base group: retired)												
Other occupation	0.048	0.040	-0.132	0.049	-0.017	-0.000	0.004	0.008	0.076	-0.111	0.003	-0.013
	(0.045)	(0.038)	(0.320)	(0.317)	(0.032)	(0.034)	(0.012)	(0.012)	(0.248)	(0.144)	(0.024)	(0.015)
Paid occupation	0.002	-0.006	0.037	0.190	0.008	0.027	-0.010***	-0.016***	0.091	0.133	0.018	0.012
	(0.018)	(0.018)	(0.262)	(0.253)	(0.025)	(0.025)	(0.003)	(0.005)	(0.213)	(0.116)	(0.023)	(0.013)
No paid occupation	-0.015	-0.021	-0.213	-0.029	-0.015	-0.007	-0.014*	-0.013	-	-	-	-
	(0.023)	(0.017)	(0.309)	(0.278)	(0.030)	(0.029)	(0.008)	(0.008)	-	-	-	-
Children	0.008	-0.025	-0.191	-0.058	-0.015	-0.004	-0.017**	-0.027**	-0.415**	0.029	-0.035*	0.001
	(0.018)	(0.019)	(0.137)	(0.122)	(0.013)	(0.013)	(0.007)	(0.010)	(0.174)	(0.183)	(0.018)	(0.020)
Partner	-0.064***	-0.023	0.127	0.220	0.016	0.016	-0.012	-0.007	0.008	0.056	0.001	0.003
	(0.018)	(0.019)	(0.174)	(0.138)	(0.017)	(0.015)	(0.009)	(0.007)	(0.166)	(0.194)	(0.017)	(0.022)
Constant	0.480***	0.442***	8.185***	8.537***	1.891***	2.104***	0.263***	0.346***	7.956***	8.130***	1.987***	1.911***
	(0.094)	(0.089)	(0.861)	(0.905)	(0.101)	(0.106)	(0.051)	(0.046)	(0.935)	(1.103)	(0.150)	(0.143)
Rho	0.649	0.684	0.573	0.653	0.577	0.646	0.835	0.876	0.781	0.898	0.732	0.888
Observations	10,143	7,612	1,896	1,252	1,896	1,252	10,143	7,612	324	365	324	365
Number of respondents	2,102	1,879	643	499	643	499	2,102	1,879	136	153	136	153

