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# The Effect of Educational Debt on the Probability of Homeownership for College Graduates: An Empirical Analysis

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The Effect of Educational Debt on the Probability of Homeownership for College  
Graduates – An Empirical Analysis

By

Cole Ikkala

\*\*\*\*\*

Submitted in partial fulfillment  
of the requirements for  
Honors in the Department of Economics

UNION COLLEGE

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## **Abstract**

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ADVISOR: Professor J. Douglass Klein—Kenneth B. Sharpe Professor of Economics  
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With the average tuition of both public and private institutions on the rise, students are graduating from college with a higher burden of debt than ever before. In turn this is adversely affecting their post-graduation decisions, specifically the purchasing of their first home. With the simultaneous increase of educational debt levels and tightening of lending constraints for mortgages, it is hypothesized that first-time homeownership is being delayed. The purpose of this study is to analyze what exactly is delaying graduates from purchasing a home, the outstanding total educational debt amount or the monthly educational debt repayment amounts. Both can hinder the requirements necessary to sign a mortgage, as potential homebuyers look to bypass the down payment and monthly mortgage payment constraints. Literature exists that looks into the increasing burden of educational debt on graduates and separate literature that looks into the future trends of homeownership in America, but the goal of this paper is link these studies providing an empirical analysis of the effect college debt has on homeownership rates. Studies suggest that educational debt is becoming a significant variable in the decision to buy a home. Through the development of an empirical model the trends in homeownership rates relevant to homebuilders, prospective students, college graduates, and families will be properly exposed.

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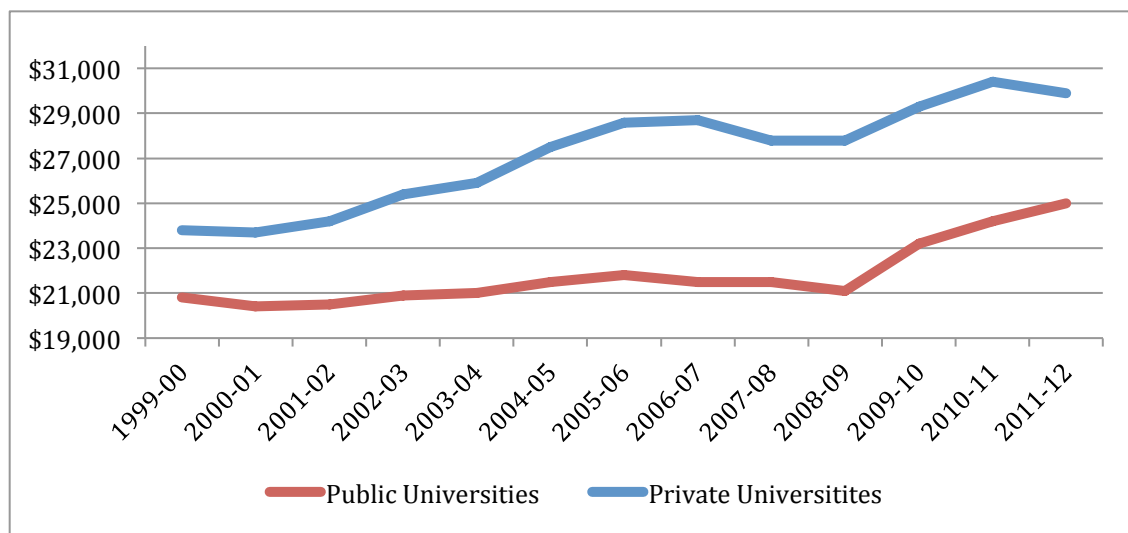
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## ***I. The Student Debt Dilemma and the Barriers College Graduates Face when Entering the Housing Market***

Attaining a college degree has become a vital component of the American Dream. Attending college allows students to realize their dream job, earn good money, and make major purchases such as a car and home, and raise a family. But with the increased demand comes an increased price tag, and students are being forced to take out massive loans in order to finance their education. Much concern is generated as the amount of debt owed by the average student continues to grow rapidly upon graduation. This chapter covers the basis of information necessary to understand the growing concerns exemplified and start to hypothesize how educational debt is impacting post-college purchasing decisions, specifically homeownership. Exhibit I-1 displays the dilemma of increasing debt that is being realized by graduates at both public and private universities.

**Exhibit I-1:** Average Total Debt Levels of Bachelor’s Degree Recipients, Public and Private Four-Year Colleges and Universities in 2012 Dollars, 1999-2000 to 2011-12

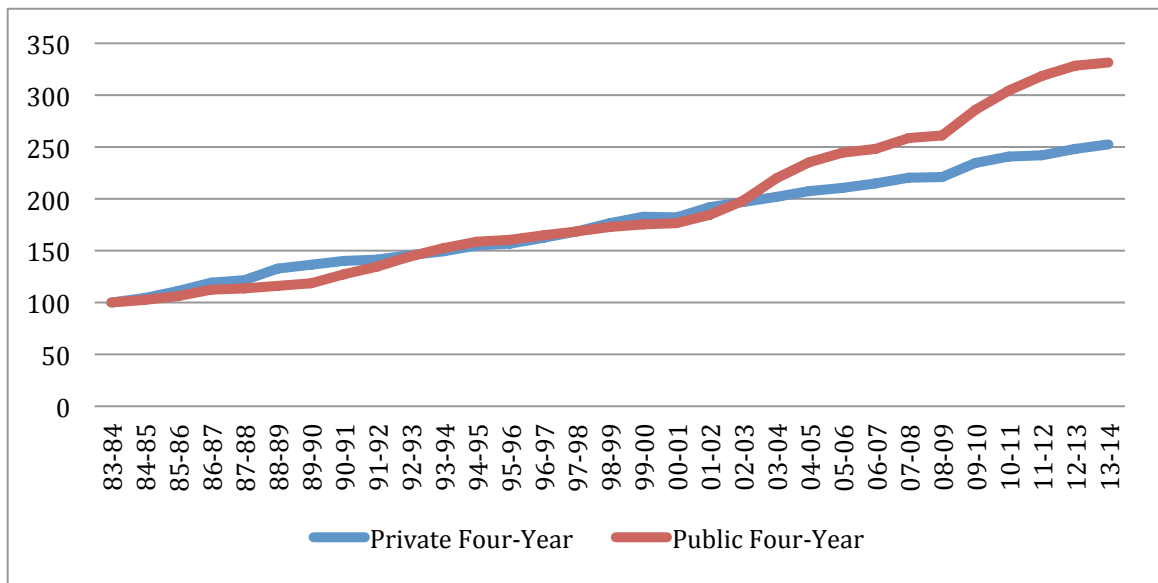


**Source:** Baum and Payea (2013)

## I.A. Rising College Costs

With rising college costs at both private and public postsecondary institutions, concerns about how students will finance these investments are growing within society among the government, lenders, borrowers, and individual institutions. Although only about one-third of full time students pay the full tuition price, the published price continues to increase. Exhibit I-2 demonstrates that tuition and fees relative to 1983-84 have been steadily increasing.

**Exhibit I-2:** Inflation-Adjusted Published Tuition and Fees Relative to 1983-84, 1983-84 to 2013-14 (1983-84 = 100)



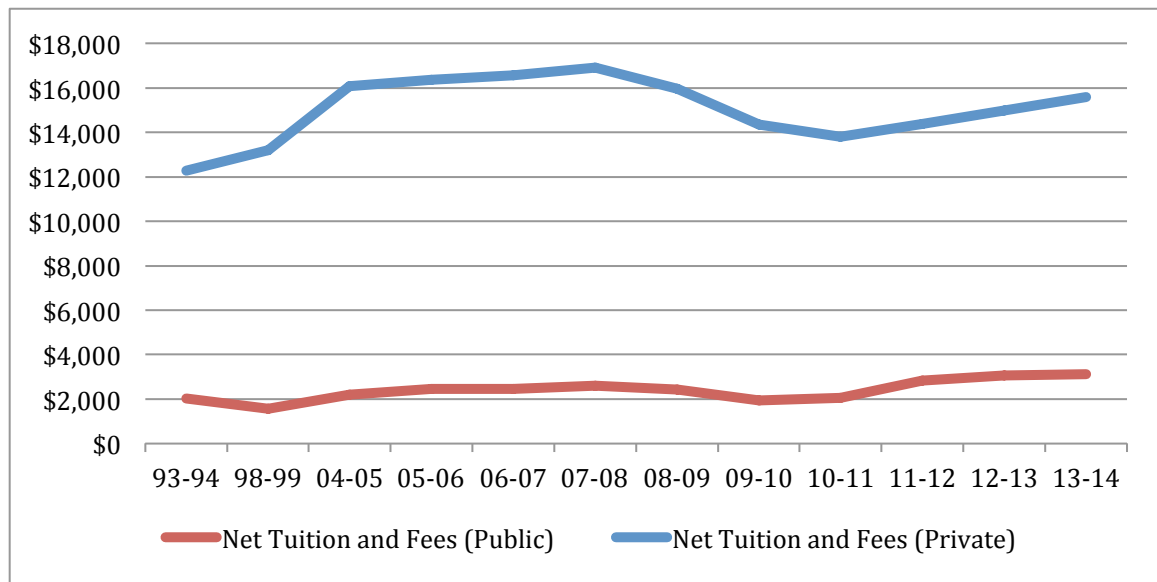
Source: Baum, Kurose, and Ma (2013)

However, with discounts, grants, and tax benefits increasing, the amount that students actually pay has remained relatively unchanged over the past decade. The annual increase in inflation-adjusted average tuition and fees at both public private four-year institutions has declined dramatically since 2009-10. Public colleges and universities have experienced a decline in each of the past five years, from 9.5% to 0.9% in 2013-14.



Private colleges and universities saw a similar decline over the past five years, from 5.9% to 1.9%. The average net prices at public and private institutions for the 2013-14 academic years were \$12,260 and \$23,290 respectively (Baum, Kurose and Ma 2013). These values, reflecting the price that students actually pay, have barely changed over the past decade, inferring that student aid is significantly rising. This phenomenon is displayed in Exhibit I-3, showing that although the published price of both public and private universities are on the rise, the net price that students actually have to pay has remained constant.

**Exhibit I-3:** Average Net Price of Tuition and Fees for Public and Private Institutions in Inflation-Adjusted Dollars



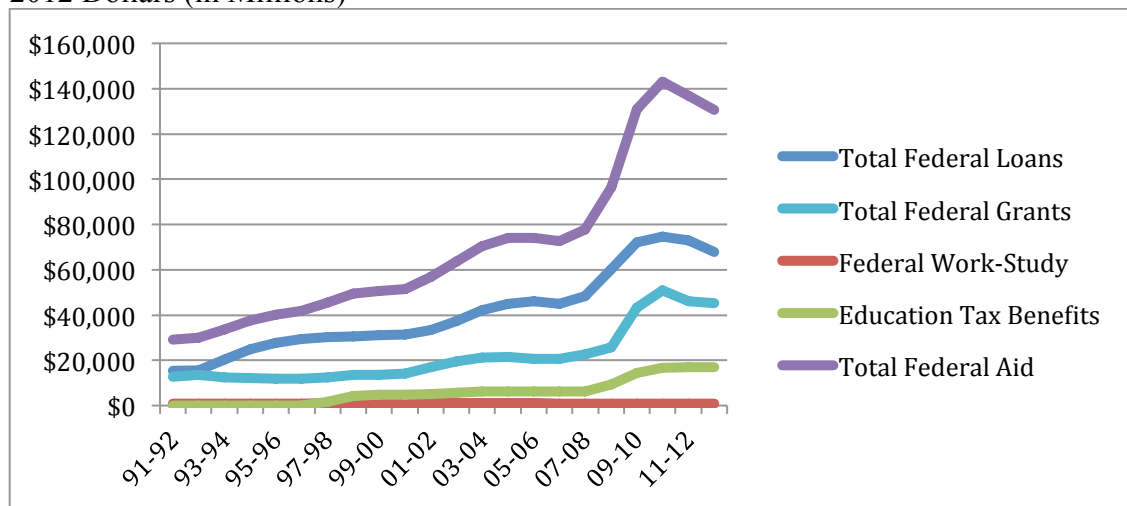
Source: Baum, Kurose, and Ma (2013)

### I.B. Financing Higher Education

Student aid is available through several sources and generally comes in three categories: loans, grants, and work-study programs. Federal aid, a form of need-based aid, is dependent on the information provided by students and their families on the Free

Application for Federal Student Aid (FAFSA). Pell Grants, a form of federal aid, are directly related to the financial need of the student and independent to the cost of the college. Direct subsidized loans are based on both the financial need of the student and the cost of college and only available to undergraduate students. Direct unsubsidized loans are available to students regardless of their financial need, including graduate students. Direct loans are federal loans supplied by the U.S. Department of Education. Other forms of loans available include Grad PLUS loans (for graduate students), PLUS loans (for parents), and Perkins loans (for students with high need at some institutions). Grant aid comes from the federal government, state government, employers, other private sources, and from respective institutions in the form of a discount off the ticket price of attending. Finally, aid is available through the Federal Work-Study Program in which the government provided the funds for colleges and universities to pay wages for student workers. Exhibit I-4 presents the increase in total funds used to finance post secondary education for federally supported programs.

**Exhibit I-4:** Total Federal Aid Used to Finance Postsecondary Education Expenses in 2012 Dollars (in Millions)



Source: Baum and Payea (2013)

Total education borrowing in 2013-14 was \$110.3 billion, declining from the \$120.1 billion borrowed in 2010-11 but still dramatically higher than it was a decade ago, an increase of 69% (Baum and Payea 2013). Apart from the Federal student loan market is the attractive private loan market that has more than doubled from \$55.9 billion to \$140.2 billion between 2005-2011 (Johnson, Van Ostern, and White 2012). The three largest lenders in this market include Sallie Mae, Wells Fargo, and Discover and all of these institutions are seeing an enormous potential for profit. Regardless of the outlet, students are taking out a substantial amount of loans in order to finance their education.

Of the \$185.1 billion distributed in student aid in 2012-13, 37% was federal loans for undergraduates and 63% for graduate students. Since peaking in 2010-11, total borrowing from the federal Direct loan program has decreased by 10%. Despite the decrease in borrowing, the volume of loans dispersed still increased by 8% between 2008-09 and 2012-13. The percentage of undergraduate students now taking out federal subsidized or unsubsidized loans to finance their education is 34%, up from 24% in 2002-03. With the increasing amount of federal Direct loan assistance, student-debt is experiencing a similar increase in volume. Nearly 60% of graduates from private and public institutions in 2011-12 graduated with debt, on average \$26,500. This increasing debt post graduation imposes a burden upon the students to pay back annually as part of their income (Baum and Payea 2013). The effect that this debt burden has on homeownership rates, the purpose of this study, has not been examined thoroughly in economic literature.

Policies to increase the affordability of college are being implemented by the government and universities to help students not only attend college but lower the debt

burden following it. The Obama administration has created incentives for colleges to keep net costs down, increased the educational information available to families, doubled the number of federal work-study jobs, and lowered the interest rates for the repayment of federal loans. Table I-1 includes the historical federal student loan interest rates.

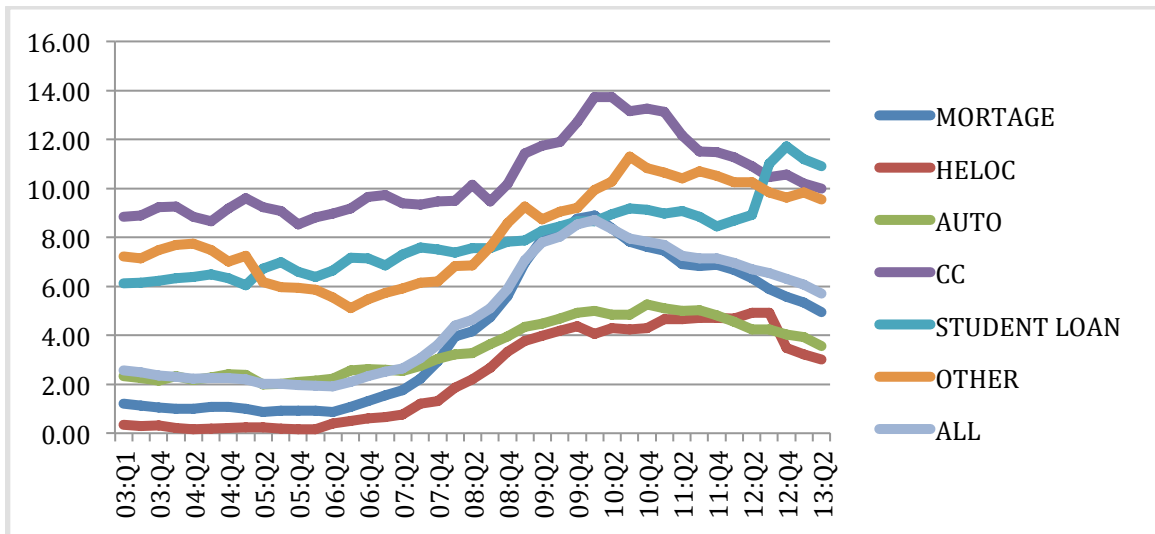
**Table I-1: Loan Interest Rates by Disbursement Dates**

Loan Type	Disbursed Between July 1, 1998 and June 30, 2006	Disbursed Between July 1, 2006 and June 30, 2013
Direct Subsidized Loans and Subsidized Federal Stafford Loans (Undergraduate Students)	The interest rate is variable (adjusted annually on July 1st) and will not exceed 8.25%.  Between 7/1/13 and 6/30/14, loans in repayment or <b>forbearance</b> have an interest rate of 2.35%, and loans in an in-school, grace, or <b>deferment</b> period have a lower rate of 1.75%.	7/1/06–6/30/08: Fixed at 6.8% , 7/1/08–6/30/09: Fixed at 6.0%, 7/1/09–6/30/10: Fixed at 5.6%, 7/1/10–6/30/11: Fixed at 4.5%  7/1/11–6/30/13: Fixed at 3.4%
Direct Unsubsidized Loans and Unsubsidized Federal Stafford Loans (Undergraduate and Graduate or Professional Students)		Fixed at 6.8%
Direct PLUS Loans (Parents and Graduate or Professional Students)	The interest rate is variable (adjusted annually on July 1st) and will not exceed 9.0%.	Fixed at 7.9%
FFEL PLUS Loans (Parents and Graduate of Professional Students)	Between 7/1/13 and 6/30/14, the interest rate on these loans is 3.15%.	Fixed at 8.5%

**Source:** <http://studentaid.ed.gov/types/loans/interest-rates>

Even as the economy continues to strengthen, student loans and 90+ day delinquency rates continue to rise to record highs. Exhibit I-5 depicts this trend in rising delinquency rates over the past years. Unlike delinquency rates for student loans, rates for mortgage, auto, and credit card debts have all declined from previous highs. Although the data is scarce for this particular topic, economists are realizing that the major and university pursued also have an impact on the ability to pay back substantial amounts of debt (Gage and Lorin 2014).

**Exhibit I-5: Percent of Balance 90+ Days Delinquent by Loan Type**



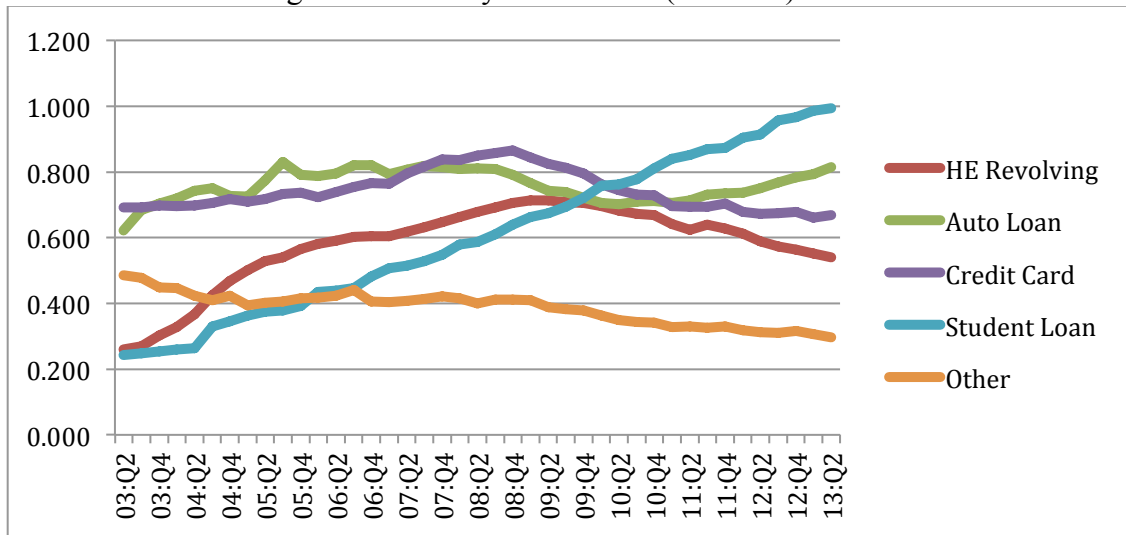
**Source:** Baum and Payea (2013)

**I.C. Qualifying for a Mortgage Contract and the Housing Market**

With average student-debt levels increasing for college graduates, their ability to qualify for a mortgage becomes more difficult. One of the key determinants in qualifying for a mortgage is the debt-to-income ratio (DTI), which is generally composed of two calculations: the “front-end ratio” and the “back-end ratio”. The front-end ratio calculates the monthly mortgage payment as a percentage of monthly income. The back-end ratio includes the monthly mortgage payments along with any recurring debt the household owes as a percentage of monthly income. For example, recurring debt includes payments like car loans, student loans, and credit card debt in which debt payments are made on a consistent basis. The Federal Housing Administration (FHA) requires a debt-to-income ratio when acquiring a mortgage of 41% (Mishory and O’Sullivan 2013). This thesis will focus primarily on the back-end ratio with the increasing educational debt payments for young households. With total educational debt held by Americans reaching 1 trillion, this

recurring debt element of the back-end ratio is becoming significant in the ability to qualify for a mortgage. Exhibit I-6 offers a visual of the trends household are experiencing with the following recurring debt payments: HE Revolving (Home Equity Revolving Debt), Auto Loan, Credit Card, and Other. A revolving line of credit allows the borrower to pay monthly payments between the minimum required balance and the remainder of the debt, in which case the amount not paid will then “revolve” into the next month.

**Exhibit I-6:** Recurring Debt Owed by Households (Trillions)



**Source:** Baum and Payea (2013)

Relators and housing experts are forecasting a later entry into the housing market for the new mass of graduate buyers (Powell 2013). According to statistics from the National Realty Association, the median-age of first time homebuyers over the last 30 years has ranged between 30-32. With the increasing amount of educational debt, the new millennia of buyers are choosing to temporarily live at home, or rent longer, as they look to pay down educational debt before investing in a house. Debt can influence home ownership in two distinct ways including the credit constraints that will add to the

inability to finance a home and debt can tighten budget constraints (Shand 2007). Following the housing bubble of 2008, credit has tightened and the new generation of homebuyers with credit constraints are having a hard time acquiring mortgages. This generation is living at home longer, choosing to rent before buying, pushing back marriages, and waiting to start a family (Powell 2013). According to a FRBNY report in 2005, 9% of 25-30 year olds with educational debt were granted a mortgage, a number that currently stands just above 4%. With first-time home buyers making up nearly 40% of the housing market, they are an integral component that educational debt could diminish. Clearly, there is room for investigation into the linkage between increasing educational debt and the delay in homeownership. Table I-2 displays the changes in home ownership rates by age between 1990 and 2010 using data from the Census.

**Table I-2: Homeownership Rates for Selected Age Groups Between 1990-2010**

<b>Year</b>	<b>All Ages</b>	<b>&lt; 35</b>	<b>35-44</b>	<b>45-54</b>	<b>55-64</b>	<b>&gt;65</b>
1990	63.9	38.5	66.3	75.2	79.3	76.3
1995	64.7	38.6	65.2	75.2	79.5	78.1
2000	67.4	40.8	67.9	76.5	80.3	80.4
2001	67.8	41.2	68.2	76.7	81.3	80.3
2002	67.9	41.3	68.6	76.3	81.1	80.6
2003	68.3	42.2	68.3	76.6	81.4	80.5
2004	69.0	43.1	69.2	77.2	81.9	81.1
2005	68.9	43.0	69.3	76.6	81.2	80.6
2006	68.8	42.6	68.9	76.2	80.9	80.9
2007	68.1	41.7	67.8	75.4	80.6	80.4
2008	67.8	41.0	67.0	75.0	80.1	80.1
2009	67.4	39.7	66.2	74.4	79.5	80.5
2010	66.9	39.1	65.0	73.5	79.0	80.5
Change Since 1990 (%)	4.69	1.56	-1.96	-2.26	-0.38	5.50
Change Since 2004 (%)	-3.04	-9.28	-6.07	-4.79	-3.54	-0.74

**Source:** U.S. Department of Commerce (2012)

As seen in Table I-2, homeownership rates for the general population are higher than they were in 1990 but the downward trend starting in 2004 is alarming. The trough in 1990

was due to a large housing recession and began to recover during the housing boom between 2001-2005. The housing recession of the early 1990's was a product of developments from the late 1980's. In 1987, "Black Monday" occurred and served as an indication that inflation might occur due to the large U.S. budget deficit. In this time, many of the savings and loan associations went bankrupt, a sign of weakness in the housing market. In the mid 1990's new governmental policies were enacted that relaxed the constraints for obtaining a mortgage and the housing market rebounded. Increasing, from the mid 1990's to the 4<sup>th</sup> quarter of 2004, homeownership in the U.S. showed signs of optimism. However, with tightening lending constraints and the increase in defaulting mortgage payments, the homeownership rates have been declining since 2004 in which the highest homeownership rate was recorded. The 2008 housing recession resulted from the credit crisis with evidence that the quality of subprime loans had been deteriorating for six years before the bubble. Policymakers should have seen this coming, but masked by rising home prices, this problem went undetected. When home prices stopped rising, a rise in mortgage defaults occurred. Ultimately the main causes of the housing bubble were low mortgage interest rates, low short-term interest rates, relaxed standards for mortgage loans, and irrational exuberance (Holt 2009). The 2000's experienced a dramatic boom and bust in the housing market, a market that has symbolically been representative of the economy in the United States. Student loan payments, since 2003, have increased significantly and are now the largest component of the recurring debt category.

#### **I.D. Purpose of the Thesis and Outline of Further Chapters**



The purpose of this paper is to incorporate the effect of educational debt post graduation to analyze the decision and constraints, both down payment and monthly payment, young households face when purchasing a home. An abundance of literature is available on rising college costs, the associated debt burden, and the possible decisions that will be altered. To fully expose the effect student aid has on the decision to purchase a home the trends in student aid policy and economic conditions during the time period would also need to be analyzed, providing room for further studies. The scope of this thesis focuses primarily on how educational debt alone may hinder individuals when looking to secure a mortgage. Beyond the educational debt variables, other descriptive household characteristics will be incorporated to further analyze the different effects on homeownership.

A few studies are available that link educational debt to the decision to purchase a home, and this thesis will look use those papers as a foundation for analyzing the most recent data and trends at a national level. Theoretical models will be presented from earlier studies that will display why a household may delay homeownership with tightening budget constraints from the increasing educational debt. Additionally, an empirical model will be developed that uses the Survey of Consumer Finances from 1992-2010, a triennial study. Data will be selected for an age group between 23-32, allowing for a population that has begun to pay educational debt with an average repayment period of 10 years. According to earlier studies, the effect of educational debt on homeownership became significant towards the tail end of their studies, 2004 for the study using the Survey of Consumer Finances. Therefore, there is room for further analysis with more recent data and significant changes in relevant trends.

The remainder of this thesis will consist of six more chapters organized as follows. Chapter II will review previous literature in four separate sections: The Correlation Between Rising College Costs and Educational Debt, Effect of Educational Debt on Post-Graduation Decisions, The Effect of Educational debt on the Transition to Homeownership, and Further Recommendations for Policy on Homeownership and Student Loans. Chapter III analyzes previously proposed theoretical models on the housing-tenure choice. Chapter IV will give a brief summary of the data from the Survey of Consumer Finances and highlight the pertinent variables necessary for the study. Chapter V discusses the empirical model that is formulated and the results of the binary probit and OLS regressions. Chapter VI will provide a brief summary of the thesis, followed by policy proposals for the student debt crisis and areas for further research.

## ***II. Previous Literature on Educational Debt***

Student loan debt has an ample effect on the decision making process of college graduates as they graduate college and enter society. The connection between rising college costs and the increasing need for student-aid is evident and recent reports have been able to highlight this. Whether it is the decision to pursue further education, apply and accept jobs in certain specialties, purchase a car, or in the case of our study the decision to purchase a home, student-loan debt plays a copious role in all of these decisions and literature is available to support that. The following literature review will be organized as follows:

- a. The Correlation Between Rising College Costs and Educational Debt
- b. Effect of Educational Debt on Post-Graduation Decisions
- c. The Effect of Educational Debt on the Transition to Homeownership
- d. Further Recommendations for Policy on Homeownership and Student Loans

Over the past three decades rising costs of attaining a college degree has led to dramatic increase in educational debt, addressed in Section A. Once students graduate college, accumulate debt and then enter the “real world” they face many decisions including purchasing a car, purchasing a home, pursuing further education, and accepting a job which will be covered in Section B of the literature review. With limited studies available on the effect educational debt has on homeownership, Section C and the remainder of this paper will focus primarily on this. The final section of the literature review, Section D, will analyze current policies on homeownership and student loans as well as proposals that could help to mitigate the problems.

## **II.A. The Correlation Between Rising College Costs and Educational Debt**

This section of the literature review will look first at the previously published data on rising college costs. Once the data is presented then a few studies are reviewed that look to the causes of this upward trend in college prices and how policies should address the issue. Educational debt is then analyzed from multiple angles with published data presented first. This is followed by the reasons students need to take out loans and a discussion of just how much educational debt is manageable. Ultimately, the goal of this section is to link rising college costs with an increasing dependence on educational loans.

### II.A.i. Rising College Costs

According to Johnson, Van Ostern, and White (2012) the cost of attending college, an integral part of the American Dream, has increased by over 1000 percent. Baum, Kurose, and Ma (2013) reports that from 1983-84 to 2013-14, inflation-adjusted average published tuition and fees for public and private four-year colleges and universities rose 153% and 251% respectively. Although the published tuition and fees are on the rise for both public and private colleges and universities the net price that students actually pay has been relatively stable or declining due to increased grant aid and tax benefits. For public four-year universities, the average net-price of tuition and fees actually decreased from 2009-10 to 2011-12, but has since been rising. For private universities, however, the average net price of tuition and fees has been declining each year between 2007-08 and 2011-12.

One report written by Dickeson (2004) of the Lumina Foundation identifies four forces responsible for increasing college costs: increasing demand, diminished capacity, economic and fiscal problems, and demands for accountability. Due to the fact that

higher education is seen as a stepping-stone on the path to economic stability, many more students are attending college and thus increasing the demand. However, some colleges are experiencing a diminished capacity and are forced to adjust admission standards. Economic and fiscal problems are also an underlying cause of rising college costs as many states have begun to funding and colleges are decreasing endowment values, a factor also supported by Johnson, Van Orstern, and White (2013) who stated that the financial crisis of 2008 played a dramatic role in rising college costs because college degrees became much more attractive in the tough times. Izadi (2013) also supports this force, stating that about a decade ago students were responsible for one-third of the cost of college with the government covering the remaining two-thirds, but with the decrease in state funding this ratio has flipped. The final reason given for rising college costs is the lack of demands for accountability, defined as the justification of higher costs of education by the federal and state governments. Ehrenberg (2000) also proposes several ideas as to why colleges cost so much. He believes colleges exist in a “winner-take-all” society where colleges continue to spend more in order to stay competitive, with no emphasis placed on reducing costs, increasing efficiency, or reallocating costs. The shared governance at private institutions between trustees, administrators, and faculty creates a system focused solely on attracting students, while slowly reacting to cost pressures. The published rankings of institutions also places pressure on colleges to increase the amount spent on each student, a published figure.

While congress continues to focus on the increasing interest rates student borrowers are facing on federal loan interest rates, Izadi (2013) believes that lawmakers should shift their focus on the increasing tuition costs. She supports this proposal with the

idea that as college costs continue to rise the amount students need to borrow consequently rises as well. To mediate the pressures, Ehrenberg (2000) believes that a proper resource allocation method should be installed, deans should be held responsible for the well being of their institution, and universities should adopt a mindset of growing by substitution rather than expansion.

#### II.A.ii. Educational debt

Dwyer, McCloud, and Hodson (2012) find that the likelihood of graduation for students in private colleges and those that are economically privileged studying at a public university is not greatly influenced by debt levels. For less advantaged students, taking out debt beyond a level of approximately \$11,835 reduces graduation likelihood. Baum and Payea (2013), in a further report on student aid, determine that total educational borrowing is 69% greater than it was a decade ago. Over the past few years, total educational borrowing has begun to decline from \$120.1 billion in 2010-11 to \$110.3 billion in 2012-13. As a percentage of total federal aid, student loans have decreases from 70% of aid in 2007-08 to 60% in 2012-13. When looking at total undergraduate student aid, federal loans were 37% (\$67.8 billion) of the total amount of student aid provided. Compared to 2002-03, 5% more students have taken out federally subsidized or unsubsidized loans to help finance their education. Of the 57% of public four-year graduates with debt, the average amount borrowed was \$25,000, nearly 22% higher than 2001-02. Similarly, of the 65% of private four-year college graduates with debt, the average amount borrowed was \$29,900, which is 24% higher than 2001-02. Of the borrowers, 40% owed less than \$10,000, 30% owed between \$10,000 and \$25,000, and 4% owed more than \$100,000. Strikingly, it is determined that total outstanding

educational debt was twice as large in 2012 (\$962 billion) as it was in 2005 (\$461 billion) and the number of adults with educational debt was 56% higher. Brown and Caldwell (2013) reported that the aggregate student loan is now the second largest U.S. household debt at the end of 2012, reaching \$966 billion. Reed and Cochrane (2012) estimated that two-thirds of 2011 college graduates had, on average, \$26,000 in student loan debt. Mishory and O'Sullivan (2013) found that between 2000-2010 there has been a 46% increase in the amount of college debt held upon graduation, although graduates are entering a tighter job market with salaries that have failed to keep up.

Baum and Schwartz (2006) attempt to define a manageable debt level from the borrower's perspective on the basis of the life-cycle model. The life-cycle model is relevant to this study as it implies that young people will consume more than current income levels can justify. For example, the major goal of student loan borrowing is to allow young people to borrow to finance education that will increase future income. Several studies exhibited in this article accept an 8% rule, stating that educational debtors should not allocate more than 8% of their gross income to the repayment of their loans. Several objective indicators have been proposed to also derive appropriate debt-service ratios. Over indebtedness has two benchmarks to define too much debt including spending more than 25% of gross income on credit commitments and spending more than 50% on credit commitments and household commitments. Looking into average expenditures on discretionary consumption items, Hansendn and Rhodes (1988) define income-sensitive benchmarks for manageable debt levels between 9.9% and 11.5%. Hartman (1971) takes a different approach and believes that students should be willing to make student loan payments up to the amount that their earnings exceed a similar high

school graduate's earnings. Need analysis methodologies have also been developed that base expected contributions on income level, assets, family size, and number of children in college. By implementing an Income-Contingent Repayment Loan System (ICRL), as seen in New Zealand and Australia, a fixed repayment rate could be established as 10% of your income. In the United States, the repayment rates are a function of the size of the loan and the repayment period and generally ignore post-college incomes, very similar to mortgage-style loans. Debt levels can also be looked at subjectively, based on the National Student Loan Survey by Nellie Mae.

Choy, Li, and Carroll (2005) find that the aid that students from different income backgrounds receive to help pay of their loans is much different. The authors find that one out of every five students from the top quartile receive help from their families to pay off their debt. This ratio is significantly smaller than the one-in-ten students of the bottom quartile that receive aid in paying off their loans. This question of equity has to be weighed against the benefits of having a college degree.

## **II.B. Effect of Educational Debt on Post-Graduation Decisions**

Choy and Carroll (2000) found that in the 1990's borrowing did not appear to have an affect on major purchases (such as a home or car), the propensity to save, or the decision to start a family. Those who had taken out student loans in the early 1990's were just as likely to make major purchases and start a family by 1997 as those who had not taken out any form of student loans. In a survey performed by the American Student Assistance (2013) it is shown that attitudes towards major purchases, career choices, and family life have changed significantly since earlier studies. Stone, Van Horn, and Zukin (2012) carried out a survey that found 40% of the respondents admitting to the fact that



their college debt burden is delaying major purchases such as a car or home. A recent AICPA (2013) survey found that student debt cause significant financial constraints on their respondents; 40% delayed a car purchase, 29% have delayed the purchasing of a home, and 15% off put off marriage.

### II.B.i. Lifetime Wealth

Boushey (2003) believes that taking on loads of educational debt to finance higher education pays off in higher lifetime earnings. Hiltonsmith (2013) attempts to quantify how much increasing load of debt can affect an individual's lifetime wealth figure. The model used, with data from the Survey of Consumer Finances, predicts that a lifetime wealth loss of \$208,000 is associated with educational debt of \$53,000. The wealth loss is broken down further into two categories: retirement savings and home equity. The decrease in lifetime wealth loss can be attributed to these two categories with two-thirds of the loss coming from lower retirement savings and one-third of the loss from lower home equity. Johnson, Van Ostern, and White (2012) conclude that the effects of educational debt extends beyond the students, affect families as well and hinders current and future generations from building successful careers, and previous generations from building wealth. Elliot and Nam (2013) studied the effect of educational debt on household wealth in 2009. Using the Survey of Consumer Finances, the authors conclude that in households without educational debt have a net worth of \$117,700 while households with outstanding student loans have a median net worth of \$42,800, nearly three times lower. Although more research is needed, Elliot and Nam (2013) also conclude that policy prescriptions are needed as outstanding educational debt is shown to reduce the net worth of households.

### II.B.ii. Labor-Market Entry

Mischel, Bernstein, and Allegretto (2005) found in 2003 that the ratio of entry-level wages for male college graduates was 177% higher than their high school counterparts, and similarly 162% higher for females. In American Student Assistance (2013), nearly 30% of respondents to the survey said that educational debt had a considerable effect on their career choice decisions, a number that has doubled since 2002. In relation to this figure, 47% made a trade-off between higher pay and satisfaction in order to have the ability to pay off their student loans. Johnson, Van Ostern, and White (2012) reported a study that found students are incapable of waiting for the higher paying jobs they dream of, accepting lower paying jobs in order to start paying off the debt. Approximately 41% of the respondents of the American Student Assistance Survey (2013) state that with the national unemployment rate for college graduates at 8.9% they have been forced to accept jobs that don't even require a bachelor's degree just to start paying off debt. ASA's survey proves that not many students are taking advantage of income-based student loan repayment schemes and because of this, 25% of respondents took jobs in the private sector with higher pay instead of public service jobs they preferred, which is detrimental to economy.

### II.B.iii. Delay in Marriage and Starting a Family

Over the past few decades the average marriage age for men has increased from 23 to 29 and women saw an increase from 21 to 27, accredited to young peoples inability to reach financial milestones. American Student Assistance (2013) found that 29% of respondents delayed marriage because of educational debt, a number that is significantly larger than the 14% that delayed marriage in the Rutgers survey performed by Stone, Van

Horn, and Zukin (2012). Delaying marriage has historically experienced economic impacts as married households statistically earn more than the unmarried households. College educated women are already statistically holding off on children, with college educated women having their first child at 30. This number is only inflated for those women that also hold educational debt. Finally, 73% of those respondents to the ASA survey had to hold off on any form of retirement savings.

#### II.B.iv. Purchasing a Car

In a study performed by Mishory and O'Sullivan (2013), 47% of their respondents admitted they had put off buying a car. Historically, Brown and Caldwell (2013) point out that up through the housing boom of 2008 those individuals with student loan debt were 3-4 percentage points likelier to purchase a vehicle. Following the 2008 housing boom, the debt-funded purchases of vehicles dropped dramatically for educational debt and non-debt burdened individuals and by 2012 those burdened by educational debt were actually less likely to purchase a vehicle.

#### **II.C. The Effect of Educational Debt on the Transition to Homeownership**

In American Student Assistance (2013) it was documented that nearly 75% of the young people surveyed stated that educational debt affected their decision or ability to buy a house. Similarly, 27% of those surveyed attributed their educational debt to their inability to move out of their parents' home. Young adults, or first-time homebuyers represent the lowest ring of the housing industry and when the number of first-time homeowners begins to decrease a ripple effect is sent through the economy. A survey done by One Wisconsin Institute (2013), found that of 61,762 individuals there was a strong correlation between individuals with student loan debt and the propensity to rent,

as opposed to paying a mortgage or owning a home. In comparison, the homeownership rate for respondents with student loan debt was 36.1% lower than those who had already paid off their debt. Brown and Caldwell (2013) show that the median age of first-time homebuyers has been relatively stable and therefore take home-secured debt as the indicator for homeownership in the Consumer Credit Panel. Between 2003-2009, they found that homeownership rates were higher for owners with student loan debt. This trend has changed dramatically over the past few years, and while home ownership rates have plummeted for owners with and without educational debt, those with educational debt are now two percentage points lower.

#### II.C.i. The Housing Market

An abundance of literature is available regarding the housing crisis of 2008, where subprime loans defaulted and home prices plummeted leading to an abundance of foreclosure. Allen (2012) commented on an increase in first-time homeownership during this period because of a less-rigorous screening process for attaining loans. The difficulties to repay these loans were not linked to the mortgage loan structuring but rather the financial constraints they find themselves in after securing the loan. Some of these constraints include unemployment, marital issues, and most importantly, a decline in house prices that leaves the house worth less than the mortgage balance. Belsky (2013) looks at the future of homeownership in America and everything that could possibly affect it. An in-depth literature review is performed analyzing attitudes towards homeownership, market conditions, mortgage constraints, and why the demand for homeownership will likely persist. The part relevant to young households and homeowners is quite interesting. The general consensus from the studies analyzed is that

the majority of all ages, including the current generation of young households, expect to own. It was determined that 94-95% of people between the age of 18-44 were expecting to buy a home, a number that could have been quite lower when taking into effect the current unemployment rates, mortgage constraints, and housing market. From 2004-2010 homeownership rates fell dramatically with the increase in foreclosures, decrease in average home prices, high unemployment, and credit constraints. Belsky (2013) concludes that homeownership rates will likely stage a recovery in the near future and the interest in buying a home will reset, especially among the young. The one constraint that could thwart this recovery, however, is persistent difficulties in acquiring a home purchase loan. Surprisingly, the median age at the time of first home purchase has fluctuated between 30-32 since 2001 (National Association of Realtors), showing stability.

Gabriel and Rosenthal (2005) offer multiple explanations for the dramatic increase in homeownership in the 1990's. With the aging of the baby boomers, the economic boom of the 1990's and the historically low interest rates, the 1990's saw an increase in homeownership rates to a high of 67.5% in 2001. Also coinciding with the rise in homeownership rates is the implementation of policies designed to ease the access to mortgage credit. Bracha and Jamison (2011) conducted a survey asking individuals about certain attitudes such as renting versus buying a home or about how large of a mortgage payment is acceptable, in order to study the relationship between the real estate crisis of 2008 and attitudes towards homeownership. The findings suggest that the crisis had little effect on people who didn't have a personal connection to it. However, there is a positive correlation between the decline in home prices and the amount people were

willing to pay on a mortgage. The two main findings of the study were that individuals affected by the shock faced greater shifts in attitudes towards homeownership and that the confidence of young individuals is negatively affected by the declining real-estate prices.

#### II.C.ii. Transition to Homeownership

Di and Liu (2004) examine the effect wealth and income has on the transition from renting to owning. The analytic method used in this study is the method of survival analysis, utilizing a multi-period longitudinal dataset. Using the Panel Study of Income Dynamics (PSID), collected by the survey research center at the University of Michigan, cohorts of samples are taken every five years and it is the transition from renting to owning at every five-year interval that is of interest. The study finds that household income and net wealth are significant and positively related to the transition from renting to owning. Colton (2011) states that first-time buyers are hit hard by the high down-payment requirements and stringent qualifying standards following the recession. Of the renters surveyed, 65% said they could only afford to make a down payment of only 5% or less on the mortgage. Similarly, of the young buyers (current renters) under the age of 35, 83% expected to use personal savings as a down payment. Drew and Herbert (2012) use Fannie Mae's National Housing Survey from 2010 and 2011 to conclude that the recent housing bubble, the associated decrease in home prices, loan delinquency rates, of knowing others who have personally defaulted on a mortgage is not evident in the preference for owning versus renting.

Several factors beyond educational debt also affect the transition to home ownership and the following studies have provided in-depth analyses of each. Barakova,

Bostic, Calem, and Wachter (2003) test the role of credit quality in limiting access to homeownership. Using data from the Survey of Consumer Finances, credit records, and house price data sets, the study looks to determine the role financing constraints may have on the decision of potential buyers. They utilize a previously established two-step model, first determining the preferred house value and then secondly whether the household's income and wealth can purchase that home. The results proved the hypothesis and wealth and credit constraints have a significant negative effect on homeownership decisions. Fisher and Gervais (2011) provide evidence for several different factors that affect the home ownership rates for the young, ages 25-44. It is concluded in their paper that homeownership rates for the young have experienced a substantial decline between the years of 1980-2000. First-time homebuyers in this period are beginning to finance their homes with a larger value to income ratio which infers lower down payments and higher monthly mortgage payments. Finally, they conclude that people are waiting to get married now and their model suggests that this delay in marriage is lowering home ownership rates. This paper is the first to link income risk and delayed home ownership. Linneman and Wachter (1989) empirically determined that the both wealth and income constraints reduce the propensity to purchase a home, even in well-developed capital markets. Their results also prove that mortgage market innovations were able to reduce the effect these constraints had on the decision.

### II.C.iii. Constraints to Homeownership

Following the recent housing bubble, college graduates are also facing tighter lending constraints and are unable to afford the higher down payments being requested (American Student Assistance 2013). Mishory and O'Sullivan (2013) look at a key

determinant in qualifying for a mortgage, debt-to-income ratio (DTI), and found interesting results for the class of debtors from 2004. The average educational debtor in this cohort had a debt-to-income ratio of 0.49, and would not qualify for an FHA loan or most private loans. The FHA generally requires a DTI of 0.41 to qualify for a mortgage. The DTI is generally broken down into the “front-end ratio” and the “back-end ratio”, with the analysis of the effect of educational debt on homeownership relying heavily on the back-end ratio. The front-end ratio refers to the total housing spending as a percentage of the monthly income. The back-end ratio incorporates not only housing payments, but also the debt owed by a household that may include credit card debt, student loans, car loans, and housing loans as a percentage of monthly income. The back-end ratio is a strong indicator of mortgage qualification, however, this ratio can be ignored if the household has a large down payment, a history of strong credit, high net-worth, more manageable mortgage terms, or several other factors. Mishory and O’Sullivan (2013) calculated the DTI for the 2003-2004 graduate debtors in order to estimate the effect educational debt has on borrowing capacity. Their analysis varied salaries and debt levels, and calculated average values for credit card and car payments for 25 to 34 years olds. Their study found that single and two-debtor households were hit the hardest, and depending on their salary and debt percentile, were unqualified for mortgage loans more frequently.

#### II.C.iv. Empirical Studies

Empirically, two studies were found that analyze the effect of early life debt burdens on homeownership rates. Shand (2007) uses a bivariate probit specification and data from the Survey of Consumer Finances to incorporate the existence of educational



and credit debt into the analysis of homeownership decisions. The model demonstrates two channels through which homeownership decisions are affected. The first channel is a credit-constrained model and a debt-to-income ratio that the household cannot exceed. The other channel involves the budget constraint, and the presence of educational debt burdens the household's voluntary optimization process. The results of this study indicated that households could be affected by debt in two ways as they may not be able to finance their home due to credit constraints or the debt may delay homeownership through a tightening of the budget constraint. Educational debt and credit card debt variable became significant towards the tail end of the study, indicating future possibilities for studies. The results from the credit-constrained model found that for every \$1,000 of educational debt, homeownership rates declined by 0.5 percentage points. For the budget-constrained model, every \$1,000 of educational debt reduced homeownership rates by 2.63%. These results indicate that educational debt has an impact on post-graduation economic behavior.

Similarly in an article by Andrew (2009) in Britain, there is an overwhelming concern that homeownership rates will continue to fall as financing for higher education continues to be reformed. Using a housing tenure choice model, this paper analyzes how these policy changes will affect the homeownership transition for young adults. Four equations were estimated for the study including a real gross wage equation, a housing demand equation, a household formation equation, and a housing tenure choice equation. It was concluded that increased levels of debt created by the new policies will delay graduates' transition into home ownership, dependent on the expected earnings profile and employment patterns.

## **II.D. Further Recommendations for Policy on Homeownership and Student Loans**

Jacobus and Lubell (2007) examine policy options that have been implemented in an effort to reduce the cost of homeownership, with the ultimate goal of preserving homeownership throughout the future. The most common approach is a public subsidy that is offered to either the homebuyer or the developer allowing families to afford homes that they would not be able to purchase otherwise. The problem in an environment with rising home prices, with incomes increasing less steadily, is that this becomes much more expensive for the government. In the traditional housing market there is renting and buying, and in terms of wealth creation only buying offers the opportunity for wealth creation. Collins (2002) concludes that buying a home is typically the largest financial commitment families make and because of this many first-time homebuyers face several obstacles before they are able to accomplish this. The largest federal policy at this time, to help these buyers overcome these hurdles, is the personal income tax deductible for mortgage interest and real estate taxes. The Federal Housing Administration (FHA) provides government insurance guarantees to lenders, although many private lenders are finding new way to reach the undeserved markets. Shaping entire markets are the Community Reinvestment Act (CRA) and the Fair Housing Act, which expand the access to credit. Finally, policies are needed to educate homebuyers before purchasing in an effort to stress the importance of preservation of their asset and protection from loan delinquency.

Palmer, Pinto and Parente (2001) provide the first empirical study linking parental/guardian involvement as a co-obligor on college students' credit cards leads to lower credit card balances. This allows for joint liability between parties that forces close

monitoring of the credit card balances. Alexander, Harnisch, Hurley and Moran (2010) describe the recent efforts of Congress to promote financial incentives for public higher education that maintain their funding levels for education. The “Maintenance of Effort” (MOE) provisions to law require states to meet certain levels of funding in order to receive federal funds. This is the first policy that was implemented not dealing with funding federal student aid programs that allows for a shared responsibility between federal and state governments to maintain the affordability of college. In a release from the White House (2012), President Obama proposes his blueprint for keeping college affordable. He promotes the responsibility shared by the federal government, states, colleges, and universities with the goal of keeping college affordable. Federal aid will be provided to colleges that keep net tuition down as an incentive for unaffordable college to lower costs. Better data will be provided to families as they embark on their college careers, with affordability at the top of the priority list. Through increases in the Pell grant and by shoring up the repayment programs, the president is making the investments in the system in order to keep interest rates low. The President made the American Opportunity Tax Credit permanent and has doubled the number of work-study jobs available to students. Cooperation between all parties is essential in making college affordable and setting up students for success as they graduate.

Certain policies are being proposed in the Senate and as Weise (2014) explains, they are trying to put the colleges on hook for student loans. Senators Jack Reed (D-R.I.), Elizabeth Warren (D-Mass), and Dick Durbin (D-Ill) have named the bill the Protect Student Borrowers Act of 2013. College will be forced to pay fines, ranging between 5-20 percent, on a share of their students that default. In order to reduce these fines,

colleges can support those with the greatest need with loan-management counseling. The fines will be collected by the Department of Education and reinvested in further Pell Grants or to help students at need. Private colleges would statistically face the highest amount of fines due to their large default rates. For both public and private institutions and incentive is proposed to reduce their default rate below 15 percent in which case they would avoid fines entirely. The authors of AICPA(2013) agree with the proposed bill and believe students should be provided with, by the college, the ability to budget their money, make informed decisions about the loans they take out, and realize that loans should be a last resort after all other forms of aid are exhausted. Colleges should also be encouraged to keep tuition low, indirectly lowering the need for financial aid.

Outside of the institutions that students attend, the Federal Government, State Governments, and the private industry can all help to alleviate some of the student loan dilemma. It was proposed in American Student Assistance (2013) that the federal government should seek ways to support more funding for grants, encourage college savings plans early in life, maintain low interest rates on loans, and provide students with an amplitude of free information about payment solutions. The rise in public university tuitions is a result of decreased state funding for education, and states should not only commit more money to higher education, but they should consider a radical shift in the way in which they do so. Finally, the private industry is the beneficiary of the educated populations and should therefore commit more to not only scholarships and grants, but to student loan repayment upon hiring. There truly is room for improvement and support from all aspects of the economy, and in order to be successful full cooperation between all parties seems to be obligatory.

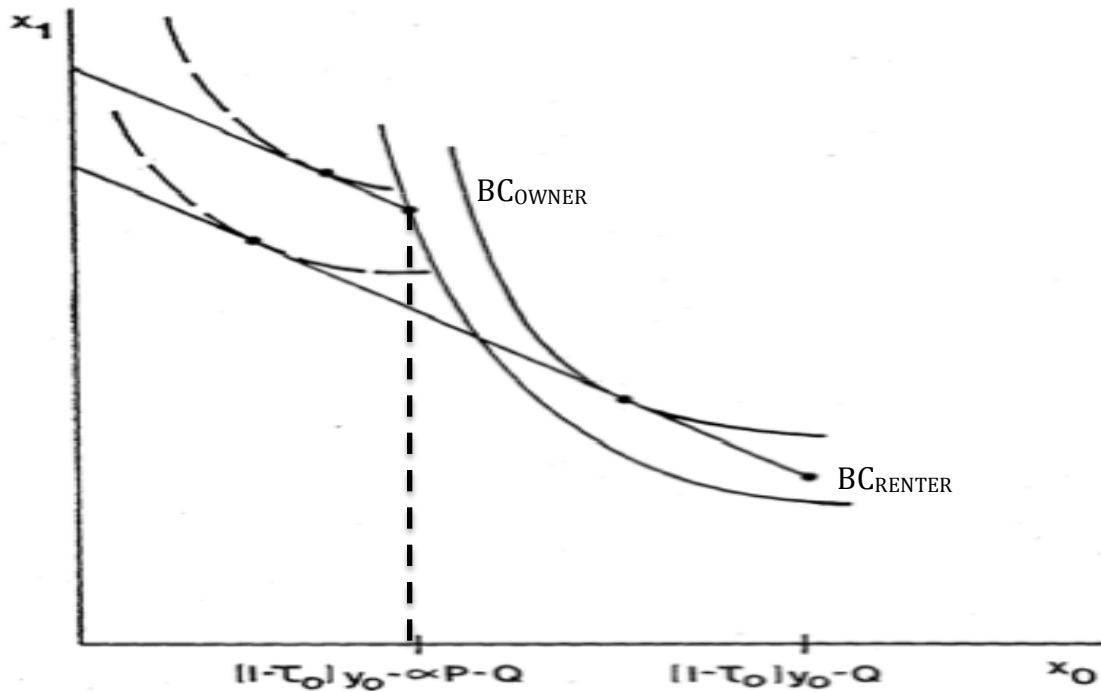
### ***III. Previously Proposed Theoretical Models – The Housing Tenure Choice***

The theoretical models presented in this chapter, first by Brueckner (1986) and secondly by Shand (2007), highlight certain constraints individuals face as they look to transition from renting to owning. The model first presented by Brueckner (1986) is a two-period model that establishes a down payment constraint as the obstacle that individuals need to overcome when purchasing a home. For Shand (2007), with recent emphasis placed on manageable debt levels, a debt-to-income constraint is established as an obstacle that individuals face when securing a mortgage. In both cases, the theoretical framework developed is beneficial when understanding the housing tenure choice.

#### **III.A. Brueckner's (1986) Two-Period Model**

The theoretical framework introduced in this study was first established by Brueckner (1986) in a paper that uses a two-period model (periods zero and one) to analyze the effect of a down payment constraint on housing tenure choice. An understanding of the impact of the down-payment constraint (dotted line in Exhibit III-1) is useful as the down payment is a serious obstacle for families looking to make the transition to homeownership. Essentially a family must bear the burden of the mortgage down payment to enjoy the benefits of homeownership in the future. As displayed in Exhibit III-1 both the renter and homeowner have their respective budget constraints, with the owner above the renter.

**Exhibit III-1:** Brueckner's Two-Period Housing Tenure Choice Model with Down Payment Constraint



**Source:** Brueckner (1986)

This model assumes that income is earned throughout the period and both rent and mortgage interest is paid at the end of the respective period. However, the down payment of a mortgage must be made at the beginning of a period, and because of the two-period model this means that it must be made at the start of period one. This is under the assumption that the down payment saving is amassed throughout period zero.

When these two budget constraints are compared, for the renter and the owner, the housing cost of owning is less than that of renting due to the tax-deductible mortgage interest. However, for an individual to enjoy this benefit then the period zero savings must have been greater, inferring that this tenure choice isn't clear-cut but rather depends on the parameters of the problem. The owner's budget constraint is truncated in Exhibit III-3 because of the down payment constraint. Also displayed is the fact that when the

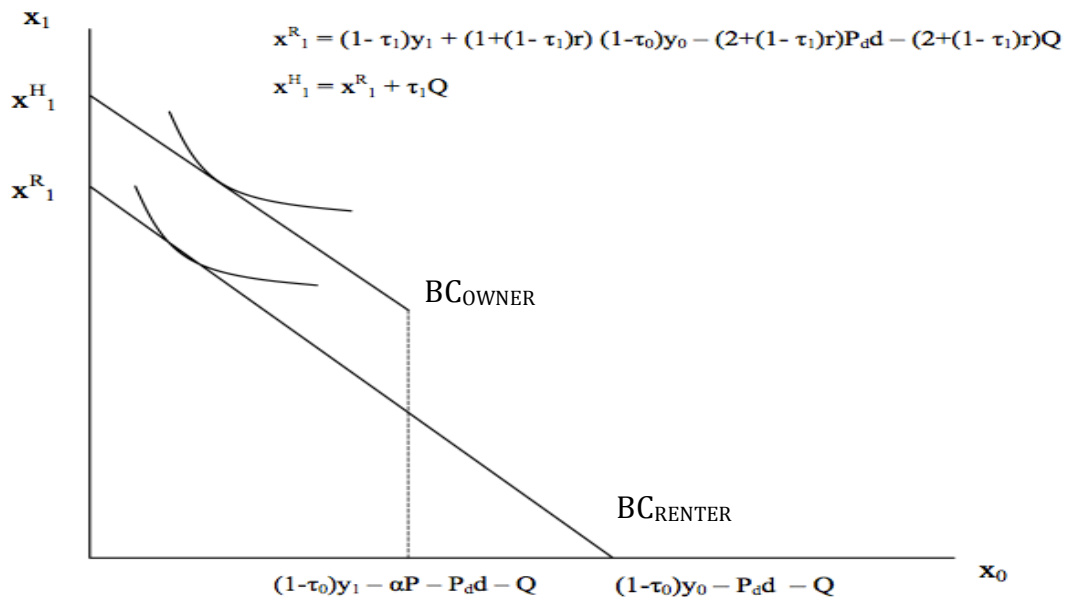
renter's optimal saving point exceed the down payment, owning is preferred, which in this case is represented by the renter tangency point lying below the owners. A few other equations developed by Brueckner (1986) explain the attractiveness of owning as well as how different parameters change the tenure choice.

The first equation in Brueckner's (1986) article denotes the fact that owning becomes more attractive as the discount factor increases if the savings of the renter is less than the down payment constraint. Essentially, as the discount factor continues to increase there will be a point where the savings of the renter will be greater than down payment constraint and owning is then preferred. The second equation developed, proves that owning becomes attractive at high values of period zero income. Similarly, owning is then preferred if income in period one consists of small values. Ultimately, owning is preferred over renting when the discount factor or period zero income is large, or if the period one income is expected to be small. The consumer will look to transfer purchasing power to period one. Other values also have an effect on the decision to purchase a home including down payment percentage, period zero income tax rate, and period one income tax rate. As the down payment percentage increases it not only reduces the homeowner's utility but also shrinks the area where owning a home is preferable. As expected, an increase in the tax rate of period zero shrinks the homeownership area, while an increasing tax rate in period one enlarges this area. The Brueckner (1986) model offers insight into the role of the down payment constraint in the housing tenure choice, as well as discusses how the multiple parameter changes affect the outcome.

### III.B. Shand's (2007) Two-Period Model

The two-period model later presented by Shand (2007) is an extension of Brueckner's (1986) model, substituting the down payment constraint with the debt-to-income credit constraint. Similar to Brueckner's (1986) model, Exhibit III-2 contains the budget constraints for both the owner and renter, with the owner constraint lying above the renters. The dotted line represents the debt-to-income constraint with constrained renters lying to the right and unconstrained renters lying to the left. Shand (2007) goes on to compare the unconstrained renters and owners, those to the left of the debt-to-income constraint, and offers some conclusions. If homeowner savings are greater than renter savings then homeownership is preferred. If renter savings are greater than homeowner savings then the outcome becomes ambiguous. If there is a large discount factor or period zero income then owning dominates. However, if period one income dominates then renting is preferred.

**Exhibit III-2:** Shand's (2007) Two-Period Housing Tenure Choice Model with Debt-To-Income Ratio as a Credit Constraint

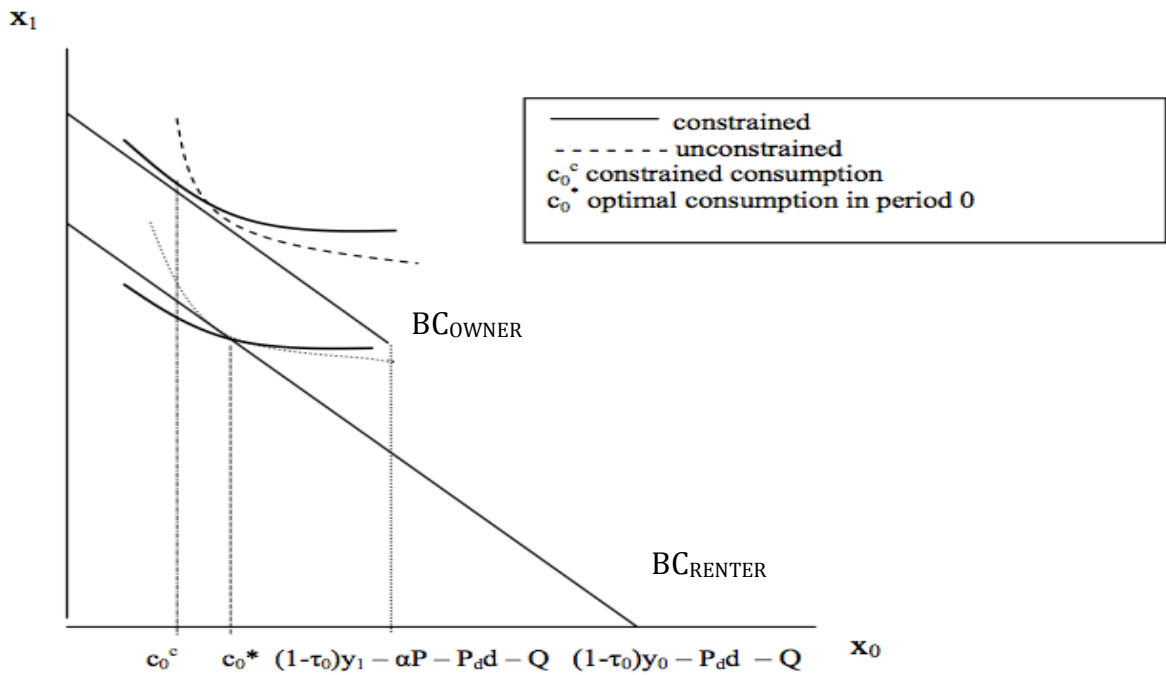


Source: Shand (2007)



Debt plays a very important role in tightening the budget constraint as well by increasing the debt payments made out of the income and reducing the threshold enacted by the mortgage lender. The household can then relax this constraint by either waiting until the debt is paid down or reduce consumption in the current period to increase savings. Exhibit III-3 essentially explains this with the production of flatter indifference curves.

**Exhibit III-3:** Shand's (2007) Two-Period Housing Tenure Choice Model with Constrained Indifference Curve Demonstration



**Source:** Shand (2007)

In this new model, Exhibit III-3, owning is still preferred but the constrained renters, to the right of the debt-to-income constraint, must save more than usual to compensate for the constraint, which means decreasing consumption from the displayed  $c_0^*$  to  $c_0^c$ . This would restore the tangency in the indifference curves.

Important concepts are exposed in both the Brueckner (1986) and Shand (2007) two period housing tenure choice models. For the Brueckner (1986) model the individual has to overcome the down payment constraint as they look to transition from renting to owning. Shand (2007) incorporates a debt-to income ratio as the credit constraint and homeowners must pass this constraint in the transition to homeownership. Comparable in both models is the fact that saving and income accumulation in period zero maximize the possibility of homeownership in period one. If income in period one is expected to be large than renting is encouraged. Shifting from unconstrained renting to owning, in both models, leads to the benefit of tax-deductible mortgage payments that make the housing cost of owning less expensive.

#### ***IV. The Survey of Consumer Finances and Selected Variables***

This chapter will provide background information on the Survey of Consumer Finances including the types of variables, households, and most importantly the concept of multiple imputations. The variables selected will then be defined and exposed along with the selected sample for the study. The final section provides data that is used later to analyze the regression results, both from the sample and nationally published figures. These values include the percentage of graduates with educational debt, the average income of households and individuals, the average educational debt amount at graduation, and monthly educational debt payments, all of which can be used to determine the probabilities of homeownership for the sample household with educational debt.

##### **IV.A. The Survey of Consumer Finances and Multiple Imputations**

The Survey of Consumer Finances is a triennial, cross-sectional survey of U.S. families. The data includes information on balance sheets, pensions, income, interest rates on loans, account ownership and other demographic characteristics. The survey contains around 2700 variables and for individual families there are substantial amounts of missing information. For this reason, the Survey of Consumer Finances uses multiple imputations in order to input missing values into the data set. Five imputations are made for every missing value, so in the dataset that families are stored as five replicates (Kennickell 1998).

The Survey of Consumer Finances is chosen because it is a publically available dataset with a broad enough focus to formulate multiple regressions. The most important feature is that the dataset is a single source with education loan and homeownership data,

the focus of the study. Other possible sources of data include University of Michigan's Survey of Consumers, Fannie Mae's National Housing Survey, Nellie Maw National Student Loan Survey, National Postsecondary Student Aid Study (NPSAS), the American Housing Survey (AHS), and data gathered by the National Association of Realtors. These datasets, although very useful, didn't offer student loan data and homeownership data together and for that reason the Survey of Consumer Finances is chosen. Thus, using the Survey of Consumer Finances allows for the study of the effect of educational debt on homeownership, while allowing for the addition of other beneficial household characteristics influencing the decision.

Missing data remains to be the biggest limitation to the Survey of Consumer Finances, as respondents don't always know or want to provide certain values. Before the implementation of multiple imputations in 1989, missing data was generally entered using regressions or other proven techniques. The FRITZ (Federal Reserve Imputation Technique Zeta) model was designed to follow a predetermined path through the survey data imputing missing values along the way. Five imputations are made for every missing value until the key estimates are stable. The FRITZ model carries out three basic types of imputations in order to incorporate continuous variables, multinomial variables, and binary variables into the dataset. Generally, the response rate for the survey is low for eligible respondents. Many financial values are highly skewed and in order to support the analysis of these variables two sample designs are included – a multi-stage national area-probability design and a list sample design. The list sample design provides a disproportionate representation of the wealthy households with assets at the far right tail of the distributions. Including this data causes complications including an unusual

amount of values at the far right tail of the data, wealthy households generally have more assets and liabilities and can fill in more of the missing values, wealthy households hold complex assets with undetermined values, and their unusual characteristics make the review of the data more challenging. In conclusion, the wealthy households that are included make it hard to distinguish between errors or outliers (Kennickell 1998).

#### **IV.B. The Restricted Sample and Descriptive Statistics**

The full sample used in this paper includes 6360 observations after being narrowed down to select for certain characteristics. The dataset is modified to include head of households between the ages of 23-32. The age group is selected and based off of Shand's (2007) model where setting the minimum age to 23 ensures that the majority of individuals have been out of school long enough to start repaying their loans. According to Baum and Payea (2013) the average repayment period is 10 years, so setting the upper limit on age to 32 limits the sample to people that should still be relevant to the study. The data is further reduced to include head of households with at least four years of college (EDUC 16-17), which could include graduate school, and a college degree (EDCL 4). The variables used for the empirical analysis are listed in Table IV-1, along with all relevant descriptions. For the empirical analysis two sets of regressions were performed with one data set using the EDN\_DEBT variable and the other with EDNDEBT\_PMT variable to demonstrate if it is the outstanding balance of educational debt that deters graduates from homeownership or the monthly payments in the years to come that would have to be coupled with mortgage payments.

**Table IV-1: Descriptions of All Variables Used in Empirical Analysis**

Variable	Description
<b>Homeownership</b>	
<b>Variables</b>	
HOME_VALUE	Total value of primary residence of household (dollars)
HOMEOWNERSHIP	Dichotomous variable for homeownership (0=no house, 1=owns house)
<b>Educational Debt</b>	
<b>Variables</b>	
EDN_DEBT	Total value of education loans held by household (dollars)
EDNDEBT_PMT	Total monthly payments on all education loans (dollars)
<b>Head of Household</b>	
<b>Characteristics</b>	
AGE	Age of head of household (years)
HHSEX_MALE	Dichotomous variable for head of household's sex (0=female, 1=male)
MARRIED_YES	Marital status of head of household (0=not married, 1=married)
KIDS	Total number of children in the household
RACE_NONWHITE	Race of head of household (0=white non-Hispanic, 1=nonwhite or Hispanic)
<b>Other Explanatory</b>	
<b>Variables</b>	
8PERCENT_DUMMY	Dichotomous variable for ratio of monthly educational debt payments to monthly income (0=less than 8%, 1=greater than 8%)
LATE60	Dichotomous variable if household had any debt payments more than 60 days past due in last year (0=no, 1=yes)
YEAR_1992	Dichotomous variable for 1992
YEAR_1995	Dichotomous variable for 1995
YEAR_1998	Dichotomous variable for 1998
YEAR_2001	Dichotomous variable for 2001
YEAR_2004	Dichotomous variable for 2004
YEAR_2007	Dichotomous variable for 2007
YEAR_2010	Dichotomous variable for 2010

Table A-1 in the Appendix shows the descriptive statistics for the full sample of 6360 observations, the individual statistics for sample years 1992-2010, and the sample with and without educational debt. When looking at the year-by-year breakdown of the

data an upward trend in average student loan debt is noticed, from \$6,940 in 1992 to \$22,937 in 2010. The total monthly payments have remained relatively stable over the sample years, increasing from \$124.35 in 1992 to \$135.34 in 2010. There is a dramatic increase, however, noticed in monthly educational debt payments by the household since 2004. It is important to note the many respondents in the survey have no educational debt, so the values for the full sample and individual years include those with and without educational debt. The average amount of outstanding student loan debt for the full sample is \$13,475, and of those with educational debt the average is \$28,341. The average amount of monthly educational debt payments for the full sample is \$115.61, and of those with educational debt the average monthly payment is \$243.15.

When comparing those observations with and without student loan debt, both income and non-educational debt offer some other unique insights. The households with educational debt had on average, \$80,484 less income than those who did not carry educational debt. Similarly, those households without educational debt had on average, \$29,195 more non-educational debt than those households with student loan debt. This could possibly mean that these households, because they didn't have educational debt, were able to secure mortgage debt by purchasing a home or other form of an asset. The average home value of those households without educational debt is \$84,544 greater than the households with educational debt. Finally, the homeownership rate of those burdened by educational debt is 41%, as compared to the 48% homeownership rate of those without debt. Educational debt seems to play an integral role in the post-graduation decisions of individuals.

#### IV.C. Data Used to Further Analyze Regression Results

The following tables, Tables IV-2, IV-3 and IV-4, include data that is used to analyze the regression results in Chapter V. Table IV-2 is an exposition of the data looking at both the percentage of sample with educational debt and then, of those debt holders, the average total amount. In both case there is a dramatic upward trend as the percentage of households with educational debt increases from 40% to 56% and the average amount of educational debt increases from \$6,940 to \$24,317.

**Table IV-2:** Percentage of Households with Educational Debt and the Average Amount of Education Debt Held of Sample Data

<b>Year</b>	<b>Percentage of Households with Educational Debt</b>	<b>Average Amount of Educational debt per Household</b>
1992	40%	\$6,940
1995	38%	\$7,102
1998	50%	\$13,962
2001	42%	\$8,154
2004	51%	\$12,570
2007	54%	\$19,068
2010	56%	\$22,937

According to Baum and Payea (2013) about 60% of bachelor degree recipients graduated with debt in 2011-12 with an average amount of \$26,500 borrowed. This scholarly data legitimizes the sample data used later in the thesis, as the percentage of households in 2010 is just under 60%. The average amount of debt per household of \$22,937 is just below the average debt per bachelor degree recipient at graduation established by Baum and Payea (2013) and therefore the data source is an accurate representation. It is important to note that the households could be in any stage of repayment, up to 10 years out of college, and these values don't reflect the amount held at graduation. The important takeaway is that there is a dramatic upward trend in the data. The average amount of



educational debt held by the household for the years 2004-2010 will be used in later analysis to analyze the effect of educational debt on homeownership.

To analyze the effect of average monthly educational debt on homeownership, the monthly educational debt values from the sample were needed for the years 2001-2010 (years in which the educational debt variables were significant). In order to verify the validity of the sample payment amounts it is imperative that the values fell within the 8-Percent Rule for both the sample data and nationally published data. To calculate the maximum monthly educational debt payments acceptable, the average household income is divided by 12 and then multiplied by 8%. Table IV-3 displays the average monthly educational debt amounts per household from the sample (Column 4) and these clearly fall within the maximum monthly payments that households should be making (Column 3).

**Table IV-3:** The Average Household Income, Maximum Monthly Educational Debt Payment (8-Percent Rule), and Average Monthly Educational Debt Payments per Household of Sample Data

<b>Year</b>	<b>Average Household Income from Sample</b>	<b>Maximum Monthly Educational Debt Payment (8-Percent Rule)</b>	<b>Average Monthly Educational Debt Payments per Household from Sample</b>
2001	\$109,672	\$731.14	\$103.46
2004	\$138,838	\$925.59	\$78.06
2007	\$117,167	\$781.11	\$122.41
2010	\$92,418	\$616.12	\$134.34

Table IV-3 looks at household incomes from the sample, and Table IV-4 re-computes the maximum acceptable monthly payments for the average individual between the ages of 25-34 with a bachelor's degree or higher (U.S. Department of Education 2012). This data is gathered and analyzed to reinforce the fact that although our data is of

households it is still an accurate representation of what individual college graduates are paying per month. This is concluded using the same procedure from Table IV-3, dividing the average income of college graduates by 12 and then multiplying that value by 8%. Again, when comparing the average monthly educational debt payments per household (Column 4) to the maximum monthly educational debt payment (Column 3) it is evident that the values from the sample fall within the 8-Percent Rule and are acceptable.

**Table IV-4:** Published Incomes of Individuals Between the Age of 25-24 with a Bachelor’s Degree or Higher (in 2011 dollars) and the Inferred Maximum Monthly Educational Debt Payment (U.S. Department of Education, 2012)

<b>Year</b>	<b>Average Income of College Graduate (Ages 25-34) in 2011 Dollars</b>	<b>Maximum Monthly Educational Debt Payment (8-Percent Rule)</b>	<b>Average Monthly Educational Debt Payments per Household from Sample</b>
2001	\$52,240.00	\$348.27	\$103.46
2004	\$50,530.00	\$336.87	\$78.06
2007	\$51,910.00	\$346.07	\$122.41
2010	\$50,270.00	\$335.13	\$134.34

For both the total educational debt amount and the monthly educational debt payment amounts, the data from the sample is an accurate representation of college graduates and is viable for use when analyzing the regression results later in Chapter V.

## ***V. The Empirical Model and Regression Results***

A binary probit regression is established in order to analyze the effect of educational debt on homeownership. Two supplementary OLS regressions are run to further analyze the effect of educational debt on home value. Once the probit model is established, the regression results are presented and all the important marginal effects are discussed. In addition to presenting the marginal effects from the regressions, further analysis is carried out with both sample data and nationally published data verified in Chapter IV. Outstanding educational debt amount and monthly educational debt payments are used in order to calculate the probability of owning a home for the individual years.

### **V.A. The Binary Probit Regression**

A binary probit regression is chosen in order to analyze the binomial response variable of homeownership. When a dependent variable is only able to take on two values, homeownership for example (yes/no), then this variable is a dichotomous variable. A probit on homeownership is a function of the probability of selected characteristics on owning a home. The coefficients of the regression results therefore offer the marginal effect these characteristics have on the probability of owning a home. The economic function would then look like,

$$y^* = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k + \varepsilon$$

where the x variables are the chosen characteristics including the educational debt variables and head of household characteristic variables. The regression results and marginal effects of these characteristics on homeownership are listed in Tables A-2 and A-3 in the appendix.

## **V.B. Regressions Results for Probit and OLS Regressions on Homeownership and Home Value**

Estimates of the marginal effects for the binary probit regressions with homeownership (HOMEOWNERSHIP) as the dependent variable are presented in Table A-2 and A-3 in the Appendix. Table A-2, Columns 1-8, includes the marginal effects of total educational debt (EDN\_DEBT) on homeownership. Table A-3, Columns 10-17, includes the marginal effects of monthly educational debt payments (EDNDEBT\_PMT) on homeownership. Columns 1 and 10 contain the probit regression estimates for the full sample using either total educational debt or monthly educational debt payments as the measure of student loan debt. Both have a significant effect and it is concluded that for every \$1,000 of total student loan debt, a household is 0.21% less likely to own a home than those without student loan debt. When looking at monthly educational debt payments as the measurement of student loan debt, it is concluded that for every \$100 of student loan monthly payments, the household is 1.9% less likely to own a home. Column 10 also contains the regression estimates for the 8-Percent Rule dummy (8PERCENT\_DUMMY) variable, included because the general agreement is that individuals shouldn't allocate more than 8% of their gross income to paying off student loans. This variable is significant and if a household is allocating more than 8% of their income to student loan repayments then they were 23% less likely to own a home.

In addition to these variables the age of the head of household (AGE), marital status (MARRIED\_YES), and the amount of kids in the household (KIDS) all have significant and positive marginal effects on homeownership. Nonwhite head of households (RACE\_NONWHITE) were also significantly less likely to own a home than white head of households. Non-educational debt (NONEDU\_DEBT), the household

income (INCOME), and the households' repayments behaviors (LATE60) all have a significant effect on homeownership as well. For every \$1,000 of non-educational debt a household carries reduces the chance of homeownership by 0.90%. Surprisingly, for every \$1,000 of additional income a household has, homeownership is lowered by 0.12%. Finally, as a measure of repayment behavior, households with loans over 60 days delinquent were 64% less likely to own a home in this sample.

Interesting trends were noticed when the years were analyzed separately for both total educational debt and monthly educational debt payments. When using EDN\_DEBT as the measure of educational debt, Columns 2-8, the variable becomes significant in 2001, insignificant in all years before that. Although the variable isn't significant in 2007, three of the past four years have shown significance. For every \$1,000 of outstanding education debt the probability of homeownership is lowered by 1.2%, 7.6%, and 0.28% in 2001, 2004, and 2010 respectively. When EDNDEBT\_PMT is used as the measure of educational debt, Columns 11-17, similar results are noticed. The variable becomes significant in 2001 and remains significant through the most recent survey. For every \$100 of total monthly educational debt payments the probability of homeownership is reduced by 36%, 38%, 16%, and 13% for the 2001, 2004, 2007, and 2010 samples. In both cases, using the total educational debt amount or monthly educational debt payments, educational debt had the greatest effect on homeownership in 2004.

The final two regressions run were OLS regressions, Columns 9 and 18 of Tables A-2 and A-3. The goal of these regressions is to determine the effect of educational debt on home value (HOME\_VALUE). The total amount of educational debt has a significant effect on home value and for every dollar of educational debt home value decreases by

\$0.52. The age of the head of household and the number of kids in the household both have a positive significant effect on home value with every year of age increasing the value by \$5,905 and every kid increasing the home value by \$10,685. Once again, income has a significant negative effect for homeownership in this sample and for every additional dollar of income home value is decreased by \$0.09. When monthly educational debt payments are incorporated as the measure of student loan debt it is concluded that for every dollar of monthly educational debt payments the home value decreases by \$37.63. Both the total educational debt amount and monthly educational debt payments have a significant negative effect on the home value of a household.

#### V.C. Further Analysis of the Effect of Educational debt on Homeownership

The important regression results pertaining to the effect of educational debt on homeownership are summarized in Table V-1.

**Table V-1: Summary of Significant Regression Results Pertaining to the Effect of Educational Debt on Homeownership**

Dependent Variable	HOMEOWNERSHIP				
	Full	2001	2004	2007	2010
Educational Debt Variable	(1),(10)	(5),(14)	(6),(15)	(7),(16)	(8),(17)
EDN_DEBT (000's)	-0.21%***	-1.2%***	-7.6%***	Not Significant	-0.28%***
EDNDEBT_PMT (00's)	-1.9%***	-36.0%***	-38.0%***	-16.0%**	-13.0%***

\* Statistically significant at the 0.10 level.

\*\* Statistically significant at the 0.05 level.

\*\*\* Statistically significant at the 0.01 level.

Table V-1 includes the marginal effects of the educational debt variables on homeownership as percentages. The only marginal effect not included is the percentage for 2007 for the total educational debt amount variable, as this variable is not significant.

By using these percentages, it is possible to analyze the marginal effects of both total educational debt amount and monthly educational debt payments on homeownership by year. The results of the calculations were included in Table V-2 and for every additional \$1,000 of outstanding educational debt, the change in the probability of homeownership. This is determined using the verified values of educational debt for the sample from Table IV-2. The probability of owning a home for an educationally indebted household, with the average amount of educational debt, was worst hit in 2004, with over a 95% reduction in the probability of home ownership, compared to households without educational debt. The most recent year, 2010, is not as dramatic and if a college graduate held the average amount of educational debt then they were about 6% less likely to own a home.

**Table V-2:** The Calculated Probability of Owning a Home with the Sample Average Amount of Educational Debt

<b>Year</b>	<b>Average Amount of Educational Debt per Household</b>	<b>EDN_DEBT (From Table V-1)</b>	<b>Change in the Probability of Owning a Home</b>
2001	\$8,154	-1.20%	-9.78%
2004	\$12,570	-7.60%	-95.53%
2007	\$19,068	-	-
2010	\$22,937	-0.28%	-6.42%

The changes in probability, Column 4 of Table V-2, were calculated by dividing the average amount of educational debt per household (Column 2) by 1,000 and then multiplying this value by the marginal effect of total educational debt on homeownership (Column 3).

When analyzing the marginal effects of monthly educational debt payments on homeownership for the years 2001-2010 the average monthly educational debt payments

from Table IV-3 were used. These monthly payments were taken directly from the sample. There is a downward trend with the probability of owning a home, but the numbers are still significantly large. For the most recent year of 2010, with a monthly educational debt payment of \$134.34, the probability of you owning a home is about 17% less than those who made no educational debt payments. For a household in 2001, the effect was most significant with over a 37% reduction in the probability of homeownership, as compared to those making no payments. The monthly educational debt payments, Column 2 of Table V-3, in these four years increased slightly, while the change in the probability of ownership decreased (Column 4).

**Table V-3:** The Probability of Owning a Home with the Sample Average Monthly Payments

<b>Year</b>	<b>Average Monthly Educational Debt Payments per Household</b>	<b>EDNDEBT_PMT (From Table V-1)</b>	<b>Change in the Probability of Owning a Home</b>
2001	\$103.46	-36.0%	-37.25%
2004	\$78.06	-38.0%	-29.66%
2007	\$122.41	-16.0%	-19.59%
2010	\$134.34	-13.0%	-17.46%

The changes in probability, Column 4 of Table V-3, were calculated by dividing the average monthly educational debt payment per household (Column 2) by 100 and then multiplying this value by the marginal effect of monthly educational debt payments on homeownership (Column 3).

Comparing Tables V-2 and V-3, except for year 2004, the monthly educational debt payments have a more significant effect on homeownership than does the outstanding educational debt amount. When an individual is looking to secure a mortgage, a down payment has to be made followed by a fixed amount of monthly



mortgage payments. The results from Tables V-2 and V-3 offer some interesting insight into the homeownership constraints experienced. The amount of money an individual is willing to contribute to the mortgage down payment, it can be argued, is hindered by the amount of outstanding educational debt that individual owes (EDN\_DEBT). Non-educational debt (NONEDU\_DEBT) also plays a large role in being able to secure a mortgage and for the years of significance non-educational debt had a significant effect on homeownership and for every \$1,000 the probability of homeownership was decreased by 4.3%, 5.5%, 3.5%, and 1.8% for the years 2001-2010. Essentially, outstanding debt hinders the household's net wealth and ultimately the ability to secure a mortgage and bypass the down payment constraint. Similarly, with increasing educational debt payments individuals are failing to pass the monthly mortgage payment (EDNDEBT\_PMT) constraints set by the FHA. When comparing the results from Tables V-2 and V-3 it is then concluded that the monthly mortgage payment constraint is much more significant than the down payment constraint when the individual is looking to secure a mortgage contract, as the changes in probability of homeownership associated with these the monthly educational debt payments are more severe.

These results differ slightly than the study conducted by Shand (2007). In contrast to this paper, which focuses solely on the effect of educational debt on homeownership, Shand (2007) focuses on explaining the difference between the marginal effects for homeownership models with and without credit constraints, incorporating both student loan debt and credit card debt. By examining both EDN\_DEBT and EDNDEBT\_PMT it is possible to hypothesize whether monthly educational debt payments or an outstanding educational debt balance have a greater effect on homeownership. If the values were

scaled right it seems as if the monthly debt payments have a much greater effect on the probability of homeownership than the outstanding educational debt balance amounts do. It can be inferred then that monthly educational debt payments are a much greater hindrance to the ability to purchase a home and the monthly mortgage payments associated with that transaction. It doesn't appear that the outstanding educational debt amount has as great of an effect on tightening the mortgage down payment requirement, if these variables are correlated in that fashion.

Educational debt, whether the outstanding amount or monthly payments, has a significant effect on homeownership. More importantly, there is an interesting trend, as these variables become significant in 2001, and remain significant through the most recent year of the survey. However, when interpreting the data it appears that the effect of educational debt on homeownership may not be linear. It is possible that the marginal effects of total educational debt may diminish as debt rises as higher debt makes home ownership impossible past some point. This leaves room for further study, but the concept that educational debt has a significant effect on homeownership is clearly evident and exposed by the regression results.

## ***VI. Conclusion – Policy Proposals and Recommendations for Further Study***

As news articles continue to be printed on the educational debt crisis, research reports continue to analyze the effect of educational debt on post graduation decisions, and surveys continue to highlight borrowers' attitudes, an alarming amount of attention is being drawn to the educational debt dilemma. Although many students borrow and have no problem paying off their debts, there is a growing number of indebted graduates delaying major purchases such as a car or home, delaying marriage and having kids, and avoiding certain careers in public service, or attending graduate school. The posted college and university tuition prices continue to increase, but the net price that students pay has actually remained relatively constant, inferring an increase in financial aid through grants, loans, tax incentives, or work-study programs. The student aid system has shifted from a need-based grant system to a system with loans readily available. Loans are enabling millions of students to get through college, at low interest rates, and upon graduation are buried in debt that alters their post graduation decisions.

The purpose of this study is to highlight how this accumulating amount of debt is effecting household's decisions to purchase homes. Using the Survey of Consumer Finances and binary probit regressions it is possible to determine the probability of owning a home based on multiple characteristics including, most importantly, educational debt. By controlling for two separate measures of educational debt, either the outstanding amount or monthly debt payments, a comparison could be made determining what exactly deters individuals from owning a home. The first of the possible conclusions is students with outstanding educational debt balance are unable to meet down payment

requirements by the mortgage lender and therefore have a higher probability of not owning a home. On the other hand, the monthly mortgage payments that are being paid are possibly altering the debt-to-income ratio enough to lower the probability of owing a home. This study allows for the comparison of these two hypotheses and for proper conclusions to be drawn.

It is determined that educational debt, in general, reduces the probability of homeownership and this is significant for the full sample from 1992-2010. However, when separated by year, the results didn't become significant until 2001 for both educational debt variables inferring that this is a dilemma that is becoming prominent in the 21<sup>st</sup> century. We find that the probability of homeownership throughout the sample years from 2001-2010 is reduced by educational debt. The effects of both educational debt variables are substantial and analysis shows that increasing amounts of monthly educational debt payment amounts has a greater effect on reducing homeownership than does increasing outstanding total educational debt amount. This proves that households looking to secure a mortgage are hindered more by the monthly mortgage payments as opposed to the money needed for the down payment. This leads to a delayed entry in to the homeownership market for these individuals and calls for immediate policy action to curb the educational debt dilemma.

#### **VI.A. The Detrimental Effects on the Housing Market**

The housing bubble that occurred in 2008 was due to an accumulation of events by both potential buyers and lenders since the year 1999. For the homeowners, purchasing a home seemed like a low-risk investment with good upside potential. The lenders, with masses of economic incentives, began issuing subprime loans with variable

interest rates to households with no or poor credit histories. This increase demand for houses raised the prices right up until the housing bubble. When the housing bubble occurred, many homeowners saw their home prices decrease and mortgage interest rates increase to a point where many fell into delinquency or foreclosure. Following the bubble, now into the stages of recovery seen today, the demand for homeownership didn't increase as would have been expected with falling home prices. Due largely in part to tighter lending constraints, lenders are unable to issue mortgages as they did before the bubble. For first-time homebuyers, including college graduates with an increasing amount of educational debt, the ability to secure a mortgage is now hindered by the lending constraints set by the mortgage contracts. To loosen these lending constraints households are having to wait until debt is paid down to a manageable amount.

First-time homebuyers make up a significant portion of the housing market and according to a recent release by the National Association of Realtors (2013) these buyers now only make up 38% of the market as opposed to the historical norm of 40%. This number is slipping due largely in part to the rising student loan debt college graduates are experiencing. First-time homebuyers generate a lot of economic activity being such a large portion of the housing market. According to Mishory and O'Sullivan (2013), 17% of the homes purchased by this cohort are newly built, stimulating the construction and raw materials industries. Beyond this, the marketing, staging, appraisals, property insurance, and realtor commissions all have a significant effect on the economy as well. According Emrath (2009), 143,000 first-time homebuyers could create 86,000 new jobs. However, if educational debt continues to grow this economic activity will be halted. College graduates could wait longer and pay more debt, lowering their debt-to-income

ratio within the FHA requirements or they could try and save for a larger down payment and cut down their mortgage loan. Both are plausible solutions, but for the meantime these individuals will be cut out of the market. Proposing and implementing policies to stymie the educational debt dilemma is the ultimate solution.

## **VI.B. Policy Proposals to Address the Student Debt Crisis**

A report published by Reed and Cochrane (2013) highlights key recommendations for addressing the rising educational debt. The first initiative mentioned in the study is to reduce the students' need to borrow. By encouraging college saving plans early in the students' lives then the dependence on loans when it comes to apply to college wouldn't be as significant. Students take out loans when these savings, their personal and family earnings, and grant aid aren't sufficient enough to cover the tuition. Since the 1980's the financial aid market has switched from relying heavily on grant based aid to loan based aid. Pell Grants, as explained earlier, are strictly based on the financial aid of the student and the cost of college and funding for these grants has diminished, so it is proposed that funding for these and other forms of higher education funding be increased significantly at both the state and national levels. By promoting saving plans and increasing grant-based aid, the need to take out loans will decrease.

Another proposal to reduce the rising educational debt dilemma is to provide both students and their families with accessible information when looking to apply for colleges. This information needs to be marketed and easily accessible and maneuverable for any person looking to use it. The promotion and improvement of tools such as FAFSA4caster, College Scorecards, Net Price Calculators, and Shopping Sheets is beneficial to this initiative. The FAFSA4caster allows for students and their families to

input their W-2 information in order to get an early estimate of their eligibility for student aid. College Scorecards, developed by the Obama Administration, is a tool that helps students understand their chances of not only completing college but also managing their debt effectively and avoiding default. By federal law, most schools are required to post a net price calculator so families can figure how much they would pay at certain schools before they apply. Developed by Consumer Financial Protection Bureau, the Shopping Sheet is a developed financial aid model that students, after being accepted, can use to compare the real cost of attending to other schools. All these measures are currently implemented but promotion and innovation is needed to not only make them easily accessible but highly utilized. Students and families are taking out an excessive amount of loans to finance college, thinking in the present and not clearly understanding the future consequences.

Strengthening the colleges' accountability in the success of their students by offering rewards to schools through funding would help to reduce the number of students dropping out of or graduating with excessive amounts of debt. The ideas found in this proposal are heavily based on the Student Default Risk Index (SDRI), a three-year CDR (Cohort Default Rate) multiplied by the school's borrowing rate. Sanctioning schools based on this measure better conveys a student's chance of defaulting at their respective college or university. Schools with low SDRI's should be rewarded to provide an incentive to other schools to enlist more low-income students and help them enroll in aid and graduate. Finally, the study proposes to put an end to federal aid funded programs, like gainful employment, that under-deliver and leave students with an excessive amount of debt. For vocational and career programs looking to be eligible for financial aid then

these programs must prepare students for “gainful employment” in a recognized occupation. Essentially, the program is designed to hold colleges accountable for the debt their students hold and help graduates pay off their loans by assuring that their salary is substantial enough to cover their debt. The Obama Administration is focused on assuring that federal student aid goes only to programs that train students for careers, not institutions that leave graduates with massive amounts of debt (Halperin 2014). Incentives need to be established to hold colleges accountable for their graduation rates, default rates, and their federally funded programs.

Private loans generally have, although not always the case, variable interest rates that as compared to the fixed rate of federal loans are much higher. Lower-income students generally rely on these loans that have the worst rates and terms, and offer the consumer little protection. Many private loan borrowers could have been eligible for more federal student loans and it is required of the private lenders to make sure of this before agreeing to contract. The government should implement changes to enforce this rule and make sure students are not entering the private market when they are still eligible for federal funding. Loan refinancing for private debt doesn't include income driven repayment plans or unemployment deferments like federal loans. Making private loan debt more manageable is a topic that should be included in current legislation.

The final recommendation for student loan repayment is to improve and promote awareness of federal loan repayment options. The U.S. Departments of Education, the Treasury, and Intuit Inc. have announced recently, in collaboration with TurboTax Online, that messages will be displayed pertaining to repayment options for federal student loans when users file their taxes (U.S. Department of Education 2014).



Advertising initiatives such as this could be very effective, guiding graduates to beneficial information and tools to plan repayment. Employers can also play an integral role in this process by discussing repayment options when salaries are agreed upon since repayment amounts are based heavily upon this figure. By promoting counseling before and during the repayment period, counselors would have the ability to enroll students in affordable plans to decrease the currently rising default rates. Capping monthly payments as a share of income (Income-Based Repayment) is an option that became available in 2009 as a part of the College Cost Reduction and Access Act of 2007 that helps students avoid delinquency and any debt after 20-25 years is forgiven. Federal law requires that students enter counseling if they have borrowed a federal loan, but the content of the counseling needs to be improved. This comes down to timing as students and their families need to enter counseling before they take a loan, not just when they enter repayments. In essence, individuals need counseling to not only determine the extent of loans to take out but also the most practical and affordable repayment plan upon graduation. This report released by Reed and Cochrane (2013) offers great insight into possible solutions to the current dilemma that students face as they pursue a college degree.

#### **VI.C. Recommendations for Further Study**

This study focused on how educational debt affects homeownership, specifically what dissuades potential homeowners from purchasing a home. The results support the conclusion that the value of monthly educational debt payments reduces the probability of homeownership more than the value of the total outstanding educational debt balance. This is just a small piece of the developing dilemma of educational debt, offering a lot of

room for further research. Research on the linkage between educational debt and the age at which individuals purchase their first home would be beneficial to the housing market, as first-time homebuyers make up a substantial portion of the housing market.

The topic of this thesis is based solely on how educational debt affects homeownership and value of purchased homes with some emphasis on head of household characteristics. Further studies could incorporate macroeconomic indicators about the economy and the housing market such as unemployment rates, mortgage interest rates, and housing prices. Encompassing the financial market conditions within the study would add additional dimensions to the study. The decision to purchase a house is based heavily on the current housing market conditions so including these measures within a study along with educational debt could be very beneficial. Individuals look to financial markets, as borrowers, to secure longer-term mortgages to help finance a home purchase. Financial markets also play an integral role in savings mobilization, as households look to save for future consumption such as a home. The state of the financial markets, when integrated with educational debt, could offer an interesting look into housing market as well.

The year 1965 marked the start of the federal student loan program backed by banks and non-profit lenders, however, the first federal student loans were provided under the National Defense Education Act of 1958 with loans capitalized by U.S. Treasury Funds (New America Foundation 2012). The majority of policies have been introduced in the last two decades and because of this further studies could look at the effect of these studies on individuals involved in the student loan market. This could offer an interesting look into the effectiveness of certain policy programs, especially in the

recent years when the data becomes available. Recent policy proposals have dealt with repayment options for students and future datasets from the Survey of Consumer Finances could be used to examine them. The educational debt data became significant in 2001, so both this thesis and other proposed studies could be carried on well into the future as the educational debt dilemma continues to grow. Educational debt has established itself as a mainstream issue at the personal, institutional, and national governmental levels. By studying the effects of educational debt on the decisions to make major purchases, financial markets, or personal characteristics the government and policy makers can look to restrain this escalating issue.

According to the U.S. Department of Education, about 11.5 million undergraduates were enrolled in 2010, a 70% increase as a share of the population since 1965 when 4.3 million were enrolled. The general fact here is that many more students are attending college and many more students just can't afford the investment. Across the nation, in both public and private universities and colleges, undergraduates are taking out excessive amounts of debt to finance their higher education. Although the returns are generally still high on this investment, students hindered by debt are unable to realize the benefits they looked to achieve. College costs, student aid, and delinquency rates on loans are all sharing a similar upward trend, a trend that not only affects the individuals but also the economy. Consumer purchasing is a primary driver of the U.S. economy, with home mortgages playing a large role, but with surmounting amounts of student debt, graduates aren't able to make these purchases. The issue is beginning to gain traction on the road to recovery, but for now educational debt is hindering an individual's post-graduation

spending decisions, lifetime wealth, family choices, and most importantly the economy that they are entering.

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## *Appendix*

**Table A-1 : Descriptive Statistics For Observations by Full Sample, Sample Year, and With or Without Educational debt**

Variables	Full Sample	1992	1995	1998	2001	2004	2007	2010	w/ Educational Debt	w/o Educational Debt
<b>Homeownership Variables</b>										
HOME_VALUE	131,242 (307,017)	108,989 (320,481)	94,344 (183,120)	83,550 (358,598)	143,528 (265,388)	164,509 (343,810)	219,795 (444,804)	125,048 (207,924)	86,897 (157,558)	171,441 (392,210)
	5,335,551	3,790,170	2,124,503	5,335,551	1,470,435	3,705,079	3,143,044	1,500,000	1,500,000	5,335,551
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HOMEOWNERSHIP (1=Y)	0.45 (0.50)	0.38 (0.49)	0.51 (0.50)	0.31 (0.46)	0.47 (0.50)	0.47 (0.50)	0.50 (0.50)	0.49 (0.50)	0.41 (0.49)	0.48 (0.50)
<b>Educational Debt Variables</b>										
EDN_DEBT	13,475 (28,959)	6,940 (20,455)	7,102 (20,039)	13,962 (25,360)	8,154 (13,865)	12,570 (19,180)	19,068 (31,129)	22,937 (44,845)	28,341 (36,641)	-
	358,570	186,476	152,398	189,412	90,677	90,901	179,363	358,570	358,570	-
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	70.82	-
EDNDEBT_PMT	115.61 (308.84)	124.35 (498.84)	104.26 (386.15)	131.36 (320.17)	103.46 (205.11)	78.06 (139.81)	122.41 (196.49)	134.34 (243.58)	243.15 (411.85)	-
	8,035	8,035	7,082	4,042	2,524	828.47	1,676	1,860	8,035	-
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
<b>Head of Household Characteristics</b>										
AGE	28.26 (2.70)	28.46 (2.64)	28.34 (2.59)	27.98 (2.70)	28.24 (2.80)	28.13 (2.82)	28.05 (2.68)	28.50 (2.67)	28.08 (2.70)	28.43 (2.69)
	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
HHSEX_MALE (1=M)	0.78 (0.41)	0.78 (0.41)	0.80 (0.40)	0.75 (0.43)	0.78 (0.42)	0.76 (0.43)	0.81 (0.39)	0.78 (0.41)	0.76 (0.43)	0.80 (2.69)
MARRIED_YES (1=Y)	0.54	0.55	0.60	0.52	0.53	0.55	0.60	0.48	0.55	0.53

	(0.50)	(0.50)	(0.49)	(0.50)	(0.50)	(0.50)	(0.49)	(0.50)	(0.50)	(0.50)
KIDS	0.46	0.54	0.56	0.43	0.48	0.41	0.41	0.44	0.49	0.44
	(0.86)	(0.88)	(0.94)	(0.85)	(0.85)	(0.72)	(0.82)	(0.89)	(0.90)	(0.82)
	7.0	5.0	4.0	4.0	4.0	3.0	4.0	7.0	7.0	5.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RACE_NONWHITE (1=NW)	0.21	0.13	0.17	0.20	0.15	0.29	0.29	0.27	0.20	0.23
	(0.41)	(0.33)	(0.38)	(0.40)	(0.36)	(0.45)	(0.45)	(0.44)	(0.40)	(0.42)
<b>Other Explanatory Variables</b>										
8PERCENT_DUMMY (1=Y)	0.10	0.12	0.10	0.15	0.10	0.06	0.06	0.11	0.21	-
	(0.30)	(0.32)	(0.30)	(0.35)	(0.30)	(0.24)	(0.23)	(0.31)	(0.41)	-
NONEDU_DEBT	95,630	85,468	69,962	53,358	103,107	116,359	136,081	107,690	80,344	109,539
	(169,407)	(216,373)	(83,395)	(118,945)	(187,105)	(176,625)	(207,954)	(155,264)	(130,193)	(197,461)
	2,425,709	2,425,709	473,764	1,133,805	1,372,406	1,280,669	1,369,738	1,286,000	1,369,738	2,425,709
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INCOME	112,670	181,409	64,261	95,521	109,672	138,838	117,167	92,418	70,454	150,938
	(512,670)	(100,000,081)	(46,163)	(400,457)	(200,862)	(782,519)	(205,795)	(204,784)	(95,389)	(699,875)
	12,746,946	12,746,946	369,862	8,656,051	1,990,427	10,517,523	1,831,585	3,527,283	1,990,427	12,746,946
	270.50	6,529	3,131	270.50	6,299	472.70	2,155	2,541	270.50	472.70
LATE60 (1=Y)	0.05	0.05	0.04	0.07	0.04	0.06	0.02	0.05	0.08	0.02
	(0.21)	(0.21)	(0.20)	(0.25)	(0.19)	(0.24)	(0.13)	(0.23)	(0.27)	(0.14)
Number of Observations	6360	905	905	850	845	810	725	1320	3030	3330

Note: The reported values are the mean, followed by the standard error in parentheses then the max and min. The means are not weighted.

**Table A-2:** Estimates of the Marginal Effect of Outstanding Educational Debt Amount on Homeownership and the Regression Estimates for the Effect on Home Value

Dependent Variable Sample Regression	HOMEOWNERSHIP								HOME_VALUE
	All	1992	1995	1998	2001	2004	2007	2010	w/ House OLS
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Intercept	-4.25*** (0.24)	-4.28*** (0.61)	-4.09*** (0.90)	-5.82*** (0.85)	-2.42*** (0.93)	-7.77*** (1.80)	-5.39*** (1.24)	-2.59*** (0.67)	-170,654*** (32,949)
EDN_DEBT (000's)	-0.0021*** (-0.00072)	-0.0013 (0.0023)	-0.00066 (0.0051)	-0.0011 (0.0032)	-0.012** (0.0061)	0.076*** (0.019)	-0.0041 (0.0035)	-0.0028*** (0.0014)	-0.52*** (0.096)
8PERCENT_DUMMY		-0.29* (0.17)	-0.24 (0.29)	-0.14 (0.21)	0.40* (0.24)	-0.55 (0.66)	-0.63 (0.55)	-0.26 (0.20)	
AGE	0.12*** (0.0083)	0.12*** (0.021)	0.089*** (0.031)	0.15*** (0.029)	0.0029 (0.32)	0.22*** (0.064)	0.13*** (0.046)	0.044* (0.024)	5,905*** (1,154)
HHSEX_MALE	0.017 (0.059)	0.13 (0.16)	-0.34 (0.21)	-0.050 (0.20)	0.84*** (0.24)	-1.66*** (0.63)	0.26 (0.27)	-0.12 (0.15)	7,505 (8,292)
MARRIED_YES	0.30*** (0.053)	0.54*** (0.14)	0.099 (0.21)	0.67*** (0.19)	-0.40* (0.23)	-1.99*** (0.63)	-0.87*** (0.28)	-0.14 (0.14)	2,195 (7,616)
KIDS	0.23*** (0.026)	0.19*** (0.061)	0.24*** (0.082)	0.054 (0.084)	0.42*** (0.13)	1.78*** (0.38)	0.49*** (0.18)	0.30*** (0.060)	10,685*** (3,708)
RACE_NONWHITE	-0.37*** (0.051)	-0.38** (0.15)	0.27 (0.19)	-0.44** (0.19)	-0.33 (0.24)	-0.026 (0.42)	-1.08*** (0.28)	-0.35*** (0.13)	-1,888 (7,065)
YEAR_1992	-0.34*** (0.071)								-9,861 (10,005)
YEAR_1995	0.12* (0.069)								-6,671 (9,982)
YEAR_1998	-0.23*** (0.072)								26,411*** (10,077)
YEAR_2001	0.047 (0.072)								18,016* (10,109)

YEAR_2004	-0.050								28,554***
	(0.075)								(10,150)
YEAR_2007	0.077								59,696***
	(0.078)								(10,499)
NONEDU_DEBT (000's)	0.0090***	0.0028***	0.031***	0.016***	0.043***	0.055***	0.035***	0.018***	1.28***
	(0.00022)	(0.00033)	(0.0023)	(0.0011)	(0.0034)	(0.0080)	(0.0033)	(0.00086)	(0.021)
INCOME (000's)	-0.0012***	-0.00041***	0.0044**	0.0017	0.000018	0.0052	0.0036***	0.0026***	-0.088***
	(0.000042)	(0.000069)	(0.0019)	(0.0016)	(0.00092)	(0.0051)	(0.0010)	(0.00067)	(0.0065)
LATE60	-0.64***								-18,324
	(0.11)								(13,610)

McFadden R-squared	0.453	0.256	0.660	0.520	0.726	0.916	0.791	0.662	0.461
Log Likelihood	-2392.38	-447.81	-209.95	-250.41	-160.02	-46.50	-105.13	-305.45	-87,403.90
<b>Number of Observations</b>	6,360	905	905	850	845	810	725	1,320	2,850

Note: The standard errors are presented in parentheses. For the probit regressions, the value in the table represents the marginal effect for the independent variables. For the OLS regression, the value in the table represents the coefficient of the independent variables.

\* Statistically significant at the 0.10 level.

\*\* Statistically significant at the 0.05 level.

\*\*\* Statistically significant at the 0.01 level.

**Table A-3:** Estimates of the Marginal Effect of Total Monthly Educational debt Payments on Homeownership and the Regression Estimates for the Effect on Home Value

Dependent Variable Sample Regression	HOMEOWNERSHIP								HOME_VALUE
	All	1992	1995	1998	2001	2004	2007	2010	w/ House OLS
Independent Variables	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Intercept	-4.17*** (0.24)	-4.37*** (0.61)	-4.10*** (0.90)	-5.74*** (0.84)	-3.25*** (0.97)	-7.97*** (1.62)	-6.15*** (1.32)	-2.59*** (0.66)	-183,126*** (32,842)
EDNDEBT_PMT (00's)	-0.019*** (0.011)	-0.048 (0.030)	-0.0059 (0.032)	-0.015 (0.031)	-0.36*** (0.085)	-0.38*** (0.15)	-0.16** (0.068)	-0.13*** (0.040)	-37.63*** (9.20)
8PERCENT_DUMMY	-0.23*** (0.087)	-0.063 (0.21)	-0.19 (0.28)	-0.034 (0.24)	1.23*** (0.32)	-0.93 (0.77)	0.38 (0.51)	0.17 (0.25)	
AGE	0.12*** (0.0083)	0.12*** (0.021)	0.090*** (0.03)	0.14*** (0.029)	0.026 (0.034)	0.21*** (0.057)	0.17*** (0.049)	0.043* (0.024)	6,067*** (1,155)
HHSEX_MALE	0.016 (0.059)	0.11 (0.16)	-0.34 (0.21)	-0.040 (0.20)	1.10*** (0.26)	-0.90* (0.47)	0.15 (0.26)	0.043* (0.024)	8,566 (8,297)
MARRIED_YES	0.29*** (0.054)	0.56*** (0.14)	0.11 (0.20)	0.68*** (0.19)	-0.22 (0.25)	-1.86*** (0.53)	-0.67** (0.27)	-0.13 (0.015)	950.44 (7,616)
KIDS	0.23*** (0.026)	0.19*** (0.061)	0.24*** (0.082)	0.051 (0.084)	0.34** (0.13)	1.46*** (0.31)	0.46*** (0.17)	-0.068 (0.14)	9,931*** (3,709)
RACE_NONWHITE	-0.38*** (0.051)	-0.37** (0.15)	0.28 (0.19)	-0.44** (0.19)	-0.48* (0.27)	0.019 (0.36)	-1.20*** (0.27)	0.32*** (0.062)	-1,572 (7,073)
YEAR_1992	-0.31*** (0.071)								18,885* (9,860)
YEAR_1995	0.14** (0.069)								14,693 (9,838)
YEAR_1998	-0.21*** (0.072)								32,073*** (10,031)
YEAR_2001	0.064 (0.071)								25,490** (9,996)

YEAR_2004	-0.047 (0.075)								32,222*** (10,118)
YEAR_2007	0.065 (0.078)								61,964*** (10,499)
NONEDU_DEBT (000's)	0.0090*** (0.00022)	0.0028*** (0.00033)	0.031*** (0.0023)	0.015*** (0.0011)	0.046*** (0.0037)	0.044*** (0.0055)	0.036*** (0.0034)	0.019*** (0.00092)	1.29*** (0.021)
INCOME (000's)	-0.0012*** (0.000042)	0.00040*** (0.000070)	0.0044** (0.0019)	0.0019 (0.0016)	0.000035 (0.00077)	0.0052 (0.0047)	0.0035*** (0.0012)	0.0028*** (0.00068)	-0.088*** (0.00656)
LATE60	-0.64*** (0.11)								-22,654 (13,584)
McFadden R-squared	0.453	0.259	0.660	0.520	0.743	0.901	0.795	0.667	0.460
Log Likelihood	-2377.29	-445.53	-209.94	-250.35	-149.94	-55.25	-102.88	-301.53	-87,410.46
<b>Number of Observations</b>	6360	905	905	850	845	810	725	1320	2,850

Note: The standard errors are presented in parentheses. For the probit regressions, the value in the table represents the marginal effect for the independent variables. For the OLS regression, the value in the table represents the coefficient of the independent variables.

\* Statistically significant at the 0.10 level.

\*\* Statistically significant at the 0.05 level.

\*\*\* Statistically significant at the 0.01 level.