

Homeownership and Student Debt: Exploring the Impact of Student Debt on Homeownership in the Netherlands

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Abstract. Rising student loan debt has been shown in recent literature to have a negative impact on homeownership rates, especially for young adults. This study focuses on the relationship between student debt and homeownership in the Netherlands. Utilizing data from the DNB Household Survey (DHS) with 6,824 observations over the period 2002-2022, this study uses logistic regression models to assess how student debt presence, high debt levels, and accrued debt influence the likelihood of homeownership. The key independent variables are a binary student debt indicator, a binary indicator of high student debt, and the logarithm of accrued student debt. The results show that student loan debt has a substantial negative effect on homeownership. Individuals with student debt are significantly less likely to become homeowners, and the negative impact becomes more pronounced for those with higher debt levels. Life course events such as living together with a partner, obtaining a college degree, and having children remain key predictors of homeownership. These findings contribute to the academic literature by providing empirical evidence of student debt's impact on homeownership within the Dutch context, given the previous literature's focus on the U.S. context. This illustrates the need to take institutional and economic variations into account when analyzing how student loans affect various housing markets. These findings highlight the necessity for policy measures to mitigate the financial strain of student loans and enhance homeownership opportunities for young graduates.

Keywords: Student debt, Homeownership, Young adults, Financial stability, Starters

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1. INTRODUCTION

1.1 Societal Relevance

Homeownership and Student loans

The housing affordability crisis has been coined as the next global crisis in the making, an alarming trend can be seen in many urban centers around the world which shows that household expenses are rising faster than salary and wages (Wetzstein, 2017). Housing supply shortages are a key reason for this crisis, rising construction material shortages and costs in recent years have slowed down economic recovery efforts to combat this crisis (Arnold, 2021). Several issues, including homelessness, financial instability, inadequate housing, and the inability of younger generations to leave their family homes and become independent, have been brought on by the EU's growing housing shortage (Bieling, 2023).

The effects of the housing crisis extend far beyond just the affordability of houses. They fuel broader social problems including obesity, falling fertility rates, inequality, and climate change (Bowman, Myers and Southwood, 2021; Bieling, 2023). People's lifestyles are greatly influenced by their housing, which has an impact on their social circles, place of employment, number of children, and health. Increasing amounts of people are being compelled to live further away from city centers due to rising housing costs, this led to a significant effect on their quality of life and financial standing. Inadequate and insufficient housing has been connected to political and cultural divisions and inequality (Bowman, Myers and Southwood, 2021).

Unaffordable housing mostly affects vulnerable populations. These vulnerable households often comprise of members of the younger generation, those with lower and middle incomes, and those who are facing material, social, and physical challenges (Wetzstein, 2017). This paper will focus primarily on members of the younger generation who aim to achieve homeownership. Generational gaps in homeownership rates appear to be growing. The homeownership attainment levels of young adults have seen a significant decline in recent years (Myers *et al.*, 2019; Hochstenbach and Arundel, 2021). Homeownership has been stimulated by many governments including the Netherlands over the past few decades, this promotion of owning a home has gone hand in hand with the narrative that homeownership has become a marker of class attainment, social status, and financial security (Ronald, 2008; Hochstenbach and Arundel, 2021). This stimulation of homeownership has not gone without reason however as it has proven to have numerous spillover effects which can be encapsulated in four key areas; wealth accumulation, child outcomes, social capital, and mobility (Andrews and Caldera Sánchez, 2011).

The current narrative regarding homeownership is that its decline has led to a series of individual and societal implications. However, as Ronald (2008) states, discussing the declining opportunities of young adults in the owner-occupied market runs the risk of reinforcing narratives that emphasize homeownership. Homeownership preferences are not "natural," but rather the result of socialization and discourses that promote an ideology of homeownership. Similarly, the benefits of homeownership are

not often obvious and are mostly the result of policies that have given it preference over alternative tenures (Ronald, 2008; Hochstenbach and Arundel, 2021). However, young individuals' incapacity to purchase becomes more problematic as safe and inexpensive rental options grow more and more scarce (Hochstenbach and Arundel, 2021). Young adults in the Netherlands are becoming more reliant on private rentals, which proves problematic as their rent obligations are substantial and rising making up to 45% of their net income in 2021 (Statistics Netherlands, 2022).

Paired with the falling homeownership rates and rising private rental costs, the current generation of young adults face mounting student loans. This raises concerns about the social and economic consequences of this debt and subsequent homeownership attainability. According to Statistics Netherlands (2023) student debt has been increasing steadily over recent years; in 2012 average student debt was 11.8 thousand euros compared to 2022's average of 16,4 thousand euros. Critically students aged 25-29 face the highest average debt with 21.2 thousand euros which is when the majority of individuals will have already obtained a degree and are undergoing life course transitions such as family formation and home buying. The relationship between student loan debt and home buying is heavily debated, with contention surrounding whether the potential negative consequences of student debt on homeownership outweigh the benefits of educational attainment (Myers *et al.*, 2019). The positive and negative associations of this relationship are further expanded upon in section 2.1 however it is important to note this dynamic between student debt and homeownership, and the interconnectedness of various channels that can have different associations and outcomes. Understanding these dynamics is crucial for policymakers, financial advisors, and individuals navigating the complexities of higher education financing and homeownership attainment. Public opinions on student debt are still negative as the "pechgeneratie" (bad luck generation) struggles with increasing interest rates on existing loans, making it challenging to get a mortgage. In turn, this causes them to enter the private rental sector limiting their ability to accumulate savings (Bajja, 2023).

1.2 Academic Relevance

Earlier literature on student loans and homeownership has been most extensive within the US context¹. The current body of literature is almost exclusively focused on the North American context as remarked by De Gayardon, Callender and Desjardins (2021). Several of these research efforts have been dedicated to assessing the extent to which the empirical association observed between student debt and homeownership may reflect a causal connection. This relationship is rendered complex due to the existence of confounding variables. Despite these challenges in empirically establishing a causal link, numerous studies have yielded significant insights regarding the different dynamics of the relationship. Andrew (2010) notes a greater variation in the timing of first-time house purchases of graduates due to

¹ See Appendix G which indicates what search engines as well as keywords were used to find appropriate literature.

increased earning heterogeneity among graduate cohorts. P. Akers and Chingos (2014) further deduce that the financial obligations of student borrowers are relatively manageable in relation to their incomes, which highlights the benefits gained from their educational investments. In contrast, Gicheva and Thompson (2014) identified notably higher incidences of binding credit constraints and bankruptcy among student loan borrowers following their educational period, compared to those without student loans. Additionally, some indications of reduced homeownership rates among individuals with student debt were found. Houle and Berger (2015) in their analysis of homeownership rates within the 1997 cohort of the National Longitudinal Survey of Youth (NLSY), observed a slightly lower rate of homeownership among individuals with student loans compared to those without. However, they did not find a significant link between the balance of student loans and the likelihood of owning a home. Rather, their findings indicated that sociological indicators marking the transition to adulthood have a significantly positive correlation with homeownership. Houle and Warner (2017) and Cooper and Luengo-Prado (2018) acknowledging that patterns of young adults living with their parents is crucial, given its impact on homeownership, find student debt does not substantially increase the likelihood of young adults moving back into their parents' home. Along the same lines Purcell et al., (2013) finds using survey data in England, that student debt prevents graduates from leaving the parental home. Letkiewicz and Heckman (2017) yield three principal conclusions. Firstly, traditional factors like marital status, education level, and income remain significant indicators of homeownership, with married individuals holding a college degree and having children being the most probable homeowners. Secondly, possession of student loan debt does not by itself affect the likelihood of homeownership compared to those without a loan, once various factors are accounted for; nonetheless, individuals who have settled their student debts tend to be homeowners more often. Lastly, a propensity for financial risk-taking increases the chances of homeownership, whereas a higher degree of conscientiousness may decrease these chances. Sommer (2020) claims that although student loan debt may have played a role in the decline in the percentage of homeowners due to the large financial strains young individuals experience the effect has been mostly transitory. It is not anticipated to have a long-term or significant influence on the general trend of homeownership in the economy due to government ownership of student loan risk. Mezza et al. (2020) report that increases in \$1,000 of student loan debt causes a 1-2 percentage point drop in homeownership rates. Additionally, it is noted that student loan debt has a clear negative effect on credit scores potentially excluding indebted students from the mortgage market. De Gayardon, Callender and Desjardins (2021) using the Next Steps dataset, find that young graduates who don't have student loans are more likely to become homeowners and less likely to rent or live with their parents than graduates who borrowed for their studies or individuals who never attended higher education. Scott III and Bloom (2021) find that possessing student loan debt is associated with a 15.1% increase in the likelihood of purchasing a home. However, those with student loan debt tend to purchase homes that are 39.2% less expensive and possess 58% less equity compared to their counterparts without

such debt. Furthermore, the study highlights the significance of the debt amount, with high levels of debt decreasing the probability of being a homeowner.

The findings of a growing body of literature present a complex picture. A significant body of research suggests that there is a negative relationship between student loan debt and the probability of becoming homeowners, implying that higher levels of debt deter individuals from purchasing homes. However, some academics contend that there is no definitive relationship, pointing to other mitigating factors as being the primary influence on this dynamic. Finally, a third group of academics report mixed outcomes, further highlighting the nuanced and complex nature of the relationship between student debt and homeownership. Overall prior research has been extensive in its insights however limited in its context. Aside from Andrew (2010), Purcell et al., (2013) and De Gayardon, Callender and Desjardins (2021), all studies based in England, the predominant focus of existing literature is on the U.S. context. This points to a significant gap regarding the generalizability of findings across different countries, particularly in light of institutional differences. These differences primarily present themselves in the student loan systems, which could have potential implications for homeownership. The U.S. system largely depends on federal student loans, capped by Congress, loans are not dischargeable in bankruptcy, and options for repayment include standard 10-year amortization or income-based repayment plans, the latter offering forgiveness after 20 or 25 years. Private loans, with interest rates based on credit scores, provide an alternative when federal loans are insufficient, though they offer fewer protections. The UK student loan system provides tuition fee loans and maintenance loans. Tuition fee loans cover up to £9,250 per year, whilst maintenance loans are designed to cover living expenses with amounts being based on household income. Students living away from home can borrow up to £10,000 each year. Interest on these loans begins the day they are taken out, which is linked to the retail price index (RPI). Repayment begins post-graduation, with a threshold of £25,000, above which graduates repay 9% of their income over this amount. Loans are written off after 40 years. The Dutch system, while similar in offering government loans, has seen significant changes. It provided a baseline grant, convertible into a gift upon completion of studies within ten years, before 2015 and again after 2023. Additionally, students from less financially able households were eligible for a supplemental grant. From 2015 to 2023, the system transitioned to loans only, starting with no interest and later experiencing an increase in interest rates. These changes in the Dutch system, in contrast to the more stable U.S and U.K. model, suggest varying impacts on graduates' ability to achieve homeownership, with the Dutch system's grant-based financing periods possibly providing benefits. When analyzing the relationship between student debt and homeownership rates, it is important to comprehend these differences in the institutional framework. In doing so it becomes evident that the prior extensive research from the U.S. is not fully generalizable to for example the Dutch context. Therefore this study focuses on examining the role of student loan debt on homeownership within the Dutch context to contribute to the gap in the existing literature. This study utilizes an unbalanced panel dataset to conduct a longitudinal analysis incorporating various socioeconomic status factors, such as income, educational level, urbanicity, and

marital status. The 20-year time span of this research aims to explain the extent and manner in which changes in student debt levels among potential homebuyers correlate with shifts over time, particularly in light of the institutional redesign of the Dutch student loan system. These comparisons could give better insight into different dynamics across countries.

1.3 Research problem statement

Despite the well-known obstacles that young people face in order to become homeowners, there appears to be limited empirical evidence of the impact student loan debt has outside the North American context. Consequently, the primary objective of this study is to provide empirical evidence and create a further understanding of the relationship between student loan debt and homeownership. Concretely this study aims to analyze the Dutch context to identify any similarities with past literature focusing on other regions. In doing so, this study hopes to add to the existing academic literature available on the dynamics of homeownership attainment for starters and young homebuyers. This leads to the central research question:

RQ: What is the relationship between student loan debt and homeownership?

To effectively address the main research question, two sub-questions have been formulated, specifying the theoretical and empirical aspects of the study:

Sub-RQ 1: What insights does the existing scientific literature provide regarding the relationship between student loan debt and homeownership, and what empirical evidence is there?

The initial sub-question seeks to synthesize and critically analyze the existing scientific literature to illuminate the impact of student debt on homeownership. Emphasis is placed on discerning both the positive and negative associations and dynamics within this relationship, while also considering the surrounding institutional context.

Sub-RQ2: What is the empirical relationship between individuals with student loan debt and their homeownership attainment ability?

The second sub-question aims to contribute to the ongoing discussion by empirically substantiating the role student debt has on the ability of young adults to attain owner-occupancy. The data used will be from the DNB household survey (DHS) provided by the Centerdata Research Institute which includes survey data from individuals across the Netherlands between 2002 and 2022, and incorporates socioeconomic and geographic factors.

1.4 Outline

The structure of this paper is as follows; First, this paper provides more in-depth knowledge on the existing literature and clarifies the empirical context of the Netherlands in section 2. Thereafter in section 3, the data and methodology are further elaborated on. Section 4 presents the results and discussion. Section 5 consists of concluding remarks, potential limitations of the findings, and future research ideas.

2. THEORETICAL FRAMEWORK

This chapter serves to expand the theoretical framework for this study. Initially, the institutional background of student loan systems within primarily the U.S. and Netherlands is further elaborated on, and a short section elaborating on the current loan system in England is also given. Then the theory behind homeownership and its relation to student debt is further contextualized. Furthermore, this section will present the conceptual model and the hypothesis.

2.1 Institutional background.

Within the U.S. Loan system, the vast majority of students have access to federal student loans. The amount that can be loaned is capped by Congress, these federal student loans are not dischargeable in bankruptcies, potentially reducing the options of lenders in financial turmoil (Mezza *et al.*, 2020; Blagg *et al.*, 2022). The federal capped loan amounts depend on dependency status, whether the student is an undergraduate or graduate, and the year of study. Each year around half of the federal student loans are allocated to graduate students as they have the least restrictions (Blagg *et al.*, 2022). Interest rates are also determined by Congress, depending on which loan program is chosen this can range from 4.9 to 7.5 percent in recent years (Blagg *et al.*, 2022). If student borrowers require more than the available federal loans they can move on to expensive private loans with parents as their cosigners. These loans are generally less forgiving and carry less protections. Private loans have interest rates based on borrowers' credit scores ranging generally from 3-13 percent (Blagg *et al.*, 2022). Repayment of student loans can be done in two ways; If no choice is made borrowers are required to repay their loans with a 10-year amortization period. Post (under)graduate students also have the option to apply for income-driven repayment (IDR) plans which base monthly payments on income and not the amount borrowed. Undergraduate borrowers have 20 years and graduate borrowers have 25 years until unpaid balances are forgiven. While all federal loan borrowers are eligible for such a plan they are often not aware of the option (Blagg *et al.*, 2022). Private loans do not offer IDR plans.

The Dutch loan system has many similarities but experienced some key changes in recent years. Important to note is that prior to 2015 students had multiple options to finance their studies. All students were eligible for a basic grant for the nominal duration of the study of choice. A supplementary grant was also available for students based on parental income to support less financially able families. These

grants were, in essence, a loan unless the student in question was able to complete their studies within 10 years, then it would be converted into a gift from the government. If students required more financial aid they could apply for an interest-bearing loan from the government similar to U.S. federal loans which had to be repaid within 15 years. A switch was made during the years 2015-2023 where the basic grant was removed. Students now only had the option for interest-bearing loans from the government similar to the U.S. system which initially had a fixed 0% interest rate until 2022 but has since risen to 2,56 percent. The supplementary grant however was still in effect for less financially able individuals. Since 2023 the Dutch government made the switch back to the original basic grant system. This switching back and forth saw a range of students have substantially more student loan debt for the period when the basic grant was not in effect. Important to mention is that the interest-bearing loan repayment is income contingent and are written off after 35 years.

Comparing the two contexts of the U.S. and the Netherlands we see that during the years 2015-2023, the Dutch loan system had multiple similarities with the U.S. federal loan system. Outside of that timeframe, the institutional differences are more apparent. These institutional variations highlight the possibility of different effects on homeownership between the two countries. These differences are rooted in several key areas which can affect the generalizability of previous results.

By looking at the loan terms and conditions under which students borrow in the United States and the Netherlands some influential differences can be identified, namely surrounding interest rates and bankruptcy discharge ability. For instance, Congress sets the interest rates on federal student loans in the United States, and these loans are not dischargeable in bankruptcy, placing a financial burden on graduates that affects their ability to get a mortgage. The financial environment for graduates of the Dutch system is unusual because of its differing approach to grants and loans in recent years, which includes periods of zero interest. The differing manner repayment responsibilities and forgiveness provisions are structured within each country further changes the possibilities and routes to homeownership. Repayment possibilities for the U.S. prove more limited especially if individuals become dependent on private loans. While the government loans offer a similar structure regarding repayment and forgiveness the Dutch grant system in place outside of the years 2015-2023 greatly reduces financial burden while also incentivizing degree completion. The Dutch implementation of supplementary grants for economically disadvantaged families and the reversion to a grant-based system demonstrates a support mechanism that aims at alleviating students' financial burdens. In contrast, the reliance on a combination of federal and especially private loans within the U.S., and the lack of a comprehensive grant system or equivalent financial safeguards, causes a distinctive economic strain on students and graduates in the U.S. It is important to also recognize the significant disparity in tuition fees for higher education between the U.S. and the Netherlands, with costs in the U.S. considerably exceeding those in the latter. This disparity has implications for students who take out loans to finance their education, a practice that has become more common due to recent tuition increases in the U.S., as reported by Bleemer et al. (2021). As a result, this dynamic puts those who are studying in the United

States at a disadvantage in comparison to those who are studying in the Netherlands. The increased reliance on student loans in the United States may worsen the financial difficulties graduates face resulting in increasing challenges when seeking homeownership. This reliance is only exacerbated due to increasing tuition costs.

Taking a short look at the UK student loan system, it provides tuition fee loans and maintenance loans and is more akin to the Dutch system. Tuition fee loans cover up to £9,250 per year, whilst maintenance loans are designed to cover living expenses with amounts being based on household income. Students living away from home can borrow up to £10,000 each year. Interest on these loans begins the day they are taken out, which is linked to the retail price index (RPI). Similar to the Dutch system repayment begins post-graduation and the repayments are loan contingent in contrast to the U.S. fixed-time payments. English graduate loans are written off after 40 years similar to the Dutch system.

This examination of the institutional backgrounds highlights the underlying reason why the generalizability of previous studies' results can't be transferred to different contexts. Based on the aforementioned analysis, it appears that Dutch graduates enjoy a comparative advantage stemming from a more favorable student loan framework compared to the U.S. system. Analyzing the Dutch context can result in potentially different findings. The examination of homeownership rates and the correlation with student debt will require a comprehensive understanding of the institutional contexts and their temporal dynamics to be kept in mind to demonstrate whether these institutional differences across different contexts affect the generalizability of previous studies' results.

2.2 Theoretical framework

Homeownership vs Renting

To enhance comprehension of homeownership, it is crucial to juxtapose the experiences of first-time homebuyers with the dynamics of renting within real estate markets. The housing market is divided into two segments: the rental market and the owner-occupied market. In the owner-occupied segment, individuals secure mortgage loans, which are repaid over a specified period. Conversely, in the rental market, prices are set by market dynamics, and tenancies are often overseen by private landlords. Housing tenure choice is intricately linked to important life-cycle decisions of the individual. The choice between renting and buying a home is influenced by numerous factors, and the level of homeownership within a country has implications for various economic and social aspects of the country (Raya and Garcia, 2012). Governments are therefore often inclined to stimulate homeownership over renting (Ronald, 2008; Hochstenbach and Arundel, 2021; Acolin, 2022). Andrews and Caldera Sánchez (2011) mention four areas of positive spillovers; wealth accumulation, child outcomes, social capital, and mobility. Acolin (2022) further illustrates that homeowners tend to experience more favorable outcomes, encompassing aspects such as life satisfaction, civic engagement, educational achievements for children, and both physical and mental health. Additionally is seen as a significant source of individual wealth. While homeownership is linked to a range of positive outcomes in comparison to

renting, certain drawbacks can make renting a more advantageous option than owning. Namely, the fact that homeowners face higher immobility compared to renters due to high transaction costs associated with buying and selling property as well as potentially stronger connections to the surroundings and the neighborhood (Dietz and Haurin, 2003). These high transaction costs also fail to shield consumers effectively against adverse economic shocks, especially during periods of declining house prices and when the mortgage balance of the homeowner is high (Díaz and Luengo-Prado, 2010). Considering these elements, understanding the determinants that influence individuals' choices between renting and homeownership becomes a matter of interest. Raya and Garcia (2012) in their analysis of different models of tenure choice, it is suggested that housing tenure decisions are influenced by life cycle variables such as permanent income, age, education level, and notably, marital status, which is considered the most significant. Furthermore, the transition from renting to owning is also argued to be influenced by these life cycle variables. Building on the results of Raya and Garcia (2012) concerning the influence of life cycle variables on housing tenure decisions, it is critical to take into account the complex correlation between student loan debt and these factors, especially income and educational attainment. Student debt has a dual role in life course transitions as it acts as both a barrier and facilitator, this is primarily due to the temporal delay between the accrual of student debt and the realization of its associated benefits. In many countries, the growing debt associated with student loans is a major source of financial strain for individuals, which has a profound impact on their economic behavior and decisions, including housing tenure. Integrating the role of student debt into this framework offers a more comprehensive view of the contemporary challenges individuals face when seeking to transition to homeownership.

Student loans in the context of homeownership.

In many countries, the growing debt associated with student loans is a major source of financial strain for individuals, which has a profound impact on their economic behavior and decisions, including housing tenure. Student loan debt can act as a barrier to mortgage access through three direct channels; income restrictions, debt-to-income (DTI) ratios, and credit scores. Firstly looking at income restrictions, having student loan debt has a direct impact on one's permanent income, which is a crucial factor to consider when deciding housing tenure. Repayment obligations can reduce disposable income, thereby affecting individuals' ability to accumulate savings for a down payment. This reduction in liquidity can delay the transition from renting to homeownership. Blagg et al. (2022) further elaborate on this issue in their research report on policy efforts. They indicate that households burdened with student loan debt might not only face difficulty with saving due to decreased disposable income but also demonstrate reluctance towards incurring additional debt. This reluctance can further impact the timing of purchasing a first home, indicating an intricate relationship between debt obligations and homeownership. Secondly when considering DTI ratios, student loan debt can unfavorably skew the ratio, which as noted by Bleemer et al. (2021) is of importance in mortgage underwriting. High DTI

ratios due to student loans increase the risk of defaulting. Bleemer et al. (2021) reinforce this argument using the New York Fed Consumer Credit Panel and Equifax showing that for a cohort of young Americans leaving school in 2009 around 50% of borrowers have either defaulted, been severely delinquent, or not repaid at all as of 2014. Delinquency of loans introduces the third critical variable in mortgage acquisition, credit scores. Mezza et al. (2020) note that student loan debt has a clear negative effect on credit scores potentially excluding indebted students from the mortgage market. Additionally, Gicheva and Thompson (2015), using the Survey of Consumer Finances (SCF), found significantly higher rates of binding credit constraints and bankruptcy following schooling for student borrowers than for non-borrowers. For young borrowers, in particular, credit history and DTI ratio are the two most common reasons for mortgage denial (Blagg *et al.*, 2022).

Estimating more casual relationships between student loans and homeownership is more challenging. Higher education, often facilitated by student loans to attain a degree, can lead to more promising job prospects, and more financial stability due to higher income. These factors make homeownership more attainable, this raises an important dynamic between student debt and homeownership, namely the interconnectedness of various channels that can have different associations and outcomes. Previous studies looking at the positive association of educational attainment state it can offset the negative effect of student debt (Andrew, 2010; Myers et al., 2019; Mezza et al., 2020; Scott III and Bloom, 2021). Notably Scott III and Bloom (2021) find that using the Federal Reserve's 2019 Survey of Consumer Finances data having student loan debt increases the likelihood of homeownership by 15.1%, however those with debt purchase homes 39,2% less expensive and have 58% less home equity compared to first-time home buyers who did not have student loans. The reference group for this study is individuals without any student loan debt. De Gayardon, Callender and Desjardins (2021), find individuals who have obtained a degree without borrowing to be 13.1% more likely to be homeowners than those who made use of student loans. The study focusses on a cohort aged 25 and find graduate borrowers seem unable to capitalize on their education in terms of homeownership, while graduate non-borrowers do. A more expansive study done by Bleemer et al. (2021) takes a slightly different approach looking at the impact of rising tuition fees on student debt and subsequent homeownership within the U.S. using a merged data source from multiple administrative sources. Their results show that although tuition fees are rising, students absorb the increases by amassing significantly more student debt showing the perceived importance of educational attainment. Notably, however, the study finds "that the increase in the cost of college and student debt that our sample cohorts experienced from 2001 to 2009 is able to explain around 11–35% of the measured 7.7 percentage point drop in the rate of age 28 to 30 homeownership in the U.S. from 2007 to 2015". Attaining a higher education, particularly a bachelor's degree, typically enhances income potential, thereby increasing the probability of transitioning into homeownership. However, accumulating substantial debt can impede this pathway, making it challenging to secure a mortgage. Moreover, individuals who incur debt for their education but drop out of their degree programs are at a distinct disadvantage. These individuals often find themselves in a

vulnerable financial position, as they are less likely to earn an income adequate to manage their student loan repayments successfully, compared to their counterparts who have completed their degrees. This disparity emphasizes the nuanced impact of student loans on post-graduation financial stability and the broader implications for accessing homeownership.

Another causal relationship between student loans and homeownership is that of family wealth. Students coming from low-income households face compounded challenges in affording both education and homeownership. The connection between a family's financial resources and success in higher education is substantial. Financial stability during educational pursuits and access to quality schools with the accompanying benefits play a pivotal role in educational outcomes and, by extension, future housing opportunities (Blagg *et al.*, 2022). Further highlighting the intricate link between student debt, educational attainment, and access to homeownership. Financial transfers from family members can be a significant factor in helping students avoid or reduce their need for loans, which will reduce their debt upon graduation (Mazelis and Kuperberg, 2022). This debt reduction is pivotal, as it can significantly influence earlier mentioned life cycle variables, including housing tenure choices. People who have less debt are in a better position to make decisions that promote homeownership, demonstrating the profound impact of family financial support on post-graduation economic outcomes.

Student loan debt may indirectly delay homeownership through channels such as family formation and marriage as these often precede buying a home. Recent studies found that student loan debt leads to lower marriage rates as well as lower fertility rates among young women in particular (Addo, 2014; Nau, Dwyer, and Hodson, 2015). The rationale behind this is multifaceted; marriage can lead to pooled financial resources which can provide a stronger economic foundation when applying for a mortgage. Additionally, the social commitment of marriage also prompts individuals to seek stability further motivating them to attain homeownership. Along a similar trend of household formation studies by Houle and Warner (2017) and Cooper and Luengo-Prado (2018), analyze the effects of student loan debt on the decision of young adults to return home after having lived independently. Recognizing the co-residence behavior of young adults with their parents is vital as it affects homeownership, residential investment, and wealth accumulation. Notably, however, they find student debt provides little to no increased risk of young adults returning to the parental home population-wide. Thus it appears based on the literature that key demographic features influencing the casual relationship between student debt and homeownership prove to be cohabitation and marital status.

2.3 Conceptual framework

In summary, the theoretical framework examines the relationship between student loan systems in the U.S. and the Netherlands and their impact on homeownership, emphasizing the distinctions in loan conditions and repayment strategies. It investigates how student debt affects housing tenure choices, pointing out the duality of student loans as both barriers and facilitators, through mechanisms like income constraints, DTI ratios, and creditworthiness. Furthermore, it considers the influence of family

wealth and major life choices, such as marriage, when navigating the complexities of student loans and homeownership. Drawing upon the comprehensive literature review outlined in this section, the conceptual model in Figure 1 is aimed at further clarifying the mechanisms at work. Based on the literature this study expects to find that (1) outstanding student loan debt will have a small negative relationship with homeownership among individuals. (2) The presence of marriage and family formation variables serve as key influences in the student loan debt and homeownership relationship. (3) In the institutional contexts where student loan financing options are more favorable (Dutch 2002-2014 time frame) the negative impact of student debt on homeownership is limited.

The conceptual model (Figure 1) illustrates that student debt influences various aspects of an individual's finances and life choices as they transition to homeownership. The model suggests that the path from student loan debt to homeownership is intricate and multifaceted, with several intermediary factors such as barriers to mortgage access in the form of borrowing constraints and DTI ratios that may impede the homebuying process. Additionally, the model emphasizes a temporal dynamic with regard to educational attainment, suggesting that the benefits of education on income—and subsequently on the ability to purchase a home—are realized over time. Notably, having a higher educational attainment increases disposable income, through improved job prospects. Higher debt, however, may also result in decreased disposable income and higher debt-to-income ratios, which could have a detrimental effect on borrowing ability. The model captures the dual influences of disposable income on homeownership, showing both positive and negative routes. The complex and varied connections between student loan debt, financial circumstances, and the pursuit of homeownership are highlighted by this illustration.

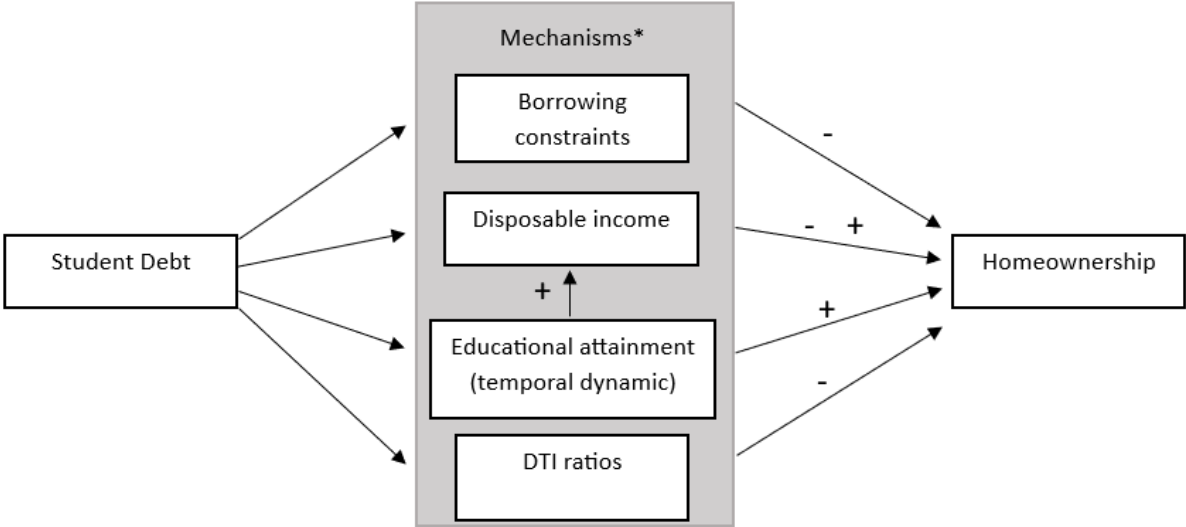


Figure 1. Conceptual model; Theoretical associations observed between student debt and homeownership. Note, that key theoretical casual relationships are noted in greyscale.

2.4 Hypothesis

Based on the theoretical framework and the conceptual model, the following hypotheses are formulated. Firstly, having some sort of student loan debt and especially having higher debt levels will be associated with a lower likelihood of homeownership among individuals. This hypothesis is supported by the adverse effects of student loan debt on disposable income, debt-to-income (DTI) ratios, and borrowing restrictions, all of which make it more challenging to qualify for a mortgage and save for a down payment. Furthermore, in institutional contexts where financing choices for student loans seem more favorable—like the Dutch system from 2002 to 2015—the detrimental effects of student debt on homeownership will be diminished. This theory is supported by the grant programs and lower loan interest rates found in the Dutch financial system at that time, which lessened the overall financial load on graduates and made the transition to homeownership easier. Finally, it is expected that the existence of traditional marriage and family formation variables remain important factors in the relationship between student loan debt and homeownership. Marriage can create a pooled financial resource, improving economic stability and mortgage eligibility, whilst family creation may raise the urgency to become a homeowner.

3. DATA & METHOD

This chapter serves as the methodological research framework of this study. Firstly, the used dataset is described. Secondly, the statistical methods used for the analysis of the data are elaborated upon. Thirdly, the variables are further operationalized, and finally, ethical considerations are clarified.

3.1 Dataset

This study observes the Dutch housing market and individual household data to measure the role of student debt on homeownership among young adults. Data is obtained from the DNB household survey (DHS) provided by the Centerdata Research Institute. This study conducts a longitudinal analysis by comparing survey data ranging across a 20-year time period (2002-2022). The DHS data has a rotating household panel structure that is conducted yearly. The household survey collects information on economic and psychological determinants of saving behavior as well as financial decisions of households and individuals. The study has multiple data modules, namely; household information, work & pension data, accommodation data, income data, wealth data, and psychological concepts data. The household survey aims to be an accurate representation of the Dutch population. The targeted population of the survey consists of persons of 16 years or older living in a household in the Netherlands (Teppa and Vis, 2012; Streefkerk, 2023). The household survey consists of around 2000 households. Recruitment is based on a random national sample drawn from a private postal address file issue, chosen addresses are contacted to identify if they are willing to participate in the survey. Households that choose to exit the study are replaced with another household with similar characteristics. Households can only join the panel study by invitation and not by their request. The dataset is one of the few European micro-level panel datasets that permits detailed analysis of households' financial circumstances and economic behavior. In addition to providing a thorough picture of household wealth and debt portfolios in the Netherlands, the dataset is unique in that it allows researchers to identify important links between saving behavior and the psychological characteristics of individual household members (de Bruijne and Streefkerk, 2020).

While the survey ranges from 1993-2022, the waves prior to 2002 do not include a variable indicating accommodation type which is not missing a large portion of observations, thus a 20-year period from 2002-2022 is chosen as the designated sample size. As the data modules for each year are given separately from each other these were initially merged to create a complete dataset for each year, this was done through the creation of a unique personal index by multiplying “nohold” (household index) and “nomem” (index of the member of the household) as recommended by the survey codebook (Streefkerk, 2023). Each yearly dataset was then appended to create a master dataset including the years 2002-2022. The appended datasets of these waves result in 100,647 observations. Survey responders who did not indicate if they had a student loan were excluded from the analysis as this is a key variable of interest (n=54,599). Of the remaining 46,148 observations further missing values of key measures were removed to result in n= 31,052 observations for the entire population. However, as this study is

focused on younger adults who have student loans and are seeking homeownership only individuals aged 21-40 were chosen those falling outside this range are dropped (n= 24,059) similar to other studies (Scott III and Bloom, 2021; Mazelis and Kuperberg, 2022). Additionally, respondents who stated their type of accommodation was “free accommodation” were removed due to limited observations and to simplify the analysis, focusing on a more straightforward comparison between renters and homeowners (n=24). Outliers of the data were manually examined through descriptive statistics and visual inspections of box plots, scatter plots, and histograms and removed where necessary(n=10). To remove potential outliers for the continuous variables of debt and income, the 99th percentile was dropped (135). The remaining analytic sample consists of n=6,824 observations. From this sample multiple measures were created, these are described in the following sections and further shown in Appendix D.

3.2 Approach and Regression models

This section's main objective is to provide an overview of the methods of analysis used to look at how student debt affects homeownership. This study uses logistic regression models since the dependent variable, homeownership status, is binary. Logistic regression models suit this analysis as they are specially designed to deal with binary outcomes and enable an analysis of how changes in student debt levels and other factors affect the likelihood of homeownership. The assumptions of this type of regression are discussed in Appendix C.

Three variables of interest differentiate the main models as shown in the equations² below. Equations for all the models can be found in Appendix A. Equation 1 includes a binary variable indicating whether an individual has student debt. Equation 2 includes a binary variable indicating whether an individual has high student debt. Equation 3 includes a continuous variable indicating the accrued student debt of an individual. The structure used is similar to previous literature (Scott III and Bloom, 2021). Initially, however, the focus will lie on equation 1 which will be used when considering multiple models each of which includes different specifications. The first model includes whether respondents have student debt or not. The subsequent models progressively add control variables. This step helps to understand the effect of each additional variable. The second model adds financial factors such as income, whether individuals receive financial aid from family and knowledge of financial matters. The third model adds demographic factors such as gender and marital status and whether respondents have children. The variables added in models two and three are similar to previous literature regression specifications (Houle and Warner, 2017; Letkiewicz and Heckman, 2017; Silver and Washington, 2023). The fourth model adds location factors, similar to the literature by Letkiewicz and Heckman (2017). Recognizing the rotational panel structure of the dataset Model 5 aims to account for time-varying effects by adding a year dummy. Models 6, 7, and 8 focus on the equations below and essentially mimic the regression specifications of model 5 but with different measures of student debt, this is done to gain a deeper

² Equation 1 corresponds to model 6, Equation 2 to model 7 and Equation 3 to model 8. In total 10 models are present in the results section, but these equations are regarded as the most comprehensive.

understanding of how degree student debt impacts homeownership similar to literature by Scott III and Bloom (2021). Finally, Models 9 and 10 focus on two distinct cohorts, with Model 9 representing the pre-2015 period and Model 10 representing the post-2015 period.

$$\begin{aligned} \ln(\text{owner})_{i,t,r} = & \mu + \beta_1 \text{HasStudyLoan}_i + \beta_2 \ln(\text{Income}_i) + \beta_3 \text{Financialfamily}_i & (6) \\ & + \beta_4 \text{Financial literacy}_i + \beta_5 \text{Degree}_i + \beta_6 \text{Child}_i + \beta_7 \text{Gender}_i + \beta_8 \text{marital}_i + \beta_9 \text{prov}_r \\ & + \beta_{10} \text{urbanity}_i + \beta_{11} \text{year}_t + \varepsilon_{i,t,r} \end{aligned}$$

$$\begin{aligned} \ln(\text{owner})_{i,t,r} = & \mu + \beta_1 \text{HighDebt}_i + \beta_2 \ln(\text{Income}_i) + \beta_3 \text{Financialfamily}_i & (7) \\ & + \beta_4 \text{Financial literacy}_i + \beta_5 \text{Degree}_i + \beta_6 \text{Child}_i + \beta_7 \text{Gender}_i + \beta_8 \text{marital}_i + \beta_9 \text{prov}_r \\ & + \beta_{10} \text{urbanity}_i + \beta_{11} \text{year}_t + \varepsilon_{i,t,r} \end{aligned}$$

$$\begin{aligned} \ln(\text{owner})_{i,t,r} = & \mu + \beta_1 \ln(\text{StudentDebt}_i) + \beta_2 \ln(\text{Income}_i) + \beta_3 \text{Financialfamily}_i & (8) \\ & + \beta_4 \text{Financial literacy}_i + \beta_5 \text{Degree}_i + \beta_6 \text{Child}_i + \beta_7 \text{Gender}_i + \beta_8 \text{marital}_i + \beta_9 \text{prov}_r \\ & + \beta_{10} \text{urbanity}_i + \beta_{11} \text{year}_t + \varepsilon_{i,t,r} \end{aligned}$$

3.3 Measures and descriptive statistics

Dependent variable descriptive statistics

The measure *owner_occupied* is included as the dependent variable to answer sub-question 2. This variable captures what the current type of accommodation of respondents is. The variable (*woning*: in the dataset) is categorical with four outcomes: *Owner-occupied*, *Rented*, *Sub-rented*, and *Free accommodation*, this study transforms this variable into a binary variable named *owner-occupied* which functions as the dependent variable (0) renters (1) homeowners. Note ‘*Free-accommodation*’ respondents were dropped. Table 1 indicates 31% of respondents are renters while 69% are homeowners.

Financial, Economic, and Educational Descriptors (Micro-level Data) and Descriptive Statistics

Table 1 presents the descriptive statistics for the variables used in the analysis by a binary student loan indicator as well as housing tenure. This sub-header describes the financial, economic, and educational variables. The key independent variables related to student debt are measured through three variables; a binary variable *has_study_loan* indicating whether respondents have student debt (0) and non-debtors (1). A second variable, *student_debt_balance*. indicating student debt in euros. A third binary variable *high_debt* indicates high amounts of student debt where people have above the median amount of student loans among those with student debt – i.e. greater than €11,000. Splitting student debt between these variables has multiple uses. By examining having student debt and the amount of student debt, the relationship between student loans and buying a home can be identified as being due to debt itself or because of who typically has student debt. Furthermore, the third variable aims to further explain the degree of importance of the amount of student debt respondents have accrued. These key variables of

interest function as the independent variables and follow a similar structure to previous literature (Scott III and Bloom, 2021).

Gross Income is included in the analysis as a control variable through a continuous variable as well as a categorical variable. Including these in the analysis aims to adjust the effect of income levels on the likelihood of homeownership so any observed relationships between student loans and homeownership are not confounded by underlying economic capacities. Furthermore, a categorical value for income is created representing an individual's income in percentages; lowest 20%, low middle, middle 20%, upper middle, and upper 20% income brackets. Additionally, gross income as well as the previously mentioned student loan balance variable are transformed into their natural logarithms as *ln_gross_income* and *ln_debt_student*. Transforming the data normalizes the distribution and reduces skewness in the data and allows for easier interpretation of logistic regressions, namely how proportional changes in these variables influence the odds of homeownership. The variable *financial_family* is a binary variable that indicates whether respondents receive financial support from family or acquaintances (1) or not (0). The variable helps control for any external financial aid respondents have attained impacting their ability to attain a home.

Educational status is controlled through a binary variable, *college_degree* indicating the educational attainment of respondents, namely a tertiary degree (1) or lower (0). Considering the accumulation of student debt goes hand in hand with educational advancement, incorporating this variable as a control helps address the potential positive correlations with educational attainment. This is supported by previous studies that suggest education may mitigate the adverse impacts of student debt (Andrew, 2010; Myers et al., 2019; Mezza et al., 2020; Scott III and Bloom, 2021).

Demographic and Household Characteristics (Micro-level Data) and Descriptive Statistics

Several demographic factors have been shown to affect homeownership status, to capture these effects these variables are included in the analysis (Choi et al., 2018). Variables included *age* which as previously stated is limited to the age range of 21-40, and *gender* which is presented as a dummy variable (*0 = male; 1 = female*). *marital_status* which was originally comprised of six distinct groups; (*married or registered partnership having community of property; married or registered with a marriage settlement; divorced; spouse; together with partner; widowed*) was simplified into two broader categories; (*0 = married/ registered partnership/ living together; 1 = divorced/ separated/ widowed/ never married*) this change was implemented to simplify data analysis, enabling clearer associations between marital status, homeownership, and student loan debt. An additional dummy variable *children* indicates whether respondents have children (*0 = no children; 1 = one or more children*).

Geographical Context (Meso-level Data) and Descriptive Statistics

Two measures are included to control for regional differences. Previous literature has shown that spatial factors can impact the predictability of housing tenure (Coulter and Kuleszo, 2024). The *urbanity*

measures the degree of urbanization the respondents are located in ranging from a very high degree of urbanization to a very low degree of urbanization. Additionally *province* is coded into twelve categories; Groningen, Friesland, Drenthe, Overijssel, Flevoland, Gelderland, Utrecht, Noord-Holland, Zuid-Holland, Zeeland, Noord Brabant, and Limburg.

3.4 Descriptive Statistics

The descriptive statistics from the DNB Household Survey are presented in this section, with particular attention to how homeownership is distributed across various financial, educational, and demographic profiles, with regard to student loan status. The essential information underlying these observations is provided in Tables 1 and 2. It is crucial to make clear that this section just looks at trends in the data. Although there may be a connection between student loans and homeownership, causality cannot yet be established from the apparent disparity.

Through exploring the data Table 1 provides, a substantial gap can be seen regarding homeownership rates between those with student loans and those without. In particular, only 50.7% of respondents who have student loans are homeowners, compared to 73.0% of respondents who do not have such loans. This indicates that student loans potentially put a financial burden on one's capacity to buy a home. Furthermore, table 1 indicates those with higher debt balances choose to rent rather than buy homes, possibly as a result of the financial constraints brought on by high debt.

Those receiving financial support appear more likely to achieve homeownership, hinting that such aid may mitigate the adverse impacts of student loans on acquiring property, a very small portion of the sample however receives financial support. The average age of the sample is 32.6 years of age. Table 1 shows younger people have significantly lower rates of homeownership than their older counterparts in the 36–40 age range, especially those between the ages of 21 and 25 who also have student loans. Education appears as a double-edged sword when looking at Table 1. Respondents with student loans have higher levels of education however these do not translate into higher percentages of homeownership. This observation might suggest that while a college education generally offers advantages in terms of income potential, the immediate financial strain caused by student loans can postpone homeownership, possibly until those debts are substantially reduced or paid off in full. Individuals from the sample who live in more urbanized areas, who are also managing student debts, face lower homeownership rates compared to those in less urbanized settings.

Table 2 provides a detailed summary of gross income and student debt figures for both individuals with and without student loans, broken down by housing situation. When it comes to student loans, the average debt for homeowners is €12,847, while the average debt for private renters is €15,870. The income profiles of the student loan cohort show that the mean income of homeowners is €31,882, significantly greater than the mean income of private renters, which is €17,694. In comparison, the wage gap between homeowners and renters is less pronounced for those without student loans, with homeowners making an average of €30,784 compared to €23,243 for renters.

Table 1: Descriptive Statistics by student loans and housing tenure

DNB Household survey 2002-2022	With Student Loans		Without Student loans		Full Sample	
Respondents in analytic Sample (n=6,824)	(n=1,220)		(n=5,604)		(n=6,824)	
	Prop.		Prop.		Prop.	
	Homeowners (n=618)	Private Renters (n=602)	Homeowners (n=4,089)	Private Renters (n=1,515)	Homeowners (n=4,707)	Private Renters (n=2,117)
Current housing Tenure	0.507	0.487	0.730	0.270	0.690	0.310
High debt balance	0.261	0.383			0.057	0.161
Family financial support	0.102	0.118	0.047	0.054	0.054	0.072
College degree	0.744	0.645	0.493	0.395	0.525	0.455
Age groups						
21-25	0.170	0.334	0.069	0.119	0.084	0.179
26-30	0.241	0.339	0.167	0.256	0.179	0.278
31-35	0.395	0.238	0.348	0.326	0.355	0.299
36-40	0.194	0.103	0.417	0.309	0.382	0.244
Sex (male)	0.490	0.413	0.451	0.422	0.450	0.412
Partner (yes)	0.706	0.418	0.789	0.477	0.778	0.455
Has at least one child	0.335	0.118	0.555	0.321	0.525	0.262
Income Groups						
Low income	0.137	0.282	0.183	0.248	0.175	0.262
Lower middle income	0.118	0.276	0.175	0.271	0.167	0.279
Middle income	0.196	0.227	0.187	0.238	0.198	0.225
Upper middle income	0.238	0.144	0.219	0.150	0.221	0.142
Upper income	0.311	0.085	0.236	0.103	0.239	0.092
Debt Category						
Low debt	0.239	0.179				
Lower middle debt	0.249	0.174				

Middle debt	0.204	0.216				
Upper middle debt	0.186	0.252				
High debt	0.121	0.178				
Financial literacy						
Not knowledgeable	0.093	0.178	0.125	0.185	0.122	0.180
More or less knowledgeable	0.501	0.522	0.522	0.545	0.521	0.536
Knowledgeable	0.344	0.268	0.295	0.228	0.300	0.233
Very knowledgeable	0.062	0.046	0.058	0.052	0.057	0.050
Province						
Groningen	0.073	0.088	0.052	0.071	0.055	0.076
Friesland	0.039	0.044	0.053	0.047	0.052	0.045
Drenthe	0.041	0.013	0.037	0.026	0.038	0.023
Overijssel	0.056	0.065	0.077	0.099	0.075	0.090
Flevoland	0.006	0.009	0.024	0.016	0.021	0.015
Gelderland	0.120	0.131	0.129	0.127	0.129	0.125
Utrecht	0.082	0.080	0.070	0.074	0.072	0.074
Noord Holland	0.127	0.155	0.118	0.152	0.120	0.151
Zuid Holland	0.199	0.191	0.190	0.214	0.190	0.208
Zeeland	0.009	0.022	0.033	0.019	0.029	0.020
Noord Brabant	0.146	0.145	0.158	0.126	0.155	0.128
Limburg	0.102	0.071	0.059	0.038	0.064	0.045
Degree of Urbanization						
Very low	0.123	0.038	0.177	0.127	0.136	0.310
Low	0.143	0.068	0.228	0.158	0.246	0.325
Moderate	0.219	0.114	0.235	0.150	0.232	0.138
High	0.270	0.388	0.239	0.302	0.215	0.126
Very high	0.246	0.407	0.121	0.274	0.172	0.101

Table 2: Descriptive statistics of gross income and student debt in euros

DNB Household survey 2002-2022	With Student Loans				Without Student loans			
	(n=1,220)				(n=5,604)			
	Homeowners		Private Renters		Homeowners		Private Renters	
	Mean	st. dev.	Mean	st. dev.	Mean	st. dev.	Mean	st. dev.
Respondents in analytic Sample (n=6,824)								
Student debt (€)	12,847	10,392	15,870	11,339				
Student debt per group (€)								
Low debt	2,631	1,379	2,202	1,227				
Lower middle debt	6,947	1,393	6,873	1,365				
Middle debt	12,113	1,848	12,385	1,891				
Upper middle debt	21,042	2,926	21,923	2,909				
Upper debt	33,791	6,534	34,130	5,900				
Income (€)	31,882	20,719	17,694	16,692	30,784	20,918	23,243	17,570
Income by income group (€)								
Low income	2,470	2,295	2,328	2,344	1,369	2,011	1,418	1,940
Lower middle income	14,855	4,489	13,726	4,684	15,754	4,511	15,929	4,370
Middle income	27,988	2,788	27,530	2,880	27,963	2,900	28,039	2,764
Upper middle income	38,416	3,609	37,329	3,432	38,257	3,547	37,214	3,561
Upper income	57,562	10,794	56,099	12,003	59,011	12,965	58,955	12,591

4. RESULTS & DISCUSSION

To investigate the impact of student loan debt on homeownership this study employs a logistic regression analysis. This chapter initially covers the study's findings and offers a thorough analysis and interpretation of them. The analysis is divided into two main tables, Table 3 incrementally adds control variables and Table 4 employs three different debt variables to further dissect the relationship with homeownership. In addition, Figures 2, 3, and 4 are incorporated into the discussion to graphically emphasize key findings. The chapter then moves on to the discussion of the results.

4.1 Results

First, this study examines student debt and homeownership with a binary student debt indicator as its independent variable. Table 3 represents the results of the logistic regression, the full model results are attached in Appendix E. The basic impact of student loan debt on homeownership is established by Model 1. Further models incorporate further variables like demographics, financial factors as well as spatial and temporal controls. This sequential approach assists in determining the impact of each factor on the likelihood of owning a home. The models include 6,824 observations and are all statistically significant (Prob > chi2 = 0.0000), demonstrating that a significant portion of the variance in homeownership is explained by the predictors. The following discussion considers an effect statistically significant if $p < 0.01$ unless otherwise stated.

In model 1, the only predictor is whether the individual has student loan debt, serving as a baseline to measure the direct effect of student loans. The odds of homeownership are 62% lower for those who have study loans (odds ratio = 0.380, SE = 0.025, $p < 0.001$). The subsequent models indicate an increasing odds ratio moving closer to 1, this reflects a relative decrease in the magnitude of this negative impact when accounting for other influential factors. The introduction of control variables helps to isolate the specific effect of student loans from other confounding factors. Model 2 builds on the baseline by including financial variables such as income and financial aid from family. The slight decrease in the odds ratio indicates the added financial factors compound the barrier to homeownership student loans create. The odds ratio of income suggests that a higher income significantly increases the likelihood of homeownership, likewise, increased financial knowledge increases the likelihood as well. Financial aid from family has been shown to decrease the odds of homeownership however this result is not significant. These odds ratios remain relatively consistent across further models. Model 3 adds demographic factors, such as age, gender, and marital status, to the analysis. These variables prove to be strongly correlated with homeownership and mitigate the effects of student loans as the odds ratio increases (odds ratio = 0.423, SE = 0.031, $p < 0.001$). Life course events such as obtaining a college degree, living together with a partner, and having children all significantly increase the likelihood of becoming a homeowner. Notably, respondents living together with a partner are almost 3 times more likely to become homeowners (odds ratio = 2.908, SE=0.190, $p < 0.001$). In Model 4, location-specific characteristics are included and the impact of geographical variation, such as province or urbanity, on homeownership is controlled for. The shift in the odds ratio for student loans from 0.423 in Model 3 to 0.487 in Model 4 is worth mentioning. When spatial factors are taken into account, the negative effect of student debt on the likelihood of homeownership becomes slightly less pronounced. The final model in Table 3 includes time-varying effects through the inclusion of year dummies. This addition is essential to account for any temporal dynamics given the rotational panel structure of the data. Model 5 is the most controlled and shows an odds ratio of 0.497 for student loans (SE=0.039, $p < 0.001$). This model still indicates that those with student loans have a roughly 50% lower chance of becoming property owners than people without loans. The adjusted effect is however less

severe than the baseline model. This suggests that some factors can partially offset this effect, such as the demographic and financial factors mentioned in previous models. Figure 2 complements the regression outputs by depicting the homeownership rate by age group and student debt, visually illustrating the statistical relationship observed in the regression models. The figure indicates those with student debt see lower homeownership rates.

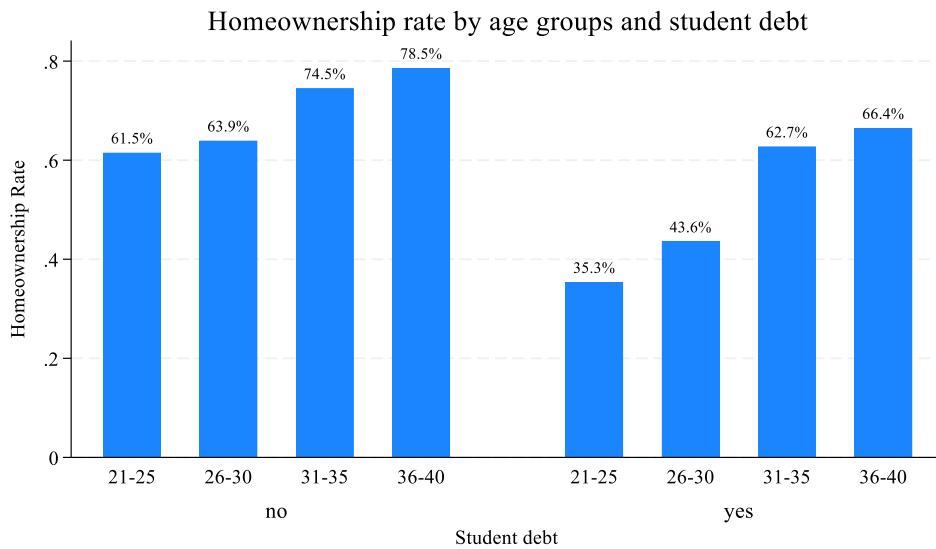


Figure 2. Bar chart depicting homeownership rate by age group and student debt.

Table 3: Binary logistic regression with increasing control variables

	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5
Owner occupied					
Study loan (no debt)	0.380*** (0.025)	0.377*** (0.025)	0.423*** (0.031)	0.487*** (0.037)	0.497*** (0.039)
Log gross income		1.049*** (0.008)	1.025*** (0.009)	1.033*** (0.00948)	1.033*** (0.0096)
Financial aid family (not received)		0.860 (0.094)	0.848 (0.099)	0.852 (0.104)	0.827 (0.103)
Financial Literacy (not knowledgeable)					
More or less knowledgeable		1.412*** (0.109)	1.373*** (0.113)	1.437*** (0.122)	1.427*** (0.123)
Knowledgeable		1.891*** (0.164)	1.810*** (0.167)	1.899*** (0.182)	1.917*** (0.187)
Very Knowledgeable		1.626*** (0.221)	1.645*** (0.237)	1.685*** (0.251)	1.736*** (0.265)
College degree (no degree)			1.486*** (0.089)	1.761*** (0.112)	1.684*** (0.109)
Gender (male)			0.812*** (0.048)	0.814*** (0.0496)	0.822*** (0.051)

Marital status (not living together)			2.908*** (0.190)	2.787*** (0.188)	2.850*** (0.197)	Note: The
Children (no children)			1.843*** (0.127)	1.681*** (0.120)	1.645*** (0.120)	
Location-specific Controls (2)				yes	yes	
Year dummy controls (1)					yes	
Constant	2.699*** (0.081)	1.224** (0.115)	1.630*** (0.204)	3.228*** (0.507)	2.119*** (0.428)	
Pseudo R Squared	0.0260	0.0383	0.1205	0.1589	0.1771	
Observations	6,824	6,824	6,824	6,824	6,824	

dependent variable is a binary indicator for housing tenure (0= Private renter, 1= Homeowner). Reference categories are in parentheses. The location-specific control characteristics are province and urbanity, year dummy controls are also included. (Appendix E shows the full model). Standard errors in parentheses with ***, **, and * indicating significance at 1%, 5% and 10%, respectively.

Moving on to table 4, to enrich the understanding of various aspects of debt on housing tenure choices the table employs three different debt variables to further examine the relationship. Model 6 serves as a direct continuation of the analysis in Table 3, particularly replicating the final model 5 from Table 3 maintaining all its variables and showing the odds of homeownership are around 50.3% lower for those with student loans than for those without. Model 7 substitutes the binary study loan indicator for a binary indicator for high debt. Namely having an above median student debt (i.e. above 11,000). This decreases the odds of being a homeowner by a further 66.3% (odds ratio =0.337, SE 0.044, $p < 0.001$). This suggests that not just having debt, but the magnitude of that debt is crucial in determining homeownership. Higher debt levels pose a substantial barrier to entering the housing market. Model 8 changes the key independent variable once more to the logarithm of student debt (transformed as $\log(student\ debt + 1)$). The model reveals that each unit increase in the logarithm of student debt reduces the likelihood of homeownership by 7.6% (odds ratio = 0.924, SE = 0.008, $p < 0.001$). To ease interpretation, given the base unit of the debt variable is euros, the impact of a €1,000 rise in debt can be computed by exponentiating the product of this €1,000 increase and the logarithm of the odds ratio. The resulting adjusted odds ratio for a €1,000 increase in student debt is approximately 0.579, indicating that such an increase corresponds to a 42.1% decrease in the odds of becoming a homeowner. Figures 3 and 4 further illustrate the effects of student debt on homeownership. Figure 3 utilizes the Lowess scatterplot to further help visualize the interaction between education, homeownership rates, and student debt. The plot shows a trend where younger individuals with student debt experience notably lower homeownership rates compared to their debt-free counterparts. This visual representation helps underscore the findings of the logistic regression models, highlighting the barriers that student debt imposes on different educational and age cohorts in accessing homeownership. Likewise, Figure 4 features a trend plot that tracks homeownership rates among young adults aged 21-40 and student debt levels over 20 years. This visualization effectively captures the temporal dynamics of how student debt influences homeownership by providing a longitudinal

view. The figure shows increasing student debt levels and decreasing homeownership rates, with the exemption of the outlier homeownership rates of the year 2019.

Table 4: Binary logistic regression with varying debt indicators.

	(1) Model 6	(2) Model 7	(3) Model 8
Owner occupied			
Study loan (No debt)	0.497*** (0.0387)		
High debt (Low debt)		0.435*** (0.0440)	
Log of student debt			0.924*** (0.00779)
Log gross income	1.033*** (0.00959)	1.034*** (0.00957)	1.032*** (0.00959)
Financial aid family (Not Received)	0.827 (0.103)	0.809* (0.101)	0.829 (0.103)
Financial literacy (Less knowledgeable)			
More or less knowledgeable	1.427*** (0.123)	1.418*** (0.122)	1.428*** (0.123)
Knowledgeable	1.917*** (0.187)	1.891*** (0.185)	1.918*** (0.188)
Very Knowledgeable	1.736*** (0.265)	1.748*** (0.267)	1.740*** (0.266)
College degree (No degree)	1.684*** (0.109)	1.633*** (0.105)	1.694*** (0.110)
Gender (Male)	0.822*** (0.0508)	0.814*** (0.0503)	0.821*** (0.0508)
Marital status (Not living together)	2.850*** (0.197)	2.853*** (0.197)	2.860*** (0.197)
Children (No children)	1.645*** (0.120)	1.669*** (0.121)	1.636*** (0.119)
Location-specific Controls (2)	yes	yes	yes
Year dummy controls (1)	yes	yes	yes
Constant	2.119*** (0.428)	2.078*** (0.419)	2.120*** (0.429)
Pseudo R Squared	0.1771	0.1756	0.1779

Note: The dependent variable is a binary indicator for housing tenure (0= Private renter, 1= Homeowner). Reference categories are in parentheses. The location-specific control characteristics are province and urbanity, year dummy controls are also included. (Appendix F shows the full model). Standard errors in parentheses with ***, **, and * indicating significance at 1%, 5% and 10%, respectively.

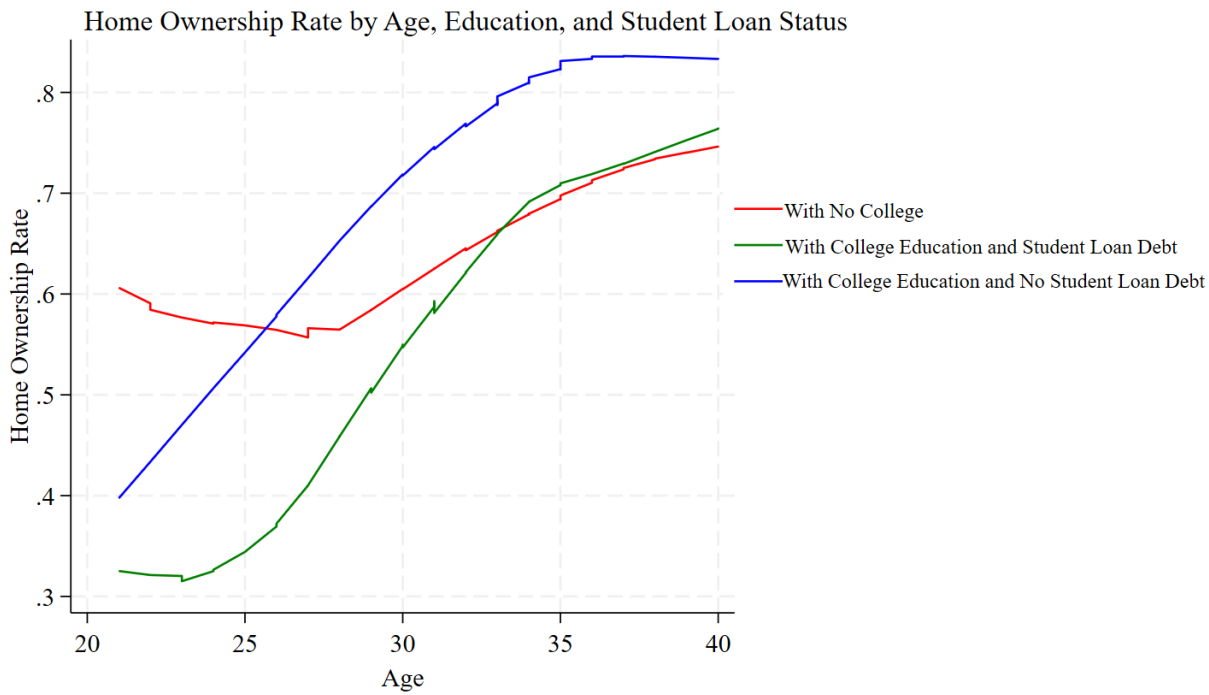


Figure 3. Lowess scatterplot depicting homeownership rates by age, education, and student loan status.

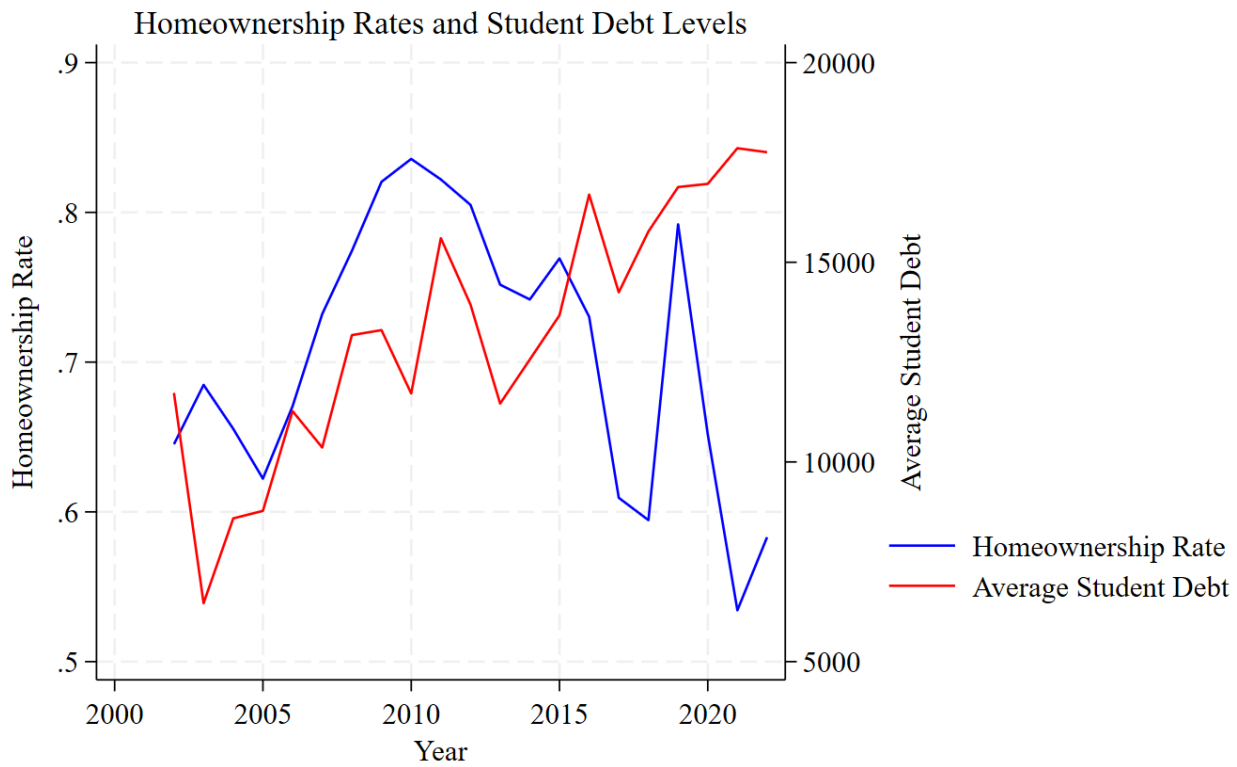


Figure 4. Trend plot tracking student debt and homeownership rates from 2002-2022.

Table 5: Binary logistic regression with two different cohorts (pre-2015 & post-2015)

	(1) model 9	(2) model 10
Owner occupied		
Study loan (Ref; no debt)	0.535*** (0.063)	0.475*** (0.051)
Log gross income	0.996 (0.013)	1.079*** (0.016)
Financial aid family (Ref: Not Received)	0.789 (0.125)	0.846 (0.173)
Financial Literacy		
More or less knowledgeable	1.375*** (0.148)	1.541*** (0.228)
Knowledgeable	1.722*** (0.220)	2.294*** (0.365)
Very Knowledgeable	1.639** (0.352)	2.003*** (0.460)
College degree (no degree)	1.607*** (0.139)	1.833*** (0.184)
Gender (male)	0.695*** (0.057)	0.984 (0.095)
Marital status (not living together)	2.651*** (0.252)	3.071*** (0.318)
Children (no children)	1.718*** (0.166)	1.519*** (0.176)
Location-specific Controls (2)	Yes	Yes
Year dummy controls (1)	Yes	Yes
Constant	1.134 (0.274)	1.033 (0.287)
Pseudo R Squared	0.1420	0.2309
Observations	3,961	2,863

Note: The dependent variable is a binary indicator for housing tenure (0= Private renter, 1= Homeowner). Reference categories are in parentheses. The location-specific control characteristics are province and urbanity, year dummy controls are also included. (Appendix G shows the full model). Standard errors in parentheses with ***, **, and * indicating significance at 1%, 5% and 10%, respectively.

Considering the previous discussion of the institutional redesign of the Dutch student loan system Table 5 further elaborates the two periods with two regressions. Model 9 is the pre-2015 cohort where the student grants were implemented and model 10 is the post-2015 cohort where the student grant was no longer available. Looking at model 9, the odds of homeownership are 46.5% lower if an individual has student loans (odds ratio = 0.535, SE = 0.063, $p < 0.001$). While model 10 indicates a 52.5% lower odds of homeownership (odds ratio = 0.475, SE = 0.051, $p < 0.001$). While the negative impact of having a study loan on the likelihood of homeownership is present and significant in both

cohorts similar to previous models, a slightly stronger negative effect can be observed in the post-2015 period. To further analyze the institutional changes in Appendix H the Predictive Margins Table indicates for individuals with no student debt, the probability of homeownership decreased slightly from 71.5%, pre-2015 to 68.8%, post-2015. Additionally for those with student debt, The probability of homeownership decreased slightly from 62.2%, pre-2015 to 60.3%, post-2015. Those with student debt are marginally worse off when comparing the two cohorts, with a 1.88% percentage point change compared to the 1.65% percentage point change of the earlier cohort.

4.2 Discussion

The primary objective of the research is to examine the relationship between student loan debt and homeownership to contribute to a broader understanding of the socio-economic impacts of such rising student debt on young individuals. This study was further motivated by the lack of empirical data on how student loans affect one's capacity to buy a home outside of the more widely researched U.S. setting. By focusing on the Dutch context, it fills a gap in the literature that has predominantly centered on the U.S.. In the previous section, the analysis reveals a considerable negative impact of student loans on homeownership, showing to significantly negatively affect the ability of young adults to become homeowners in the Netherlands. This result holds for a variety of models that take demographic, socioeconomic, spatial, and time variables into consideration. Specifically, having student loan debt reduces one's chances of becoming a homeowner by 50.3%, the effect is further amplified by larger debt levels. The results align with several studies in the academic literature, yet also deviate significantly when considering the magnitude of the negative impact of student loans on homeownership.

For instance, existing scientific literature by Mezza et al. (2020) reports that increases in \$1,000 of student loan debt cause a 1-2 percentage point drop in homeownership rates. In this study, an increase of €1,000 in student debt is significantly associated with a 42.1% decrease in the odds of becoming a homeowner. To facilitate interpretation converting the odds ratio to a probability change with a baseline probability of 0.69 (derived from Table 1); a €1,000 increase in student debt reduces the probability of becoming a homeowner by 12.7 percentage points. The findings of this study are consistent with findings by Houle and Berger (2015), Sommer (2020), and the previously mentioned Mezza et al. (2020) in that student loans decrease the ability of individuals to acquire homeownership. Figure 2 provides a visual representation of this phenomenon, depicting the homeownership rate by age group and student debt. Comparing this study with that of Scott III and Bloom (2021), there is a contrast in findings about the impact of student loan debt on homeownership. With both studies having a binary homeownership indicator, Scott and Bloom (2021) find a 15.1% increase in the likelihood of homeownership for those with student loans while this this study finds a 50.3% decrease. However, both studies agree on the notion that high debt levels, specifically those above the median, adversely affect homeownership prospects. Scott III and Bloom (2021) report a 27% decrease in the odds of becoming a homeowner whereas this study presents a decrease of 66.3%. The study by De Gayardon, Callender, and Desjardins (2021) focused on the English context and reported a 13.1% increase in the likelihood of homeownership for those with a degree and no debt compared to those who used debt to obtain their degree. While previous and existing literature primarily both converge when considering the directional effect of student loans, this study finds the magnitude of the effect to be far greater. A few considerations can be made that could contribute to this, given the mean debt amount is far lower within the Dutch context compared to that of literature in the U.S. It could be theorized that individuals in the Netherlands choose to settle their debts before acquiring homeownership given the far lower debt amounts. The dataset used in the analysis does not account for individuals who transition between different debt statuses over time. The

analysis might overestimate the negative impact of student loan debt on homeownership as those who have paid off their debts before acquiring their home are indistinguishable from those who never had debt in the first place. This would be in line with the findings of Letkiewicz and Heckman (2017) who note individuals who settle their student debts tend to be homeowners more often. Figures 2 and 3 also indicate this possible trend. Concerning Figure 2, it is possible that older age groups—which exhibit greater homeownership rates and a lower proportion of student loans—contain individuals who have already repaid their student debts. Similarly, figure 3 shows that older, more educated individuals with no current student loans have higher rates of homeownership, inferring that these individuals are more likely to have settled their student debts. Another plausible reason for the different magnitude of the student loan effect in this study is the housing market dynamics in the Netherlands, such as housing supply constraints, high transaction costs, or different mortgage lending criteria compared to the U.S or the U.K. This could make the impact of any additional financial burden from student loans more severe disproportionately affect those with student loans.

Although due to dataset limitations, the mortgage amounts are not included in the analysis. These might affect the decision to become a homeowner. Respondents with student debt can choose less expensive houses to lessen their financial burden and become homeowners earlier. On the other hand, people who opt for more expensive houses could put off becoming homeowners until they are more financially stable. This dynamic can significantly influence the timing and likelihood of purchasing a home. This phenomenon might also be relevant for those who have no higher education degree and have no outstanding student loans, as shown by the red line in Figure 2. These respondents have high homeownership rates at a younger age indicating they may choose to purchase less costly homes sooner and can do so because of their lack of student debt and time spent at university. In contrast, higher-educated individuals may prefer more expensive housing, resulting in lower homeownership rates until they are financially stable enough to afford such investments. Previous literature by Scott III and Bloom (2021) reports that individuals with student loan debt tend to purchase homes that are 39.2% less expensive and possess 58% less equity compared to their counterparts without such debt. Their research indicates that preferences about housing costs play a critical role in homeownership attainment, particularly for individuals who are limited financially due to student debt.

Considering the dataset covers a period of 20 years where the Netherlands saw an institutional redesign the downwards trending homeownership of Figure 4 could be attributed to the less favorable loan systems in place. Table 5 and Appendix H indicate individuals with student debt are worse off in the period where grant programs were not available as expected in the hypothesis. The lack of student grants places further stress on individuals. This is due to additional financing needed during their studies comes solely from loans they have to repay. This trend of needing additional financing can also be identified in Figure 4 where an upward trend of average student debt amounts can be seen, especially post-2015. Given there is often a time lag between graduating and becoming a homeowner as individuals enter the job market and begin to build their wealth up true effects of the student loan system change can not fully be explained yet with the current sample. This delay suggests that the full impact of the policy shift from grants to loans on homeownership rates will likely become more evident in future years. Especially given the grant system has recently been re-implemented.

Given the difference in findings with regard to debt looking at other determinants of homeownership within the model may shed light if other confounding variables are influencing the relationship. Letkiewicz and Heckman (2017) and Houle and Berger (2015) namely mention traditional factors that indicate a transition to adulthood such as marital status, education level, and being a parent, and remain significant indicators of homeownership. This study also finds

partnership, having children, and higher education all to have a significant positive correlation to homeownership. Especially partnership and living together make respondents three times more likely to become homeowners. This is in line with the literature which mentions that marriage leads to pooled financial resources providing a stronger economic foundation when applying for a mortgage. Additionally, the social commitment of marriage also prompts individuals to seek stability further motivating them to attain homeownership (Addo, 2014; Nau, Dwyer, and Hodson, 2015). Given the nature of the DHS dataset, the survey also collects information on the financial knowledge of respondents. The results indicate, that increased financial literacy increases the odds of homeownership considerably compared to those with limited financial knowledge. This result is supported by previous literature that links a propensity for financial risk-taking and financial literacy to higher homeownership rates. (Houle and Berger, 2015; Letkiewicz and Heckman, 2017). Financially literate individuals are generally more capable of making informed decisions on long-term financial commitments involved in buying a home, as well as being better equipped to assess and manage the risks associated with such an investment.

5. CONCLUSION

This study investigates the impact of student debt on young adults' ability to become homeowners. Understanding the interplay between rising education costs and a volatile housing market is crucial for both academia and society. By concentrating on the effects of student debt on homeownership in the Netherlands, this study contributes to the academic discourse and addresses a gap in the literature, which has primarily focused on the U.S. This study does so by answering the main research question: What is the relationship between student loan debt and homeownership?

The results reveal that those who have student loan debt have a significantly lower likelihood of being homeowners than individuals who do not have such debt. In particular, carrying student loan debt lowers one's likelihood of owning a home by 50.3%; this likelihood is further increased with higher debt burdens. The findings hold for various models and control for different socioeconomic and demographic variables. This indicates that young people with educational debt in the Netherlands experience a barrier to becoming homeowners. The results of this study are in line with a wider body of academic research, indicating that student debts can cause significant life events like buying a home to be delayed. Previous studies by Houle and Berger (2015), Mezza et al., (2020), Sommer (2020), and Scott III and Bloom (2021) found similar negative impacts of student loans on homeownership. However, this study finds a much greater magnitude of effect within the Dutch context. The conceptual model accurately reflects the various impacts of student debt on ownership, accounting for mechanisms such as borrowing constraints, disposable income, educational achievement, and debt-to-income (DTI) ratios. The model shows the dual impact of student debt on disposable income: while higher education can improve job chances and income potential, large debt repayments reduce disposable income. This distinction is consistent with the findings given the odds ratios of student debt and educational attainment. Debt-to-income (DTI) ratios are crucial in determining mortgage eligibility. The model correctly incorporates this mechanism, as findings show especially higher debt leads to a decrease in the odds of homeownership. Thus higher DTI ratios negatively impact homeownership. Overall the model fits well when considering the relationship between student debt and homeownership. If the model were to be expanded to focus on other determinants for homeownership, it should incorporate variables like living together and family formation as these remain key indicators.

The use of a longitudinal dataset enhances the study's strength, providing valuable insights into the trends over time. However, the inability to fully account for macroeconomic and temporal fluctuations during the study period besides a year dummy can be seen as a limitation. These issues can introduce biases into the results, potentially overstating the impact of student loans. Further explanation for this increased magnitude of the negative impact of student loans on homeownership could lie in the following limitations; Important confounding variables that affect both student loan debt and homeownership that are not included might be falsely inflating the perceived impact of student loans. Without the correct variables, there might be endogeneity issues leading to biased estimates. For instance, variables related to student loans could be correlated with unobserved factors that affect both the levels of student debt and the ability to purchase a home. This could lead the regression specification to attribute too much of the effect to student loans themselves. Additionally, due to the study looking at a period over 20 years, the model might not adequately account for temporal variations, where different housing market conditions over time can influence the results. Especially given the 20 years covers the recession of 2008 and the rotational nature of the dataset. The previously mentioned omission of the mortgage amount also serves as a limitation as currently only the likelihood of homeownership is analyzed and not the type or quality of homes. Possible heterogeneity issues could also play a role, diversity within the sample can obscure the effects that student loans have on different demographic groups. For example, the sample includes young adults who achieved a higher education and those who did not, potentially causing heterogeneity issues.

Future research should focus on incorporating local housing prices and mortgage amounts as this would provide additional insights into how housing quality and costs influence homeownership among individuals with student debt. Especially given the findings by Scott III and Bloom (2021) that report individuals with student loan debt tend to purchase homes that are 39.2% less expensive. Further studies could also narrow the focus on specific population subsets, such as only college graduates, to refine the understanding of student loan impacts. Finally given the previous literature emphasis on young adults and whether they live with their parents in combination with student debt future studies should explore this aspect (Purcell et al., 2013; Houle and Warner, 2017; Cooper and Luengo-Prado, 2018). Investigating this within the Dutch context could provide deeper insights into the drivers of homeownership.

Given the findings of this study, three key areas of policy implications should be taken into account. Firstly, increasing student loans of young individuals can make it difficult for them to save for a down payment on a home. This financial strain can delay or restrict homeownership. Second, homeownership is generally associated with economic growth and wealth gain. A decline in homeownership rates could have an influence on the economy as a whole, potentially leading to less investment in housing and other related sectors. Finally, rising student debt can exacerbate social inequality by disproportionately affecting those economically disadvantaged, restricting their ability to become homeowners and accumulate wealth. Given these implications, multiple measures can be taken to reduce the impact of student debt on homeownership. The re-introduction of the grant system has been a step in the right direction, given the findings of Table 5. Another recommendation is to aim to improve the financial literacy and implications of taking up a student loan for students. Implement a form of financial counseling for students taking out loans to ensure they understand the implications of borrowing and are equipped to manage their finances post-graduation. Especially with the recent institutional changes in the loan system further clarity should be essential and can empower individuals with the knowledge and skills needed to navigate possible future financial decisions as well.

Talks of introducing a long-study fine could prove to do more harm than good, especially given the large fine of €3000 attached to it (Van Gestel and NOS, 2024). The findings of this paper suggest large increases in debt provide further financial strain for individuals seeking homeownership. Policymakers however should consider that the limited findings within the same context and research methodology make it challenging to compare results, especially when considering the negative implications of student debt on homeownership. The long-term implications of the 2015-2022 period without student grants can also not fully be understood, but are indicated due to the time lag of graduating and home acquisition.

This study provides significant results into the relationship between student loan debt and homeownership in the Netherlands but does not come without its limitations. This highlights the need for additional future research and possible policy considerations to address the growing burden of student debt on young adults' ability to achieve homeownership.

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Appendices

Appendix A: Notational Glossary & Empirical Model

$$\ln(\text{owner})_{i,t,r} = \mu + \beta_1 \text{HasStudyLoan}_i + \varepsilon_{i,t,r} \quad (1)$$

$$\ln(\text{owner})_{i,t,r} = \mu + \beta_1 \text{HighDebt}_i + \beta_2 \ln(\text{Income}_i) + \beta_3 \text{Financialfamily}_i + \beta_4 \text{Financial literacy}_i + \varepsilon_{i,t,r} \quad (2)$$

$$\ln(\text{owner})_{i,t,r} = \mu + \beta_1 \ln(\text{StudentDebt}_i) + \beta_2 \ln(\text{Income}_i) + \beta_3 \text{Financialfamily}_i + \beta_4 \text{Financial literacy}_i + \beta_5 \text{Degree}_i + \beta_6 \text{Child}_i + \beta_7 \text{Gender}_i + \beta_8 \text{marital}_i + \varepsilon_{i,t,r} \quad (3)$$

$$\ln(\text{owner})_{i,t,r} = \mu + \beta_1 \text{HasStudyLoan}_i + \beta_2 \ln(\text{Income}_i) + \beta_3 \text{Financialfamily}_i + \beta_4 \text{Financial literacy}_i + \beta_5 \text{Degree}_i + \beta_6 \text{Child}_i + \beta_7 \text{Gender}_i + \beta_8 \text{marital}_i + \beta_9 \text{prov}_r + \beta_{10} \text{urbanity}_i + \varepsilon_{i,t,r} \quad (4)$$

$$\ln(\text{owner})_{i,t,r} = \mu + \beta_1 \text{HasStudyLoan}_i + \beta_2 \ln(\text{Income}_i) + \beta_3 \text{Financialfamily}_i + \beta_4 \text{Financial literacy}_i + \beta_5 \text{Degree}_i + \beta_6 \text{Child}_i + \beta_7 \text{Gender}_i + \beta_8 \text{marital}_i + \beta_9 \text{prov}_r + \beta_{10} \text{urbanity}_i + \beta_{11} \text{year}_t + \varepsilon_{i,t,r} \quad (5)$$

$$\ln(\text{owner})_{i,t,r} = \mu + \beta_1 \text{HasStudyLoan}_i + \beta_2 \ln(\text{Income}_i) + \beta_3 \text{Financialfamily}_i + \beta_4 \text{Financial literacy}_i + \beta_5 \text{Degree}_i + \beta_6 \text{Child}_i + \beta_7 \text{Gender}_i + \beta_8 \text{marital}_i + \beta_9 \text{prov}_r + \beta_{10} \text{urbanity}_i + \beta_{11} \text{year}_t + \varepsilon_{i,t,r} \quad (6)$$

$$\ln(\text{owner})_{i,t,r} = \mu + \beta_1 \text{HighDebt}_i + \beta_2 \ln(\text{Income}_i) + \beta_3 \text{Financialfamily}_i + \beta_4 \text{Financial literacy}_i + \beta_5 \text{Degree}_i + \beta_6 \text{Child}_i + \beta_7 \text{Gender}_i + \beta_8 \text{marital}_i + \beta_9 \text{prov}_r + \beta_{10} \text{urbanity}_i + \beta_{11} \text{year}_t + \varepsilon_{i,t,r} \quad (7)$$

$$\ln(\text{owner})_{i,t,r} = \mu + \beta_1 \ln(\text{StudentDebt}_i) + \beta_2 \ln(\text{Income}_i) + \beta_3 \text{Financialfamily}_i \quad (8)$$

$$+ \beta_4 \text{Financial literacy}_i + \beta_5 \text{Degree}_i + \beta_6 \text{Child}_i + \beta_7 \text{Gender}_i + \beta_8 \text{marital}_i + \beta_9 \text{prov}_r$$

$$+ \beta_{10} \text{urbanity}_i + \beta_{11} \text{year}_t + \varepsilon_{i,t,r}$$

$$\ln(\text{owner})_{i,t,r} = \mu + \beta_1 \text{HasStudyLoan}_i + \beta_2 \ln(\text{Income}_i) + \beta_3 \text{Financialfamily}_i + \beta_4 \text{Financial literacy}_i + \beta_5 \text{Degree}_i \quad (9)^3$$

$$+ \beta_6 \text{Child}_i + \beta_7 \text{Gender}_i + \beta_8 \text{marital}_i + \beta_9 \text{prov}_r + \beta_{10} \text{urbanity}_i + \beta_{11} \text{year}_t + \varepsilon_{i,t,r}$$

$$\ln(\text{owner})_{i,t,r} = \mu + \beta_1 \text{HasStudyLoan}_i + \beta_2 \ln(\text{Income}_i) + \beta_3 \text{Financialfamily}_i + \beta_4 \text{Financial literacy}_i + \beta_5 \text{Degree}_i \quad (10)^4$$

$$+ \beta_6 \text{Child}_i + \beta_7 \text{Gender}_i + \beta_8 \text{marital}_i + \beta_9 \text{prov}_r + \beta_{10} \text{urbanity}_i + \beta_{11} \text{year}_t + \varepsilon_{i,t,r}$$

Where:

Dependent owner_{i,t,r} is the homeownership status (0 = Homeowner, 1 = Renter) on an individual level (i) in year (t), in province (r),

μ Is the intercept

Independent (1) HasStudyLoan_i is the binary indicator for student debt (0 = no loans, 1 = has loans)

Independent (2) HighDebt_i is the binary indicator for high student debt (0 = below 20,000, 1 = higher than 20,000)

Independent (3) StudentDebt_i is the accrued student debt of the individual

income_i is the gross income of the individual

financial family_i is the indicator if individuals receive financial aid from their family.

financial literacy_i is the indicator of how knowledgeable individuals are regarding financial matters.

degree_i is the educational degree of attainment of the individual

child_i is the indicator if an individual has at least one child

gender_i is the gender of the respondent

marital_i is the marital status of the individual

prov_r is the province in which the individual lives

urbanity_i is the urbanity of the location

year_t is the year of observation

$\varepsilon_{i,t,r}$ is the error term

Appendix B: Cramér's V for Pearson's Chi-squared

	Tenure	Study Loan	Financial aid	College degree	Gender	Marital Status	Children	Province	Urbanity	Year	Financial literacy	income groups
Tenure	1	0.1862	0.0531	0.1006	0.0692	0.3596	0.2327	0.0289	0.1481	0.1803	0.0943	0.2314
Study loan	0.1862	1	0.0999	0.1762	0.0062	0.1175	0.2059	0.0308	0.2008	0.2156	0.0242	0.0843
Financial aid	0.0531	0.0999	1	0.0131	0.0041	0.0217	0.0060	0.0396	0.0430	0.0838	0.1740	0.0302
College degree	0.1006	0.1762	0.0131	1	0.0189	0.0478	0.0953	0.1286	0.1599	0.1627	0.0960	0.3369

³ Model 9 refers to Pre-2015 Cohort

⁴ Model 10 refers to Post-2015 cohort

Gender	0.0692	0.0062	0.0041	0.0189	1	0.0226	0.0566	0.0751	0.0597	0.0448	0.1570	0.3246
Marital Status	0.3596	0.1175	0.0217	0.0478	0.0226	1	0.4938	0.1048	0.0566	0.1608	0.0521	0.1528
Children	0.2327	0.2059	0.0060	0.0953	0.0566	0.4938	1	0.1413	0.2579	0.1526	0.0481	0.0766
Province	0.0289	0.0308	0.0396	0.1286	0.0751	0.1048	0.1413	1	0.2169	0.0499	0.0723	0.0802
Urbanity	0.1481	0.2008	0.0430	0.1599	0.0597	0.0566	0.2579	0.2169	1	0.0624	0.0484	0.0673
Year	0.1803	0.2156	0.0838	0.1627	0.0448	0.1608	0.1526	0.0499	0.0624	1	0.0941	0.1463
Financial literacy	0.0943	0.0242	0.1740	0.0960	0.1570	0.0521	0.0481	0.0723	0.0484	0.0941	1	0.1034
Income groups	0.2314	0.0843	0.0302	0.3369	0.3246	0.1528	0.0766	0.0802	0.0673	0.1463	0.1034	1

Appendix C: Assumptions of logistic regression analysis

Assumption	Explanation
Binary nature of the dependent variable	The binary logistic regression requires the dependent variable to be consistent of two categories. The dependent variable in this study is housing tenure with two categories: Homeowner and private renter
Independence of observations	Logistic regression requires independence of observations. This assumption is met since the unit level of the data is on household level.
Linearity of log odds	The logistic regression model assumes linearity between the independent continuous variables and log odds of the dependent variable. To accommodate potential non-linear relationships between predictors and the outcome, the only continuous predictor, income, is log-transformed. The remaining predictors are of categorical nature so linearity does not apply.
No multicollinearity	The logistic regression model assumes there is no multicollinearity between the independent variables. The Cramér's V values for Pearson's Chi-squared (Appendix B) show there is no high correlation between the included independent variables. Relying on the rule of thumb it is assumed there is no multicollinearity when these values are below 0.5. The correlation between Children and Marital status notably however is close to 0.5 with a value of 0.4938 but remains under the 0.5 rule of thumb.
Large sample size	Logistic regressions also require a large sample size. Due to the large size of the original dataset after data preparation and cleaning 6,824 observations remain, this is adequate to perform a logistic regression.
Absence of strong influential outliers	By transforming the continuous variables of gross income as well as student debt into their log variants outliers are controlled for, additionally, the removal of the upper 99 th percentile of both income and debt was done to further control for outliers. Due to the categorical nature of other variables, no further effect of outliers is assumed.

Appendix D: Measures

Data variable	Data explanation	Data type	Code
owner_occupied	Yes; no	Binary	0 = Renter 1 = Homeowner
has_study_loan	Yes; no	Binary	0= no student loans 1= has student loans
high_debt	Yes; no	Binary	0 = debt lower than 12,250 1 = higher than 12,250
ln_debt_student	Log of student debt	Log- continuous	Natural log of student debt
ln_gross_income	Log of income	Log – continuous	Natural log of income
college_degree	Yes; no	Binary	0 = lower educational degree completed (MBO-HAVO etc.) 1 = college degree completed (HBO-WO)
financial_family	Yes; no	Binary	0= no financial support from family/acquaintances 1= Yes to financial support from family/acquaintances
children	Yes; no	Binary	0 = no children 1 = at least one child
prov	Province	Categorical	Provinces of Netherlands – Groningen as reference
marital_status	Marital status	Categorical	1 =Married/registered partnership/living together 2 = divorced/separated/widowed/never married
urbanity	Degree of urbanization	Categorical	1=very high degree 2= high degree 3=moderate degree 4= low degree 5= very low degree
age	Respondents age	Continuous	Age of respondents 18-40
gender	Respondents gender	Binary	0 = male 1 = female
year	year of panel data	Discrete	Ranging from 2002-2022
financial_literacy	How knowledgeable do you consider yourself with respect to financial matters?	Categorical	1= not knowledgeable 2= more or less knowledgeable 3= knowledgeable 4= very knowledgeable

Appendix E: Table 3 Full logistic regression model results

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5
Owner occupied					
Study loan (Ref; no debt)	0.380***	0.377***	0.423***	0.487***	0.497***
	(0.0246)	(0.0247)	(0.0306)	(0.0366)	(0.0387)
Log gross income		1.049***	1.025***	1.033***	1.033***
		(0.00834)	(0.00913)	(0.00948)	(0.00959)
Financial aid family (Ref: Not Received)		0.860	0.848	0.852	0.827
		(0.0944)	(0.0990)	(0.104)	(0.103)
Financial Literacy					
More or less knowledgeable		1.412***	1.373***	1.437***	1.427***
		(0.109)	(0.113)	(0.122)	(0.123)
Knowledgeable		1.891***	1.810***	1.899***	1.917***
		(0.164)	(0.167)	(0.182)	(0.187)
Very Knowledgeable		1.626***	1.645***	1.685***	1.736***
		(0.221)	(0.237)	(0.251)	(0.265)
College degree (no degree)			1.486***	1.761***	1.684***
			(0.0895)	(0.112)	(0.109)
Gender (male)			0.812***	0.814***	0.822***
			(0.0481)	(0.0496)	(0.0508)
Marital status (not living together)			2.908***	2.787***	2.850***
			(0.190)	(0.188)	(0.197)
Children (no children)			1.843***	1.681***	1.645***
			(0.127)	(0.120)	(0.120)
Province (zuid holland)					
Groningen				0.730**	0.726**
				(0.0974)	(0.0987)
Friesland				0.533***	0.527***
				(0.0845)	(0.0849)
Drenthe				0.606**	0.583***
				(0.119)	(0.115)
Over Ijssel				0.415***	0.411***
				(0.0537)	(0.0539)
Flevoland				0.482***	0.549**
				(0.114)	(0.132)
Gelderland				0.512***	0.522***
				(0.0590)	(0.0608)
Utrecht				0.816	0.822
				(0.106)	(0.109)
Noord-Holland				0.761***	0.749***
				(0.0783)	(0.0781)
Zeeland				0.781	0.828
				(0.163)	(0.176)
Noord Brabant				0.619***	0.642***

				(0.0699)	(0.0732)
Limburg				0.918	0.929
				(0.140)	(0.142)
Urbanity (moderate)					
Very high degree				0.235***	0.233***
				(0.0254)	(0.0256)
High degree				0.500***	0.496***
				(0.0450)	(0.0452)
Low degree				1.058	1.049
				(0.109)	(0.110)
Very low degree				0.987	0.958
				(0.110)	(0.108)
Year dummy (2002)					
2003					1.277
					(0.232)
2004					1.302
					(0.234)
2005					1.066
					(0.185)
2006					1.317
					(0.241)
2007					1.766***
					(0.332)
2008					2.228***
					(0.447)
2009					3.842***
					(0.869)
2010					3.568***
					(0.862)
2011					3.029***
					(0.736)
2012					2.805***
					(0.660)
2013					2.241***
					(0.451)
2014					1.670***
					(0.299)
2015					2.164***
					(0.415)
2016					1.920***
					(0.352)
2017					1.298
					(0.225)
2018					1.385*
					(0.250)
2019					2.759***
					(0.711)
2020					1.547**
					(0.274)
2021					0.972
					(0.168)
2022					1.098
					(0.199)
Constant	2.699***	1.224**	1.630***	3.228***	2.119***
	(0.0812)	(0.115)	(0.204)	(0.507)	(0.428)

Pseudo R Squared	0.0260	0.0383	0.1205	0.1589	0.1771
Observations	6,824	6,824	6,824	6,824	6,824

Note: The dependent variable is a binary indicator for housing tenure (0= Private renter, 1= Homeowner). Reference categories in parentheses. Standard errors in parentheses with ***, **, and * indicating significance at 1%, 5% and 10%, respectively.

Appendix F: Table 4 full regression model results

VARIABLES	(1) Model 6	(2) Model 7	(3) Model 8
Owner occupied			
Study loan (no debt)	0.497*** (0.0387)		
High debt (low debt)		0.337*** (0.0441)	
Log of student debt			0.924*** (0.00779)
Log gross income	1.033*** (0.00959)	1.034*** (0.00955)	1.032*** (0.00959)
Financial aid family (not received)	0.827 (0.103)	0.771** (0.0953)	0.829 (0.103)
Financial literacy			
More or less knowledgeable	1.427*** (0.123)	1.412*** (0.122)	1.428*** (0.123)
Knowledgeable	1.917*** (0.187)	1.900*** (0.186)	1.918*** (0.188)
Very Knowledgeable	1.736*** (0.265)	1.749*** (0.268)	1.740*** (0.266)
College degree (no degree)	1.684*** (0.109)	1.621*** (0.104)	1.694*** (0.110)
Gender (male)	0.822*** (0.0508)	0.808*** (0.0500)	0.821*** (0.0508)
Marital status (not living together)	2.850*** (0.197)	2.853*** (0.197)	2.860*** (0.197)
Children (no children)	1.645*** (0.120)	1.693*** (0.123)	1.636*** (0.119)
Province (zuid holland)			
Groningen	0.726** (0.0987)	0.693*** (0.0938)	0.728** (0.0990)
Friesland	0.527*** (0.0849)	0.503*** (0.0805)	0.527*** (0.0849)
Drenthe	0.583*** (0.115)	0.574*** (0.113)	0.588*** (0.116)
Over Ijssel	0.411*** (0.0539)	0.406*** (0.0532)	0.413*** (0.0541)
Flevoland	0.549** (0.132)	0.531*** (0.127)	0.548** (0.132)
Gelderland	0.522*** (0.0608)	0.514*** (0.0600)	0.525*** (0.0612)
Utrecht	0.822 (0.109)	0.821 (0.108)	0.825 (0.109)

Noord-Holland	0.749*** (0.0781)	0.736*** (0.0767)	0.749*** (0.0781)
Zeeland	0.828 (0.176)	0.846 (0.182)	0.835 (0.178)
Noord Brabant	0.642*** (0.0732)	0.636*** (0.0724)	0.646*** (0.0737)
Limburg	0.929 (0.142)	0.868 (0.133)	0.928 (0.142)
Urbanity (moderate)			
Very high degree	0.233*** (0.0256)	0.222*** (0.0243)	0.234*** (0.0257)
High degree	0.496*** (0.0452)	0.486*** (0.0443)	0.497*** (0.0454)
Low degree	1.049 (0.110)	1.052 (0.110)	1.045 (0.109)
Very low degree	0.958 (0.108)	0.965 (0.109)	0.956 (0.108)
Year dummy (2002)			
2003	1.277 (0.232)	1.238 (0.224)	1.270 (0.231)
2004	1.302 (0.234)	1.287 (0.231)	1.298 (0.233)
2005	1.066 (0.185)	1.091 (0.190)	1.065 (0.185)
2006	1.317 (0.241)	1.361* (0.249)	1.318 (0.241)
2007	1.766*** (0.332)	1.815*** (0.342)	1.764*** (0.332)
2008	2.228*** (0.447)	2.299*** (0.462)	2.231*** (0.448)
2009	3.842*** (0.869)	3.845*** (0.869)	3.853*** (0.872)
2010	3.568*** (0.862)	3.593*** (0.870)	3.586*** (0.867)
2011	3.029*** (0.736)	3.075*** (0.746)	3.050*** (0.742)
2012	2.805*** (0.660)	2.877*** (0.680)	2.815*** (0.663)
2013	2.241*** (0.451)	2.083*** (0.417)	2.247*** (0.452)
2014	1.670*** (0.299)	1.645*** (0.295)	1.675*** (0.300)
2015	2.164*** (0.415)	2.140*** (0.410)	2.175*** (0.418)
2016	1.920*** (0.352)	1.882*** (0.345)	1.945*** (0.357)
2017	1.298 (0.225)	1.270 (0.220)	1.305 (0.226)
2018	1.385* (0.250)	1.376* (0.248)	1.397* (0.253)
2019	2.759*** (0.711)	2.729*** (0.704)	2.808*** (0.725)
2020	1.547** (0.274)	1.543** (0.273)	1.568** (0.278)
2021	0.972 (0.168)	0.981 (0.170)	0.987 (0.171)

2022	1.098 (0.199)	1.095 (0.199)	1.111 (0.202)
Constant	2.119*** (0.428)	2.068*** (0.417)	2.120*** (0.429)
Pseudo R Squared	0.1771	0.1760	0.1779
Observations	6,824	6,824	6,824

Note: The dependent variable is a binary indicator for housing tenure (0= Private renter, 1= Homeowner). Reference categories are in parentheses. Standard errors in parentheses with ***, **, and * indicating significance at 1%, 5% and 10%, respectively.

Appendix G: Table 5 full Regression model results

VARIABLES	(1) model 9	(2) model 9
Owner occupied		
Study loan (Ref; no debt)	0.535*** (0.0628)	0.475*** (0.0511)
Log gross income	0.996 (0.0127)	1.079*** (0.0157)
Financial aid family (Ref: Not Received)	0.789 (0.125)	0.846 (0.173)
Financial Literacy		
More or less knowledgeable	1.375*** (0.148)	1.541*** (0.228)
Knowledgeable	1.722*** (0.220)	2.294*** (0.365)
Very Knowledgeable	1.639** (0.352)	2.003*** (0.460)
College degree (no degree)	1.607*** (0.139)	1.833*** (0.184)
Gender (male)	0.695*** (0.0570)	0.984 (0.0952)
Marital status (not living together)	2.651*** (0.252)	3.071*** (0.318)
Children (no children)	1.718*** (0.166)	1.519*** (0.176)
Province (Zuid Holland)		

Groningen	0.843 (0.157)	0.538*** (0.113)
Friesland	0.694* (0.145)	0.324*** (0.0842)
Drenthe	0.676 (0.164)	0.466** (0.161)
Over IJssel	0.466*** (0.0771)	0.316*** (0.0697)
Flevoland	0.800 (0.253)	0.336*** (0.129)
Gelderland	0.542*** (0.0838)	0.451*** (0.0826)
Utrecht	0.719* (0.128)	1.031 (0.208)
Noord-Holland	0.755** (0.103)	0.731* (0.120)
Zeeland	1.200 (0.365)	0.510** (0.161)
Noord Brabant	0.724** (0.108)	0.524*** (0.0950)
Limburg	1.276 (0.269)	0.583** (0.137)
Urbanity (moderate)		
Very high degree	0.300*** (0.0436)	0.160*** (0.0280)
High degree	0.536*** (0.0635)	0.453*** (0.0663)
Low degree	0.807 (0.109)	1.522** (0.258)
Very low degree	0.840 (0.121)	1.179 (0.218)
Year dummy (2002 & 2015)		
2003	1.235 (0.222)	
2004	1.271 (0.226)	
2005	1.064 (0.183)	
2006	1.292 (0.234)	
2007	1.734*** (0.323)	
2008	2.179*** (0.434)	
2009	3.626*** (0.810)	
2010	3.452*** (0.822)	
2011	2.959*** (0.711)	
2012	2.747*** (0.638)	
2013	2.202*** (0.439)	
2014	1.677*** (0.297)	

2016		0.864 (0.168)
2017		0.595*** (0.110)
2018		0.645** (0.125)
2019		1.246 (0.336)
2020		0.699* (0.132)
2021		0.433*** (0.0806)
2022		0.492*** (0.0957)
Constant	1.134 (0.274)	1.033 (0.287)
Pseudo R Squared	0.1420	0.2309
Observations	3,961	2,863

Note: The dependent variable is a binary indicator for housing tenure (0= Private renter, 1= Homeowner). Model 9 is the cohort pre-2015 and model 10 is the cohort post-2015. Reference categories in parentheses. Standard errors in parentheses with ***, **, and * indicating significance at 1%, 5% and 10%, respectively.

Appendix H: Predictive Margins Table:

Expression: Pr(owner occupied), predict()

1. Has study loan = 0
Post-2015 = 0
2. Has study loan = 0
Post-2015 = 1
3. Has study loan = 1
Post-2015 = 0
4. Has study loan = 1
Post-2015 = 1

	Margin	Std. err	Z	P> z	[95% conf.	interval]
1	0.715	0.0077	93.03	0.000	0.700162	0.730298
2	0.699	0.0086	81.21	0.000	0.681823	0.715546
3	0.622	0.0160	38.90	0.000	0.590537	0.653197
4	0.603	0.0175	34.56	0.000	0.568929	0.6373343

Appendix I: Search engines and keywords used to find relevant (Dutch) literature

Search engines	SmartCat, Google Scholar
Keywords Dutch	eigenwoningbezit, woningbezit, studieschuld, schuld, studie, studielening, studiefinanciering, eigenaar zijn van een huis
Keywords English	homeownership, renting, student debt, debt, study, student loan, student financing, tenure, housing tenure, owning a home
Example Dutch	(eigenwoningbezit OR woningbezit) AND (studieschuld OR studielening OR studiefinanciering)

Example English	(homeownership OR "owning a home") AND (student debt OR student loan) AND (Netherlands OR Dutch)
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Appendix K: Research Data Management Plan

1. General	
1.1 Name & title of thesis	Sjoerd Rootliep - Homeownership and Student Debt: Exploring the Impact of Student Debt on Homeownership in the Netherlands
1.2 (if applicable) Organisation. Provide details on the organization where the research takes place if this applies (in case of an internship).	Not applicable

2 Data collection – the creation of data	
<p>2.1. Which data formats or which sources are used in the project?</p> <p>For example:</p> <ul style="list-style-type: none"> - theoretical research, using literature and publicly available resources - Survey Data - Field Data - Interviews 	<p>Provide a short description of the sources/data that you are going to use.</p>
<p>2.2 Methods of data collection</p> <p>What method(s) do you use for the collection of data. (Tick all boxes that apply)</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Structured individual interviews <input type="checkbox"/> Semi-structured individual interviews <input type="checkbox"/> Structured group interviews <input type="checkbox"/> Semi-structured group interviews <input type="checkbox"/> Observations <input type="checkbox"/> Survey(s) <input type="checkbox"/> Experiment(s) in real life (interventions) <input checked="" type="checkbox"/> Secondary analyses on existing data sets <p>(if so: please also fill in 2.3)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Public sources (e.g. University Library) <input type="checkbox"/> Other (explain):

<p>2.3. (If applicable): if you have selected 'Secondary analyses on existing datasets': who provides the data set?</p>	<p><input type="checkbox"/> Data is supplied by the University of Groningen.</p> <p><input checked="" type="checkbox"/> Data have been supplied by an external party. (Centerdata Research Institute, DHS data repository).</p>

<p>3 Storage, Sharing, and Archiving</p>	
<p>3.1 Where will the (raw) data be stored during research?</p> <p>If you want to store research data, it is good practice to ask yourself some questions:</p> <ul style="list-style-type: none"> • How big is my dataset at the end of my research? • Do I want to collaborate on the data? • How confidential is my data? • How do I make sure I do not lose my data? <p>Need more information? Take a look at the site of the Digital Competence Centre (DCC)</p> <p>Feel free to contact the DCC for questions: dcc@rug.nl</p>	<p><input type="checkbox"/> X-drive of UG network</p> <p><input type="checkbox"/> Y-drive of UG network</p> <p><input type="checkbox"/> (Shared) UG Google Drive</p> <p><input type="checkbox"/> Unishare</p> <p><input checked="" type="checkbox"/> Personal laptop or computer</p> <p><input type="checkbox"/> External devices (USB, harddisk, NAS)</p> <p><input type="checkbox"/> Other (explain):</p>
<p>3.2 Where are you planning to store/archive the data after you have finished your research? Please explain where and for how long. Also explain who has access to these data</p> <p>NB do not use a personal UG network or google drive for archiving data!</p>	<p><input type="checkbox"/> X-drive of UG network</p> <p><input type="checkbox"/> Y-drive of UG network</p> <p><input type="checkbox"/> (Shared) UG Google Drive</p> <p><input type="checkbox"/> Unishare</p> <p><input type="checkbox"/> In a repository (i.e. DataverseNL)</p> <p><input checked="" type="checkbox"/> Other (explain): Personal laptop or computer</p> <p>The retention period will be 1 year.</p>
<p>3.3 Sharing of data</p> <p>With whom will you be sharing data during your research?</p>	<p><input type="checkbox"/> University of Groningen</p> <p><input type="checkbox"/> Universities or other parties in Europe</p> <p><input type="checkbox"/> Universities or other parties outside Europe</p> <p><input checked="" type="checkbox"/> I will not be sharing data</p>

4. Personal data	
<p>4.1 Collecting personal data</p> <p>Will you be collecting personal data?</p> <p>If you are conducting research with personal data you have to comply to the General Data Privacy Regulation (GDPR). Please fill in the questions found in the appendix 3 on personal data.</p>	No
If the answer to 4.1 is 'no', please skip the section below and proceed to section 5	
<p>4.2 What kinds of categories of people are involved?</p> <p>Have you determined whether these people are vulnerable in any way (see FAQ)?</p> <p>If so, your supervisor will need to agree.</p>	<p>My research project involves:</p> <p><input type="checkbox"/> Adults (not vulnerable) ≥ 18 years</p> <p><input type="checkbox"/> Minors < 16 years</p> <p><input type="checkbox"/> Minors < 18 years</p> <p><input type="checkbox"/> Patients</p> <p><input type="checkbox"/> (other) vulnerable persons, namely (please provide an explanation what makes these persons vulnerable)</p> <p>(Please give a short description of the categories of research participants that you are going to involve in your research.)</p>
<p>4.3 Will participants be enlisted in the project without their knowledge and/or consent? (E.g., via covert observation of people in public places, or by using social media data.)</p>	<p>Yes/no</p> <p>If yes, please explain if, when and how you will inform the participants about the study.</p>
<p>4.4 Categories of personal data that are processed.</p> <p>Mention all types of data that you systematically collect and store. If you use</p>	<p><input type="checkbox"/> Name and address details</p> <p><input type="checkbox"/> Telephone number</p> <p><input type="checkbox"/> Email address</p> <p><input type="checkbox"/> Nationality</p> <p><input type="checkbox"/> IP addresses and/or device type</p> <p><input type="checkbox"/> Job information</p>

<p>particular kinds of software, then check what the software is doing as well.</p> <p>Of course, always ask yourself if you need all categories of data for your project.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Location data <input type="checkbox"/> Race or ethnicity <input type="checkbox"/> Political opinions <input type="checkbox"/> Physical or mental health <input type="checkbox"/> Information about a person's sex life or sexual orientation <input type="checkbox"/> Religious or philosophical beliefs <input type="checkbox"/> Membership of a trade union <input type="checkbox"/> Biometric information <input type="checkbox"/> Genetic information <input type="checkbox"/> Other (please explain below):
<p>4.5 Technical/organisational measures</p> <p>Select which of the following security measures are used to protect personal data.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Pseudonymisation <input type="checkbox"/> Anonymisation <input type="checkbox"/> File encryption <input type="checkbox"/> Encryption of storage <input type="checkbox"/> Encryption of transport device <input type="checkbox"/> Restricted access rights <input type="checkbox"/> VPN <input type="checkbox"/> Regularly scheduled backups <input type="checkbox"/> Physical locks (rooms, drawers/file cabinets) <input type="checkbox"/> None of the above <input type="checkbox"/> Other (describe below):
<p>4.6 Will any personal data be transferred to organisations within countries outside the European Economic Area (EU, Norway, Iceland and Liechtenstein)?</p> <p>If the research takes places in a country outside the EU/EEA, then please also indicate this.</p>	<p>Yes/no</p> <p>If yes, please fill in the country.</p>

5 – Final comments

Do you have any other information about the research data that was not addressed in this template that you think is useful to mention?