

ESSAYS ON THE INDEBTEDNESS OF U.S. HOUSEHOLDS:
A HISTORICAL PERSPECTIVE

by

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ABSTRACT

The main motivation of this research is to contribute to the body of work that challenges the mainstream approach to household borrowing. This contribution is twofold. First of all, in this research *history matters*, unlike in ahistorical utility analyses. This is accomplished by presenting data that goes back to the 1980s to support the hypothesis formed. This way, it is possible to see if there has been a significant shift in the relationships investigated. Second, this research draws on the literature from various fields such as psychology, medicine, sociology, and law as well as economics and finance. This allows the author to make a more holistic analysis of household borrowing without ignoring the institutional, social, and physiological dimensions of the issue.

To Everyone I Love

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INTRODUCTION

The Great Recession exposed a fundamental weakness of the U.S. economy: debt. The financial bubble that was driven by an unprecedented increase in housing prices finally burst in the last quarter of 2007. Many households lost their jobs, delinquency on loans skyrocketed, and foreclosures ensued. What started as a credit bubble ended with a real economic crisis that put, at one point, 1 out of every 10 labor force participants in the country out of their jobs.

Dire situations spark curiosity, as did the financial impasse many U.S. households found themselves in in the aftermath of the recession. Economists had their fair share of interest in American households as well, although this interest was limited in its scope and methodology. The mainstream theory in economics characterizes the household as an extension of the hedonistic utility-maximization of individuals. The household, then, is simply a group of rational individuals making utility-maximizing decisions collectively within that group. An extension of this simple understanding of the nature of a household is Modigliani and Brumberg's (1954) *Life-Cycle Hypothesis*. According to this theory, individuals (or households) make consumption decisions over their life cycles. Later on, Friedman (1957) complemented Modigliani's efforts with his own *Permanent Income Hypothesis*, that explains individual (or household) consumption decisions based not only on their current income, but also on their future expected income. From these two theories, we have a somewhat vague mainstream approach to debt, which suggests that debt is just

a device that individuals or households use to move economic resources in time for smoothing out their consumption (Santos, Costa, & Telles, 2014). One can say, according to the mainstream theory, debt is an indispensable part of individual rational decision making. Without debt, consumption smoothing would be impossible as individuals wouldn't be able to shift resources across time.

There are various issues with such conceptualization of household borrowing (Scott, 2007). First and foremost, it ignores the fact that households fail to make rational decisions more often than not. It is fairly difficult for an average American household to understand the terms of a mortgage agreement, let alone be able to estimate accurately their permanent income in order to make perfectly rational decisions. Avery and Turner (2012), for instance, explain how inaccurate predictions about one's future income, in an economy with large gaps in the life-time earnings of different career paths, can easily result in overborrowing in student loans. A second issue with the mainstream approach to household borrowing is that household tastes are treated exogenously. However, households' *habits of thought* are inseparable from the institutional structure they are embedded in. Therefore, changes in the institutions of the economy will be reflected in the household decision making. Borrowing decisions of households are very much endogenous to the financial and legal institutions that are in place in the economy. Third, credit and debt are "a dyadic unit" (Peebles, 2010). They define a power relation together, and one can't exist without the other. Also, this power structure is peculiar to the time and space it exists in: "In some instances, perhaps creditors are socially powerful usurers and debtors are their weak targets, but on other occasions, debtors can be enormously powerful too, as the American Insurance Group revealed to the global public in late 2008" (Peebles 2010, p. 226). Last,

the mainstream approach excludes the multidimensional aspect of indebtedness by reducing borrowing decisions to utility maximization. Debt maximizes utility only to the extent that it can be repaid. Unpaid debt has both negative financial consequences such as restricted access to credit, but also negative social consequences such as lower mental and physical health.

The main motivation of this research is to contribute to the body of work that challenges the mainstream approach to household borrowing. This contribution is twofold. First of all, in this research *history matters*, unlike in ahistorical utility analyses. This is accomplished by presenting data that goes back to the 1980s to support the hypothesis formed. This way, it is possible to see if there has been a significant shift in the relationships investigated. Second, this research draws on the literature from various fields such as psychology, medicine, sociology, and law as well as economics and finance. This allows me to make a more holistic analysis of household borrowing without ignoring the institutional, social, and psychological dimensions of the issue.

There are four chapters to this dissertation. It starts with a historical analysis of the institutional changes in the U.S. economy that played a significant role in the increased indebtedness of the U.S. households. In the second chapter, I investigate how households responded to such institutional changes by looking at the evolution of their attitudes toward borrowing. A multivariate analysis of ten waves of the Survey of Consumer Finances from 1983 to 2013¹ suggests that there has been a structural change in the relationship between attitudes toward borrowing and explanatory factors since 1983 and also between attitudes and indebtedness since 2007. Accounting for these structural changes, I find that, after

¹1986 wave is excluded from this part due to lack of observation for household attitudes.

financial liberalization, households developed more positive attitudes toward borrowing. However, in the postrecession period, indebted households responded to the new economic reality by changing their attitudes in a more conservative direction.

The next chapter investigates the association between indebtedness and household health with a historical viewpoint. As pointed out earlier, debt is useful to the extent that it can be repaid. Indebted households are either about to experience financial strain (low liquidity, net negative financial worth or high leverage) or are already in financial strain (fallen behind in payments). Evidence from eleven waves of the Survey of Consumer Finances suggests that indebtedness is associated with lower self-reported health of household heads. It is also interesting that this association is stronger after 2001, indicating that the perverse effect of indebtedness on household health increases during the credit boom of the 2000s.

In the last chapter, the discussion is directed at a growing concern of the American public and the media: student loan debt. The sudden increase in the delinquency rate of student loans across the country that coincided with the historically low homeownership rate of young households has drawn scholarly interest. This part brings in a more general discussion of the possible effect of student loan debt on young households' borrowing decisions. Using the 2007-09 panel of the Survey of Consumer Finances, I estimate a model of loan applications for the sample of young households (between ages 24 and 35). The results of this estimation suggest that contrary to the popular belief, student loan debt had a positive effect on the outcomes of loan applications of young households with no college degree. However, the effect of a college degree itself was far greater than the positive effect of carrying student loan debt. These results suggest two things. First, not every debt is the

same. Different kinds of debt have different effects on households' financial decisions. Also, investing in a college degree is a worthwhile effort as far as credit applications are concerned. If there is a retreat of young households from the credit markets in general and the housing market in particular, it doesn't seem to be due to student loan debt.

These three chapters come together to form a research project that provides an alternative multidisciplinary and historical approach that takes into account that household decision making is endogenous to the institutional structure of the U.S. socioeconomic system. Debt has far more overarching impacts on household wellbeing than simply smoothing out consumption by shifting economic resources across time. Debt is social as much as it is financial. Therefore, borrowing decisions cannot be reduced to individual utility maximization and should be investigated with much more social precision through revealing the ways in which it interacts with our socioeconomic existence. All the parts to this dissertation have one common theme: Debt is endogenous to the household reality in the United States, both economic and social. Households use debt to make up for losses in earnings, to improve their living standards and also to increase future earnings. However, during this process, they are influenced by the very social institutions they helped create in the first place. These institutions are not static either, they respond to changing economic circumstances. For instance, since the 1980s, U.S. households helped create the institution of abundance through obsessive use of debt. Nevertheless, they responded to the economic reality of the Great Recession by changing their attitude toward debt. Debt is endogenous to the household social reality also in the sense that it has immediate consequences on their health as well as being a tool to buy better healthcare and make better health choices. Finally, debt is endogenous to other borrowing decisions, especially the ones that can

generate higher future income, such as education loans. In that sense, having education loan debt is both enabling and a burden. Although education loan debt is a positive indicator of higher earnings for someone who hasn't graduated from college yet, it can very well be a burden for a college graduate young household that reduces the positive financial gains of a college degree. This endogeneity of debt is why a more holistic approach is necessary to fully understand it.

INSTITUTIONALIZATION OF DEBT IN THE UNITED STATES

In September of 2013, trapped in the middle of a political showdown, the U.S. government had to close its doors due to a disagreement in Congress on whether or not the federal debt ceiling should be raised. Coming very close to a debt default, this simple political dilemma, not so long after a major recession, reminded many of us once more that debt could bring havoc, especially when it is not sustainable. The expenditure of the US government, like any other government, is funded by taxes and borrowing. Economists' worry about the U.S. economy doesn't come as a big surprise when we consider that government expenditure is almost 20% of the U.S. GDP, greater than private investment that remains at 15%. If the possible financial default of an institution that makes one fifth of the economy is alarming, the default of the U.S. households, consumption of which constitutes almost three fourths of the economy, deserves closer attention.

It is not the first time in history that the balance sheet of U.S. households has been in the center of attention. The literature on the Great Depression is full of evidence of the deteriorating effect of the stock market crash on U.S. households and an eventual collapse of the aggregate demand (Mishkin, 1978). The Great Recession of 2008 once more showed that a financially fragile household sector that is overburdened with debt obligations is an imminent threat to the functioning of an economy that has historically relied on the uninterrupted flow of consumer spending (Cynamon & Fazzari, 2008).

For an orthodox mind, household debt is not a threat in perfect financial markets. Households accumulate debt to smooth their life-cycle consumption. As the *Life-Cycle Hypothesis* implies, any well-informed and rational household would optimize their dissaving today based on future saving and wealth (Modigliani & Brumberg, 1954). Credit allows households to move funds across time (Ryan, Trumbull, & Tufano, 2011). Without such temporal mobility of funds, household consumption would be restricted to current disposable income. Although the theory is fool proof, its weakness is in its elegant simplicity. Neither the financial markets nor the households are perfectly rational. Due to misinformed borrowers with near-sighted expectations in a market full of predatory lenders, the life-cycle consumption/saving equations are far from optimizing. Moreover, if accumulated debt is used for spending on non-wealth-accumulating consumption (i.e. nondurables), the positive wealth effects of the debt will be minimal (Montgomerie, 2006).²

The issues household debt causes are multidimensional. First and foremost, rising debt obligations force households to allocate a higher proportion of their disposable income so that they can turnover their debt when their debt repayments grow faster than their income, meaning that they have to cut back on other spending unless they stop paying their debt. The increase in the debt service ratio of U.S. households between 1991 and 2006 by 3.5% shows the extent of the problem (Johnson & Li, 2007). For households with heavy debt burdens, however, repaying their debt back might not be an option due to the necessity of maintaining a minimum standard of living. In this case, these households are likely to stop paying their debts. Figure 1 shows the significant increase in personal bankruptcy rates

²For a detailed discussion of the Life-Cycle Hypothesis please see Deaton (2005).

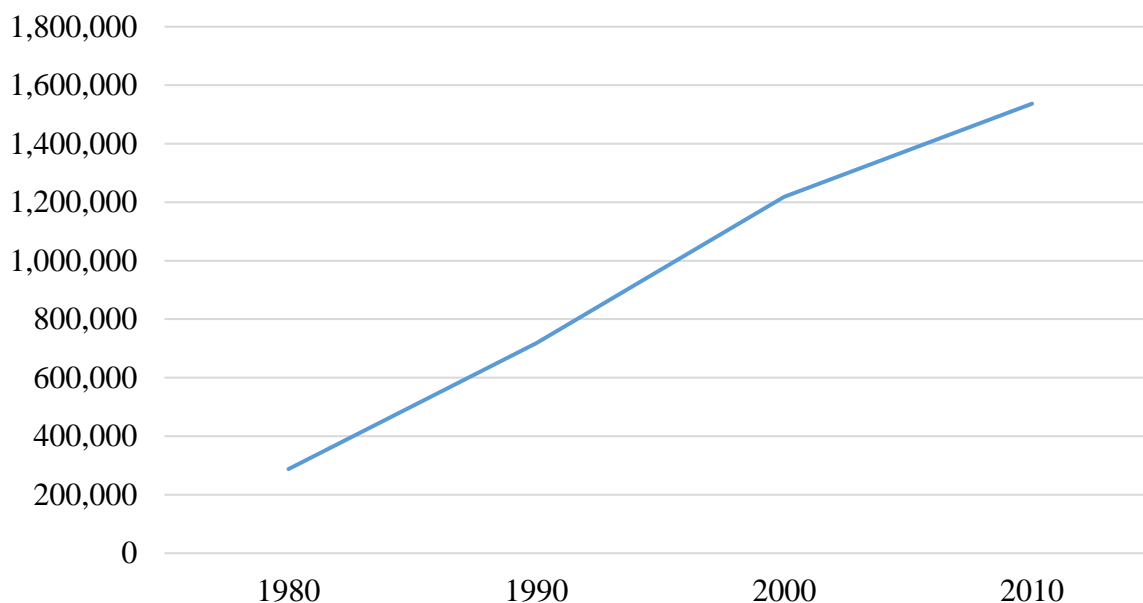


Figure 1. Nonbusiness Bankruptcy Filings in the United States
 *U.S. Courts Bankruptcy Statistics, American Bankruptcy Institute

since 1980. Although there has been a decrease in the last two years, total non-business filings (including Chapter 7, 11, and 13) grew at an average annual rate of 14.48% between 1980 and 2010. Also, among total filings, the share of consumer filings increased from 86.81% in 1980 to 96.61% in 2012. Given the credit rating system in the United States, these figures can be taken as evidences of a contraction in the credit supply for an increasing number of U.S. households. Households that are highly indebted in the short run and credit constrained in the medium run don't have much choice but to decrease their demand for consumption. Consumers carrying a heavier debt burden decrease their consumption after a financial downturn that is followed by a decline in tangible asset prices (Ogawa & Wan, 2007). This result is often attributed to the decline in household wealth after a financial collapse (Campbell & Hercowitz, 2009).

Nevertheless, this paper is not about the impacts of household borrowing on the effective demand, as those effects are clear. The purpose is instead to investigate the

reasons that brought U.S. households to the current impasse. In doing so, I intend to use an institutional and historical approach. What were the institutional factors that encouraged and allowed, if not forced, U.S. households to borrow more? Historically, the post-1980s signified an era of depressed real wages and deregulation of both financial and goods markets across the globe. It is natural to think that in times of decreased purchasing power households will try to make up the difference by borrowing more. However, it is important to separate this income effect, which increases demand for credit *ceteris paribus*, from two other effects. First, deregulation of the financial markets, coupled with immense financial innovation, increased the availability of credit at a lower cost for consumers (Dynan & Kohn, 2007). This can be visualized as a movement on the demand for credit due to a shift in supply. Second, a shift in the attitudes of consumers towards borrowing and holding debt increased the demand for credit given the cost of borrowing, which can be visualized as an upward shift of the demand for credit (Norton, 1993; Pollin, 1988).

In the next part of this paper, we will first talk about institutional changes in the financial sector that had immense impacts on the borrowing decisions of U.S. households after the 1980s. Later, we will discuss how the decision making of U.S. households was affected by these institutional changes. Particular attention will be given to the changes in credit attitudes of U.S. households and the correlation between debt and credit attitudes. Following this, findings from the Survey of Consumer Finances (SCF) will be presented. I expect a change of credit attitudes in a positive direction, indicating that households have been more accepting of debt in the United States. I will conclude with a discussion of findings and suggestions for future research.

Financial Deregulation, Innovation, and Legal Reforms

The post-80s economics were built upon the simple tenet of deregulation in every front of the economy. The financial market in the United States was not an exception. The major shift in ideology in the U.S. political economy from a Keynesian to a Neoliberal one can be tracked in numerous institutional changes since the 1980s (Sherman, 2009). I leave the detail of these institutional changes to a later discussion in this paper. The repercussions of these political arrangements on the credit market, on the other hand, are of primary concern here.

Financial deregulation achieved one crucial thing that is a pillar of any capitalist system: greater access to credit. Especially when the real wages are stagnant, access to cheap credit is the only way to maintain standard of living for households. The real earnings were stagnant throughout 1980s and 90s, with little recovery in the last decade (see Figure 2). Hence, credit became an easy exit for U.S. households.

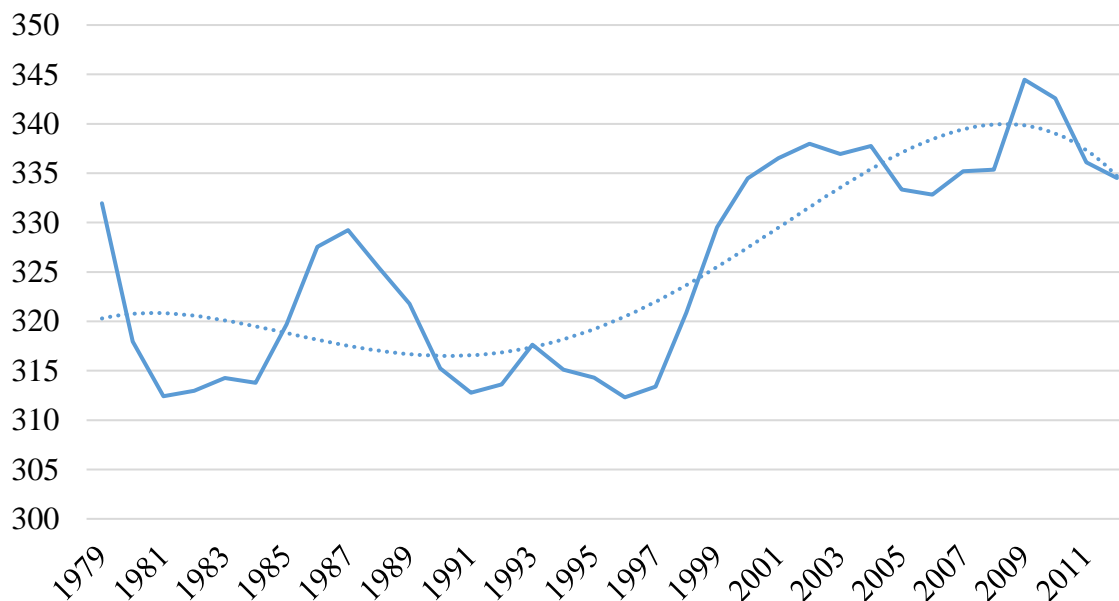


Figure 2. Median Real Weekly Earnings in the United States (Weekly Earnings / CPI)
 *Bureau of Labor Statistics, Current Population Survey (1982-84=100)

However, we need to distinguish between the different ways access to credit can be expanded. As orthodoxy has claimed, decrease in the interest rate causes an increase in the demand for credit, which I earlier described as a movement on the demand for credit. On the other hand, due to fall in equity requirements, the demand for credit also shifted up. Moreover, the case for an expansion in the supply of credit can be easily made in a less regulated financial market with relaxed lending conditions (Campbell & Hercowitz, 2009; Montgomerie, 2006). Financial deregulation after the 1980s has been found to be responsible for a 2.25% decline in private saving rates in the UK between 1980 and 1988 (Bayoumi, 1993). Private savings in the United States has a strikingly similar trend (see Figure 3). It is evident that U.S. households were saving 9% less of their disposable income in 2000 than they were in 1975. Such a sharp decline in two and a half decades cannot be attributed to lower cost of borrowing alone.

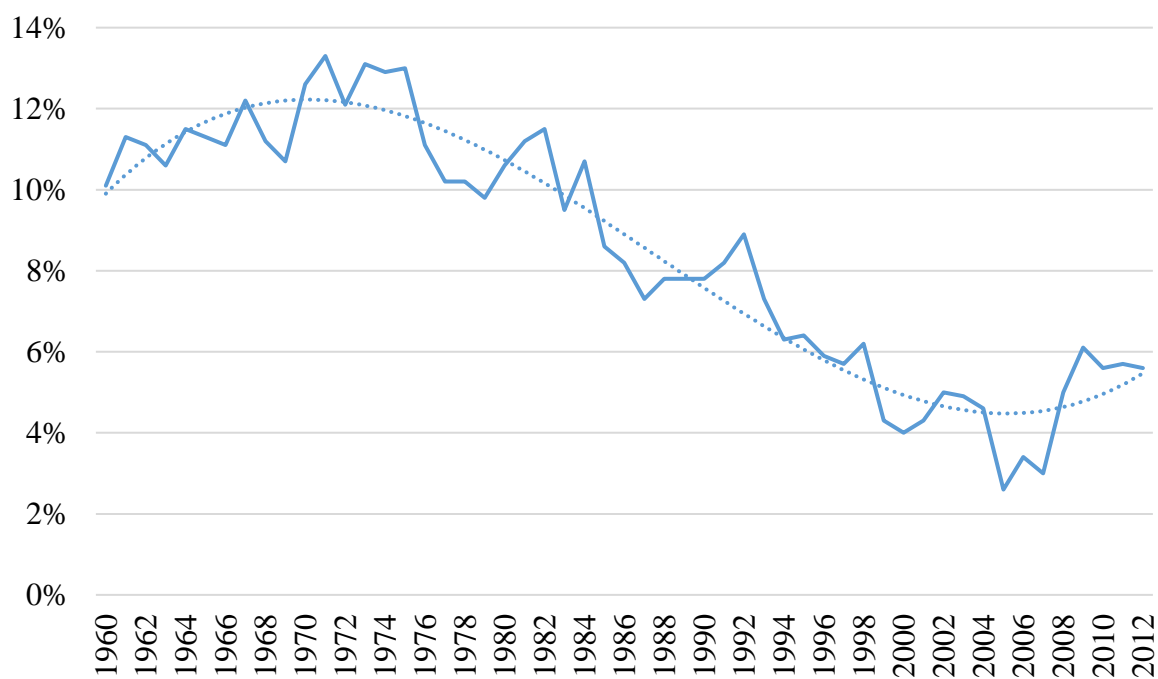


Figure 3. U.S. Private Saving Rate (Annual Average)
*Federal Reserve Bank of St. Louis

Financial Deregulation

On the supply side, an important deregulation was in the housing market. The first institutional change came with the *Depository Institutions Deregulation and Monetary Control Act* in 1980. This act allowed mortgage institutions to compete with commercial banks by opening avenues for giving consumer loans and investing in commercial paper and corporate bonds (Mishkin, 1990). Also, usury ceilings on mortgage loans were eliminated with this act. Later, the *Alternative Mortgage Transaction Parity Act* as a part of *The Garn-St. Germain Depository Institutions Act* in 1982 preempted state laws that restricted banks from making any mortgages other than fixed-rate amortizing. This allowed banks to give mortgage loans other than traditional 30-year fixed rate (Ryan et al., 2011). With variable interest rate mortgages, banks could cater to subprime borrowers as well as prime ones. For borrowers, these various instruments not only mean greater access to credit but also more complexity that requires an even more careful calculation in borrowing. However, imperfect expectations about the future combined with information overload when making complex financial decisions often lead to psychological biases in these decisions for borrowers. With more complex contracts, lenders feed into these biases to take advantage of asymmetric information, increasing the defaults especially in the subprime market (Nofsinger, 2012).

Further deregulatory arrangements were enacted in the 1990s. The *Riegle-Neal Interstate Banking and Branching Efficiency Act* allowed banks to open up branches nationwide without separate subsidiaries. In 1999, the *Glass-Steagall Act* of 1933, which prohibited the consolidation of commercial banks, investment banks, securities firms, and insurance, was repealed with the *Gramm-Leach-Bliley Act* (Ryan et al., 2011).

Financial Innovation

As suggested earlier, households rely more on credit when their real earnings decrease. According to the conventional microeconomic theory, if households have lower real income then they will demand less goods and services, *ceteris paribus*. However, if households perceive availability of credit as an increase in disposable income, then greater access to credit would translate into higher demand for goods and services, even when real earnings decline. Real household spending, with 1984 prices, grew by 11.09% between 1972-73 and 1992, 6.31% between 1992 and 2002, and contracted by 0.92% between 2002 and 2012. On average, between 1972-73 and 2012, real household spending has expanded by approximately 17% (see Figure 4). Given the deterioration of real earnings, borrowing is the only way to finance such an expanding demand for goods and services.

At the cognitive level, consumers can only want things that exist in the marketplace

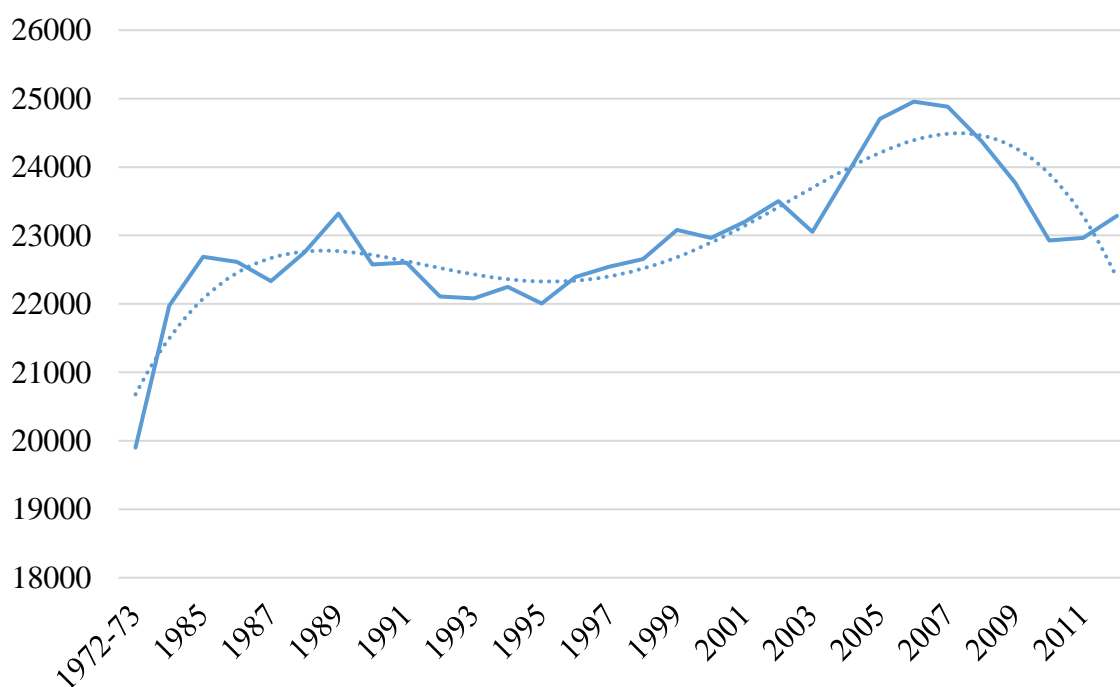


Figure 4. Average Real Household Expenditure in the United States (1984 Dollars)
*Bureau of Labor Statistics, Consumer Expenditure Survey

and can only buy things that they can afford given their resources. What we know, our objective reality, or what we imagine we know, our subjective reality, both have immediate effects on what we want. For instance, regardless of its affordability, we may want to fly to our destination instead of driving because we know flying is faster, more comfortable, and most crucially it is possible. If it is not affordable, we can't realize our wants. Hence, our behavior is a function of our budget, whereas our wants depend on our subjective and objective reality. Therefore, an expansion of the market in terms of availability of goods and services make people want more. On the other hand, an increase in the perceived budget enables people to realize their consumption decisions more often.

Innovation in the U.S. financial sector played a significant role in shaping both wants and the perceived budget of U.S. households. The most extensive use of consumer credit in U.S. history, and most likely the turning point in U.S. household finances, was 1919, when General Motors Acceptance Corporation gave the first manufacturer auto loan to middle-income car purchasers (Federal Reserve Bank of Boston, 2004). With the increase in car ownership came the necessity for convenient use of money in transactions, which now expanded beyond hometowns. Hence, gasoline companies and retail and department stores offered cards to consumers to ease their transactions when they were travelling. However, the major step was the introduction of Diners Club in 1949, which was later followed by American Express and Bank Americard (now known as Visa) in 1958, and MasterCard 1966 (Ryan et al., 2011). Widespread use of credit cards to settle daily transactions was an important turning point in consumer finances. It not only made existing consumer items more affordable because of a perceived increase in disposable income, but also opened up new venues of consumption, which expanded the objective

reality of consumers (Durkin, 2000).

Another crucial breaking point for U.S. household finances was the introduction of home equity lines of credit (HELOCs) at the end of the 1970s and in the early 1980s. For many U.S. households, equity in property has been a major source of asset. In 1962 around 26% of total household assets were composed of equity in owned property (Projector, 1964). In 1970, this increased to 60% of all assets and in 1983 it was 63% of all assets (Avery et al., 1984). Therefore, being able to borrow against the biggest chunk of their assets gives households access to a larger and cheaper pool of credit because it is secured by their property.

The financial innovation that revolutionized the financial market was *securitization*, which allowed banks to move receivable credits off their balance sheet and still make profit (Montgomerie, 2006). This financial device not only makes existing loans more profitable, but also allows bank to lend to subprime borrowers at higher interest rates because the risk on the loan is transferred to other investors. The mortgage-backed securities market expanded with the *Secondary Mortgage Market Enhancement Act* in 1984 recognizing mortgage-backed securities in the subprime market as valid forms of investments (Ryan et al., 2011). Soon after, securitization of nonmortgage loans followed, first in auto loans in 1985 and then in consumer loans in 1986, making securitization a common practice in the loan industry.

The change in the banks' lending criteria from a fixed ratio of disposable income to debt repayment to a variable ratio was also another factor that contributed to the expansion of credit supply (Montgomerie, 2006).

Bankruptcy and Tax Reforms

Two major changes in the legal institutional structure affected the demand for credit significantly. First of all, a major change in the bankruptcy law with the 1978 *Bankruptcy Reform Act* not only made filing Chapter 7 and Chapter 13 bankruptcies easier, but also increased the federal bankruptcy exemptions (Gropp, Scholz, & White, 1997). Although most of the states opted out of the federal exemptions and set their own by 1983, the new state exemptions were most often higher than the pre-1978 levels, with considerable variance across the states. The federal exemption, which was set as \$7500 for homestead and \$4000 for nonhomestead property, was further raised with the 1994 *Bankruptcy Reform Act* (Gropp et al., 1997). It was not until 2005 that filing consumer bankruptcy in the United States was a painstaking practice. The ease and appeal of bankruptcy filing encouraged U.S. households to get under heavier liability with minimal legal and financial sanctions. The evidence from the 1983 *Survey of Consumer Finances* (SCF) shows that state level bankruptcy exemptions have a statistically positive impact on the level of household debt for high-asset households. It appears that low asset households are discouraged from borrowing due to increased risk of default in high exemption states that translates into higher interest rates (Gropp et al., 1997).

The other institutional change came with the 1986 *Tax Reform Act*. Unlike conventional consumer credit such as credit cards, HELOCs were considered as home mortgages for tax purposes and the interest payments were deductible. Once the 1986 act ended the deductibility of interest payment on credit cards, the appeal of HELOCs increased significantly (Park, 1993). Figure 5 shows the change in the share of total consumer credit and revolving consumer credit in total liability of the household and

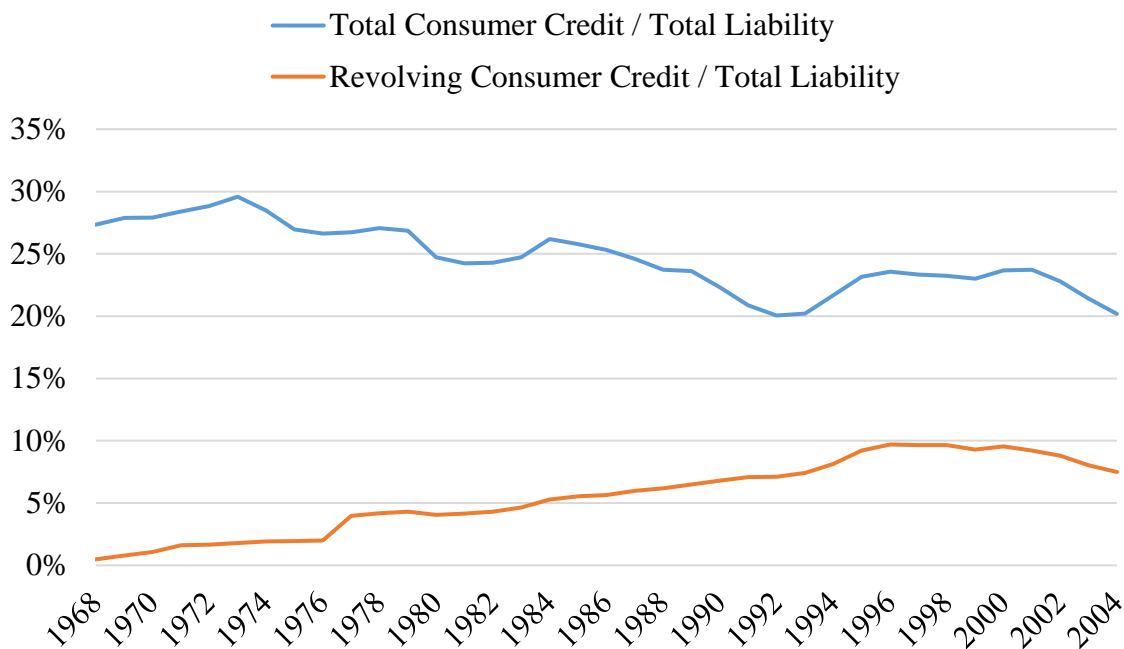


Figure 5. Ratios of Total Consumer and Revolving Consumer Credit to Total Liability of the Household Sector in the United States
*Federal Reserve Statistical Release

nonprofit organizations in the United States. It is evident that despite the fall in the share of total consumer credit in total liabilities, the share of revolving consumer credit has been climbing steadily since the late 70s until the early 2000s. Since HELOCs are considered a revolving credit like credit cards, this steady increase in revolving consumer credit in the 80s and 90s can be attributed partly to the extensive use of both credit cards and HELOCs.

The Institutionalization of Indebtedness

The 1980s are considered to be years of significant shift in the economic policies of capitalism. After multiple economic crises in the 70s, the rationale for a proactive government with Keynesian influences on the economy lost its appeal in Anglo-American politics (Montgomerie, 2006). The post-80s economic agenda, the so-called *Neoliberalism*, was an attempt to recover back from the economic slump in the 70s by a series of economic

policies aimed at reviving the American capitalist class at the expense of the working class, which enjoyed relative prosperity during the 1950s and 60s. The one-size-fits-all economic ideal was deregulated markets in every corner of the world economic system.

Do-It-Yourself Finance and Increased Risk-Taking

An outstanding number of financial instruments became available to U.S. households as a result of financial innovation and deregulation (Ryan et al., 2011). With the natural proclivity to individualize their choices, American society seized the opportunity to make personalized financial decisions and take control of their finances. The result of this increase in D-I-Y household finance was significantly increased risk taking of U.S. households. Figure 6 shows the percentage of respondents in the *SCFs* from 1983 to 2010 (with the exception of 1986) who gave an answer to the question: “Which of the statements on this page comes closest to the amount of financial risk that you (and your [husband/wife]) are willing to take when you save or make investments?” The striking decrease in the percentage of people who would take no financial risk and also the increase in the percentage of people who would take above average financial risk are suggestive of the increased risk-taking behavior of U.S. households since the early 1980s.

The literature on the effect of risk-taking behavior on household indebtedness isn't an exhaustive one. Duca and Rosenthal (1991, 1993) first modeled household demand for credit using 1983 SCF and taking into account the selection bias that is inherent to credit markets. Their *TOBIT* estimations showed that being risk averse increased the demand for credit for credit-constrained households, whereas it decreased it for the full sample. Tokunaga (1993) later found that unsuccessful credit users displayed lower risk-taking

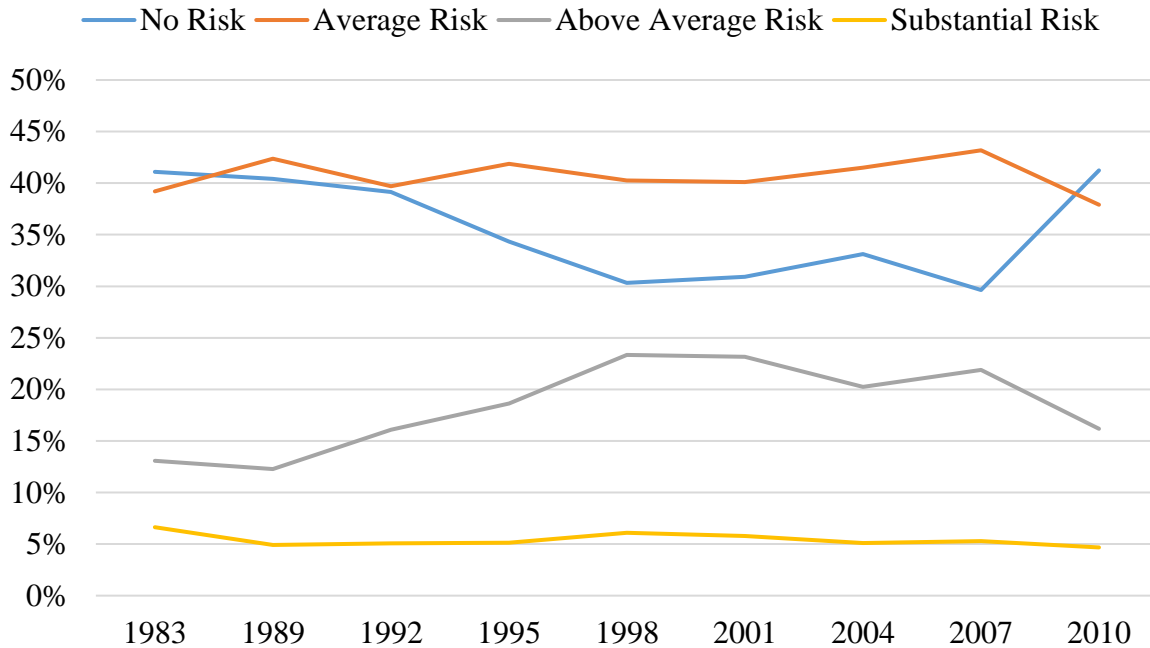


Figure 6. Percentage of Respondents Who Answered: “Which of the statements on this page comes closest to the amount of financial risk that you (and your [husband/wife] are willing to take when you save or make investments?”

*Federal Reserve Board, Survey of Consumer Finances

behavior compared to successful users. Crook (2001) used 1995 SCF in a model similar to Duca and Rosenthal’s. The results from the double selection model for households that are not credit constrained show that risk-averse households tend to demand less debt. These studies are indicative of a possibly significant link between risk-taking behavior and indebtedness of households.

Advertisement: The “Institution of Abundance”

In a world of social insulation, in which social interaction is reduced mostly to online networks, the connection to the market is the predominant way individual decisions are open to exogenous stimulus. We no longer ask our relatives or friends for advice on consumption or financial decisions but rather seek information in the market ourselves. The more exposed we are to the available products and details on them, the stronger our

connection to the market is. And there is no tool yet available to the marketer more powerful than an advertisement in facilitating product exposure.

With a conventional approach, advertisements can be seen as tools that will increase market efficiency and competition through providing better information at almost no cost to customers, because better informed individuals are assumed to make more rational decisions. Although this might have been the case in a fairly competitive market structure with small retailers trying to inform customers on the availability and price of their products in the early 20th century, the rise of monopoly capital in the mid-1900s and the resulting conglomeration of the market led to firms relying heavily on advertisements to consolidate their oligopolistic power through product differentiation (McChesney, Foster, Stole, & Holleman, 2009).

From the 1980s onwards, the U.S. capitalism faced an important impasse. The purchasing power of the working class, which had been the backbone of effective demand in the 50s and 60s, was systematically brought down as a result of labor market liberalization. On the other hand, concentrated product markets had to find new outlets to keep the capitalist in the black. One way the manufacturers dumped their excess production was through liberalized international trade. However, that proved to be a very competitive business. Domestically, the tremendous increase in the sales effort through extensive advertising, which has become ever more cheap and easy thanks to the digital revolution, was the institution that kept the average American consuming. Figure 7 shows the real aggregate advertising spending in the United States between 1960 and 2007 with constant 2009 prices. The upward trend becomes more prominent after the mid-1970s. The advertising spending in the United States increased from \$100.5 billion to a little over \$302

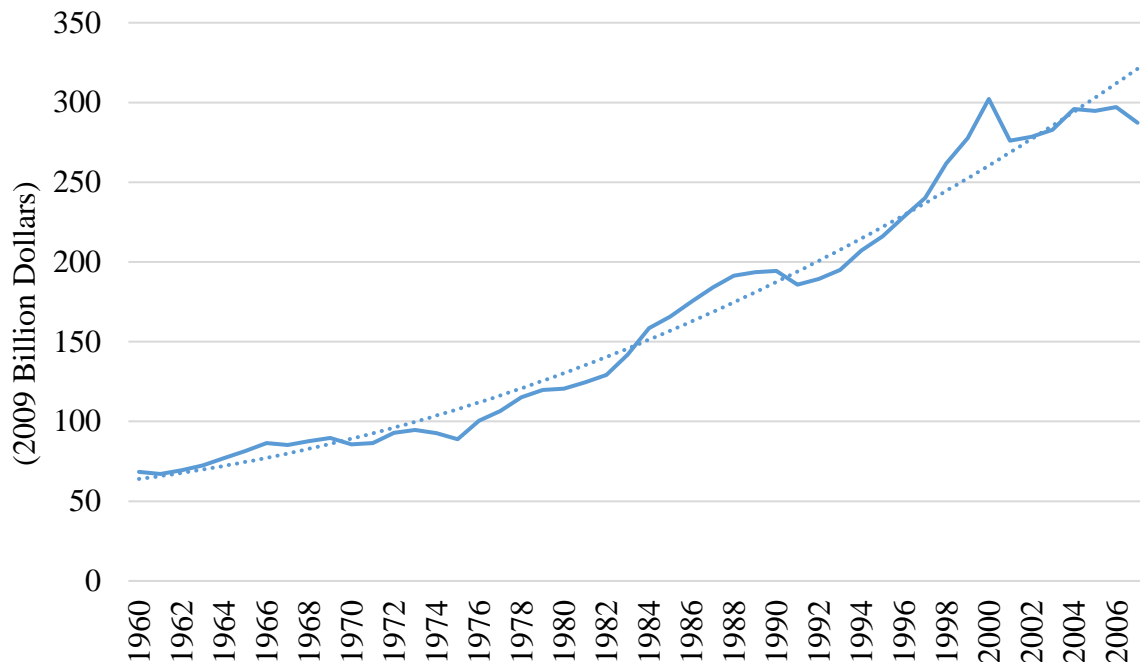


Figure 7. Real Advertising Expenditure in the United States (Nominal Ad. Exp. / GDP Deflator)

*U.S. Bureau of Economic Analysis, “Coen Structured Advertising Expenditure Dataset”
<http://purplemotes.net/2008/09/14/us-advertising-expenditure-data>

billion in 2000 with 2009 prices, an almost three-fold increase in 25 years.

Potter (2007) calls advertising an “institution of abundance” because of its power in projecting the market to the society as a place of unhindered and readily available source of every good and commodity, but of course for a price. The audience for most of the advertisements is average to high-income households. However, every income group has access to advertisement through media. What is depicted in advertisements as the desired living standard is, most of the time, beyond the reach of low-income families (Cynamon & Fazzari, 2008). Yet, being exposed to a higher standard of living at every corner of the daily routine, those households are likely to perceive the advertised living standard and the products associated with it as indispensable necessities. De Graaf, Wann, and Naylor (2001) called the consuming epidemic of the post-1980s “affluenza,” “a painful,

contagious, socially transmitted condition of overload, debt, anxiety, and waste resulting from the dogged pursuit of more.” Advertisements have set the “frame of reference” in consumption of products, spreading *affluenza* to the farthest ranks of the society (Frank, 1997).

Conclusion

The current indebtedness of U.S. households cannot be explained only by looking at the economic aspect of the issue. It is evident that households, especially those at the bottom of the income distribution, have had little real income gains since the early 1970s. When income is stagnant, spending should be stagnant as well, according to the mainstream explanation of consumer decision making. Therefore, borrowing should not increase. The fact is, household borrowing has increased.

With a more holistic approach, this study searches for an explanation by investigating the changes in the institutions that are critical to households’ economic decisions. The first of these institutions is the financial sector. Important changes in the regulatory framework, the sector itself, and the legal framework surrounding household finances culminated in a rapid deregulation of the financial markets in the United States beginning in the late 1970s. Numerous acts passed by congress, beginning with the repeal of the *Depository Institutions Deregulation and Monetary Control Act* in 1980, had one common purpose: expand the supply of credit. In the meantime, lenders’ ingenuity in devising new ways to spend household dollars (credit cards and HELOCs) and also to funnel investor dollars (securitization) into new loans made it significantly cheaper and easier to borrow for households. Also, changes in the bankruptcy and tax laws reduced the cost of default to a household, while increasing the use of less secured forms of credit like

HELOCs and credit cards.

The variety of different financial products and the multiplicity of the source made the financial landscape a complex labyrinth to navigate. However, U.S. households responded to this complexity by taking matters into their own hands instead of trusting financial professionals to take care of their finances. There is a strong cultural influence of American self-sufficiency in this without a doubt. However, the rise in the proportion of households that are ready to take increased financial risk has also been largely influenced by the aforementioned changes in the institutions of finance. Securitization is one of the easiest ways to blend risk in less risky assets. Although it sounds utterly useful to reduce risk, the financial collapse in 2008 proved that securitization elevated the level of risk by making it harder to identify. Moreover, relentless bombardment of U.S. households with ideas and possibilities of affluence through increased advertising and social influence gave people all the reasons they needed to legitimize their indebtedness and feel a necessity to borrow more.

It is no coincidence that U.S. households are indebted today. It is a result of conscious political decisions that changed the institutions of household finance in a peculiar way. Nevertheless, institutions are evolutionary. The institution of indebtedness, the social acceptance of debt, is no exception. The next thing we need to investigate is how households responded to their rising level of debt as they began to feel the social and economic pressure their indebtedness created. We expect a backward causal effect of indebtedness on households' attitude towards borrowing.

THE EVOLUTION OF HOUSEHOLD ATTITUDES

It has been argued by many that later in the 20th century, Americans had more sanguine attitudes toward holding debt (Pollin, 1988). Cynamon and Fazzari (2008) argue that the baby-boomer generation's taking over American consumption in the 1980s was responsible for the relaxed attitude toward holding debt. With the end of the Cold War, the "we won" effect might have led to more optimistic expectations about the future and a further relaxation of attitudes toward debt (Norton, 1993).

There is evidence that attitude is an important determinant of household debt at the micro level. Duca and Rosenthal (1991, 1993) were the first to model the determinants of credit constraints and demand using SCF data with adverse selection taken into account. They don't look at the effects of *general attitude*³ toward credit, but rather focus on *specific attitude*⁴ toward credit. It is noteworthy to add that they also control for risk-taking attitude. For the 1983 survey, in a bivariate *PROBIT* model, households with positive attitude toward borrowing for an auto or furniture and people with favorable attitude toward borrowing for luxury items such as a fur coat or jewelry are more likely to hold positive debt. Crook (2001) later used the 1995 SCF within a similar methodology, but didn't

³General attitude is indicated by the answer to the question in SCF: "In general, do you think it is a good idea or a bad idea for people to buy things on an installment plan?"

⁴There are also specific attitude questions in the SCFs to determine respondents' attitude toward borrowing for the purchase of certain items such as to cover for living expenses, to finance an expensive fur coat or jewelry, or an auto purchase.

include the attitude toward borrowing. As a confounding factor, Livingstone and Lunt (1992) investigated the relation of attitudinal factors as well as other psychological factors such as focusing on economic attributions, locus of control, coping strategies and consumer pleasure. For a sample of mostly low- and middle-income families in the UK, they found evidence for the positive effect of positive attitude toward borrowing on both the amount of debt held and the repayment of debt. Tokunaga (1993) also found that unsuccessful credit users differ significantly in similar psychological traits from successful credit users. Lea, Webley, and Levine (1993) used surveys among people that are in no, mild, or serious debt to a public utility company in UK. They concluded, among other significant factors associated with debt such as lower income, not owning a home, having more children, and being younger and single, that serious debtors are more permissive to debt. However, they found no statistically significant effect of attitudes toward debt on indebtedness using a multivariate analysis for the same sample of people, although there was some correlation between the two. Both Davies and Lea (1995), and later Hayhoe, Leach, and Turner (1999) investigated the determinants of credit use among college students. The first study looked at a sample of undergraduate students in their 1st, 2nd, and 3rd year at the University of Exeter in a pseudolongitudinal study. Although the correlation between favorable credit attitude and debt outstanding was weak for the 1st year cohort, it appeared to be stronger for the 2nd and 3rd year cohorts. This finding indicates that there is a possible causality running from indebtedness to attitude toward debt. The second study focused on credit card use among 426 students in the spring 1997 semester attending five state-funded colleges in the United States. The findings suggest that students with 4 or more credit cards have more sanguine attitudes toward credit, which is in line with the results presented by Davies and

Lea (1995). Webley and Nyhus (2001) also made a similar assertion. Chien and DeVaney (2001) used a stepwise selection based on 15% significance level and looked at the determinants of both installment and credit card debt using a *TOBIT* regression for 1998 SCF. For installment debt, general credit attitude was found to have a significant positive impact on the debt outstanding, whereas for credit card debt, specific credit attitude index⁵ had a significant positive impact on credit card debt outstanding. Castellani and DeVaney (2001), on the other hand, focused on a specific attitude variable, namely the attitude toward borrowing to cover living expenses. In 1995, using a logistic model with the SCF, they found that people who thought borrowing to cover for living expenses was acceptable when income is cut tend to be younger, non-White, low income, and make their credit card payments late. In another study, Kim and DeVaney (2001) used 1998 SCF to distinguish between the determinants of credit use between convenience and revolving credit card users.⁶ Revolving credit card users had a more positive attitude towards both general and specific uses of credit than convenience users. Also, a selectivity corrected model showed that a positive general attitude toward credit is associated both with positive outstanding balance and level of balance. Stone and Maury (2006) reached a similar conclusion on the effect of credit attitude on indebtedness for 501 Air Force personnel. Watson (2003) took a different approach and looked at the effect of another attitudinal variable on indebtedness of 700 urban and nonurban residents of Pennsylvania, a sample that mimicked the U.S. population in terms of location, income, and age. The variable they investigated was what

⁵Chien and DeVaney (2001) sum up positive responses to specific credit attitude questions in SCF to generate an index ranging from 0 to 5.

⁶Convenience users are the people who use a credit card due to its convenience as a means of payment and don't revolve debt. Revolving users, on the contrary, use credit cards to accumulate debt.

they called a “materialism index,” an index that measures how materialistic an individual is. People with a high materialism index were found to have significantly positive attitudes toward borrowing over 90 days for various reasons, ranging from buying a car to buying expensive sporting equipment, were more likely to accumulate credit card debt, pay finance charges on credit cards, and use installment credit, but didn’t differ significantly in the level of debt held compared to less materialistic people. Finally, Wang, Lu, and Malhotra (2011) sampled credit card customers of a commercial bank in Shanghai and find that risk-taking and positive debt attitudes are associated with higher frequency of both revolving credit card and petty installment use.

There is no study in the literature that looked at the correlation between indebtedness and credit attitude from a historical viewpoint. The cross-sectional correlation between attitude and indebtedness point to the causality from attitude to debt. In other words, from these studies we can see that households with positive attitude towards borrowing are more indebted. However, it is possible there is also a backward causality from indebtedness to attitude. It is very likely that as households become more indebted they will begin to form less positive attitudes toward credit. This kind of correlation is hard to identify at the cross-section because of its longitudinal nature. This research is not an attempt to identify the nature of causality, as that requires complex endogenous modelling and also longitudinal data. By acknowledging the complexity of the causality between indebtedness and attitudes toward borrowing, this study aims to reveal whether or not there has been significant change in the correlation between indebtedness and attitudes. Considering the significant institutional changes that took place in the U.S. economy after the 1980s and paved the way for a major deregulation of the financial markets later on, we

expect to see major changes in the correlation between indebtedness and attitudes.

Data and Methodology

Data comes from 10 waves of the Survey of Consumer Finances (SCF) since 1983, excluding the 1986 wave because it didn't include questions on attitude toward credit. SCF is a triennial survey sponsored by the Federal Reserve Board and was conducted by the Survey Research Center at the University of Michigan from 1983 to 1989 and by the National Opinion Research Center at the University of Chicago since 1992. Currently it stands as the survey that collects the most detailed information on U.S. households' finances as well as financial opinions.

There are two challenges to using a complex survey data such as SCF. First of all, missing observations are imputed for dollar variables. Up until 1989, SCF employed single imputation techniques. From 1989 onwards multiple imputation techniques have been used in SCF to impute missing observations.⁷ If not accounted for, multiple imputation can inflate variances for estimates, causing false inference for both descriptive statistics and regression analysis. This is also called "imputation error" (Kennickell, 1998). Necessary corrections have to be applied to the multiply imputed data to avoid bias (Montalto & Yuh, 1998). The other problem with SCF is called sampling variability error.⁸ Due to privacy concerns, SCF doesn't release crucial details on households that are necessary for resampling. However, as an alternative, SCF publishes replicate weights for 1989 onwards.

Thankfully, there is a user-written macro in Stata called *scfcombo* that allows

⁷Please see Montalto and Sung (1996) for an easy to read discussion on multiple imputation in SCF.

⁸For an in-depth discussion of sampling in SCF, please see Kennickell and Woodburn (1999)

researchers to correct for both imputation and sampling variability error easily. However, for this macro to work, there have to be replicate weights available. Because the waves prior to 1989 don't have replicate weights, it is impossible to employ this Stata tool when all the waves, including the waves from 1983 and 1986, are pooled together.

An alternative is to employ Stata's *mi estimation*. This requires defining the pooled data as imputed data. The difficulty is that waves prior to 1989 are imputed with single imputation techniques. Luckily, Stata can be easily fooled into thinking that singly imputed data are actually multiply imputed by merging 5 identical sets into a single set. This way, all the waves can be pooled into a single *mi dataset* and *mi estimation* commands can be employed. Hence, the following estimates for descriptive statistics, coefficients and marginal probabilities are all corrected for imputation error. Note that, given the pooled nature of the data, it is not possible to correct for the sampling variability error.

Household Attitudes

In the SCF the following question is asked to households: "In general, do you think it is a good idea or a bad idea for people to buy things on an installment plan?" Households could pick between three answers: "Good Idea, Sometimes Good Sometimes Bad Idea, Bad Idea". *Attitude* = 1 if households answered "Good Idea" to this question, and = 0 otherwise.

Indebtedness

There has been a significant amount of research on identifying financial ratios that best represent household indebtedness (DeVaney, 1994; DeVaney & Lytton, 1995; Garrett & James, 2013; Greninger, Hampton, Kitt, & Achacoso, 1996; Kim & Lyons, 2008). Three

measures stand out as most widely used and best represent financial strain of households. *Solvency ratio*, which is the ratio of household total assets to total debt, stands as the first important factor in identifying households in financial distress. Due to the large number of households in our data that have no debt, this ratio is coded into a binary variable, *insolvent*, which is equal to 1 if a household has a solvency ratio below 1. The other measure that stands out in the literature is monthly debt payments to monthly income ratio, *debttoincome*. Monthly debt payments are the summation of regular monthly debt obligations, including mortgage contracts, car loans, lines of credit and various types of regular payment consumer loans. If a regular debt obligation frequency was different than per month, its monthly values is included. Monthly income is household annual gross income divided by twelve. A binary recode of *debttoincome* is *highleverage*, which is equal to 1 if a household has a debt-to-income ratio of more than 0.33, which falls in line with the 1/3 golden rule most often used by creditors. Another variable is *liquidityratio*, which is the ratio of liquid assets, such as money in checking account, cash value of savings bonds, money in IRA, CDs and money market accounts, to monthly income. The binary recode is *lowliquidity* that is equal to 1 if a household has liquidity ratio that is lower than 3, which indicates that household doesn't have enough liquidity to cover 3 months living expenses, assuming that monthly income represents monthly living expenses. Apart from these, we also include *behindpayments*, which is equal to 1 if a household has ever fallen behind any loan payment.

Control Variables

One of the important determinants of household attitude toward credit is *income*. *Networth* is also another important financial indicator that can affect attitudes. Note that

nominal values are adjusted for inflation using the consumer price index for each SCF year included. Marital status (*married*), education in years (*education*), age of the household head (*age*), race (*White*) and employment status (*employed*) are other variables that are found to be significant determinants of household attitudes toward borrowing.

The SCF identifies households that are dissuaded from applying for credit by asking the following question: “Was there any time in the past five years that you thought of applying for credit at a particular place, but changed your mind because you thought you might be turned down?” If a household said yes to this question, *discouraged* = 1. We think that discouragement might play a role in forming a negative attitude toward credit.

The SCF also asks the following question in regards to households’ risk preference: “Which of the statements on this page comes closest to the amount of financial risk that you (and your [husband/wife/partner]) are willing to take when you save or make investments?” Among the possible answers are: “Take substantial financial risks expecting to earn substantial returns,” “Take above average financial risks expecting to earn above average returns,” “Take average financial risks expecting to earn average returns,” “Not willing to take any financial risks.” If households are not willing to take any risk at all, *riskaverse* = 1. It is possible that risk averse households are more likely to form negative attitude toward borrowing.

Hypotheses

It has already been discussed earlier that there have been significant institutional changes in the U.S. financial markets that were deregulatory. With these institutional changes in place, U.S. households are expected to have more positive attitudes toward credit. In other words, indebtedness, which was a result of those institutional changes,

should be a positive determinant of attitudes toward borrowing. In a more formal way: *Ceteris Paribus*, indebted households are more likely to have positive attitudes toward borrowing (Hypothesis 1). However, the primary interest of this study is in the historical evolution of this correlation. Deregulation of the U.S. financial sector continued in the 1990s and early 2000s. If there weren't any catastrophic consequences of deregulation to the U.S. economy, one would expect the positive correlation between indebtedness and positive attitudes toward borrowing to get stronger. However, in the time period between 1983 and 2013, the U.S. economy was hit by three economic recessions, the latest of which was the most severe recession since the Great Depression. Surely, these recessions had significant impacts on the correlation between indebtedness and attitudes toward borrowing. Then: *Ceteris Paribus*, the marginal effect of indebtedness on attitudes shifted during recessions (Hypothesis 2).

Methodology

Since we are after the effect of indebtedness on attitudes toward borrowing, attitudes can simply be written as a function of control variables and indebtedness, where X is the control variable, Y is the indebtedness variable, $Years$ are year dummies and $Y\#Years$ are interaction of indebtedness variables and years:

$$Attitude = \beta_0 X + \beta_1 Y + \beta_2 Years + \beta_3 Y\#Years + \epsilon \quad (1)$$

With the assumption that ϵ has a logistic distribution, we can estimate this equation using the logistic regression. However, Stata doesn't allow the use of analytic weights together with logit regression. Therefore, the regression method used is the Generalized Linear Model (GLM) regression with the Logit Link Function. This way, we can easily use the analytical sample weights reported by SCF.

Results

Descriptive Statistics

Imputation-adjusted estimations for weighted sample means are given in Table 1. Figure 8 demonstrates the change in households' attitudes across years. Note that there is a marked decline in the proportion of households with positive attitudes (*attitude = 1*) since 1983.

Estimation Results

Table 2 presents the estimation results of the GLM regression estimated for all the SCF waves in this study. 4 models are estimated using different definitions of indebtedness.

Age is a significant factor in determining attitudes toward credit. Older age is associated with negative attitude. This result confirms generational differences in attitude toward credit pointed out by Cynamon and Fazzari (2008).

Education is negatively associated with attitudes toward borrowing. Education is suspected to be correlated with *income*.

Employment is positively associated with attitudes toward borrowing. Employment is again suspected to be highly correlated with income, which might be the culprit.

Surprisingly, neither *income* nor *networth* is a significant factor in determining household attitude toward credit. This might be due to the possible multicollinearity mentioned above.

Discouraged is another factor that is positively correlated with attitudes. It is counterintuitive that households that are discouraged to apply for credit are more likely to have positive attitudes toward borrowing. The only plausible explanation is that attitudes are formed prior to being discouraged to apply for credit. Naturally, households that think

Table 1. Descriptive Statistics for Weighed Sample of Households

	1983	1989	1992	1995	1998	2001	2004	2007	2010	2013
Attitude	0.432 (0.008)	0.437 (0.009)	0.339 (0.008)	0.328 (0.007)	0.285 (0.007)	0.278 (0.007)	0.308 (0.007)	0.279 (0.007)	0.218 (0.005)	0.239 (0.006)
Age	48.354 (0.266)	49.545 (0.302)	49.865 (0.275)	49.936 (0.261)	50.113 (0.260)	50.559 (0.250)	51.202 (0.250)	51.601 (0.253)	52.059 (0.207)	52.686 (0.216)
White	0.837 (0.006)	0.759 (0.008)	0.760 (0.007)	0.783 (0.006)	0.785 (0.007)	0.770 (0.007)	0.740 (0.007)	0.751 (0.007)	0.710 (0.006)	0.706 (0.006)
Married	0.635 (0.008)	0.600 (0.009)	0.588 (0.008)	0.595 (0.008)	0.602 (0.008)	0.613 (0.008)	0.592 (0.008)	0.598 (0.008)	0.594 (0.006)	0.584 (0.007)
Education	12.217 (0.054)	12.464 (0.071)	12.883 (0.052)	12.930 (0.048)	13.081 (0.049)	13.145 (0.046)	13.304 (0.050)	13.273 (0.046)	13.416 (0.037)	13.495 (0.036)
Employed	0.681 (0.008)	0.679 (0.009)	0.657 (0.008)	0.680 (0.007)	0.704 (0.007)	0.717 (0.007)	0.711 (0.007)	0.698 (0.007)	0.677 (0.006)	0.658 (0.006)
Discouraged	0.088 (0.005)	0.134 (0.006)	0.129 (0.006)	0.164 (0.006)	0.147 (0.006)	0.146 (0.005)	0.154 (0.006)	0.145 (0.005)	0.182 (0.005)	0.185 (0.005)
Riskaverse	0.447 (0.008)	0.497 (0.010)	0.498 (0.009)	0.459 (0.008)	0.387 (0.009)	0.402 (0.008)	0.423 (0.008)	0.417 (0.008)	0.477 (0.007)	0.470 (0.007)
Income	30.244 (0.841)	33.289 (2.654)	28.891 (0.983)	29.779 (1.674)	33.639 (2.442)	39.474 (2.027)	37.602 (1.786)	40.656 (2.728)	36.388 (1.698)	37.452 (2.145)
Networth	138.906 (14.074)	127.278 (26.858)	128.188 (12.989)	127.759 (14.049)	168.596 (18.310)	215.273 (17.735)	226.187 (20.015)	245.128 (24.176)	205.479 (17.869)	208.340 (19.692)
Insolvent	0.043 (0.003)	0.077 (0.005)	0.053 (0.004)	0.069 (0.004)	0.080 (0.004)	0.063 (0.004)	0.069 (0.004)	0.080 (0.004)	0.120 (0.004)	0.121 (0.004)
Behindpayments	0.124 (0.005)	0.161 (0.007)	0.119 (0.006)	0.161 (0.006)	0.157 (0.006)	0.136 (0.005)	0.161 (0.006)	0.201 (0.006)	0.172 (0.005)	0.147 (0.005)
Highleverage	0.152 (0.006)	0.167 (0.007)	0.206 (0.007)	0.166 (0.006)	0.179 (0.006)	0.162 (0.006)	0.173 (0.006)	0.190 (0.006)	0.207 (0.005)	0.204 (0.005)
Lowliquidity	0.650 (0.008)	0.619 (0.009)	0.619 (0.008)	0.633 (0.008)	0.599 (0.008)	0.590 (0.008)	0.609 (0.008)	0.592 (0.008)	0.623 (0.007)	0.618 (0.006)
Observations	3,686	3,041	3,710	4,060	4,061	4,236	4,321	4,225	6,152	5,752

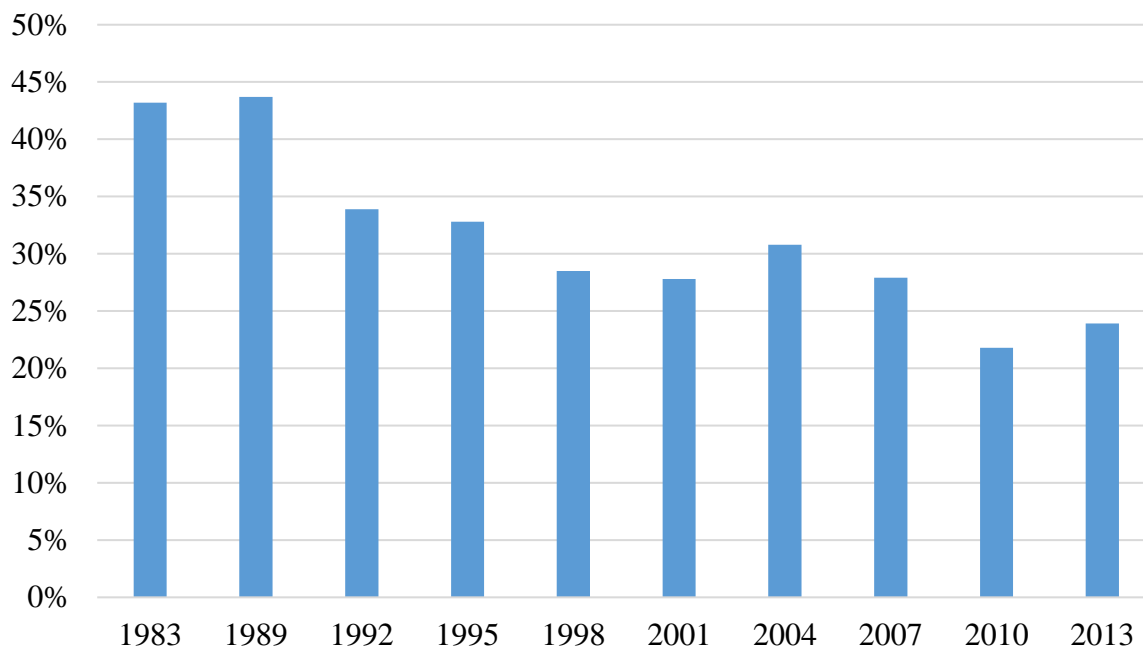


Figure 8. Percent of Households With Positive Credit Attitudes
* Survey of Consumer Finances

Table 2. Results for GLM Estimation with Logit Link Function
(Dependent Variable: *Attitude*)

	Model 1	Model 2	Model 3	Model 4
Age	-0.008** (0.001)	-0.008** (0.001)	-0.008** (0.001)	-0.008** (0.001)
White	-0.352** (0.025)	-0.354** (0.025)	-0.353** (0.025)	-0.352** (0.025)
Married	0.014 (0.023)	0.010 (0.023)	0.010 (0.023)	0.010 (0.023)
Education	-0.013** (0.004)	-0.013** (0.004)	-0.013** (0.004)	-0.013** (0.004)
Employed	0.147** (0.030)	0.145** (0.030)	0.144** (0.030)	0.140** (0.030)
Discouraged	0.158** (0.029)	0.188** (0.030)	0.169** (0.029)	0.167** (0.030)
Riskaverse	-0.184** (0.024)	-0.180** (0.024)	-0.180** (0.024)	-0.184** (0.024)
Income	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Networth	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Insolvent	0.314 (0.165)			
Behindpayments		0.030 (0.101)		
Highleverage			0.193* (0.092)	
Lowliquidity				0.141 (0.073)
1989.year	0.006 (0.047)	0.020 (0.050)	0.029 (0.050)	0.051 (0.078)
1992.year	-0.420** (0.049)	-0.413** (0.051)	-0.407** (0.053)	-0.314** (0.081)
1995.year	-0.461** (0.048)	-0.450** (0.051)	-0.429** (0.051)	-0.530** (0.084)
1998.year	-0.664** (0.050)	-0.680** (0.053)	-0.667** (0.053)	-0.660** (0.084)
2001.year	-0.729** (0.050)	-0.707** (0.052)	-0.678** (0.053)	-0.778** (0.085)
2004.year	-0.580** (0.048)	-0.576** (0.051)	-0.542** (0.051)	-0.459** (0.079)

Table 2. Continued

	Model 1	Model 2	Model 3	Model 4
2007.year	-0.720** (0.050)	-0.704** (0.052)	-0.688** (0.053)	-0.609** (0.080)
2010.year	-1.011** (0.054)	-1.025** (0.056)	-0.992** (0.057)	-0.823** (0.086)
2013.year	-0.867** (0.051)	-0.836** (0.052)	-0.865** (0.054)	-0.632** (0.081)
Indebtedness#1989	-0.121 (0.199)	-0.093 (0.141)	-0.146 (0.123)	-0.062 (0.096)
Indebtedness#1992	0.081 (0.212)	0.004 (0.142)	-0.073 (0.120)	-0.145 (0.099)
Indebtedness#1995	-0.155 (0.202)	-0.098 (0.133)	-0.217 (0.126)	0.098 (0.101)
Indebtedness#1998	-0.346 (0.204)	-0.023 (0.136)	-0.105 (0.127)	-0.028 (0.102)
Indebtedness#2001	0.000 (0.205)	-0.099 (0.140)	-0.261* (0.131)	0.097 (0.103)
Indebtedness#2004	-0.049 (0.200)	-0.006 (0.130)	-0.198 (0.123)	-0.173 (0.097)
Indebtedness#2007	-0.098 (0.196)	-0.066 (0.130)	-0.168 (0.123)	-0.158 (0.099)
Indebtedness#2010	-0.508* (0.204)	-0.172 (0.144)	-0.336* (0.134)	-0.346** (0.107)
Indebtedness#2013	-0.635** (0.200)	-0.612** (0.156)	-0.335** (0.128)	-0.450** (0.101)
Constant	0.490** (0.084)	0.531** (0.085)	0.492** (0.086)	0.412** (0.103)
Observations	43,244	43,244	43,244	43,244

Standard errors in parentheses

** $p < 0.01$, * $p < 0.05$

is a good idea will apply for credit and might end up being discouraged. Therefore, discouraged households will have more positive attitude toward borrowing than households that didn't apply for credit at all. Unfortunately, SCF doesn't distinguish between households that didn't apply at all and households that applied and weren't discouraged.

Riskaverse is negatively associated with attitude, although it is not robust for all the waves. Other studies didn't find a significant association of risk preference with attitude toward borrowing. Our results, on the other hand, suggest a weak correlation.

The coefficients for year dummies indicate whether or not the intercept of the regression equation changes. In all years except 1989, and all 4 models, year dummies have negative and highly significant signs. It is evident that there is a significant structural shift in regression equations across years. It is also clear that the magnitude of this shift gets larger in 2001 and 2010 compared to preceding years. Remember that the 2001 wave roughly coincides with the Dot.com Recession and 2010 coincides with the Great Recession.

Testing Hypothesis 1

Model 1 uses *insolvent* as the definition of indebtedness. Although the coefficient has a positive sign, it is insignificant. Similar conclusions can be reached for Models 2 and 4, which use *behindpayments* and *lowliquidity*. *Highleverage* in Model 3 is positively and significantly associated with positive attitudes. Therefore, we have partial support of the first hypothesis that claimed a positive correlation between indebtedness and attitudes. Once again, it is not possible to determine the causality here as it can run both ways.

Testing Hypothesis 2

The interaction of indebtedness variables and year dummies tells us whether or not the effect of indebtedness on having positive attitudes changes across years compared to the base year of 1983. Note that negative coefficients mean that in any year the marginal effect of indebtedness on the probability of having positive attitude is smaller than it is in 1983⁹. In 2001 for Model 3, in 2010 for Models 1,3, and 4, and in 2013 for all models we see a negative change in the effect compared to the base year. It is evident that the negative marginal effect of indebtedness on having positive attitude was significantly stronger in 2013 than in 1983, consistently so in all the models. In 2010, the same conclusion can be reached with the exception of Model 2, in which indebtedness was defined as *behindpayments*. Also in 2001, the marginal negative effect of *highleverage* appears to be stronger. In all the other years, we see a negative but insignificant change in the marginal effect.

To see if the shifts in the marginal effect of indebtedness in 2010 and 2013 were actually significant departures from previous years, the contrast of marginal effects in each consecutive year was calculated. Table 3 presents the results. Note that the only statistically significant change is in 2013 for Model 2. We can observe an increase in the marginal effects of 2010 after the recession, although this increase is not statistically significant. These results indicate that the shift in the marginal effects of indebtedness in 2010 and 2013 is not due to the recession itself. The shift is a more deep-seated change that is observed when the comparison is with the 1983 effects. Nevertheless, there is no evidence

⁹In some years, the marginal effect of indebtedness is actually negative. Hence, negative interaction terms indicate a larger negative effect of indebtedness on the probability to have positive attitude.

Table 3. Contrast of Predicted Margins for the Probability of Having Positive Attitude

	Model 1	Model 2	Model 3	Model 4
1989 vs 1983#Indebtedness	-0.121 (0.199)	-0.093 (0.141)	-0.146 (0.123)	-0.062 (0.096)
1992 vs 1989#Indebtedness	0.201 (0.173)	0.098 (0.151)	0.072 (0.114)	-0.083 (0.094)
1995 vs 1992#Indebtedness	-0.236 (0.177)	-0.103 (0.131)	-0.143 (0.116)	0.243* (0.098)
1998 vs 1995#Indebtedness	-0.191 (0.169)	0.075 (0.126)	0.111 (0.124)	-0.126 (0.102)
2001 vs 1998#Indebtedness	0.347* (0.172)	-0.076 (0.134)	-0.155 (0.128)	0.125 (0.104)
2004 vs 2001#Indebtedness	-0.050 (0.167)	0.093 (0.128)	0.063 (0.124)	-0.270** (0.099)
2007 vs 2004#Indebtedness	-0.048 (0.157)	-0.059 (0.115)	0.029 (0.115)	0.015 (0.095)
2010 vs 2007#Indebtedness	-0.410* (0.162)	-0.107 (0.132)	-0.168 (0.127)	-0.188 (0.104)
2013 vs 2010#Indebtedness	-0.127 (0.166)	-0.439** (0.155)	0.001 (0.132)	-0.104 (0.106)

Standard errors in parentheses
** $p < 0.01$, * $p < 0.05$

to support Hypothesis 2.

Conclusion

U.S. households are not new to debt. They borrowed for sewing machines in the late 1800s, and then borrowed for household appliances, furniture, and automobiles in the first half of the 20th century (Olney, 1987). It was long before the 1980s that households purchased goods and services with credit cards. They didn't buy homes on mortgages the very first time in the 1980s either. What was new to 1980s household finances is the breaking down of the perception of debt as a socioeconomic stigma. Since the 1980s, debt has become not only socially acceptable and legally forgivable, but also a promoted economic and social necessity. With all these institutional changes in place, one expects household attitudes toward borrowing to change in a positive direction. Relaxation of

household attitudes, in that case, would be a natural outcome of the process that institutionalized debt in the United States.

There are studies in the literature that find a strong association between attitude toward borrowing and debt. However, most of these studies rely on cross-section analysis. There is a longitudinal dimension to the correlation between debt and attitude toward borrowing. Households change their attitudes toward debt as they become more indebted. This longitudinal element is the reason there is likely a backward causality from debt to attitude. Households with positive attitudes toward debt borrow more. However, as they become more indebted in time, their attitudes are likely to be affected negatively. The decrease in the proportion of households with positive attitudes toward debt support this theory. The lack of longitudinal data collected from a nationally representative sample of households stands as the most important hurdle for detangling the complex endogenous relationship between indebtedness and attitudes toward debt.

In this study, we investigated the correlation between indebtedness and attitude using 10 waves of the SCF. The long period of time these waves cover is an advantage in seeing the historical evolution of the relationship between household attitudes and indebtedness. By pooling the waves into a single dataset and introducing year dummies as well as interaction of indebtedness with years, we found evidence that *highleverage* and *lowliquidity* are associated with higher probability to state positive attitude toward borrowing. However, there was no evidence to support the second hypothesis about a significant change in the marginal effect of indebtedness on attitudes. The structural change appears to be a longer-term one, that can be seen from the significant coefficients of interaction terms in 2010 and 2013. These results point out to a mild long term drift toward

viewing debt more negatively. Also, this negative attitude toward borrowing was strengthened after the financial crisis.

The limitations to this study are twofold. First of all, we didn't address the endogeneity between indebtedness and household attitudes. Although we can blame lack of longitudinal data for this negligence, it doesn't change the fact that endogeneity will reduce the accuracy of our estimations. Second, due to the pooled nature of the dataset used, sampling variability could not be corrected via using bootstrapped replicate weights published by SCF only for the years 1989 and onwards. Therefore, significance levels of estimates should be interpreted with caution.

INDEBTEDNESS AND HOUSEHOLD HEALTH:

A HISTORICAL PERSPECTIVE

American health has been worsening despite rising health care spending and an economy that has almost doubled its real output since the 1990s. Although a brief look at mortality and morbidity rates would make us think otherwise, the recent surge in the prevalence of chronic diseases shows that U.S. households are living less healthy lives (Bodenheimer, Chen, & Bennett, 2009; Ward & Schiller 2013, Ward, Schiller, & Goodman, 2014). A straightforward explanation for this chronic problem in the United States could be the aging of the population. However, one piece of evidence goes against this reasoning. The Centers for Disease Control (CDC) publish summary tables for the National Health Interview Survey (NHIS) dating back to 1962. One of the questions in the survey collects information on the “respondent-assessed” health status. Since 1997, the results are reported with respect to age groups (see Figure 9). In 1997, 73.6% of respondents between age 18 and 44 reported excellent or good health. This share was 58.5% for the group between ages 45 and 64 and 43.3% for ages 65 to 74 (Blackwell, Collins, & Coles, 2002). According to the 2014 report, for age group 18-44, the percentage of respondents with excellent or good health stayed at a relatively stable rate of 72.1% (Blackwell, Villarroel, & Clarke, 2015). However, the percentage decreased to 54.5% for the age group 45-64. What is striking is that for the senior group between ages 65 and 74, the percentage with excellent or good health increased remarkably to 50.5%. As far as their

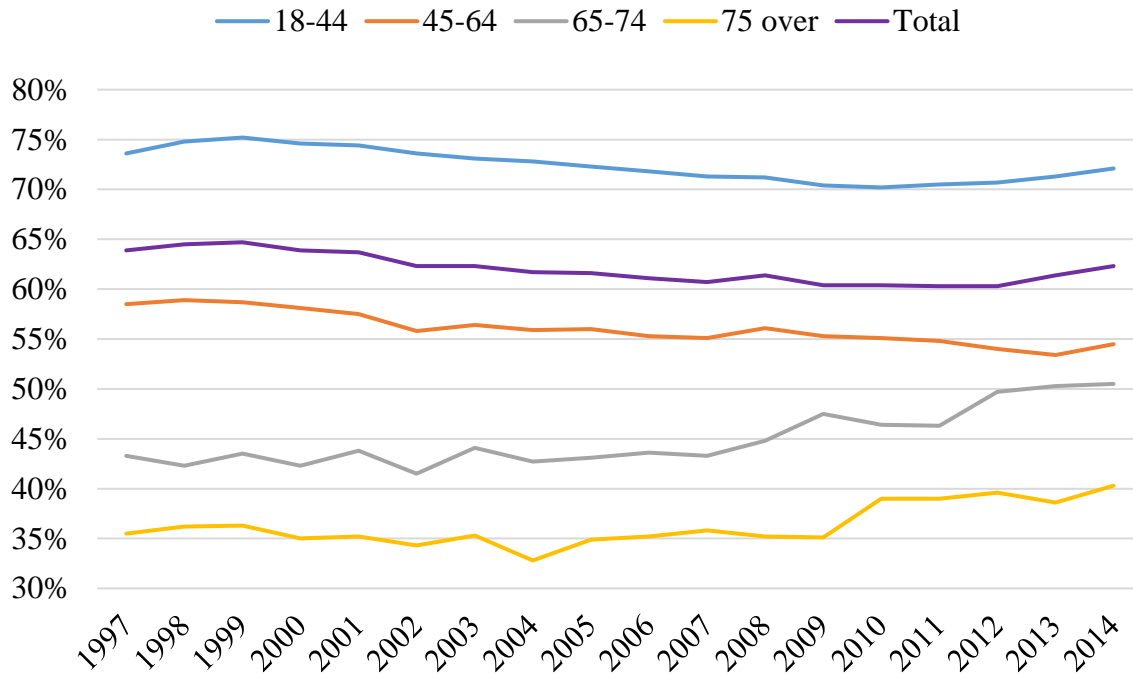


Figure 9. Adults With Excellent/Very Good Health Status
*National Health Interview Survey, 1997-2014

perceptions go, the senior population is feeling healthier in the United States.¹⁰ The same summary tables also indicate that for the entire sample of households, self-assessed health status has been worsening. Aging of the U.S. population could be a straightforward explanation to this downward trend in self assessed health status. However, changing socioeconomic circumstances is also a likely suspect here.

The correlation between SES and health is a complex one. The first layer of complexity arises due to the endogenous correlation between SES and health. From a micro perspective, most of the health disparities among households can be explained by SES, however the causality runs both ways (Gallo & Matthews, 2003). Low SES can be both

¹⁰The difference between proportions in consecutive years is statistically significant at 0.01% with the exception of the years the proportion didn't change.

the cause and the effect of worsening health. Another level of complexity appears as a result of the counter-cyclical nature of household health. In a series of studies Christopher J. Ruhm (2003, 2004, 2007), as well as Ruhm and Black (2002) demonstrated that household health deteriorates during economic expansions either because of added stress of work or because of unhealthy consumption patterns such as increased alcohol consumption. It is important to note that Ruhm was mainly interested in physical health. The possibility that physical health and mental health might not follow a similar pattern adds more complexity to the relationship between health and SES. As a matter of fact, looking at the NHIS early release table for serious psychological stress (Ward, Clarke, Nugent, & Schiller, 2016, p. 86, Figure 13.1) one can identify a counter-cyclical trend in the percentage of adults who experienced serious psychological distress during the past 30 days. Bad economic times might mean better physical health for households, but it also appears that they suffer from more stress.

One key element in the relationship between SES and health has been studied only recently. The Great Recession exposed a crucial weakness of the US economy: high leverage. The economic disaster caused by the default of the subprime mortgage industry undoubtedly spread to millions of American households who lost their homes, jobs, and retirement funds and were left with a high debt burden. It is this liability and the difficulty households experienced in paying it that attracted scholars to investigate the relationship between household debt and health.

This study contributes to that literature by looking at the debt-health nexus with a historical analysis. We use the public dataset of the Survey of Consumer Finances (SCF) between 1983 and 2013, which covers 11 waves of the survey. To our knowledge, this

study is the only study in the literature that covers a timespan this long using the SCF. We test two hypotheses. First, we will investigate whether or not there is a stable relationship between household health and its covariates across these years. Then, we will see whether the effect of indebtedness on household health changes across years, especially during the three recessionary periods. The main contribution of this paper, other than the long time span it covers, is the testing of this second hypothesis. Any evidence for a structural change in the correlation between indebtedness and household health will indicate that changing financial and economic conditions influence how households' wellbeing is related to their finances.

The rest of the paper is planned to first lay out the logical framework for the debt-health nexus by presenting findings from other studies in the literature. A section explaining the data and variables, as well as the methodology used, will follow that. Next, we will present the findings of this paper, and finally conclude with a brief summary and discussion.

Literature Review

Consumption and asset building are the two reasons a household borrows. Borrowing for the purpose of purchasing consumption goods gives households an instant gratification; it is therefore likely to improve their health status by lowering their stress. An important thing to note is that some consumption might be "unhealthy" such as alcohol consumption, smoking, or foods high in sugar and saturated fat. Borrowing for asset building is also expected to affect health positively by improving access to better housing. If we include vehicle purchases in asset building as well, then the positive health affect can be larger. However, there is stress associated with homeownership as one needs to make

regular mortgage payments and also make sure the property is maintained properly. There are negative health consequences associated with vehicle ownership as well. First and foremost, traffic injuries might lower health status for drivers compared to households who employ public transportation. Also, driving in a densely-populated area is a highly stressful activity, which might lower perceived level of health. Therefore, net health effects of, not the borrowing itself, but the final goods or services purchased are ambiguous. (Hennessy & Wiesenthal, 1997; Stokols, Novaco, & Stokols, 1978).

Debt repayment has less ambiguous effects on household health. In the case of an income loss, households are more likely to face delinquency on loan payments. Delinquency alone is a stress factor because of the social stigma of not being able to repay debt. Moreover, delinquency can quickly add more to a household's debt burden through interest charges and fees. A household that is delinquent on a loan has to either sell the collateral to repay the debt or keep on making payments by means of a refinance, which would require the household to make certain concessions in their budget. Selling the asset might have negative health effects by creating added stress for households. For instance, moving is a stressful ordeal for any family under any circumstances. Not wanting to go through that ordeal, a household might choose to repay the debt. That requires making room for loan payments in the household budget. That might mean cutting back on healthy food and utilizing less health care especially when the high cost of health care is considered. This will lower the health status of households. Note that it is possible that a household might also cut back on unhealthy consumption, which might induce better health. Another source of stress is predatory debt collection many households are subjected to during delinquency. Next, we will look at these different mechanisms through which household

debt can affect health.

Wealth and Health

Adam, Hurd, and McFadden (2003) investigated the relationship between SES and health including wealth as a measure of SES. This study used AHEAD (Asset and Health Dynamics of the Oldest Old) as its dataset, which limits the scope their research to a panel of U.S elderly at age 70 or older in 1993. Their conclusion suggested that there is no causal link from SES to mortality and acute diseases. However, there was evidence for a causal link from SES to incidence of mental problems. Endogeneity between health and wealth was recognized in this study, although the evidence for a causal link from health to wealth changes was less compelling.

Meer, Miller, and Rosen (2003) used the PSID (Panel Study of Income Dynamics) to explain the causal relationship between wealth and health. They found a weak causality running from wealth to health when they control for the endogeneity between the two.

In a more recent study, Wenzlow, Mullahy, Robert, and Wolfe (2004) studied the health-wealth nexus using the SCF (Survey of Consumer Finances). They investigated the correlation between family-size-adjusted household wealth and a self-reported dichotomous health measure. In the SCF, households are asked to rate their health status by indicating if their health is poor, fair, good, or excellent. The answers to this question are reworked into a binary variable by combining poor/fair and good/excellent values together. Control variables are age, race, gender, marital status, education, time preference, and smoking of the household head apart from household income. The results show that there is strong positive correlation between household wealth and health status. The wealth gradient of this correlation has a concave shape, meaning that the positive effect of wealth

on health gets weaker for households at the higher levels of the wealth distribution. Another result that is noteworthy is that wealth is differentially related to health depending on age, which appears to be more prominent for Whites.

Brown, Taylor, and Price (2005) tested the hypothesis that household debt is associated with increased levels of psychological distress using the 1995 and 2000 waves of the British Household Panel Survey. Unlike the previous work, this study looked at household assets and debt separately. They further dissected debt into secured and unsecured debt to see if the health effects are diverse. Authors of this study also took into account the possible endogeneity between health and debt and adjust their models accordingly. The results were compelling. First of all, outstanding debt of any kind was strongly associated with lower psychological wellbeing. Unsecured debt had a stronger effect on health than secured debt, which was mortgage debt in this case. However, the negative effect of debt was offset by the positive effect of household saving on psychological wellbeing. Note that the measure for saving didn't include possible changes in the value of assets such as an increase in house equity.

From Delinquency to Health

Studies on the link between delinquency and health attempt to reveal the mechanism through which high indebtedness might affect household health. Measures of indebtedness as well as health indicators for households vary greatly. The most common denominator is the clear distinction between physical and mental health.

Nettleton and Burrows (1998) is the earliest study we reviewed. Their focus was on the correlation between mortgage indebtedness and mental health of the British households in the 90s. The health measure used was a subjective assessment of one's own health, the

same measure that was also used by Brown et al. (2005). The mortgage indebtedness was again a self-reported indicator of whether or not the household had problems making mortgage payments, in other words *mortgage delinquency*. They found evidence that there is a link between mortgage delinquency and worsening mental health.

Drentea and Lavrakas (2000) focused on credit card debt and its effects on physical and self-reported health. They used a survey of more than 900 representative adults that were randomly interviewed in Ohio in 1997. This study stands out as one of the few studies that looked at objective and subjective measures of health independently. Their particular focus on credit card debt is important because credit card debt is unsecured, delinquency most often results in aggressive collection, and is also socially stigmatized. Although they found evidence for the correlation of both subjective and self-reported health with credit card to income ratio, some of this correlation can be explained by health behaviors such as smoking, eating, and drinking. Yet still, stress caused by delinquency appears to explain some of the correlation. Drentea (2000) focused on this aspect of the debt-health nexus and found that anxiety increases with credit card debt to income ratio and being in default.

One study that finds partial evidence for a link between debt and health is by Lyons and Yilmazer (2005). They focused on the endogenous nature of the correlation between poor health and financial strain using SCF. Being in financial strain was defined in three ways: delinquency on loans, having an asset to loans ratio less than 1, and having a liquid asset to income ratio less than 0.25. They found that poor health results in financial strain that is robust for different definitions of financial strain. However, the backward causality from financial strain to health couldn't be supported by any evidence.

Bridges and Disney (2010) used a household panel survey in Britain between 1999

and 2005. They also focused their attention on the bidirectional causality between indebtedness and psychological stress. They also analyzed objective and subjective measures of financial stress. The subjective measure of financial stress was determined by households' perception of their financial difficulties in the survey. Although there seems to be a weak relationship between objective measures of financial strain and depression, objective financial stress plays a role through households' perceived level of financial difficulty. Key drivers of depression onset were these general perceptions of financial stress, losing employment, and worsening ill-health. Similarly, Sweet, Nandi, Adam, and McDade (2013) reported that a high debt to asset ratio is associated with higher self-assessed stress and depression, lower self-reported general health, and also higher levels of diastolic blood pressure. They use the National Longitudinal Study of Adolescent Health as their dataset, therefore their sample was restricted to young adults.

Another study that investigated the mediating factors in the correlation between financial strain and mental health is by Selenko and Batinic (2011). Their results suggested that perceived financial strain was correlated with mental health, whereas objective financial strain measured as the level of debt was not. They also found that being part of a collective purpose through employment as well as self-efficacy moderated the negative effects of perceived financial strain on mental health.

In an interesting paper, Richardson, Elliott, and Roberts (2013) reviewed 65 systematically selected studies and found that 51 of these studies concluded that debt is associated with worse health. A few other studies found an association of worry for debt with health, and a couple more concluded that financial strain, rather than debt, was correlated with health. They focused particularly on unsecured debt and concluded that

most of the studies find that unsecured debt is linked to poor health.

From Health to Delinquency

As pointed out earlier, many studies recognize the endogenous relationship between financial stress and health. Worse health can be both the result and the effect of financial difficulties. Himmelstein, Thorne, Warren, and Wollhandler (2009) found that medical related bankruptcies rose by 49.6% between 2001 and 2007. Most of this rise can be attributed to either medical debt or income loss due to illness. They also added that most of these medical debtors were well-educated homeowners employed in middle-class occupations who had health insurance. Mathur, in two congressional testimonies, concluded that it was not the medical debt but other debt holdings of these households that led to their bankruptcy (Medical Debt: Is Our Healthcare System Bankrupting Americans? 2000, Medical Debt: Can Bankruptcy Reform Facilitate a Fresh Start? 2000). It is true that households with high medical debt also carry a heavier load of other types of debt. However, what is triggering bankruptcies is more likely to be their medical debt, which is usually accumulated after acute health conditions that were unexpected expenditures on top of already existing debt burden. Another issue with Mathur's argument is that nowadays most medical debt is disguised as credit card debt. If a household is filing for bankruptcy due to high credit card debt, that might very well be because of a medical expense. Nevertheless, it is crucial to identify catastrophic health expenses when analyzing the link between health and delinquency, because the causality is likely to run from health to delinquency in the presence of such acute events.

Predatory Collection

Jacoby (2002) provided a short review of the debt-health literature and also analyzed how the law can be a mitigating factor in that correlation. Informal collection methods, which are highly unregulated in the US, stood out as a major source of stress for financially delinquent households. It was also indicated in that study that the government encouraged indebtedness through various tax policies and low-cost public lending, which eventually made it ever easier for households to get under heavy debt loads.

Health Behaviors

Another factor that links indebtedness to health is the change in health behaviors when households face financial strain. Chen and Miller (2013) explained various casual factors that determine health disparities among different SES groups. If we count indebtedness a part of household SES, then indebtedness will first of all determine the neighborhood you are living in. The credit rationing literature finds evidence for how highly-indebted households relative to their income will have difficulty obtaining credit. This might mean not being able to afford a mortgage and therefore not living in a desired neighborhood. Certain neighborhoods are deprived of access to healthy living standards such as fresh food, or even clean water as seen in the Flint, MI water crisis. Violence is another factor that will have health consequences as Chen and Miller pointed out. Moving on to household level links, Chen and Miller explained the spillover of neighborhood effects on parenting. What might be added to their reasoning is that parenting can also be affected if a household is facing a financial crisis. Parents are likely to reallocate their time towards longer work hours in order to pay debt back, which will result in health problems for the children. Finally, both of these effects combined will determine health behaviors at

the individual level.

The impact of indebtedness on health behaviors was also documented by Turunen and Hiilamo (2014) in their systematic review of 33 peer-reviewed studies on the debt-health topic. First of all, the source of debt as well as the kind can have diverse health effects on households. Indebtedness appears to also leave an impact on health behaviors. Moreover, household debt stands as a significant mediator of suicidal tendencies. Debt seems to have a more indirect impact on physical health than mental health. Household mental health is directly affected negatively by the financial stress through depressive symptoms. Physical health, on the other hand, is indirectly affected by poor health decisions, worsening access to healthy environments, and cuts on health care.

Crises and Health

Economic shocks are usually unexpected and can have deleterious effects on household finances. As in the case of the Great Recession, many households experience significant losses in their wealth after an economic crisis. Combined with loss of income due to unemployment or pay cuts, these wealth losses will get under the skin sooner or later. However, as noted earlier, there is evidence in the literature that households' health actually improves during bad economic times (ala Ruhm, 2003, 2004, 2007). Below we will present studies that contest that evidence and try to bring another dimension to how the Great Recession might have affected household health.

The psychological toll the 2008 recession took on U.S. households can be observed looking at the study by Lin, Ketcham, Rosenquist, and Simon (2013). This longitudinal study investigated the impact of the decline in housing prices between December 2004 and 2009 on antidepressant prescription claims for a sample of individuals who were at least

65 years old in 2009. Results indicate a significant correlation between declining housing prices and increasing prescription claims for this age-restricted sample. Similarly, McInerney, Mellor, and Nicholas (2013) found in the 2008 Health and Retirement Study that large wealth losses were associated with increased mental distress and antidepressant use. This effect was larger for households with higher levels of stock holding, who experienced the largest decrease in their wealth. It is important to note that this significant effect only exists for subjective measures of mental health, but disappears for clinically-validated, objective measures. Yilmazer, Babiarz and Liu (2015) found similar evidence using the Panel Study of Income Dynamics for the 2007-2011 period. They concluded that a decrease in housing wealth relative to total wealth is associated with increased psychological distress and higher rates of depression.

I discussed earlier that physical health is indirectly affected by indebtedness through changes in health behaviors. However, Yilmazer et al. (2015) pointed out that there was limited evidence to support the claim that changes in household wealth had any impact on health behaviors after the 2008 recession. This result is actually in accord with the view that the relationship between economic activity and health is counter-cyclical. However, Tekin, McClellan, and Minyard (2013) used the data from the (BRFSS) Behavioral Risk Factor Surveillance System in the period 2005-2011 to find evidence contrary to that view. Their conclusion was that the counter-cyclical relationship between economic activity and health disappeared after the Great Recession. One factor that likely caused this change in pattern is an increase in involuntary changes in health behaviors after the recession. These involuntary changes in health behaviors are usually caused by restricted access to healthy behaviors. For instance, Macy, Chassin, and Presson (2013) investigated the determinants

of five different health behaviors (smoking, checking food labels, buying food based on labels, wearing a seatbelt, and frequency of vigorous exercise) in a longitudinal dataset that covers two years, 2005 and 2009. After controlling for prerecession health behaviors, age, gender, marital status, and educational attainment, they found that financial strain (defined as a five-point scale depending on respondents' answers to three questions in the survey) was significantly associated with these five health behaviors. On the contrary, neither the number of hours worked nor the change in employment status had any influence on health behaviors.

In a recent study, Wilkinson (2016) looked at a sample of respondents from the Health and Retirement Study between 2006 and 2010 to investigate the effects of worsening financial wellbeing on mental health during the Great Recession. Results indicate that subjective financial strain can robustly explain worsening anxiety and depression symptoms during that 4-year period.

Data and Methodology

Data were taken from the 11 waves of SCF since 1983 to the most current survey year in 2013. The SCF is a triennial survey sponsored by the Federal Reserve Board and was conducted by the Survey Research Center at the University of Michigan from 1983 to 1989 and by the National Opinion Research Center at the University of Chicago since 1992. Currently, it stands as the survey that collects the most detailed information on US households' finances as well as financial opinions. However, because of the nature of surveys that rely on self-reporting of variables, SCF used imputation techniques to fill out missing observations for these crucial variables.

There are two challenges to using a complex survey data such as SCF. First of all,

missing observations are imputed for dollar variables. Up until 1989, SCF employed single imputation techniques. 1989 onwards multiple imputation techniques have been used in SCF to impute missing observations.¹¹ If not accounted for, multiple imputation can inflate variances for estimates, causing false inference for both descriptive statistics and regression analysis. This is also called “imputation error” (Kennickell, 1998). Necessary corrections have to be applied to the multiply imputed data to avoid bias (Montalto & Yuh, 1998).

The other problem with SCF is called “sampling variability error.”¹² Due to privacy concerns, SCF doesn’t release crucial details on households that are necessary for resampling. However, as an alternative, SCF publishes replicate weights 1989 onwards.

Thankfully, there is a written macro in Stata called *scfcombo* that allows researchers to correct for both imputation and sampling variability error easily. However, for this macro to work, there has to be replicate weights available. Because the waves prior to 1989 don’t have replicate weights, it is impossible to employ this Stata tool when all the waves including 1983 and 1986 are pooled together.

An alternative is to employ Stata’s *mi estimation*. This requires defining the pooled data as imputed data. The difficulty is that waves prior to 1989 are imputed with single imputation techniques. Luckily, Stata can be easily fooled into thinking that singly imputed data are actually multiply imputed by merging 5 identical sets into a single set.

The following estimates for descriptive statistics, coefficients, and marginal probabilities are all corrected for imputation error. Note that, given the pooled nature of the data, it is not possible to correct for the sampling variability error.

¹¹Please see Montalto and Sung (1996) for an easy to read discussion on multiple imputation in SCF.

¹²For an in-depth discussion of sampling in SCF, please see Kennickell and Woodburn (1999)

Self-Reported Health Status

SCF also collects information on household head's health by asking the following question: "Would you say your (husband/wife/partner/spouse)'s health in general is excellent, good, fair, or poor?" The answers are recoded into a dichotomous *health status* variable, which is equal to 1 if the household head has excellent or good health, and is equal to 0 otherwise. Note that there are few cases when the respondent is not the household head, but the spouse. In those cases, the spouse is reporting on head's health status. But in the majority of cases, household heads are reporting on their health status themselves. The validity of self-reported health measures has been long discussed in the literature and there is a consensus on their consistency as a health measure given the accuracy of self-reported health status as a predictor of mortality (McGee, Youlian, Guichan, & Copper, 1999). However, it is still considered a subjective measure and is not a good reflection of more objective measures that rely on physical health. Therefore, it is reasonable to expect that self-reported health will reflect more of the respondent's psychological health than the actual physical health of households.

Indebtedness

The indebtedness variables are the same ones used in the previous part of this study following the literature on this subject (DeVaney, 1994; DeVaney & Lytton, 1995; Garrett & James, 2013; Greninger et al., 1996; Kim & Lyons, 2008). First, we have *insolvent*, which is equal to 1 if a household has a solvency ratio (total asset / total debt) below 1. Another measure used is *highleverage*, which is equal to 1 if a household has a monthly debt-to-income ratio of more than 0.33. The third measure is *lowliquidity* that is equal to 1 if a household has liquidity ratio (liquid assets/monthly gross income) that is lower than 3,

which indicates that household doesn't have enough liquidity to cover 3 months living expenses, assuming that monthly income represents monthly living expenses. Apart from these, we also include *behindpayments*, which is equal to 1 if a household has ever fallen behind any loan payment.

Control Factors

When looking at the effects of indebtedness on household health, we will control for household head's age, marital status, education, race, and employment status as well as household gross income and net worth. Note that nominal values are adjusted for inflation using the consumer price index for each SCF year included.

Hypotheses

Previous literature shows that the relationship between household health and indebtedness is a complex one. The complexity rises mostly due to the endogenous nature of the correlation. On one hand, debt and the resulting indebtedness is the only way some households can gain access to health care. On the other hand, persistent indebtedness of some households affects their physical and mental wellbeing. The SCF, because of its cross-sectional nature, provides no benefit in regards to this endogeneity issue. On the other hand, the strength of the data employed in this study is the long time span covered. With a pooled cross section of all the waves of SCF since 1983, it is possible to make a historical analysis to see if there have been significant structural shifts across years, especially in regards to the correlation between indebtedness and health status. First of all, we test if there is a negative association between indebtedness and household health: *Ceteris paribus*, indebtedness has a negative effect on household health status (Hypothesis 1). Moreover,

we are interested in a possible structural change in this correlation. Therefore, we claim: *Ceteris paribus*, the marginal effect of indebtedness on household health has shifted across years (Hypothesis 2a). Especially during crises, we expect indebtedness to have a stronger negative effect on household health due to predatory collection and reallocation of funds away from healthy choices. Finally, we want to see if economic recessions had any impact on household health. Remember, studies by Christopher Ruhm suggest that households enjoy positive health changes during recessionary periods. If his claims are true, then we should observe significant positive effects of year dummies for 1992, 2001, and 2010, which should pick up any exogenous changes to the regression equations in these years. In other words: *Ceteris paribus*, there was an upward shift in the regression of household health in 1992, 2001, and 2010 compared to previous years (Hypothesis 2b).

Methodology

Since we are after the effect of indebtedness on household health status, *healthstatus* can simply be written as a function of control variables and indebtedness, where X are the control variables, Y is the indebtedness variable, $Years$ are year dummies and $Y\#Years$ are the interactions of indebtedness variables and years:

$$Healthstatus = \beta_0 X + \beta_1 Y + \beta_2 Years + \beta_3 Y\#Years + \epsilon \quad (2)$$

With the assumption that ϵ has a logistic distribution we can estimate this equation using the logistic regression. However, Stata doesn't allow the use of analytic weights together with logit regression. Therefore, the regression method used is Generalized Linear Model (GLM) regression with Logit Link Function. This way, we can easily use the analytical sample weights reported by SCF.

Results

Descriptive Statistics

Imputation adjusted estimations for weighted sample means are given in Table 4. The total drop in the proportion of households with excellent/good health from 1983 to 2013 is 4 percentage points. Testing this difference in proportions gives us a standard normal test statistic of 4.342, which is significant at 0.01 level.

Graphical Analysis

Before moving on the estimation results, we will visually demonstrate the correlation between indebtedness and household health with respect to age, income and net worth of households. Note that the calculation of net worth and income quintiles are based on the average of five implicates for each observation. Age group, on the other hand, is calculated from only the first implicate. The sample is weighed with the analytical weights provided in the survey.

Age Gradient of Indebtedness-Health Nexus

Figures 10-13 demonstrate the correlation between indebtedness and health status across 3 different age groups and 4 different measures of indebtedness. The first important thing to point out is the notable decline in the proportion of households with excellent/good health in the youngest age group for all definitions except *lowliquidity*. Regardless of the indebtedness status, young households have experienced deteriorating health, which makes us think that indebtedness might not be the reason. However, when indebtedness is defined as having low liquidity, the proportion drops noticeably only in 2013 for households without liquidity problems. Also, when we look at the proportion among households with

Table 4. Descriptive Statistics for Weighed Sample of Households

	1983	1986	1989	1992	1995	1998	2001	2004	2007	2010	2013
Healthstatus	0.760 (0.007)	0.791 (0.008)	0.747 (0.008)	0.748 (0.007)	0.752 (0.007)	0.758 (0.007)	0.750 (0.007)	0.743 (0.007)	0.740 (0.007)	0.731 (0.006)	0.720 (0.006)
Age	48.680 (0.264)	50.356 (0.309)	49.545 (0.302)	49.865 (0.275)	49.936 (0.261)	50.113 (0.260)	50.559 (0.250)	51.202 (0.250)	51.601 (0.253)	52.059 (0.207)	52.686 (0.216)
White	0.833 (0.006)	0.844 (0.007)	0.759 (0.008)	0.760 (0.007)	0.783 (0.006)	0.785 (0.007)	0.770 (0.007)	0.740 (0.007)	0.751 (0.007)	0.710 (0.006)	0.706 (0.006)
Married	0.629 (0.008)	0.631 (0.009)	0.600 (0.009)	0.588 (0.008)	0.595 (0.008)	0.602 (0.008)	0.613 (0.008)	0.592 (0.008)	0.598 (0.008)	0.594 (0.006)	0.584 (0.007)
Education	12.134 (0.054)	12.403 (0.059)	12.464 (0.071)	12.883 (0.052)	12.930 (0.048)	13.081 (0.049)	13.145 (0.046)	13.304 (0.050)	13.273 (0.046)	13.416 (0.037)	13.495 (0.036)
Employed	0.673 (0.008)	0.625 (0.009)	0.679 (0.009)	0.657 (0.008)	0.680 (0.007)	0.704 (0.007)	0.717 (0.007)	0.711 (0.007)	0.698 (0.007)	0.677 (0.006)	0.658 (0.006)
Income	30.075 (0.847)	30.523 (1.175)	33.289 (2.654)	28.891 (0.983)	29.779 (1.674)	33.639 (2.442)	39.474 (2.027)	37.602 (1.786)	40.656 (2.728)	36.388 (1.698)	37.452 (2.145)
Networth	140.110 (14.275)	154.638 (19.617)	127.278 (26.858)	128.188 (12.989)	127.759 (14.049)	168.596 (18.310)	215.273 (17.735)	226.187 (20.015)	245.128 (24.176)	205.479 (17.869)	208.340 (19.692)
Insolvent	0.045 (0.003)	0.036 (0.004)	0.077 (0.005)	0.053 (0.004)	0.069 (0.004)	0.080 (0.004)	0.063 (0.004)	0.069 (0.004)	0.080 (0.004)	0.120 (0.004)	0.121 (0.004)
Behindpayments	0.122 (0.005)	0.098 (0.006)	0.161 (0.007)	0.119 (0.006)	0.161 (0.006)	0.157 (0.006)	0.136 (0.005)	0.161 (0.006)	0.201 (0.006)	0.172 (0.005)	0.147 (0.005)
Highleverage	0.154 (0.006)	0.110 (0.006)	0.167 (0.007)	0.206 (0.007)	0.166 (0.006)	0.179 (0.006)	0.162 (0.006)	0.173 (0.006)	0.190 (0.006)	0.207 (0.005)	0.204 (0.005)
Lowliquidity	0.655 (0.008)	0.608 (0.009)	0.619 (0.009)	0.619 (0.008)	0.633 (0.008)	0.599 (0.008)	0.590 (0.008)	0.609 (0.008)	0.592 (0.008)	0.623 (0.007)	0.618 (0.006)
Observations	3,806	2,793	3,041	3,710	4,060	4,061	4,236	4,321	4,225	6,152	5,752

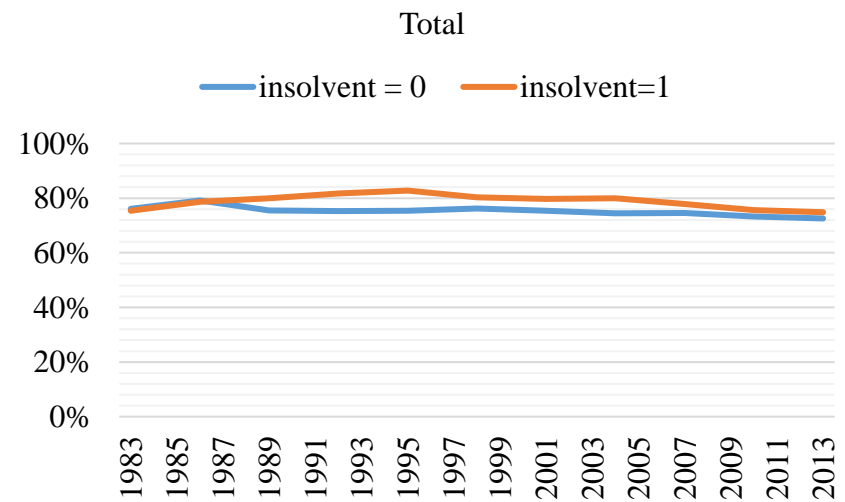
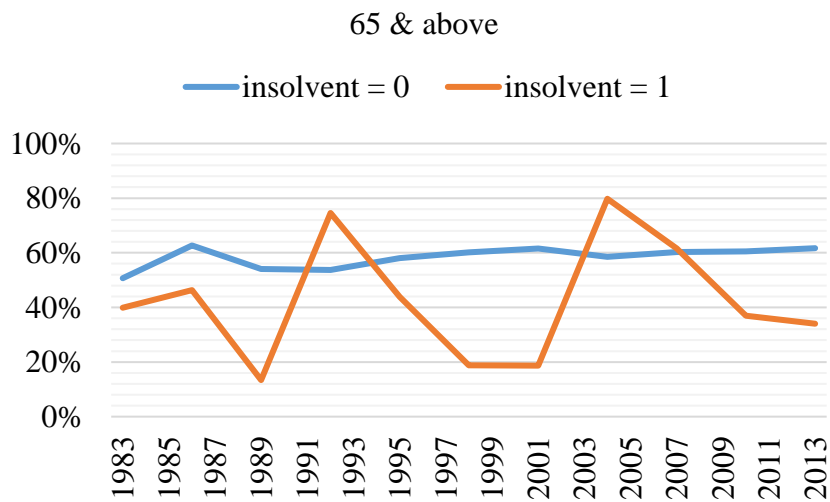
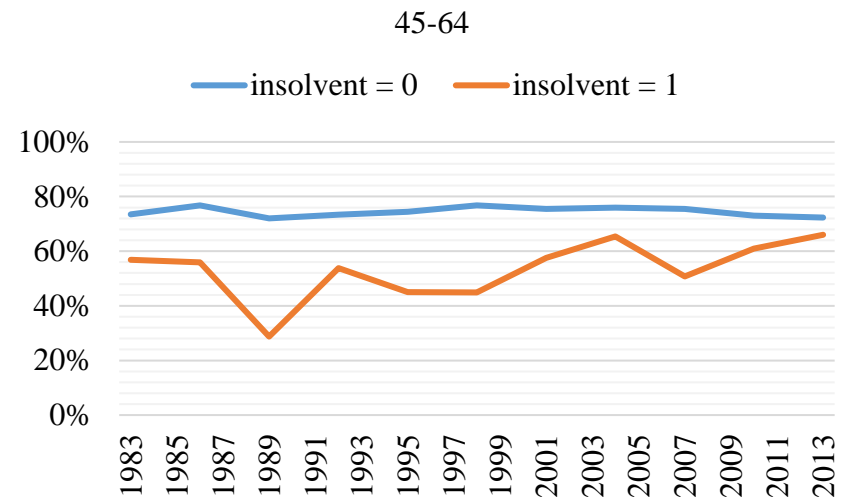
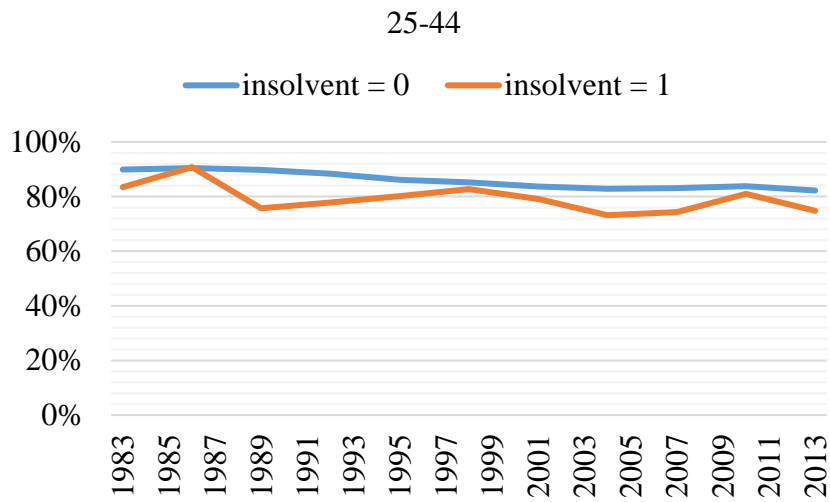


Figure 10. Proportion of Households With Excellent/Good Health by *Insolvent* Across Age Groups

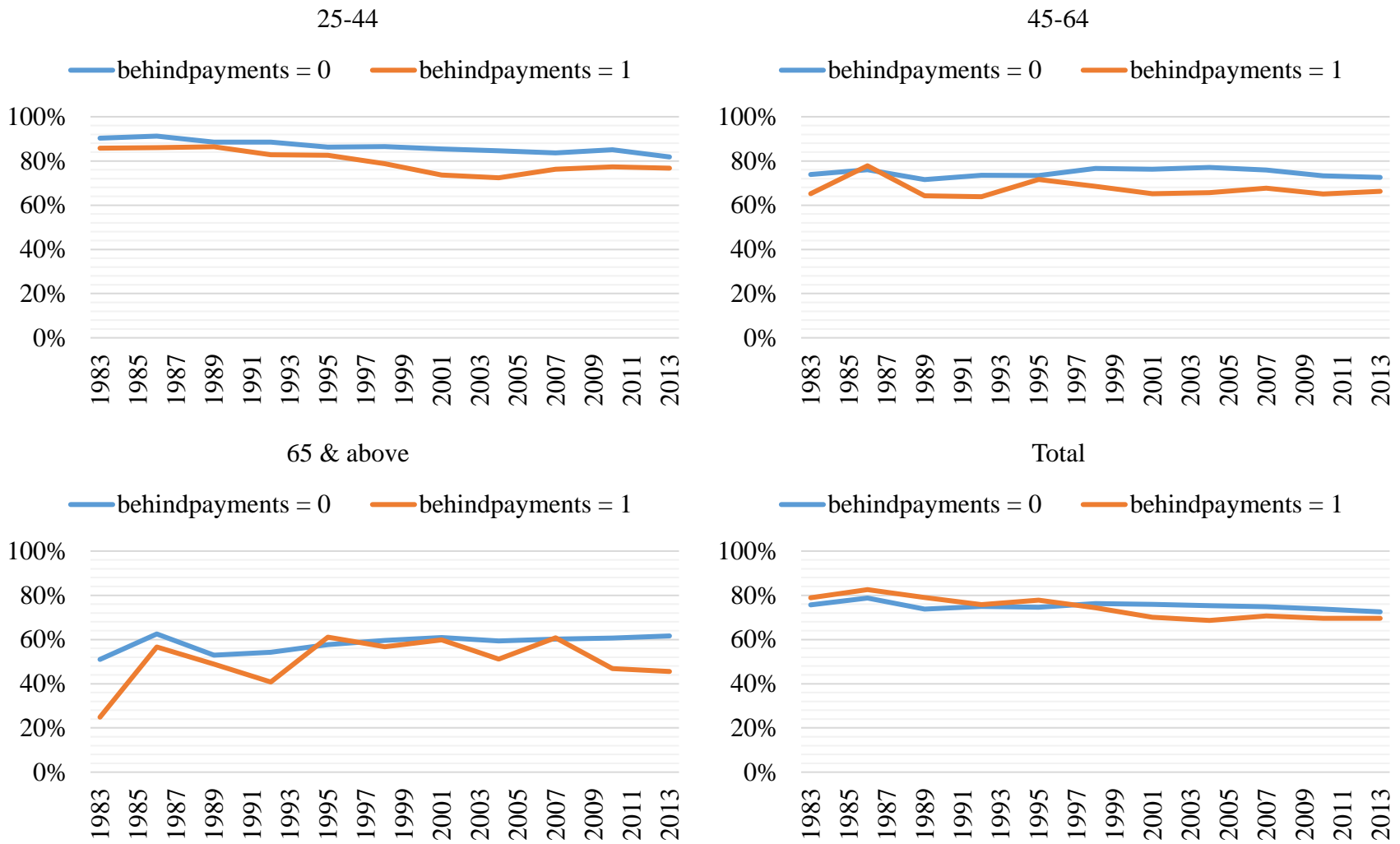


Figure 11. Proportion of Households With Excellent/Good Health by *Behindpayments* Across Age Groups

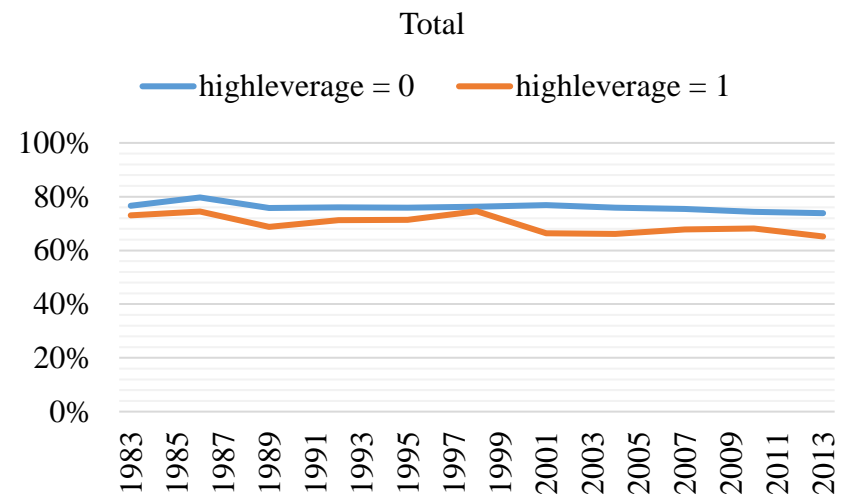
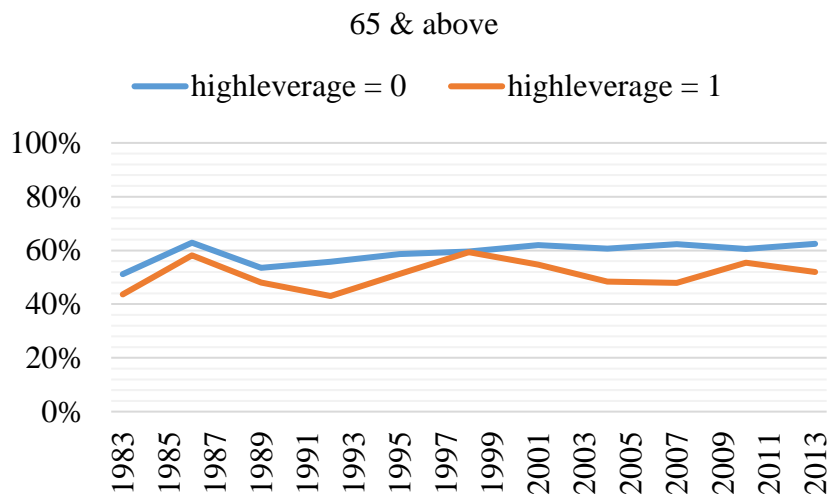
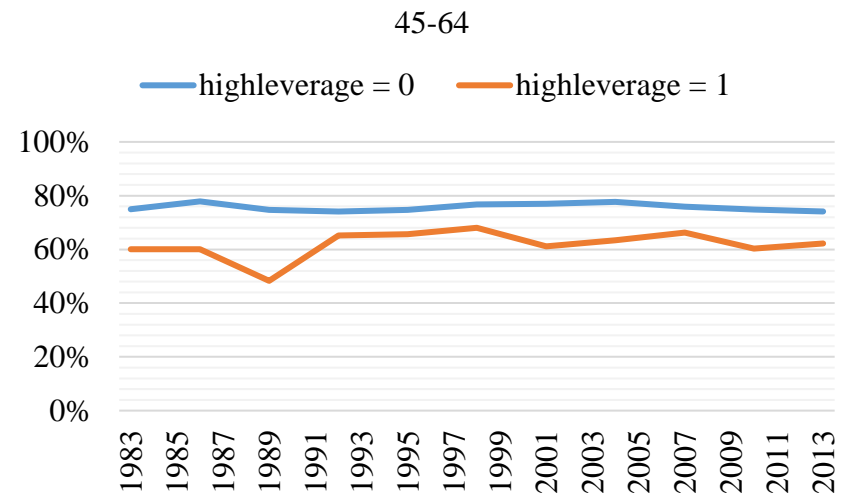
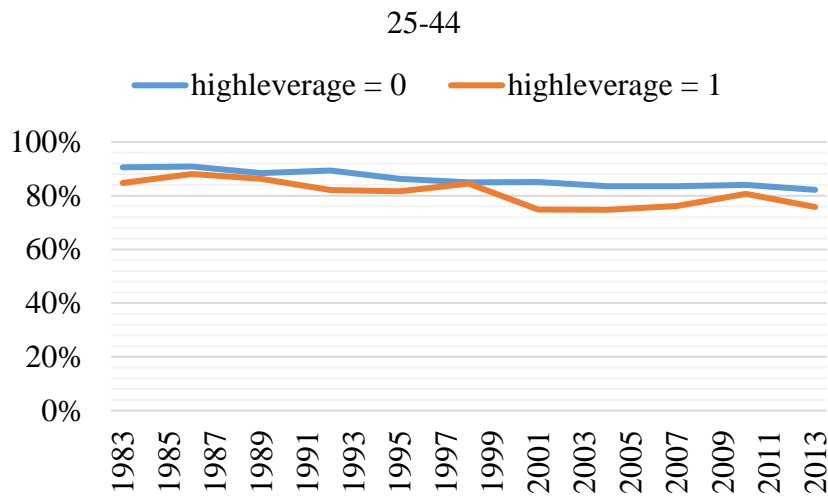


Figure 12. Proportion of Households With Excellent/Good Health by *Highleverage* Across Age Groups

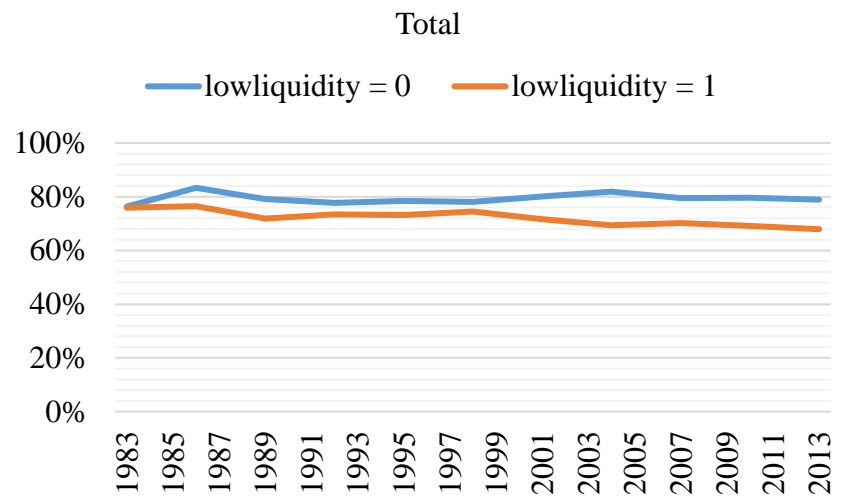
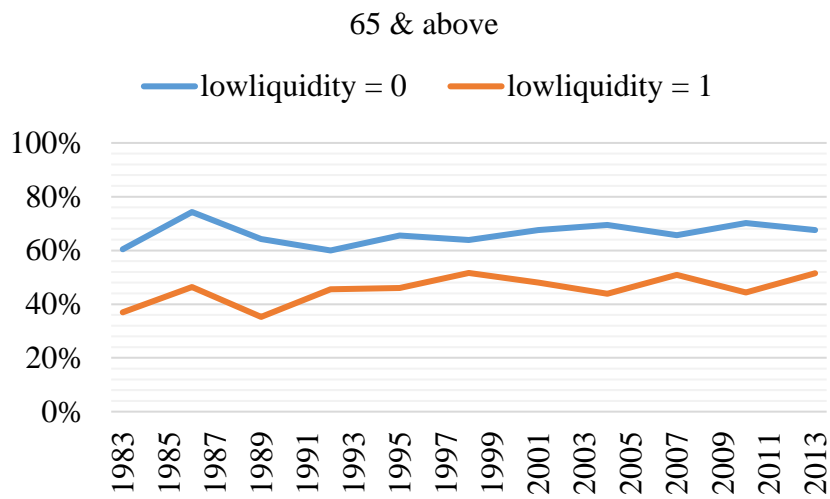
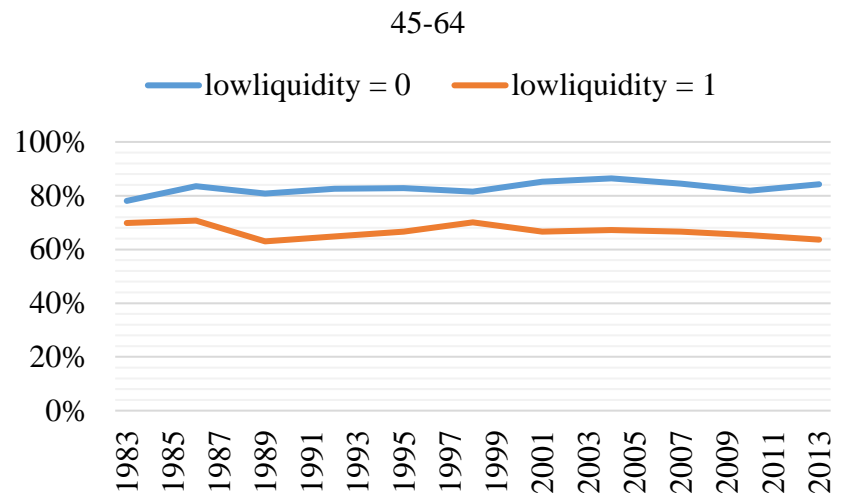
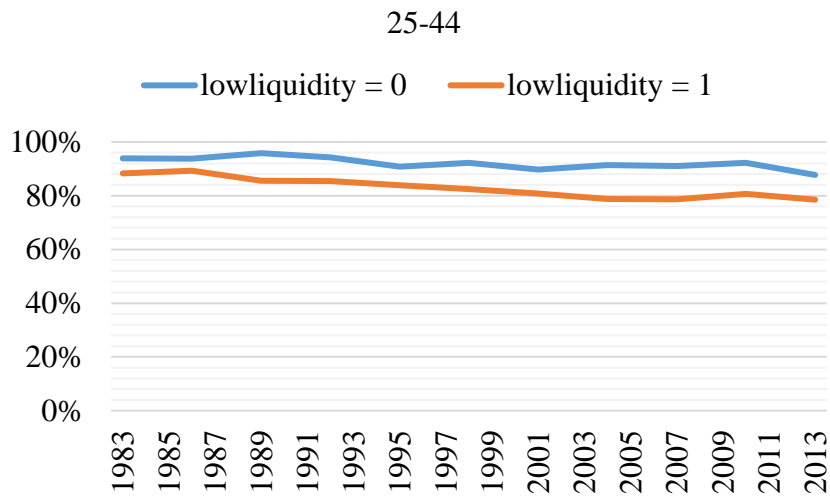


Figure 13. Proportion of Households With Excellent/Good Health by *Lowliquidity* Across Age Groups

liquidity problems, we see a notable decline, regardless of the age group they belong to. A similar *widening of the health gap* between indebted and not-indebted households can be observed for *behindpayments* and *highleverage* measures to a lesser extent in 1998 and onwards. Once other factors are taken into account, we suspect that this gap will not be statistically significant for these two measures.

Income Gradient of Indebtedness-Health Nexus

Figures 14-17 demonstrate the correlation between indebtedness and health status across 5 income quintiles and 4 different measures of indebtedness. The positive correlation between household income and health status is quite evident in every year. We are particularly interested in the relationship between indebtedness and the proportion of households with excellent/good health. For the first three definitions of indebtedness we see that the proportion is higher among the indebted households that are in the lowest income quintile. This indicates that for the poorest households, good health is only possible with indebtedness. This trend disappears as household climb up in the income ladder and can't be observed for *lowliquidity*. In regards to the health gap, we don't see a notable difference between insolvent and solvent households as well as households that are behind payments and those that are current. However, for the other two definitions of indebtedness, we see a widening of the gap 1998 onwards. It might not be a coincidence that households are affected significantly from indebtedness in a period of financial boom.

Net Worth Gradient of the Indebtedness-Health Nexus

Figures 18-20 demonstrate the correlation between indebtedness and health status across net worth quintiles and 3 different measures of indebtedness. The *insolvent* measure

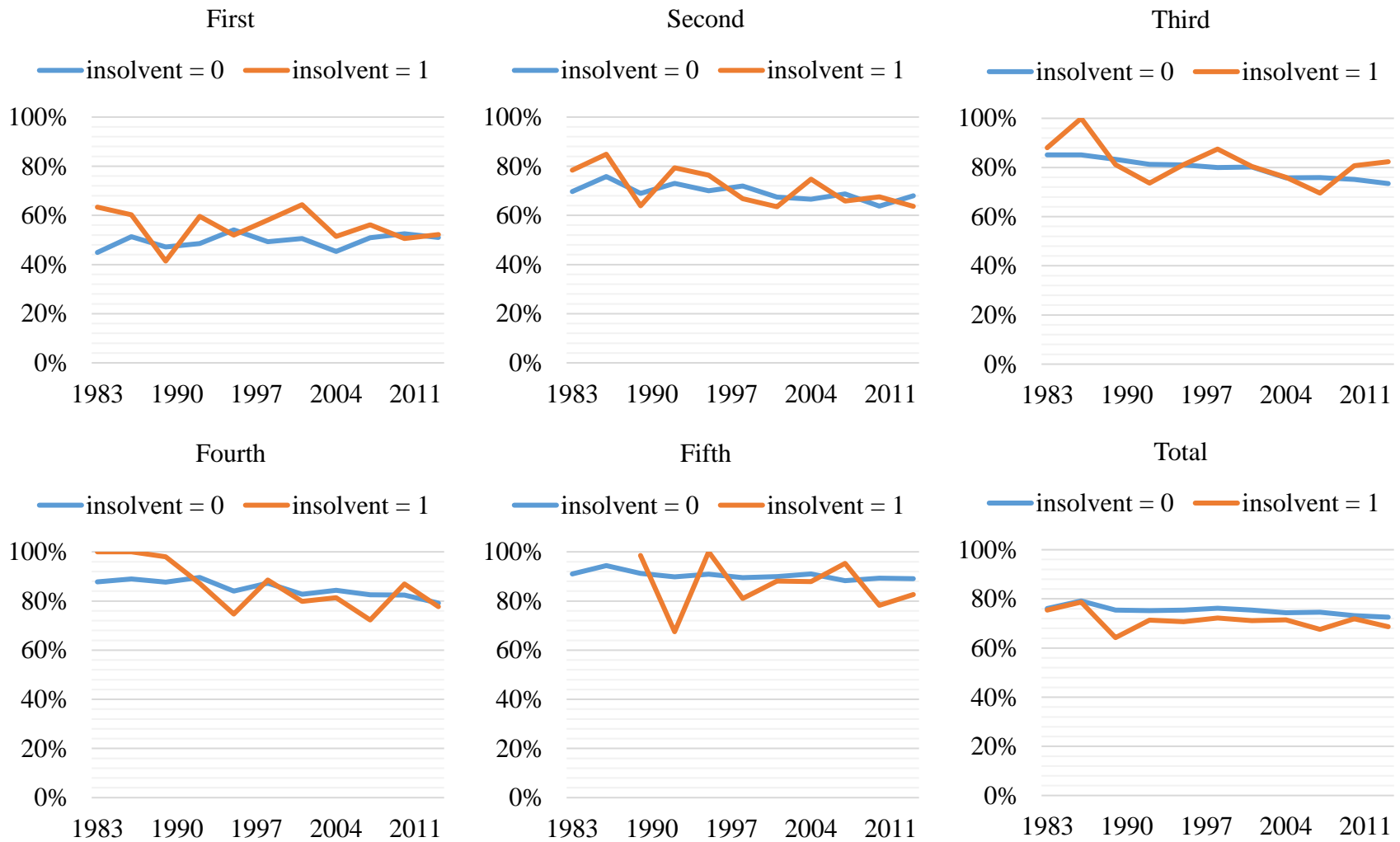


Figure 14. Proportion of Households With Excellent/Good Health by *Insolvent* Across Income Quintiles

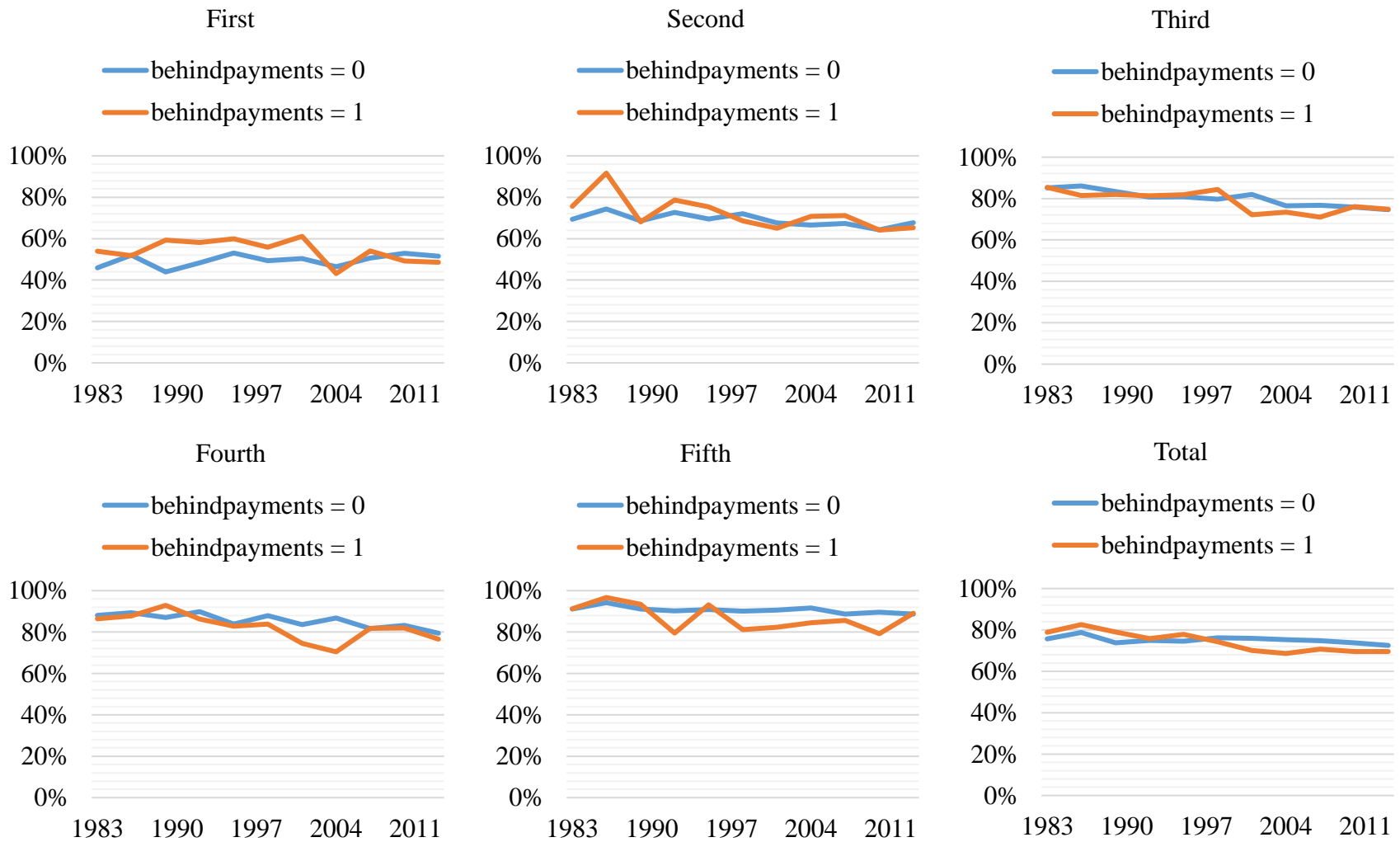


Figure 15. Proportion of Households With Excellent/Good Health by *Behindpayments* Across Income Quintiles

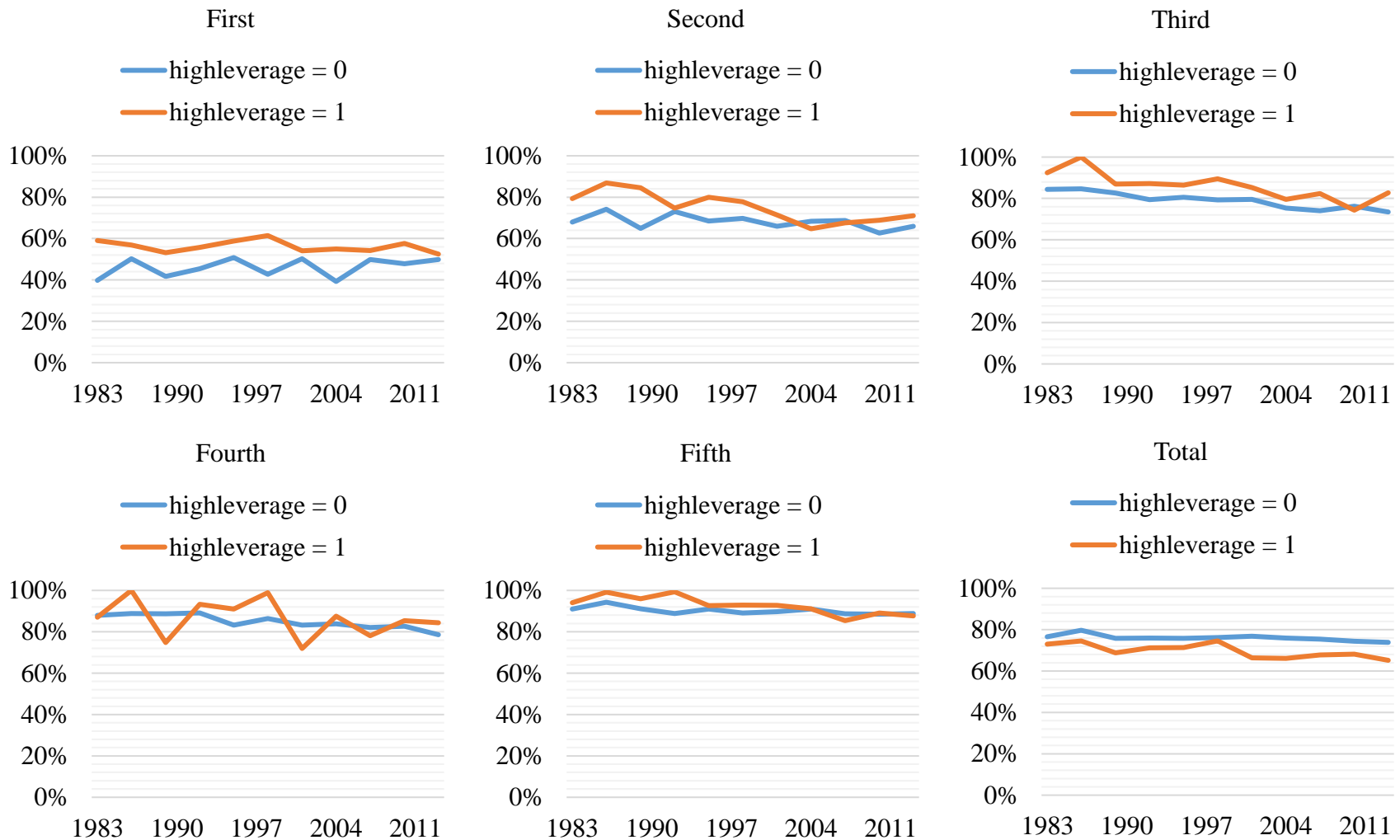


Figure 16. Proportion of Households With Excellent/Good Health by *Highleverage* Across Income Quintiles

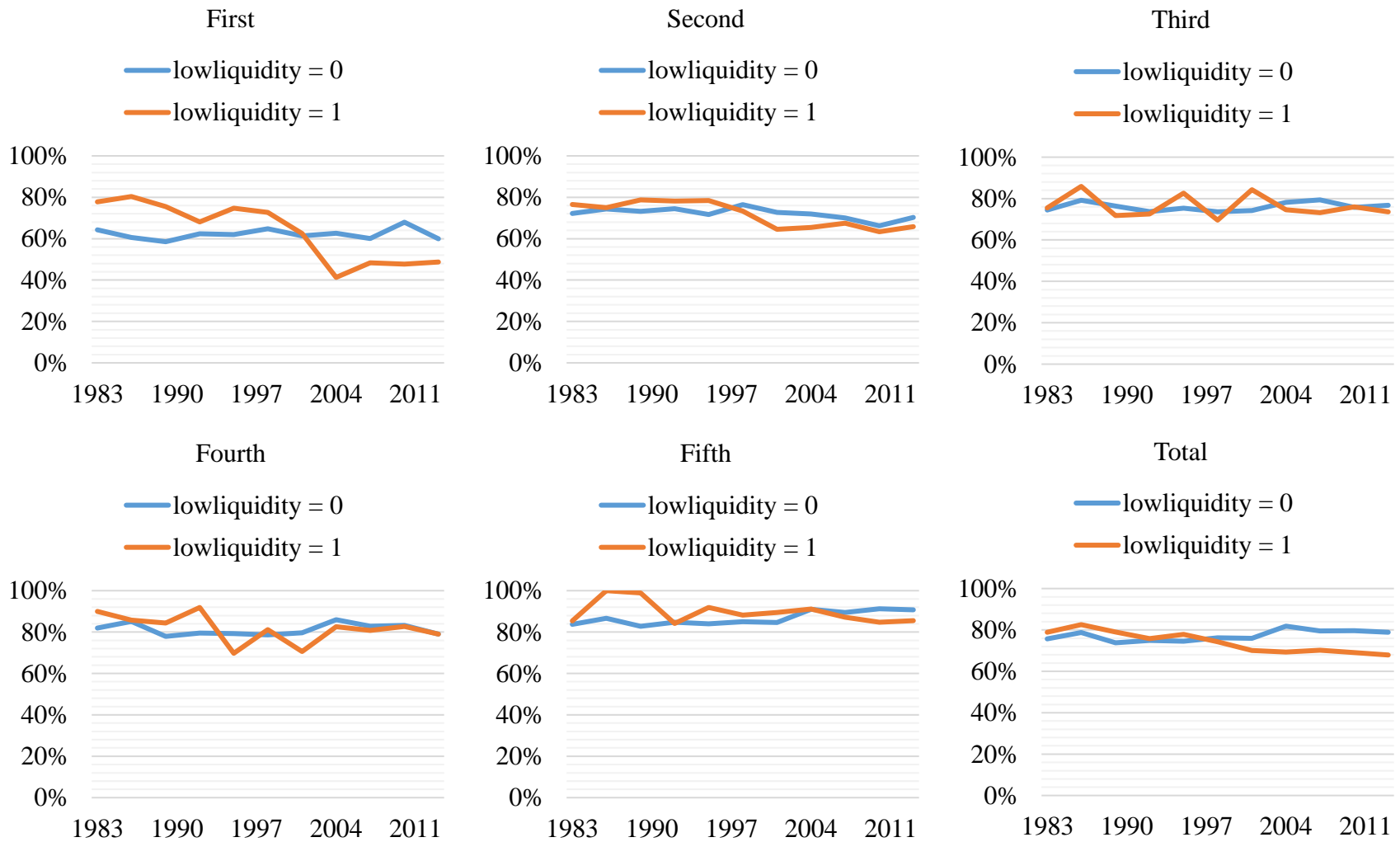


Figure 17. Proportion of Households With Excellent/Good Health by *Lowliquidity* Across Income Quintiles

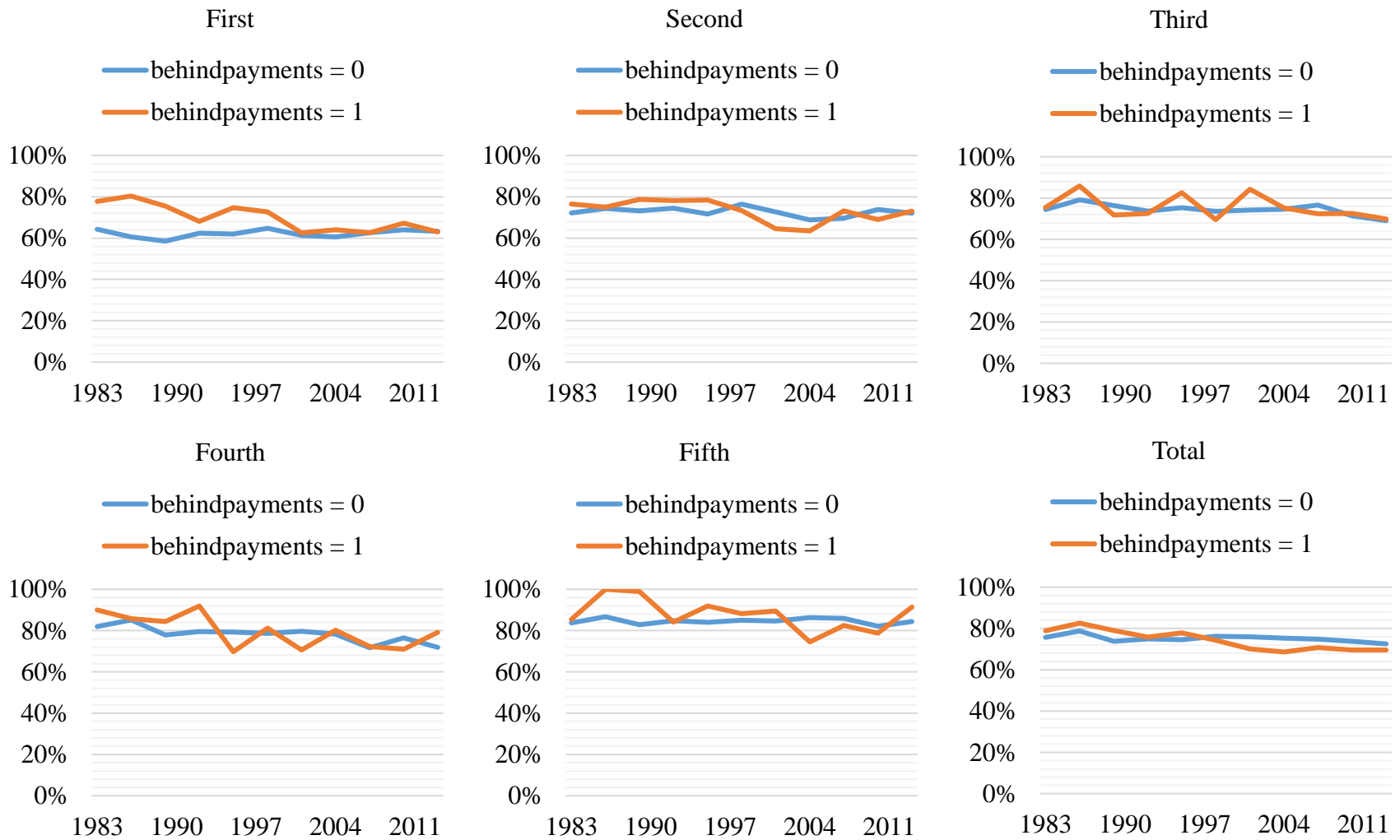


Figure 18. Proportion of Households with Excellent/Good Health by *Behindpayments* across Networth Quintiles

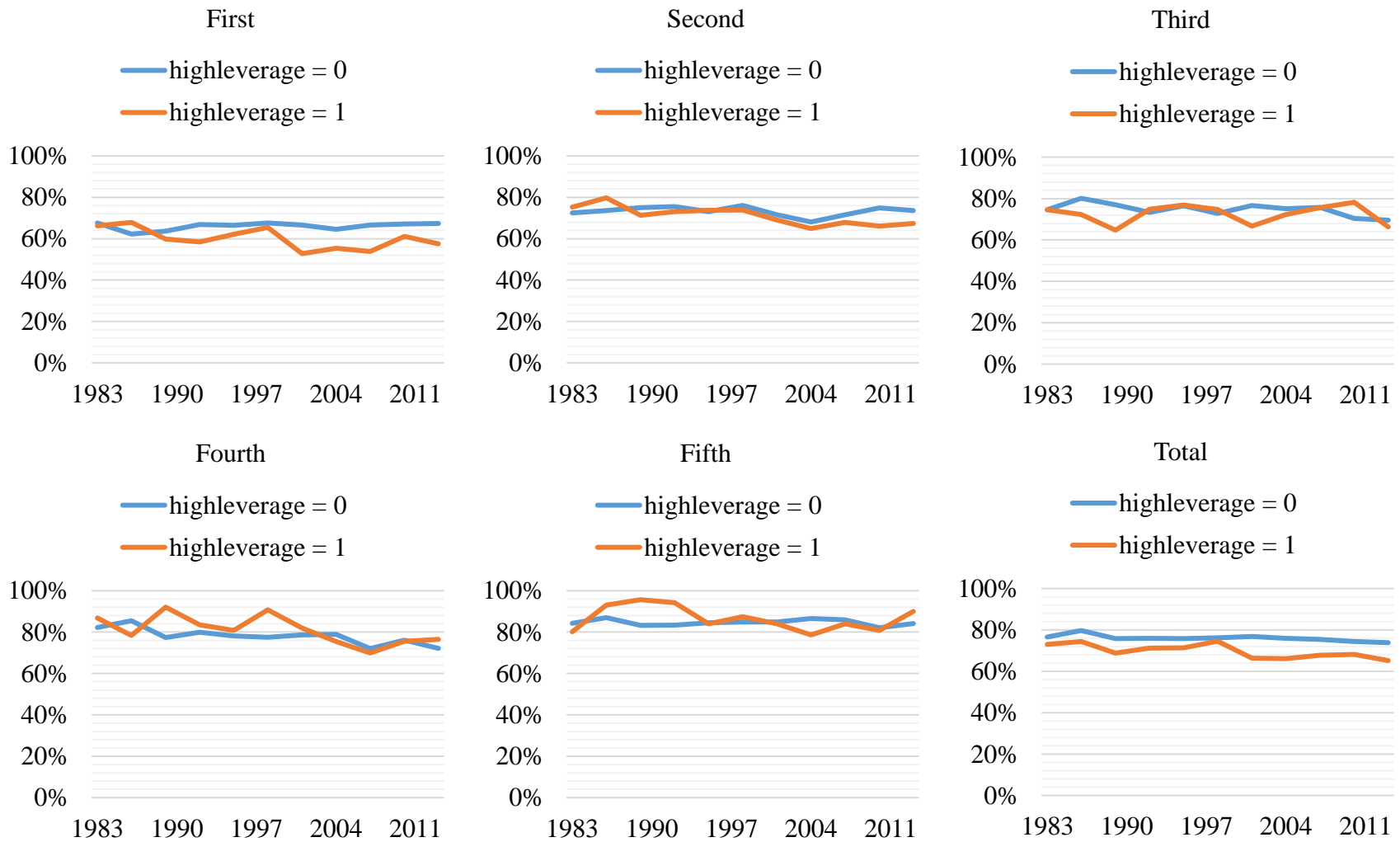


Figure 19. Proportion of Households With Excellent/Good Health by *Highleverage* Across Network Quintiles

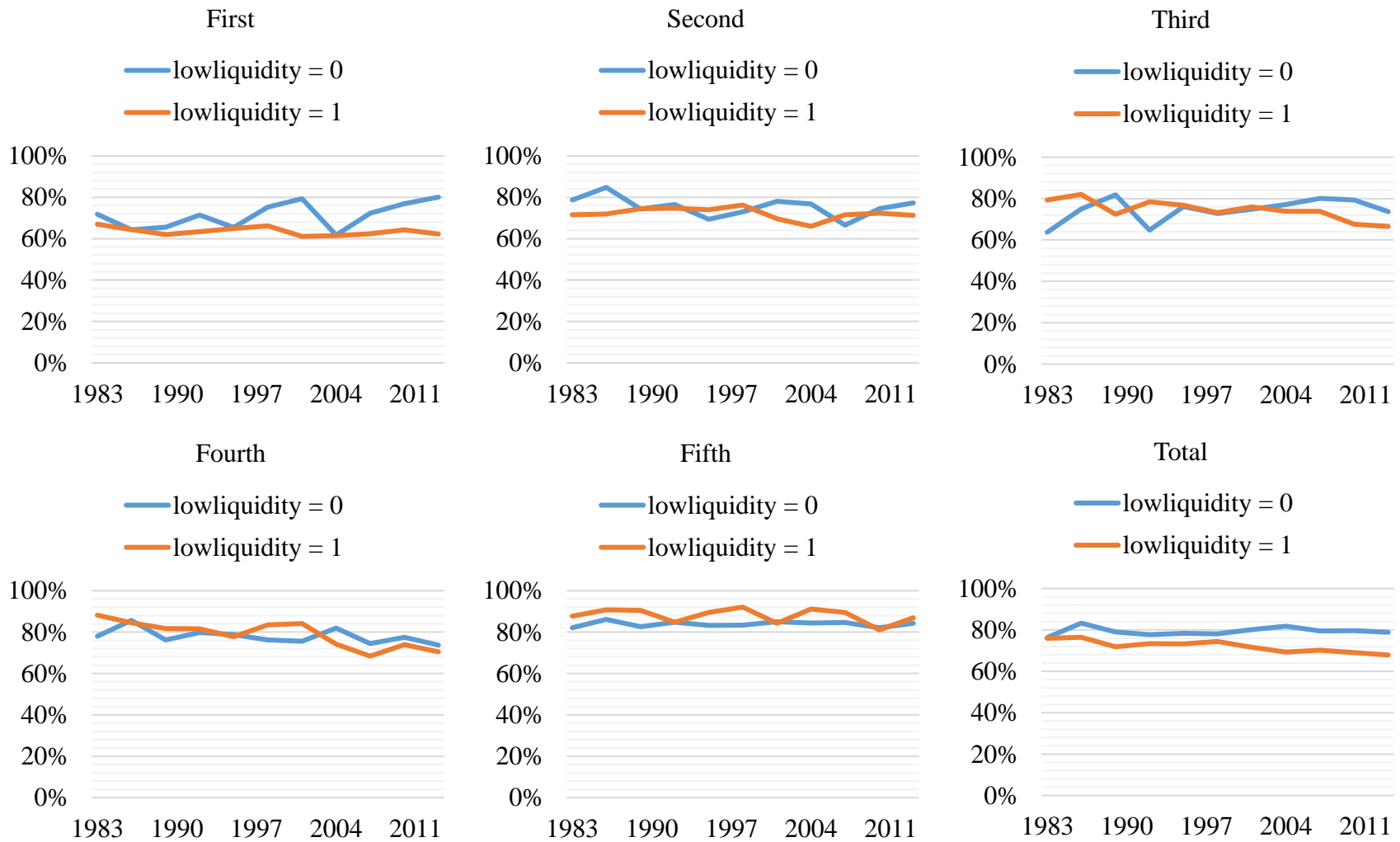


Figure 20. Proportion of Households With Excellent/Good Health by *Lowliquidity* Across Network Worth Quintiles

is omitted from these figures because of the direct collinearity between *insolvent* and *networth*.¹³ First thing to notice is the very gradual net worth gradient of household health status. Regardless of the indebtedness status, there are more households in the upper quintiles of the net worth distribution that report good health, but gradually so. For instance, the proportion of households with good health is virtually the same in any year for both the second and the third quintile households. Another noticeable trend is that only for the *lowliquidity* definition of indebtedness, we can observe the *widening health gap* after 1998, mostly due to the fact that health status of households in the lowest quintile with no liquidity problems improved compared to the ones with liquidity problems in that time period.

Estimation Results

Table 5 presents the results of the GLM estimation using Logit link function for all waves of the SCF. Four models are estimated using different measures of indebtedness.

Age is a significant predictor of health status. Higher age is associated with lower probability of reporting positive health status. This is confirming what Figures 10-13 already demonstrated: There is a negative correlation between age and health status that is consistent across all years.

White is also a strong predictor of the probability to report excellent/good health. White households are significantly more likely to report positive health status than non-White households. This result can be attributed to differences in health behaviors (healthy eating habits, regular exercise, alcohol and tobacco consumption, etc.) and health

¹³Households that are in lower quintiles of net worth distribution are almost exclusively insolvent.

Table 5. Results for GLM Estimation With Logit Link Function
(Dependent Variable: *Healthstatus*)

	Model 1	Model 2	Model 3	Model 4
Age	-0.014** (0.001)	-0.014** (0.001)	-0.013** (0.001)	-0.016** (0.001)
White	0.172** (0.026)	0.168** (0.026)	0.174** (0.026)	0.132** (0.026)
Married	-0.140** (0.026)	-0.131** (0.026)	-0.140** (0.026)	-0.122** (0.025)
Education	0.117** (0.004)	0.118** (0.004)	0.116** (0.004)	0.110** (0.004)
Employed	1.033** (0.028)	1.049** (0.028)	1.041** (0.028)	1.041** (0.028)
Income	0.020** (0.001)	0.020** (0.001)	0.020** (0.001)	0.022** (0.001)
Networth	0.002** (0.000)	0.002** (0.000)	0.002** (0.000)	0.000* (0.000)
Insolvent	0.253 (0.203)			
Behindpayments		-0.117 (0.128)		
Highleverage			0.109 (0.113)	
Lowliquidity				-0.189* (0.092)
1986	0.286** (0.061)	0.275** (0.063)	0.298** (0.065)	0.576** (0.107)
1989	-0.067 (0.061)	-0.145* (0.063)	-0.102 (0.064)	0.164 (0.103)
1992	-0.098 (0.058)	-0.104 (0.061)	-0.091 (0.064)	-0.007 (0.100)
1995	-0.090 (0.059)	-0.108 (0.062)	-0.108 (0.063)	0.121 (0.100)
1998	-0.126* (0.059)	-0.127* (0.062)	-0.196** (0.064)	-0.006 (0.099)
2001	-0.232** (0.060)	-0.204** (0.063)	-0.221** (0.065)	0.129 (0.102)
2004	-0.340** (0.057)	-0.295** (0.060)	-0.309** (0.063)	0.143 (0.102)
2007	-0.268** (0.058)	-0.272** (0.062)	-0.255** (0.062)	0.051 (0.100)
2010	-0.257** (0.057)	-0.247** (0.060)	-0.272** (0.062)	0.072 (0.100)
2013	-0.281** (0.057)	-0.290** (0.059)	-0.318** (0.061)	-0.063 (0.097)

Table 5. Continued

	Model 1	Model 2	Model 3	Model 4
Indebtedness#1986	-0.161 (0.283)	0.022 (0.194)	-0.130 (0.161)	-0.426** (0.128)
Indebtedness#1989	-0.742** (0.236)	0.143 (0.175)	-0.144 (0.148)	-0.417** (0.124)
Indebtedness#1992	-0.285 (0.258)	-0.088 (0.175)	-0.122 (0.141)	-0.150 (0.123)
Indebtedness#1995	-0.540* (0.242)	-0.106 (0.166)	-0.103 (0.144)	-0.341** (0.121)
Indebtedness#1998	-0.533* (0.238)	-0.195 (0.161)	0.109 (0.146)	-0.214 (0.120)
Indebtedness#2001	-0.436 (0.243)	-0.346* (0.160)	-0.203 (0.143)	-0.542** (0.123)
Indebtedness#2004	-0.361 (0.240)	-0.334* (0.153)	-0.255 (0.138)	-0.649** (0.121)
Indebtedness#2007	-0.549* (0.232)	-0.113 (0.155)	-0.262 (0.138)	-0.459** (0.119)
Indebtedness#2010	-0.394 (0.225)	-0.179 (0.151)	-0.099 (0.135)	-0.463** (0.119)
Indebtedness#2013	-0.461* (0.222)	-0.175 (0.153)	-0.057 (0.133)	-0.331** (0.116)
Constant	-0.775** (0.087)	-0.743** (0.089)	-0.800** (0.090)	-0.359** (0.110)
Observations	46,157	46,157	46,157	46,157

Standard errors in parentheses
** $p < 0.01$, * $p < 0.05$

environments (neighborhood factors such as accessibility of healthy food, air and water quality, etc.). Another strong predictor of household health is employment. Being employed, whether full-time or part-time, has a positive impact on the probability of household health. Besides increasing purchasing power of households (which is controlled through *income*), employment can have a positive impact on health by providing household with low-cost, employer offered health insurance. However, there is an even more important possible effect of employment on household health by increasing psychological wellbeing of the employed (Ross & Mirowsky, 1995). However, it is also possible that this positive correlation is simply due to the selection of healthy households to find and keep jobs.

Education is another positive factor determining household health. Better educated households have a higher probability of reporting positive health status. Also, education is the only control factor that might have relevance to health behaviors. Earlier we discussed how health behaviors play a mediating role in the relationship between indebtedness and physical health. Education, because of its direct effect on household choices, is capturing some of the behavioral aspect of the household health. However, there is still a big portion of health behaviors that can't be explained with years of education that might be linked to financial strain. Unfortunately, SCF doesn't collect information on health behaviors that is consistent across waves.¹⁴

Income and *networth* are both significant predictors of household health. Overall, these results are in accord with the SES-Health literature, which mostly finds a positive

¹⁴There is a question in the SCF about whether or not household head is a smoker, which has been asked since 1995.

association of household health with SES.

Testing Hypothesis 1

Neither of the indebtedness measures, except *lowliquidity*, is significantly associated with *healthstatus*. *Lowliquidity*, on the other hand, is negatively associated with household health. We find partial support for the first hypothesis that is not robust for different measures of indebtedness.

Testing Hypothesis 2a

In the first three models, the interaction of indebtedness measures and year dummies are mostly insignificant for the first three models. This was expected after seeing how indebtedness measures were not significantly associated with *healthstatus* in those three models. However, in Model 4, we see mostly significant coefficients for the interaction terms. This indicates a statistically significant change in the effect of *lowliquidity* on *healthstatus* from the base year of 1983.

To put things in perspective, we calculated the contrast of predictive margin in each year to the predictive margin in the previous year. Table 6 demonstrates the results. Negative values mean in that year, the negative effect of indebtedness on the probability of success (reporting excellent/good health) is stronger compared to the previous year. There are only five instances the contrast is significant. The first couple are in Model 1 between 1986 and 1989, and between 1989 and 1992, the latter of which is positive. This means that the marginal effect of insolvency on the probability of reporting positive health is smaller in 1992 than it is in 1989. Given the fact that the effect of insolvency was not significant in any year, this result doesn't mean much. In addition, contrast of the years

Table 6. Contrast of Predicted Margins for the Probability of Having Positive Health when *Indebtedness* = 1

	Model 1	Model 2	Model 3	Model 4
1986 vs 1983#indebtedness	-0.161 (0.283)	0.022 (0.194)	-0.130 (0.161)	-0.426 (0.128)
1989 vs 1986#indebtedness	-0.581* (0.233)	0.121 (0.190)	-0.014 (0.151)	0.009 (0.123)
1992 vs 1989#indebtedness	0.457* (0.201)	-0.230 (0.164)	0.022 (0.128)	0.267* (0.117)
1995 vs 1992#indebtedness	-0.255 (0.207)	-0.018 (0.167)	0.019 (0.124)	-0.191 (0.114)
1998 vs 1995#indebtedness	0.007 (0.181)	-0.089 (0.145)	0.212 (0.131)	0.127 (0.112)
2001 vs 1998#indebtedness	0.097 (0.184)	-0.151 (0.141)	-0.312* (0.127)	-0.328** (0.113)
2004 vs 2001#indebtedness	0.076 (0.186)	0.013 (0.130)	-0.051 (0.119)	-0.108 (0.114)
2007 vs 2004#indebtedness	-0.188 (0.172)	0.221 (0.118)	-0.008 (0.114)	0.190 (0.109)
2010 vs 2007#indebtedness	0.155 (0.149)	-0.066 (0.120)	0.163 (0.110)	-0.005 (0.108)
2013 vs 2010#indebtedness	-0.067 (0.132)	0.004 (0.118)	0.042 (0.104)	0.133 (0.104)
Standard errors in parentheses ** $p < 0.01$, * $p < 0.05$				

2001 and 1998 is significantly negative, indicating a larger negative effect of *highleverage* on *healthstatus* in 2001. Finally, in Model 4, the contrasts of 1992-1989 and 2001-1998 are significant, the former of which is positive. These contrasts are meaningful because the effect of *lowliquidity* on *healthstatus* was significant in these years (see Table 5). The contrast between 2001 and 1998 especially indicates a significant short-term shift in the correlation between indebtedness and household health. What is interesting is that the most important economic recession since the Great Depression had no significant impact on this correlation based on the contrast between 2010 and 2007. Nevertheless, these results support Hypothesis 2a claiming a change in the marginal effect of indebtedness on household health.

Testing Hypothesis 2b

In all models, the 1986 dummy has a significant positive coefficient, which indicates an upward shift of the correlation between *healthstatus* and all explanatory variables. From 1989 to 1995, year dummies have insignificant coefficients in all models. 1998 onwards, year dummies have significant negative coefficients in the first three models. In Model 4, year dummies remain insignificant. To see if there is a short-term structural shift of the intercept across years, the contrasts of predicted margins between two consecutive years are presented in Table 7. Except the positive shift from 1983 to 1986 and then a negative shift from 1986 to 1989, there is no significant change in the regression intercept in any other year. There is evidence to support Hypothesis 2b, which was similar

Table 7. Contrast of Predicted Margins Between Years for the Probability of Having Positive Health

	Model 1	Model 2	Model 3	Model 4
1986 vs 1983	0.274** (0.060)	0.278** (0.060)	0.275** (0.059)	0.315** (0.060)
1989 vs 1986	-0.397** (0.058)	-0.402** (0.059)	-0.402** (0.058)	-0.406** (0.058)
1992 vs 1989	0.003 (0.053)	0.007 (0.054)	0.015 (0.054)	-0.007 (0.053)
1995 vs 1992	-0.011 (0.053)	-0.007 (0.053)	-0.013 (0.053)	0.011 (0.053)
1998 vs 1995	-0.035 (0.052)	-0.033 (0.052)	-0.051 (0.052)	-0.049 (0.053)
2001 vs 1998	-0.099 (0.053)	-0.099 (0.053)	-0.080 (0.053)	-0.067 (0.053)
2004 vs 2001	-0.102* (0.051)	-0.090 (0.051)	-0.098 (0.052)	-0.052 (0.052)
2007 vs 2004	0.057 (0.049)	0.057 (0.050)	0.053 (0.050)	0.025 (0.051)
2010 vs 2007	0.023 (0.049)	0.015 (0.050)	0.012 (0.050)	0.018 (0.050)
2013 vs 2010	-0.029 (0.048)	-0.043 (0.047)	-0.039 (0.048)	-0.053 (0.048)

Standard errors in parentheses

** $p < 0.01$, * $p < 0.05$

to Ruhm's conclusion that the economic recessions have a positive effect on household health.

Conclusion

This study contributed to the literature on the relationship between indebtedness and household health by looking at the issue from a more historical viewpoint, which was lacking in other studies. U.S. households that are living longer are reporting better health, while the younger households are reporting worsening health. Therefore, aging can't be an explanation for the worsening health of U.S. adults that are below 65 years of age. Deterioration of SES might be another explanation, in which indebtedness plays an important mediating role.

The statistical evidence in this study is based on 11 waves of the SCF since 1983. Using multivariate analysis, we tried to demonstrate the association between indebtedness and household self-reported health status. There are four different measures of indebtedness used: Financial insolvency, falling behind loan payments, high financial leverage, and low liquidity. Age, marital status, race, education and employment status of the household head as well as family income and assets are controlled.

Three claims were tested in this study. First and foremost, we investigated whether indebtedness is associated with worsening household health status. We found evidence that households with low liquidity (liquid assets/monthly gross income < 1) are less likely to report excellent/good health as their health status. This gives partial support to the first hypothesis. Next, we wanted to see if there has been a change in the marginal effect of indebtedness on household health by looking at the interaction of indebtedness variables and year dummies. For Model 4, interaction terms are mostly significant across years, with

exceptions in two years. However, interaction terms compare each year to 1983, the base year. To better see the change between two consecutive years, we calculated the contrast of predicted margins between two consecutive years and identified a significant change in the marginal effect of indebtedness in 2001 for Model 4. These results confirmed our second hypothesis. Finally, we tested whether there has been an overall shift in our regression equations across years, which we expected to be positive in recessionary years following Ruhm's findings. However, we failed to identify any significant shift in recession years to support this last hypothesis.

One of the determinants of physical health that wasn't mentioned in this study is health behaviors. Unfortunately, SCF doesn't collect any information regarding health behaviors of households. However, from an earlier discussion made in this study, we know that indebtedness can have huge impacts on health behaviors. Also, it is difficult to assess the causality between indebtedness and health in this study, which can run both ways. A clear assessment of the causality can be possible using a longitudinal dataset that gathers information on acute health events and the impact of those events on households' employment status and finances.

DOES STUDENT LOAN DEBT AFFECT BORROWING BY YOUNG HOUSEHOLDS?

Since 2010, student loan debt has become the second largest category of debt burden households carry in the United States (see Figure 21). Especially after the Great Recession, researchers have grown increasingly interested in the effects of this growing burden of student loan debt on households' finances. One important pattern identified by researchers is that young adults have become less likely to purchase a home. Overall, homeownership rates are at a historical low according to U.S. Census Bureau data.¹⁵ Since the majority of new homebuyers are young adults between the ages of 24 and 35, their reluctance to *buy in* is an obstacle to housing market growth.

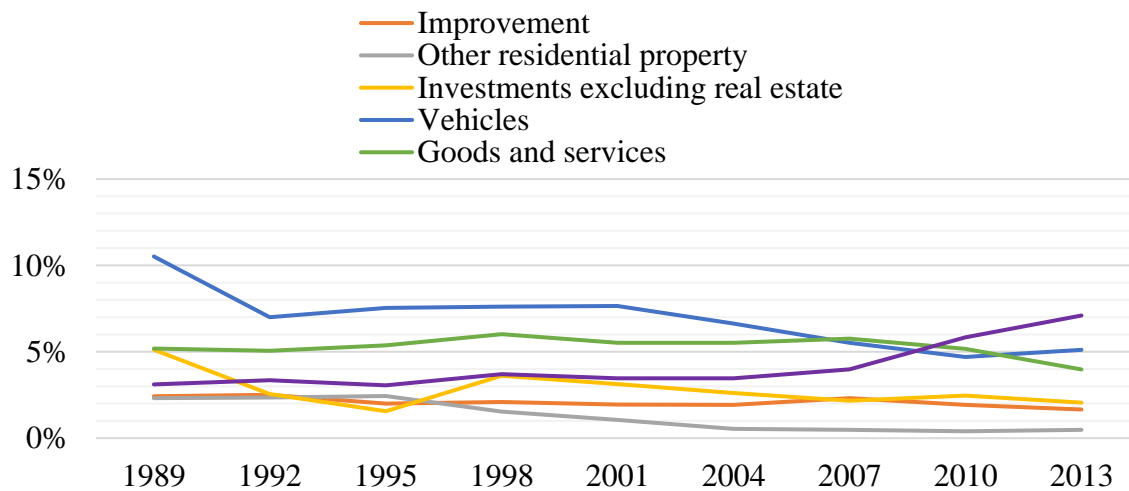


Figure 21. Different Types of Debt (% of Total Debt)
*SCF, 1989-2013

¹⁵<http://www.census.gov/housing/hvs/data/charts/fig07.pdf>

The results of a FRBNY (*Federal Reserve Bank of New York*) study have stirred this discussion recently. Brown and Caldwell (2013) found that young adults with existing student loan debt are “retreating from housing and auto markets” when they analyzed the FRBNY Consumer Credit Panel. They conclude: “Now, for the first time in at least ten years, thirty-year-olds with no history of student loans are more likely to have home-secured debt than those with a history of student loans.” The finding that makes them reach this conclusion is summarized in Figure 22. Although the conclusion they reached is somewhat striking, their methodology and data have come under criticism. An important drawback of their methodology is clearly the lack of multivariate analysis that would allow them to control for variables that might be the cause of discrepancy in homeownership between student debtors and nonstudent debtors. The CCP (*Consumer Credit Panel*) is to blame for the lack of multivariate analysis due to its limited scope regarding the demographic characteristics of the sample. In the CCP, homeownership is deduced by the

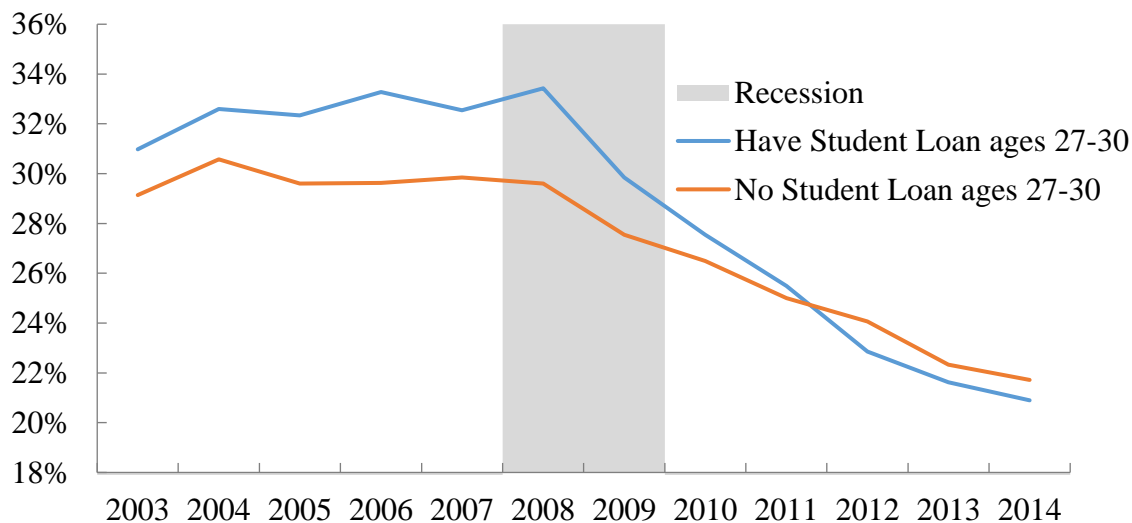


Figure 22. Proportion of Young Households With Home-Secured Debt at Age 30

*FRBNY Consumer Credit Panel/Equifax

**Taken from Brown et al. (2015) with minor format changes.

existing mortgage debt, which overlooks homeowners with no outstanding mortgage debt

(Cooper & Wang, 2014). Similarly, it is hard to infer the differences between college graduates and college nongraduates in the CCP because college education is deduced only through existing debt on student loans (Fry, 2014).

This study takes on the issue of young adults' retreat from the housing and auto markets from a different perspective. Instead of trying to establish a correlation and causality between homeownership and student loan debt of young households, which has been the common approach in the literature, this study will attempt to reveal the connection between student loan debt and young households' access to credit markets. Two important questions will be investigated in this research. The first question is: "Are young households with existing student loan debt more likely to be turned down in credit applications than similar households with no student loan debt?" The second question is: "Are young households with existing student loan debt more likely to be discouraged to apply for credit than households with no student loan debt?" Answers to these two questions will shed light on the possible reasons why young households with student loan debt might be retreating from auto and housing markets.

This study is unique both in its approach and its methodology. First of all, it is the first study in the literature that defines the credit approval process as a two-step process, which involves a demand decision (the decision to apply) and a supply decision (the decision to lend). Second, because of this two-step process, this study is the first study to use a Probit selection model for credit rationing of young households.

Literature Review

The studies on the correlation between student loan debt and young households' financial outcomes, such as homeownership, can be divided into two categories. The first

category is the *comparison approach*. Studies under this category make comparisons of the financial outcomes between student loan borrowers and nonborrowers (or borrowers with no existing balance). Brown and Caldwell (2013) serves as an example of these studies. Fry (2014) also makes a comparison using the SCF (*Survey of Consumer Finances*) and finds no significant differences in asset holdings between households with existing student loan debt and households without any student loan debt when he controls for the college degree of a household head. Brown et al. (2015) is another example of studies with a comparative approach and shares similar results with the Brown and Caldwell study as well as the same dataset. Akers (2014), on the other hand, uses SCF data and disagrees with Brown and Caldwell's conclusions. She concludes that the discrepancy in homeownership rates between households with student loan debt and without it disappears once the comparison is made according to having a college degree. An earlier study by Luong (2010) makes a comparison of student loan borrowers and nonborrowers in Canada, using a generalized linear model and two different datasets, namely the *Survey of Labor and Income Dynamics* (SLID) and the *Survey of Financial Security* (SFS). The conclusion of this study is that student loan borrowers with postsecondary education are less likely to have savings or financial investments or own their homes and tend to have a lower net worth than non-borrowers.

The second category of studies is the *control approach*. Studies in this category employ multivariate analysis to control for factors that are likely to influence whether or not a household will be financially delinquent. Some of these studies exploit panel data to establish not only correlation, but also causality between student loan debt and financial distress. Elliott and Nam (2013) use the SCF 2007-09 panel to find a significant correlation

between the 2009 networth of a household and student loan use of that household. Both the existence and the level of student loan debt in 2007 are significantly correlated with lower household net worth in 2009, when demographic variables are controlled. Two studies by Elliott et al. (2013a, 2013b) use the same methodology and data to find a negative association of student loan use with home equity and asset accumulation. Cooper and Wang (2014) look at PSID (*Panel Study of Income Dynamics*) and NEL88 (1988 *National Educational Longitudinal Survey*) data. The first part of their study actually falls under the comparison category because they compare student loan borrowers and nonborrowers in regards to their homeownership and wealth holdings using the PSID data. The second part falls under the control category, which uses the NEL88 data and various control factors to find the effect of student loan use on future homeownership. The results from both parts imply lower likelihood to own a home and build wealth for student loan users compared to nonusers, which doesn't vary much with the amount of time that has passed since a household head left school. Houle and Berger (2014) analyze the 1997 *National Longitudinal Study of Youth* (NLSY97) and finds that educational debt is negatively correlated with both homeownership and the level of mortgage debt. Some of the studies under the control approach use cross-section analysis such as Shand (2007), which uses the 2003 wave of the SCF, and Gicheva and Thompson (2015), which uses six waves of the SCF between 1995 and 2010. The former of these studies finds a negative and significant correlation between education loan debt and homeownership. The latter one looks at three different kinds of financial distress as well as homeownership. The results suggest education loan debt is associated with a higher probability of bankruptcy, late loan payments and being denied credit, the last two effects being insignificant. Moreover,

education loan debtors are less likely to be homeowners.

Methodology

There is somewhat of a consensus in the literature on the negative effects of student loan borrowing on households' financial outcomes, particularly their home ownership. However, there is little mention of what the causality could be between these variables. Is it because young households become more conservative under the load of existing debt that deters them from entering the housing market? Or is it rather because they are restricted in their ability to obtain enough credit due to their existing load of debt that prevents them from being a homeowner? These explanations are obviously not mutually exclusive and both might have an impact on households' decision making.

Hypothesis 1

The first hypothesis is: “*Ceteris paribus*, student loan debt has an independent and significantly positive effect on a young household's likelihood to be turned down in credit applications.”

In order to test the first hypothesis, the process of credit rationing has to be defined clearly. In the *Survey of Consumer Finances*, a credit-rationed household is defined as a household whose credit application was turned down due to various reasons. Therefore, for a household to be credit rationed, that household first needs to apply for credit. Getting credit is a two-step process. The first step is to decide whether to apply, and the second step is getting approved. Studies on household credit constraints that use SCF ignore this two-step nature of credit approval and estimate the following equation:

$$Y = \alpha X + \beta C + \varepsilon \quad (3)$$

Y is the outcome variable, which is observed as households that applied for credit, but were turned down. X is the vector of debt variables (student loan debt and other forms of debt), C is the vector of control variables, α and β are the corresponding vectors of coefficients and ε is the error term that includes unobserved determinants of Y . This equation assumes that applying for credit is a random event. However, the existence of unobservable factors that can directly influence the application decision can create a selection bias if those unobservables are also correlated with the likelihood of being credit rationed. Heckman (1979) provides unbiased estimators using a two-step technique when there is sample selection. Heckman's original contribution was estimating wage equations, which have a continuous dependent variable. Van de Ven and Van Praag (1981) uses Heckman selection in a probit model in which the outcome is a binary variable. To formulate simply:

$$Y = \alpha_1 X + \beta_1 C + \delta_1 A + \varepsilon \quad (4)$$

$$A = \alpha_1 X + \beta_1 C + \delta_1 A + \varepsilon \quad (5)$$

A is the selection outcome, which can be observed for households that applied for credit, Z is the vector of variables that are not correlated with Y directly but will influence households' decision to apply. Note that, unlike the original Heckman model, u and ε are both distributed with $N(0,1)$.

Hypothesis 2

The second hypothesis is: “*Ceteris paribus*, student loan debt has an independent and significantly positive effect on a young household's likelihood to be discouraged to apply for credit.”

This hypothesis can be tested by regressing being discouraged to apply for credit

(*discouraged*) on student loan debt together with independent variables. The probit model can be written as:

$$D = \alpha X + \beta C + \omega \quad (6)$$

$$\omega \sim N(0,1) \quad (7)$$

$D = 1$ for households that are discouraged to apply for credit (and 0 otherwise). X and C are control variables for financial and demographic determinants, and ω is the unobserved determinants of being discouraged (D).

Data

The source of data is the *Survey of Consumer Finances* (SCF). The SCF is normally a triennial survey sponsored by the Federal Reserve Board in cooperation with the Department of the Treasury. The data has been collected by NORC at the University of Chicago since 1992, but the first SCF was conducted earlier in 1983. The most recent wave of the SCF was completed in 2013. The particular wave we are interested in is the 2007 survey. Due to the financial recession that broke right after the 2007 wave, households that agreed were resurveyed in 2009. As a result, 89% percent (3,862) of households that were surveyed in 2007 (4,422) agreed to participate in the follow-up survey. 14.5% (561) of total households that participated in the panel were young adult households (age 24-35).

The advantages of the SCF Panel are twofold. First, SCF is the only dataset on household finances that provides detailed opinion variables such as attitudes toward borrowing as well detailed financial variables. Second, the panel nature of it allows researchers to establish a healthy causality between 2007 characteristics of households and 2009 outcomes. For instance, the only study that is similar in scope to this study in the literature is the work by Gicheva and Thompson (2015). This study uses six waves of the

SCF, which use different samples of households for every wave. This raises one important difficulty for establishing a healthy causality. Let's say we are looking at the 2007 wave of the SCF. The survey question for assessing whether or not a household is turned down for credit is: "In the past five years, has a particular lender or creditor turned down any request you or your (husband/wife/partner) made for credit, or not given you as much credit as you applied for?" If a household stated that they were turned down, it could be in the last few months or in the last few years. If this household has an existing debt on a student loan, this debt might or might not have existed before that credit application. It is hard to deduce if it was the existing burden of debt that might have caused being turned down for credit in the past.

The other advantage of the 2007-09 panel is in the way it asks the aforementioned survey question in 2009: "In the past two years, has a particular lender or creditor turned down any request you or your (husband/wife/partner) made for credit, or not given you as much credit as you applied for?" We therefore have information on student loan indebtedness in 2007 and denial of credit between 2007 and 2009. The panel nature of the data thus allows us to see whether the student loan debt precedes the denial of credit.

The most important difficulty in using the SCF for statistical inference is the large number of missing observations, especially the observations on nominal variables such as family income, debt and assets. Due to missing observations, SCF data is multiply imputed.¹⁶ Therefore, SCF data contains 5 different imputed values for nominal variables for the same household. If one doesn't take into account the imputed nature of the SCF

¹⁶For more information on the imputation of the 2007-2009 panel survey please refer to Kennickell (2011).

data, statistical software (STATA in this case) will treat 5 different imputates as 5 different observations (households) and the resulting estimators will be biased (Montalto & Yuh, 1998). To make healthy statistical inference, we need to find correct unbiased estimators and t values. For a probit model, we follow Montalto and Yuh (1998) to find the unbiased estimators and correct t values. All of the results presented later are already corrected for multiple imputation and therefore provide healthy statistical inference.

The other problem with SCF is called “sampling variability error” as pointed out earlier. Due to privacy concerns, SCF doesn’t release crucial details on households that are necessary for resampling. However, as an alternative, SCF publishes replicate weights for 1989 onwards. The user-written *scfcombo* macro for STATA allows researchers to control for both imputation error and sampling variance using replicate weights and all five imputates of observations. However, this macro doesn’t work with the estimation command *heckprobit* that is necessary to estimate the selection model. As a result, mean and coefficient standard errors are not corrected for sampling variance.

The other disadvantage of the 2007-2009 survey is its timing. A major financial recession restricted access to credit for many households because lenders were reluctant to lend in a tight credit market. This is expected to have a negative effect on credit approval rates for all the households. The difficulty is, it is not possible to assess whether or not the recession hit households in risk groups (low-income, low-asset, minority households) more than other households. If these households are affected more in their access to credit than other households, credit approval rates will be systematically lower for them when everything else is controlled.

The definitions of variables are given in Table 8. Descriptive statistics with respect

Table 8. Variable Descriptions

Crated	= 1 if a household applied for credit in 2007-09 and is either outright turned down for any amount or partially funded, = 0 otherwise.
Applied	= 1 if a household applied for credit in 2007-09, = 0 otherwise.
Discouraged	= 1 if a household thought of applying for credit in 2007-09 but didn't apply, = 0 otherwise
Household Income	Household income in 2007 (\$10,000)
Household Education Debt	Household education loan debt in 2007 (\$10,000)
Households With Education Debt	= 1 if a household has education loan debt in 2007, = 0 otherwise.
Household Other Debt	Household debt outstanding from loans other than education in 2007 (\$10,000)
Household Liquid Assets	Liquid household assets in 2007 (\$10,000)
Household Other Assets	Nonliquid household assets in 2007 (\$10,000)
Employed	= 1 if household head is either part-time or full-time employed in 2007, = 0 otherwise.
College Degree	= 1 if household head has some college degree, = 0 otherwise.
Age	Age of the household head in 2007.
White	= 1 if a household head is White in 2007, = 0 otherwise.
Married	= 1 if a household head is married in 2007, = 0 otherwise.
Household Had Fallen Behind Payments	= 1 if a household is behind 60+ days on any loan payment in 2007, = 0 otherwise.
Negative Attitude Towards Borrowing	= 1 if a household has negative attitude toward debt in 2007, = 0 otherwise.
Positive Attitude Towards Borrowing	= 1 if a household has positive attitude toward debt in 2009, = 0 otherwise.
Household Can Borrow \$3000+ In an Emergency	= 1 if a household has a family member or a friend that can assist them with \$3,000 or more in case of an emergency in 2007, = 0 otherwise.
Filed Bankruptcy	= 1 if a household filed a bankruptcy prior to 2007, = 0 otherwise.

to *rationed* and *discouraged* are presented in Table 9. To illustrate the correlation between student loans debt and these variables, we can look at the Figure 23, which only includes households headed by individuals between the ages 24-35 and that applied for a loan between 2007 and 2009. It is interesting to see that there is no significant systematic difference of student loan debt between credit-rationed households and the ones that are not rationed. In fact, credit-rationed households have slightly less education and other kinds of debt on average than nonrationed households. Similarly, the relationship between being discouraged to apply for credit and student loans debt is inverse: Young households with lower student loan debt and other kinds of debt in 2007 are more likely to be discouraged to apply for credit.

Results

Testing Hypothesis 1

Table 9 provides the summary statistics for the Probit Selection Model. Note that approximately 39% of the sample is censored (didn't apply for credit). Nearly 30% of those who applied were credit rationed. Also, only 34.4% of young households hold any student loan debt, which makes inclusion of education debt as a binary variable relevant. This sample is by no means a representative sample of young U.S. households. As a reference, individuals in the same age group from the 2007 IPUMS (Ruggles et al., 2015) sample had an average marriage rate of 52%, 73% of them are white, and 41.2% had some college degree including graduate and associate degrees.

Table 10 gives the results of analysis of credit rationing. Model 1 uses the continuous definition of the *educationdebt* variable, whereas Model 2 uses the binary definition which equals to 1 if a household carries some education loan debt. Not reported

Table 9. Descriptive Statistics by *Crated* and *Discouraged*

	Crated = 0		Crated = 1		Discouraged = 0		Discouraged = 1	
	Mean	Std. Error	Mean	Std. Error	Mean	Std. Error	Mean	Std. Error
Household Income	6.397	(0.785)	4.831	(0.448)	6.493	(0.521)	3.948	(0.203)
Household Liquid Assets	1.749	(0.397)	0.873	(0.322)	1.816	(0.279)	0.587	(0.207)
Household Other Assets	24.068	(4.505)	17.767	(8.076)	23.572	(3.299)	12.795	(5.233)
Household Education Debt	1.190	(0.167)	0.907	(0.230)	0.967	(0.124)	0.698	(0.126)
Households With Education Debt	0.413	(0.032)	0.288	(0.044)	0.347	(0.024)	0.338	(0.037)
Household Other Debt	9.917	(0.827)	8.454	(1.618)	10.084	(0.676)	5.874	(1.111)
Age	30.074	(0.209)	29.515	(0.341)	29.918	(0.169)	29.692	(0.282)
White	0.684	(0.030)	0.618	(0.048)	0.684	(0.023)	0.559	(0.039)
Married	0.684	(0.030)	0.712	(0.044)	0.661	(0.024)	0.660	(0.037)
College Degree	0.467	(0.032)	0.263	(0.043)	0.471	(0.025)	0.188	(0.031)
Employed	0.938	(0.016)	0.863	(0.034)	0.897	(0.015)	0.886	(0.025)
Negative Attitude Towards Borrowing	0.367	(0.031)	0.240	(0.042)	0.337	(0.024)	0.348	(0.037)
Positive Attitude Towards Borrowing	0.304	(0.030)	0.304	(0.045)	0.291	(0.023)	0.330	(0.037)
Household Can Borrow \$3000+ In an Emergency	0.758	(0.028)	0.572	(0.049)	0.700	(0.023)	0.600	(0.039)
Filed Bankruptcy	0.082	(0.018)	0.148	(0.035)	0.063	(0.012)	0.144	(0.028)

Notes: Mean and standard errors are estimated using five imputates and analytical weights for the sample

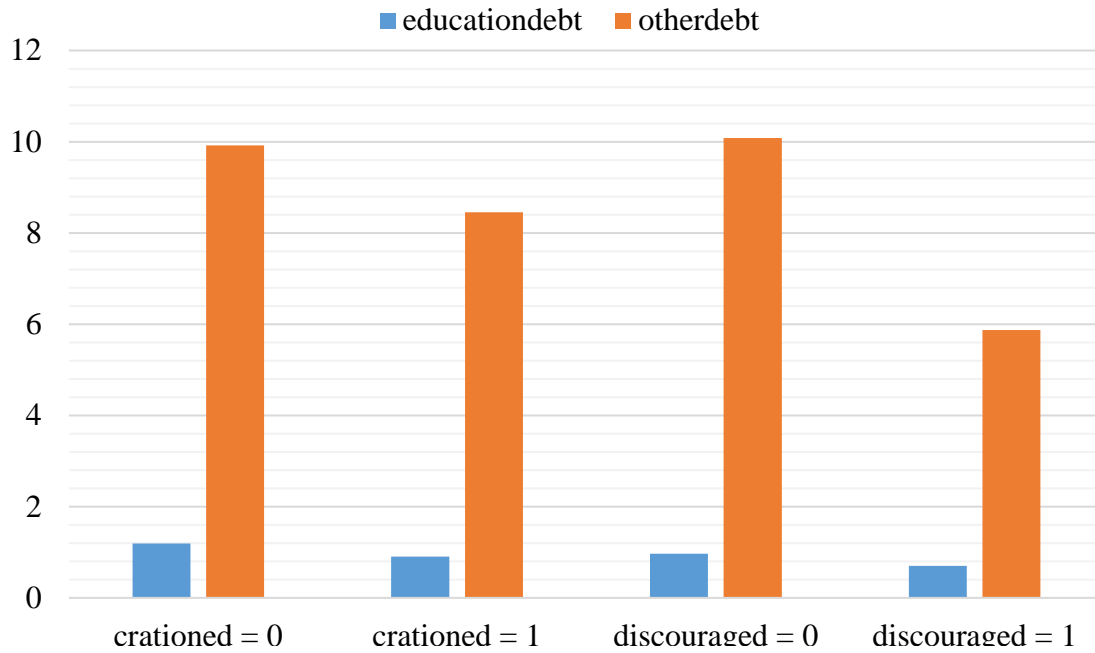


Figure 23. Education and Other Debts of Young Households in 2007 by *Crated* and *Discouraged* (\$10,000 Current)

*SCF, 2007-2009 Panel

**Analytical sample weights and five imputates are used in mean estimations.

Table 10. Results for the Probit Selection Model

	Model 1 2 nd Stage	Model 1 1 st Stage	Model 2 2 nd Stage	Model 2 1 st Stage
Household Income in 2007	-0.011* (0.006)	0.002 (0.006)	-0.013 (0.009)	0.002 (0.006)
Household Liquid Assets in 2007	0.001 (0.014)	-0.001 (0.012)	-0.003 (0.018)	-0.002 (0.013)
Household Other Assets in 2007	0.000 (0.000)	-0.000 (0.000)	0.000 (0.001)	0.000 (0.000)
Household Other Debts in 2007	0.006 (0.004)	0.004 (0.004)	0.008 (0.006)	0.003 (0.004)
Household Education Debt in 2007	-0.214** (0.105)	0.243** (0.119)	-0.327 (0.243)	0.329* (0.179)
Interaction of College Degree and Education Debt	0.188* (0.108)	-0.198 (0.123)	0.175 (0.266)	-0.145 (0.254)
Household Head Has College Degree in 2007	-0.304** (0.130)	0.044 (0.130)	-0.292 (0.182)	0.026 (0.159)
Age of Household Head in 2007	-0.023 (0.017)	0.009 (0.016)	-0.026 (0.018)	0.010 (0.017)
Household Head Was Married in 2007	-0.049 (0.121)	0.122 (0.119)	0.002 (0.183)	0.125 (0.122)
Household Head Is White	-0.111 (0.117)	0.052 (0.118)	-0.106 (0.129)	0.049 (0.123)
Household Head Was Employed in 2007	-0.471** (0.183)	0.289* (0.172)	-0.348 (0.258)	0.274 (0.179)
Household Had Fallen Behind Payments Before 2007	0.463** (0.224)	-0.091 (0.214)	0.522** (0.225)	-0.080 (0.255)
Negative Attitude Towards Borrowing in 2007		-0.293*** (0.087)		-0.199 (0.184)
Positive Attitude Towards Borrowing in 2007		-0.115 (0.098)		-0.056 (0.158)
Household Can Borrow \$3000+ In an Emergency in 2007		-0.086 (0.086)		0.001 (0.242)
Constant	1.556*** (0.513)	-0.294 (0.505)	1.143 (1.128)	-0.412 (0.549)
Observations	561	561	561	561

Standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: Sample is not weighed with analytical weights.

Second implicate is excluded from the estimation due to convergence issues.

here are the χ^2 statistics for the test of independence between the selection and the main equations. For both cases, this statistic is highly significant, which leads us to conclude that there is indeed a selection issue. This confirms the validity of the selection model to address the selection bias.

Another thing to note is that standard errors are highly sensitive to the change in the definition of the *educationdebt* variable. This is not very surprising given the fact that only one third of the sample carries some student loan debt. Level of the student loan debt, not the existence of it is actually associated with credit rationing.

It is evident that education loan debt has a significantly negative effect on the probability of being turned down in credit applications for young households with no college degree. College degree, on its own, has a significant negative effect as well. The interaction term has a significant positive sign, at least in the estimation that uses the continuous definition of *educationdebt* variable. This means young households with college degree and student loan debt are more likely to be turned down for credit compared to other college graduate households without any student loan debt. However, the impact of the interaction term is not large enough to offset the direct (negative) effect of student loan debt. To move from statistical inference to economic inference, we need to look at the marginal effect of education loan debt on the probability of being turned down. Table 11 presents the probability of being turned down conditional on having applied for credit. All the other characteristics are held constant.¹⁷

We can measure the impact of \$10,000 debt in education loans for households with

¹⁷Family income, other debt, liquid assets, other assets, and age are kept at sample mean. Also, probabilities are calculated for married, White, employed households that are not behind their loan payments 60+ days.

Table 11. Probability of Being Credit Rationed Conditional on Credit Application

No College Degree, No Education Debt	0.326*** (0.043)
College Degree, No Education Debt	0.156*** (0.040)
No College Degree, \$10,000 Education Debt	0.292*** (0.055)
College Degree, \$10,000 Education Debt	0.162*** (0.038)
No College Degree, \$20,000 Education Debt	0.255*** (0.085)
College Degree, \$20,000 Education Debt	0.167*** (0.038)
No College Degree, \$30,000 Education Debt	0.217** (0.109)
College Degree, \$30,000 Education Debt	0.171*** (0.041)
No College Degree, \$40,000 Education Debt	0.179 (0.123)
College Degree, \$40,000 Education Debt	0.175*** (0.046)

Standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

no college degree by comparing the probabilities in first and third rows. The difference is 3.4% reduction in the probability to be turned down for the first \$10,000 debt in student loans. For another \$10,000 debt, probability declines for another 3.7% (see Row 5). The effect of additional \$10,000s in student loan debt stays at 3.8% reduction in the probability. On the other hand, young households with college degrees, with or without student loan debt, have lower probability to be credit rationed. This shows how big of an impact college education can have on credit applications, which will be discussed more later. However, we don't observe the same probability reducing effect of carrying student loan debt for college educated households. On the contrary, the probability increases incrementally (0.5-0.6%) for every \$10,000 debt in student loans. It is an economically insignificant impact.

Nevertheless, it indicates an important difference between how student loan debt is associated with credit approval outcomes for non-college-educated and college-educated young households. It is possible that student loan debt doesn't signal much about households with college degree, while it signals positive financial information about households with no college degree. This might be due to the possibility that some households attended some college, but haven't finished their degrees in 2007, before they applied for credit. The prospect for a possible college degree in the near future for these households seems to be valuable information for creditors.

The only other financial variable that has significant impact is household income. Higher income is undoubtedly associated with lower probability to be turned down in a credit application for young households. Employment in 2007 (*employed*) similarly, has a significantly negative effect on odds of credit rationing. Loan delinquency 60+ days (*behindpayments*), on the other hand, increases the chances to be turned down for credit.

One demographic variable that is of particular importance here is *White*. Racial identity has been discussed in the literature as an important factor that affects a household's likelihood to be turned down for credit (Duca & Rosenthal, 1991, 1993; Yinger, 1998). Our results don't provide support for these claims.

Looking at these results, we can safely reject Hypothesis 1, which claimed: "*Ceteris paribus*, student loan debt has an independent and significantly positive effect on a young household's likelihood to be turned down in credit applications." As predicted probabilities in Table 11 showed, student loan debt reduces the odds of credit rationing for households without a college degree and incrementally increases it for college educated households.

The College Effect

As pointed earlier, college has an independent significantly negative impact on the odds of being turned down in credit applications for young households. The economic significance of this impact can be measured by looking at the predicted probabilities of college educated and non-college-educated households at any level of education debt in Table 11. To start with, college education has a marginal effect of 17% reduction in the odds of rationing for households with no education debt. This gap is 13%, 8.8%, 4.5%, and 0.4% for \$10,000, \$20,000, \$30,000 and \$40,000 debt in education loans, respectively. Clearly, the positive benefit young households get from having a college degree when they apply for loans diminishes as their student loan debt gets larger. To see if the benefit of college degree (or lack of it) is statistically significant for different levels of education loan debt, we calculated the contrast of predicted probabilities of being credit rationed for college educated and non-college-educated households for five different levels of education debt in Table 12.

The reduction in the predicted probability due to having college education is 17% for households with no student loan debt and it is statistically significant. It is 13% significant reduction for households with \$10,000 debt in student loans. However, for higher levels of education loan debt, the contrast of predicted probabilities is not statistically significant. This means that college education doesn't have a statistically meaningful effect on reducing the chances that a young household will be turned down for credit if they have more than \$10,000 or so in student loan debt.

Table 12. Marginal Effect of *College Degree* With Respect to *Education Debt*

College Degree @ Education Debt = 0	-0.170*** (0.049)
College Degree @ Education Debt = 1	-0.130** (0.059)
College Degree @ Education Debt = 2	-0.089 (0.089)
College Degree @ Education Debt = 3	-0.046 (0.114)
College Degree @ Education Debt = 4	-0.004 (0.129)
Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$	

Testing Hypothesis 2

Table 9 (p. 97) presents the summary statistics for the estimation of discouragement. Almost 30% of young adult households are discouraged to apply for a loan. It is worth noting that a household that reports being discouraged to apply for some particular loan might still apply for another loan and might even end up getting it. In the survey, being discouraged and applying for a loan are measured in two different questions. This makes sense because applying for a loan is directly observable, whereas being discouraged is not directly observable. As a result of this, there are households who applied for loans but were also observed as discouraged, as well as households who were not discouraged but didn't apply for loans either.

Table 13 gives the probit estimation results. Note that Model 1 uses the continuous definition of *educationdebt*, whereas Model 2 uses the binary definition that is equal to 1 if household has any student loans. Education debt has no significant effect on being discouraged. Neither does the interaction term, regardless of how education debt is defined. Other assets have a significantly positive effect on being discouraged, which is counter intuitive. However, this might be related to a multicollinearity issue. The biggest chunk of

Table 13. Results for the Probit Model (Dependent Variable: *Discouraged*)

	Model 1	Model 2
Household Income in 2007	-0.066*** (0.024)	-0.066*** (0.024)
Household Liquid Assets in 2007	-0.009 (0.025)	-0.007 (0.026)
Household Other Assets in 2007	0.002** (0.001)	0.002** (0.001)
Household Other Debt in 2007	-0.001 (0.005)	-0.001 (0.005)
Household Education Debt in 2007	0.153 (0.103)	0.164 (0.174)
Interaction of College Degree and Education Debt	-0.129 (0.108)	0.178 (0.289)
Household Head Had College Degree in 2007	-0.539*** (0.165)	-0.698*** (0.205)
Age of Household Head in 2007	-0.012 (0.018)	-0.012 (0.018)
Household Head Was Married in 2007	0.151 (0.138)	0.156 (0.138)
Household Head Is White	-0.337*** (0.127)	-0.317** (0.127)
Household Head Was Employed in 2007	0.219 (0.194)	0.210 (0.193)
Household Was Delinquent on Loans 60+ Days	0.598** (0.235)	0.580** (0.238)
Household Had Filed a Bankruptcy Prior to 2007	0.322 (0.198)	0.326* (0.198)
Constant	0.090 (0.560)	0.088 (0.564)
Observations	561	561

Standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: Sample is not weighed with analytical weights.

other assets is composed of residential property, which comes with mortgage debt. This makes other assets closely correlated with other debt. Household income has a highly significant negative effect on the odds of being discouraged. Falling behind loan payments 60+ days is associated with increasing probability to be discouraged. College education reduces the chances to be discouraged for young households.

Perhaps the most interesting result here is the significantly negative effect of *White* on being discouraged that is consistent for both of the estimations. Non-White households that are young, compared to White young households with similar financial and demographic characteristics, are more likely to be discouraged to apply for loans. It is hard to see what might be the underlying reason for this result without any further analysis, but minority young households might be internalizing racial discrimination in the lending markets. Financial barriers that have been put by the lending institutions might have forced these households to simply give up. It is an important issue with many social and political repercussions that needs to be further analyzed.

In conclusion, we can safely reject Hypothesis 2, which states: “*Ceteris paribus*, student loan debt has an independent and significantly positive effect on a young household’s likelihood to be discouraged to apply for credit.”

Discussion

What are the conclusions we can draw from this study? First and foremost, the issue of young households’ retreat from the credit markets, not just housing markets, is a more complicated issue than simply observing correlations. Without any clear causal link, one might easily think education debt is the culprit for low homeownership rates among young households.

Even with the causality problem addressed, the decision to participate in the housing market in particular, and credit markets in general, is a multifaceted process. First, a young household needs to decide whether or not they want to apply for a loan. If they choose to do so, then the ball is in the lender's court to decide whether or not the application is approved.

Both in making a decision to apply or being approved, the interaction of household characteristics with the education loan debt will further complicate the problem. Here, we identified only one of these interactions, which in our opinion is the most prominent one. College graduates are affected differently than those with no college degree in the approval step of a loan application. Student loan debt reduces the probability to be turned down in a loan application for non-college-educated young households, whereas it increases the probability marginally for college educated households (see Table 11). From the lender perspective, or from the *supply side* if you will, a college degree is highly praised. Education loan debt has little effect for a household if they are college graduates, while it acts as a stepping stone for households with no college degree. Perhaps, in the eye of a lender, education loan debt acts as a primer for high future earnings for a household that doesn't have a college degree but provides no additional information to the lender for a household that already has a college degree.

College education itself is an important determinant of the outcome of a loan application for a young household. College educated households are less likely to be turned down compared to their non-college-educated peers. However, after calculating the marginal effect of college degree on the odds of credit rationing in Table 12, we saw that the positive benefit of having college education for young households becomes statistically

insignificant after \$10,000 debt in student loans and economically insignificant after \$40,000 debt. In other words, *the benefit of college education is offset by having student loan debt as the debt burden grows.*

The results for the effects of education loan debt on being discouraged to apply are not conclusive. Neither the education debt nor other debt appears to have any effect on a young household's probability to be discouraged to apply for credit. On the other hand, *race* is not a factor that can be overlooked in loan applications. Race didn't seem to matter statistically in the Probit selection model for being credit-rationed. However, *discouraged* estimations provided evidence for what might be called "racial self-selection in loan applications." This self-selection happens at a level deeper than the decision to apply. White households are less discouraged to apply for a loan. Therefore, the only non-White households that actually end up applying for a loan are the ones who think they are likely to be approved. It looks like non-White households might be observing and internalizing some racial discrimination that can't be observed in our data.

There are important policy conclusions that could be drawn from this interesting result. First and foremost, student loan debt doesn't appear to be an alarming issue for young households in regards to their access to credit. If anything, student loan debt is a positive contributor to their participation in credit markets because it possibly opens the door for a college degree for those who don't have one, which will translate into better family income. However, there is no guarantee that having student loan debt will actually result in a college degree for these households.¹⁸ In the long term, failure to graduate might

¹⁸There are 73 young households with student loan debt but no college degree in the sample. Forty-four of these households have 13 or more years of education. Twenty-five out of this 44 young households

put them in a very difficult financial impasse. It is essential then for these households to obtain a college degree and turn their student loan debt into a positive outcome. Given the institutional separation of obtaining an education loan and provision of higher education in the US, it seems difficult to monitor the progress of a household with student loan debt towards a college degree. A feasible solution would be establishing an institutional bridge between higher education and education financing to closely monitor if education loans are channeled into successful graduations. Recent federal and local efforts to regulate for-profit higher education institutions all around the country are a good example of this. They should be further extended into nonprofit higher education, and households that are having challenges to get a college degree should be offered academic and financial aid to realize their goals and should be discouraged to get under more student loan debt.

Policy challenges are a little different for college graduate young households. Perhaps the biggest issue many young households face when they graduate from college is overborrowing in student loans. Overborrowing occurs when a student borrows beyond his/her repayment capacity after graduation. Avery and Turner (2012) show that overborrowing can be particularly important given the “substantial and increasing variation in realized earnings within different levels of postsecondary attainment...” (pp. 188-189). College graduates that are employed at lower paying jobs are more likely to suffer the negative effects of overborrowing in student loans than their peers. Our estimates showed that overborrowing in student loans can offset the positive benefits of having a college degree when it comes to credit approval. There are different strategies to prevent college students to overborrow in student loans. First of all, high-school students should be

reported their work status as “work only.” This means these 25 households have invested in some college degree and they are paying for it. Yet, they have not been able to finish their degree.

educated about the real cost of college and average life-time earnings of the career they want to have after they graduate. Making a financially feasible decision before investing in college is essential to have a more manageable debt burden after graduation. Second, the average time to graduate from college should be reduced to prevent students from staying in college longer than they should and accumulating debt. Third, the repayment of student loans after graduation should be restructured according to one's disposable income. What is currently done by the Federal Government under the *Student Loan Forgiveness Program* is a great head start. However, it only applies to public student loans. There are numerous consolidation programs for private student loans as well. Currently there is no federal regulation of these private programs. A federal plan that will encompass private student loans that is similar to the *Homeowners Affordability and Stability Plan* in scope might address this issue.

There are other challenges to solve some other issues raised in this study such as high discouragement of non-White young households in credit applications. The dynamics behind this observation should be revealed in an in-depth analysis. It is crucial to first understand and then lift the barriers minority young households face in entry to credit markets.

Note that the focus of this study was not seeing the effect of student loans on young homeownership, although that was our inspiration. If there was a way in the SCF to see what kind of loans young households applied for, perhaps we would have a better understanding of whether young households are particularly rationed in mortgage applications. The SCF partially provides that information, but only for households that are credit rationed.

Another limitation of the data is that it is hard to determine the exact timing of credit application between 2007 and 2009. Credit application might have happened right after the 2007 interview or right before the 2009 follow up. This leaves room for the possibility that a household that didn't have student loan debt at the time of the 2007 interview might have accumulated some before the credit application. Such a household would be considered to have no student loan debt in our analysis, which might give us biased results. As a matter of fact, 371 young households didn't report any education loan debt in 2007. Forty-four of these households reported education loan debt in 2009, the average of which was a little above \$14,500. However, 28% of these 44 households were rationed in their credit applications. Because 28% is very close to the sample average of 30.5%, we doubt that these 44 households actually create a bias in our results. Also, as we pointed out earlier, SCF is not designed to be a representative sample of young households in the US, although it is a representative sample of all households in the US. Conclusions drawn from this study cannot be generalized to all the young households in the US confidently.

We analyzed the effects of student loan debt on young households' credit applications to see if their low homeownership rates could be due to difficulty in obtaining credit in general. However, the tendency we observe that today's young households have lower homeownership rates than previous generations might be due to a larger change than growing student loan debt. What student debt allowed in the United States is greater college enrollment. With this greater college enrollment comes a unique social change. The transition to young adulthood has slowed down in the United States. This point is also discussed in Houle and Berger's (2015) most recent work. College could mean less time

or desire to have a family, buy a home and have all the other perks of the *American Dream*. Perhaps the dynamics of this social change should be investigated with more care in order to identify other reasons behind the apparent move of young households away from homeownership.

CONCLUSION

This dissertation presents an alternative viewpoint on household borrowing. Instead of relying on utility analysis, which requires rigid assumptions on human nature and markets, such as perfect rationality, perfect information and well-defined consumer preferences, this research develops a more flexible and multidisciplinary approach. By taking into account the changing institutional structure of the US economy, the social dimension to the issue of indebtedness and the effects of major shocks to the economy, we find that debt is as much of a curse to households as it is a blessing. It is obvious that without a multidisciplinary look, any analysis of indebtedness will fail to see this dichotomous nature of debt.

One of the important finding of this research is that the Great Recession reversed the correlation between indebtedness and positive attitudes toward borrowing. Prior to the recession years, indebtedness was weakly associated with positive attitudes toward borrowing. The recession was a large shock, not only to household finances, but also to the way they perceive and accept indebtedness. This result is indicative of possible endogeneity between indebtedness and household attitudes. While some households are borrowing more because they are more accepting of debt (positive attitude), some households might be more or less accepting of it because they are indebted. Prior to the recession, many households with debt were less likely to feel the threat of indebtedness, therefore the causality most likely ran in one direction: from attitudes to debt. However,

after being struck with the most severe financial and economic crises since the Great Depression, the causality turned around as many more households were threatened with indebtedness. Instead of accepting indebtedness as a “frame of reference,” households began to actually pay attention to their indebtedness. Time will tell if the causality will revert back to what it was earlier as the U.S. economy progresses further on the recovery path. The data from the Survey of Consumer Expectations¹⁹ suggests that there has been a slight increase in the proportion of households that think they will have a better financial situation in the next year between 2013 and 2016. The next wave of the SCF, the results of which should be published in 2017, will paint a better picture of the recent changes in household attitudes toward borrowing.

Also, the findings in the second chapter of this research showed that households in different socioeconomic statuses (SES) are affected distinctly by indebtedness. Particularly, the households at the bottom of the net financial worth and income distributions are most perversely affected by the negative health consequences of indebtedness. This result falls in line with the literature on SES-Health nexus that repeatedly explains what is called the *SES gradient* of household health. If indebtedness hits the least wealthy and the lowest income earners the hardest, policies should be designed in order to protect these households from the negative impacts of indebtedness on their wellbeing. Debt collection agencies, which still remain largely unregulated, are a good place to start.

The final chapter of this research dealt with a growing concern of American society:

¹⁹ The Center for Microeconomic Data, The New York FED.
<https://www.newyorkfed.org/microeconomics/sceindex#indicators/household-finance/g31>

Student loan debt. The findings showed that, as far as the young households in the 2007-09 SCF Panel go, student loan debt doesn't pose a threat to them for new loan applications. However, it is important to note that college education stands as the more important determinant of the probability that a young household will be turned down in a loan application than student loan debt. This brings us to the issue of college graduation rates. According to the National Center for Education Statistics data,²⁰ the average graduation rate of the 2008 starting cohort within the first 6 years of full-time bachelor's degree program in a nonprofit institution was 65.4% in 2014. In for-profit institutions, this rate drops to 26.5%. Investing in college and paying for tuition is a financially sound decision as long as one can actually graduate. This research showed that households with no college degree actually benefit from carrying student loan debt when they apply for another loan. However, it is also evident that an increasing number of young households with student loan payments end up not graduating from college. Especially those attending for-profit institutions are more likely to not realize their college dreams. The unique place of graduating from college as a life-long investment and the increasing cost of it require a closer inspection of the effects of student loan debt on young households' socioeconomic wellbeing in a longitudinal setting.

One last point to mention is the institutional evolution of the concept of debt in the U.S. economy. In 2013, the Federal Trade Commission commissioned research due to increasing numbers of consumer complaints about debt collectors in the aftermath of the housing market collapse. This research was titled "The Structure and Practices of the Debt Buying Industry" (Federal Trade Commission, 2013). This snapshot of the debt buying

²⁰ https://nces.ed.gov/programs/digest/d15/tables/dt15_326.10.asp

business in the United States gave important insights into the immense growth in the volume of debt buying as well as the ill-mannered practices of the industry. It is an important question to answer whether this growth is a temporary result of the Great Recession or indicative of a more permanent change in the institution of debt. As Karl Polanyi might ask: Is debt the next *fictitious commodity*?

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