Poverty Levels and Debt Indicators Among Low-Income Households Before and After the Great Recession

Kyoung Tae Kim,[a] Melissa J. Wilmarth,[b] and Robin Henager[c]

This study analyzed the debt profile of low-income households before and after the Great Recession using the 2007, 2010, and 2013 Survey of Consumer Finances (SCF). We used Heckman selection models to investigate three debt characteristics: (a) the amount of debt, (b) debt-to-income ratio, and (c) debt delinquency. Before and after the Great Recession, results from the selection stage showed the probability of holding debt for households increased as their income level increased (moving into less severe poverty categories); results from the outcome stage indicated households in the most severe poverty category (below 100% of poverty threshold) were less likely to meet debt-to-income ratio guidelines. Following the Great Recession, these lowest income households were more likely to have higher debt and debt delinquency problems.

Keywords: debt profile, Great Recession, low-income households, poverty, Survey of Consumer Finances

Debt is a major factor in household finances, and an increase in household indebtedness has occurred over the past 25 years throughout most developed countries. This growth has allowed for greater household consumption as well as a reduction in household savings (Barba & Pivetti, 2009). Consumer debt use includes both installment loan and credit card debt. Installment loans allow consumers to borrow a set amount and make payments through a specified repayment plan (Chien & DeVaney, 2001). Credit card debt tends to carry relatively high interest rates, may be paid in full monthly or carry a balance from month to month, and is used by households for financial difficulties (T. Sullivan, Warren, & Westbrook, 2000). Previous research has identified that the use of debt is influenced by sociodemographic variables, including social and educational variables.

The Great Recession impacted consumers' behavior toward debt, as half of the U.S. public reduced the amount they owed on their mortgage, credit cards, and other installment loans following the recession (Taylor et al., 2010). Many families changed their financial behaviors and increased their rate of saving while decreasing their debt level. Following a peak in the third quarter of 2008, overall household debt levels decreased; families began accelerating the pay down of their mortgage debt and reducing nonmortgage debt (Chakrabarti, Lee, van der Klaauw, & Zafar, 2011). Furthermore, during the Great Recession, there was a significant decrease in the demand for credit as well as a tightened credit market (Chakrabarti et al., 2011). On average, U.S. households had a debt load of $86,346 in 2000, which increased by 48% to $128,134 in 2007 and then decreased by 6% to $120,057 in 2009 (Taylor et al., 2010). Since the Great Recession, 40% of U.S. households experienced either unemployment, delinquency in mortgage payments, reduced or negative home equity, and foreclosures (Hurd & Rohwedder, 2010). In 2009, there were fewer new loan accounts opened and an increase in loan account closures (Chakrabarti et al., 2011).

Although the Great Recession caused economic strain for almost all U.S. households, it was particularly straining for low-income households. Between 2007 and 2009, the poverty rate in the United States increased by 1.9 percentage

[a]*Assistant Professor, Department of Consumer Sciences, University of Alabama, 312 Adams Hall, Box 870158, Tuscaloosa, AL 35487. E-mail: ktkim@ches.ua.edu*
[b]*Assistant Professor, Department of Consumer Sciences, University of Alabama, 316-A Adams Hall, Box 870158, Tuscaloosa, AL 35487. E-mail: mwilmarth@ches.ua.edu*
[c]*Assistant Professor, Economics and Finance, School of Business, Whitworth University, 300 W. Hawthorne Rd. Spokane, WA 99251. E-mail: rhenager-greene@whitworth.edu*

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points or 6.3 million people (DeNavas-Walt, Proctor, & Smith, 2010). Following the recession, record levels of U. S. households earned less than 50% of the poverty threshold (House Budget Committee Majority Staff, 2014). Almost half of the U.S. public reported that they were in worse shape following the recession, and households making less than $50,000 were most likely to say they were in worse shape postrecession (Taylor et al., 2010). Because of limited financial resources, low-income households are likely to experience financial vulnerability related to financial products, including debt products.

This study investigated the debt profile of low-income households before and after the Great Recession, using the 2007, 2010, and 2013 Survey of Consumer Finances (SCF). This study provides a comprehensive analysis of the debt profile of low-income households spanning 6 years on three different measures including the amount of debt, debt-to-income ratio, and debt delinquency. The analysis used a Heckman two-stage selection model to avoid possible selection bias of debt analyses. Our study contributes to literature surrounding debt use, family finance, and low-income households. Previous research focusing on debt issues of low-income households has been limited, specifically as it relates to the impact of the Great Recession. Understanding the changing debt profile of low-income households will help researchers, educators, and policymakers serve the vulnerable populations to better prepare for future financial crises and prevent the potential loss of a home or other assets.

Review of Literature

Great Recession and Consumer Debt

The effective use of debt allows households to consume at a level greater than their current income level, with payments on purchases in the future. In the United States, more households than in the past are holding debt and there has been an increase in the average amount of debt over time (Bucks, Kennickell, Mach, & Moore, 2009). Almost 80% of U.S. families held some kind of household debt in 2007 (Bricker, Bucks, Kennickell, Mach, & Moore, 2011). U.S. household debt increased by 176%, from $4.6 trillion dollars to $12.7 trillion dollars from 1999 to 2008 (Seefeldt, 2015). Following the recession, overall consumer debt decreased, largely because of defaults on debt, lending practices becoming more restrictive, and a reduced demand for homes (Brown, Haughwout, Lee, & van der Klaauw, 2013). The postrecession consumer has appeared more cautious than the 2 years approaching the recession (2006 and 2007). Following the recession, consumer borrowing levels have decreased, and underwriting for credit became more restrictive (Canner & Elliehausen, 2013). Most households reported a desire for higher levels of savings, and many expressed concern for their employment and future income (Bricker et al., 2011). In addition, U.S. consumers used less new nonmortgage debt following the recession (Cooper, 2013). Since the end of 2008, overall household debt decreased and many U.S. households reduced their debt levels by increasing payments to reduce the debt amount faster (Chakrabarti et al., 2011).

There was a steady increase in the U.S. debt-to-income ratio from the mid-1990s, peaking in 2006 with a 25% debt-to-income ratio (Barba & Pivetti, 2009). In addition, the rate of mortgage delinquencies almost doubled compared to prior to the Great Recession, increasing to just over 9% by the end of the first quarter of 2009 (Mortgage Bankers Association, 2009). The incidence of delinquency improved following the recession but still existed throughout the recovery. Race has been identified as a significant predictor of debt delinquency among homeowners, with Black homeowners more likely to experience delinquency following the recession (Bieker & Yuh, 2015).

Debt Among Low-Income Households

Low-income households use a variety of debt products including mortgages, installment loans, and credit cards (Bricker et al., 2011; Bridges & Disney, 2004). Prior to the Great Recession, consumers experienced an unprecedented supply of credit, especially for low-income households (Fellowes & Mabanta, 2007). In the early 2000s, homeownership rates surged for low-income households (Bucks et al., 2009). Given that the nature of the recession was centered on housing; this mortgage burden placed many families in precarious financial situations, especially low-income families.

Households experiencing debt delinquency were likely to be experiencing financial distress (Moorman & Garasky, 2008). Low-income consumers have been influenced in recent time to take on more debt, which has placed these vulnerable households at risk for debt problems including debt delinquency (Sherraden & McBride, 2010), which can

lead to foreclosure or bankruptcy, further complicating the future of the low-income families. Debt delinquency often has created long-lasting effects on a household such as loss of assets and decreased credit scores of borrowers. Debt delinquency has been a precursor to bankruptcy and may also happen simultaneously (McCloud & Dwyer, 2011; Moorman & Garasky, 2008). Previous research using the SCF has identified that households were more likely to experience debt repayment difficulty if they were younger, non-White, in larger households, previously had difficulty obtaining credit, and had other debt such as mortgages, auto loans, or durable goods loans (Godwin, 1999; Xiao & Yao, 2014).

In addition, the financial difficulty that follows a delinquency or foreclosure compounds over time and has been especially damaging to low-income and vulnerable households (Greinstein-Weiss, Spader, Yeo, Key, & Freeze, 2012). After less than 2 years of ownership, many low-income homeowners were unable to sustain their mortgage payments (Van Zandt & Rohe, 2011). Half of the low-income sample incurred unexpected costs and about a third experienced unaffordable home repairs. Many of the homeowners were also holding nonhousing debt and were at least 30 days late in debt repayment. These findings also suggest that homeownership for low-income households may not be sustainable in light of other debts or unplanned expenses.

Lower income households were less likely to perform positive credit behaviors such as maintaining a debt-to-income ratio at less than 20% for all nonmortgage debt, paying credit card balances in full, and not falling behind in payments (O'Neill & Xiao, 2014). The cycle of indebtedness is difficult to break as long-term assets are depleted and savings are not in place for emergencies or for the purchase of a home in the future. Indeed, many low-income households have to use expensive short-term loans to manage financial emergencies. Families with emergency savings, in contrast, have been able to accumulate assets, pay down debt, and afford to purchase of a new home (McKernan & Ratcliffe, 2008).

Generally, households are better prepared to deal with unexpected financial difficulties or expenses when they have a better asset-to-debt ratio (Mills et al., 2000). Through the slow recovery from the recession, low-income households were still concerned with income and income volatility, as they experienced the largest levels of income volatility (Hernandez & Ziol-Guest, 2009). Experiencing income volatility could increase a household's likelihood of using debt. Financially vulnerable families with high debt-to-income ratios in 2007 were more likely to experience a large drop in wealth from 2007 to 2009 (Bricker et al., 2011). Effort has been made to assist low-income households build assets through a program using individual development accounts (IDA; Schreiner, Clancy, & Sherraden, 2002). This program helps low-income households create saving goals and save for the future with matching funds as an incentive. The program also includes some education in managing finances. Findings indicate even households with limited resources are capable of saving when provided incentives and that financial education aids in this process (Grinstead, Mauldin, Sabia, Koonce, & Palmer, 2011; Zhan, Anderson, & Scott, 2006).

Overall, low-income households are placed in vulnerable financial situations when the amount of debt is too high, when their debt-to-income ratio is high, and when debt delinquency becomes an issue. Without the buffer of resources such as savings or low-interest loans, a significant downtown in the economy affects these households more severely than those with higher income or access to more resources.

Theoretical Framework—Life-Cycle Hypothesis

For all households, consumption is based not only on income but also on their use of credit and savings. The life-cycle hypothesis (Ando & Modigliani, 1963) posits that a household should consume less than their income when their current income is relatively high, leaving them with net savings. Alternatively, a household will consume more than their income when income is relatively low and can be facilitated by the use of credit and debt. The hypothesis suggests that taking on debt will occur at various parts of the life cycle for all consumers. Rate of consumption versus saving and debt relates not only to the stage a household is in but also to their income level. Greater access to credit may help households in smoothing their consumption in the current and short-term time frames (Lyons, 2003). However, in the long run, as Lyons (2003) suggested, households may find themselves overextended, holding large amounts of debt, limited by liquidity constraints, and potentially delinquent in repayment.

Some persistent debt for low-income households would not be inconsistent with the life-cycle hypothesis and may help explain that households are taking on debt for improving their future economic position (Bridges & Disney, 2004). Low-income households face greater challenges in meeting basic needs, which may cause low-income households to turn to credit and other short-term loans to meet basic needs or emergency expenses (McKernan & Ratcliffe, 2008; J. Sullivan, 2008). The use of credit cards tends to increase when experiencing unemployment and has been referred to as using the plastic safety net for consumption smoothing (Traub & Ruetschlin, 2012).

Economically vulnerable households use debt as a way of smoothing consumption and investing in their future (Seefeldt, 2015). For these households, debt may cause financial challenges, and, if ongoing, acquiring additional debt hinders the payment of already existing debt. The benefits of using debt throughout the life cycle may not outweigh the costs for low-income households. The cumulative negative effects of debt may actually be setting low-income households back financially rather than helping them in the future (Bridges & Disney, 2004).

Research Hypotheses

Limited research exists on the debt use of low-income households and debt issues, specifically surrounding the time period of the Great Recession. This study examined the debt profile of low-income households from 2007 to 2013 by addressing the following research hypotheses. While controlling for household characteristics, we expect that households in severe poverty were more likely to have a higher amount of debt, less likely to meet debt-to-income ratio guidelines, and more likely to have debt delinquency problems.

H1: Among debt holding households, those in severe poverty have a higher amount of debt than those in less severe poverty.

H2: Among debt holding households, those in severe poverty are less likely to meet debt-to-income ratio guideline than those in less severe poverty.

H3: Among debt holding households, those in severe poverty are more likely to have debt delinquency problems than those in less severe poverty.

Method

Dataset and Sample Selection

This study analyzed data from the SCF, released triennially by the Board of Governors of the Federal Reserve System. The SCF provides information on the broad financial status of U.S. households such as assets, debts, income, saving, and investments. Both sociodemographic background information and financial attitude information are collected for each household. For our empirical analyses, this study employed three recent waves of the SCF. Given the focus of interest and the timeframe of the Great Recession, we conducted two separate analyses with different survey waves: (a) 2007 SCF and (b) the pooled dataset of 2010 and 2013 SCF.

This study followed the sample selection method for low-income households used by Hogarth and Anguelov (2003) and S. Heckman and Hanna (2015). Our analytic sample included households with incomes no greater than 3 times federal poverty thresholds reported by the United States Census Bureau for the corresponding year. The federal poverty threshold is computed based on family size, number of dependent children younger than 18 years, and whether the householder is older than the age of 65 years.

In addition to the poverty threshold restriction for sample selection, we excluded retired households from our sample because of possible skewedness on the distribution of the low-income household sample (e.g., households with low-income, but with high wealth; S. Heckman & Hanna, 2015). As shown in Table 1, the Stage 1 of Heckman selection model included 1,063 (2007 SCF) and 3,983 (2010 and 2013 SCF). The outcome stage (Stage 2) included only debt holders from the selection stage, and the analytic sample included 812 (2007 SCF) and 2,884 households (2010 and 2013 SCF).

TABLE 1. Analytic Sample Size: 2007 and 2010 and 2013 Survey of Consumer Finances

Survey Year	Total Sample Size	Analytic Sample for Stage 1	Analytic Sample for Stage 2
2007	4,418	1,063	812
2010 and 2013	12,497	3,983	2,884
Total	16,915	5,046	3,696

Note. Stage 1—nonretired households living below 300% of poverty threshold; Stage 2—debt holders.

Empirical Specification

The empirical model of this study is built on a J. Heckman (1979) selection model to investigate the debt profile of low-income households through a two-step procedure. The first step of this model isolates the factors associated with holding debt among nonretired households living below 300% of poverty threshold, whereas the second step investigates different debt characteristics of debt holders.

Stage 1: Debt Holding. In Stage 1 (selection stage), debt holding is a binary dependent variable that is equal to 1 if the household had any debt during the past year and 0 otherwise. To identify factors related to the likelihood of holding debt, we used a probit regression analysis in the selection stage as follows.

$$Prob(Debt_i) = b \cdot x_i + \varepsilon_i$$

Where

$Debt_i$ = *debt holding of household i*
x_i = *vector of household characteristics at household i*
ε_i = *error term*

Stage 2: Debt Profile. In Stage 2 (outcome stage), we selected three different debt characteristics: (a) the amount of debt, (b) debt-to-income ratio, and (c) debt delinquency. The analysis was conducted using the appropriate regression model based on the characteristics of the outcome variables.

Hypothesis 1: The Amount of Debt. The amount of household debt is composed of two different types of debt use, following Chien and DeVaney (2001): installment loans and credit card debt. The amount of installment loans included various household loans, including loans from friends or relatives and business loans, as well as loans for education, cars, medical bills, property purchases, and home purchases, additions, or improvements. The amount of credit card debt was the total outstanding balances of their current credit cards. In the second stage model, ordinary least squares (OLS) regression analysis was used to analyze the dependent variable for research Hypothesis 1. Given the highly skewed distributions of the amount of total household debts, the log transformation was applied to meet a basic assumption of OLS.

$$Y_i = \beta_0 + x_1\beta_1 + x_2\beta_2 + \cdots + x_k\beta_k + \varepsilon_i = X\beta + \varepsilon_i$$

Where

Y_i = *logarithm of the amount of debt of household i*
x = *vector of a household's characteristics including an inverse Mills ratio*
β = *vector of coefficients to be estimated*
ε_i = *error term*

Hypothesis 2: Debt-to-Income Ratio. The debt burden has been measured by the debt-to-income ratio whether households have a heavy financial obligation compared to their income level (Baek & DeVaney, 2004; Hanna, Yuh, & Chatterjee, 2012). In concert with most previous research studies on financial obligation, we defined the debt-to-income ratio as monthly debt payments divided by monthly pretax income. Debt payments are the sum of the total monthly payments on all types of loans such as credit cards, mortgages, lines of credit, home improvement loans, land contracts, other residential property, vehicle loans, student loans, installment loans, margin loans, loans against insurance policies, pension loans, and other loans. If the household had no income, the debt-to-income ratio was computed as the amount of monthly obligation itself, in other words, the denominator will be assumed to be equal to one. This study follows the debt payment calculation provided by the SCF website.

This study sets the debt-to-income ratio guideline at 40% (for all household debt) as a cutoff point, indicating that households are having trouble managing and repaying their debt burden if beyond the threshold (DeVaney, 2000; Greninger, Hampton, Kitt, & Achacoso, 1996; Hanna et al., 2012). The dependent variable is coded as 1 if the debt-to-income ratio is less than 40%, 0 if otherwise, allowing for the estimation of the likelihood that a household meets the debt-to-income ratio threshold. For the second stage analysis, a logit regression was used to analyze the dependent variable as follows:

$$logit(p) = log\left(\frac{p}{1-p}\right) = \beta_0 + x_1\beta_1 + x_2\beta_2 + \cdots + x_k\beta_k + \varepsilon_i = X\beta + \varepsilon_i$$

Where

p = *likelihood of meeting debt-to-income ratio guideline*
x = *vector of a household's characteristics including an inverse Mills ratio*
β = *vector of coefficients to be estimated*
ε_i = *error term*

Hypothesis 3: Debt Delinquency. This study defined debt delinquency as being behind by 2 months or more in making debt payments, which reflects a serious delinquency risk (Getter, 2003; Lee & Hanna, 2012). Debt delinquency is a binary dependent variable equal to 1 if the household reports, over the last 12 months, it was behind in the debt payments by 2 months or more and 0 otherwise. A logit regression was used in the second stage analysis to analyze the dependent variable as follows:

$$logit(p') = log\left(\frac{p'}{1-p'}\right) = \beta_0 + x_1\beta_1 + x_2\beta_2 + \cdots + x_k\beta_k + \varepsilon_i = X\beta + \varepsilon_i$$

Where

p' = *the likelihood of being behind in the debt payments by 2 months or more*
x = *a vector of a household's characteristics including an inverse Mills ratio*
β = *a vector of coefficients to be estimated*
ε_i = *the error term*

For all multivariate analyses, we used the repeated imputation inference (RII) method to correct for underestimation of variances associated with parameter estimates because of imputation of missing data. In addition, datasets were weighted for descriptive analyses but not weighted for hypothesis testing following suggestions by Lindamood, Hanna, and Bi (2007).

Independent Variables

The following variables are included as control variables. We categorized households according to four different poverty thresholds: less than or equal to 100%, 101%–150%, 151%–200%, and 201%–300% of the poverty threshold. The selection stage also included the following variables: age of respondent (continuous); the highest educational attainment (less than high school, high school diploma, some college, bachelor, postbachelor degree); marital status (married, single male, single female, partner); racial/ethnicity (White, Black, Hispanic, Asian/others); employment status of respondent (salary workers, self-employed, not working); homeowner; presence of child younger than 18 years; expected household income growth (sure the same, sure increase, sure decrease, not sure); and survey year.

In addition to the variables included in Stage 1, three variables were added to the regressions in the outcome stage. First, a lower transitory income (if current income is lower than normal income); second, unbanked households (if households do not own any bank account); and third, an inverse Mills ratio computed from the selections stage was added to observe any selection bias in the analyses of debt.

Results

Descriptive Results

The characteristics of sample households, by stages of the Heckman model and survey waves, are presented in Table 2. Stage 1 of the analyses for both the 2007 SCF (n = 1,063) and the 2010 and 2013 SCF (n = 3,983) included nonretired low-income households with income below 300% of the poverty threshold. Stage 2 of the analyses for both the 2007 SCF (n = 812) and the 2010 and 2013 SCF (n = 2,884) included the debt holding households from Stage 1. The patterns of demographic characteristics of the low-income households included in the samples were similar across survey waves (before and after the recession) as well as across sample (low-income versus low-income debt holder households).

The descriptive statistics span the two groupings from the SCF (2007 and 2010 and 2013) as well as Stages 1 and 2 for each. The details can be found in Table 2, and a general description of the statistics is summarized here. Generally, about two fifths of each of the samples were in the highest income category (201%–300% of the poverty threshold); the other three poverty categories represent roughly one fifth each for the samples. The mean age of the respondent was around 40 years. More of the respondents had a high school education compared to the other education categories, ranging from 35.8% to 39.8% for each of the samples, followed by the category with some college education which ranged from 26.2% to 32.6%. Married couples made up the largest category for marital status, ranging from 38.0% to 44.2%, followed by the single female household ranging from 31.9% to 33.8%. A majority of the respondents were employed as salary workers (75.9%–79.6%) and White (56.6%–63.4%). Many were not sure of their future income, whereas very few felt their future income might increase (9.4%–11.7%). About 60% of each of the samples had children younger than the age of 18 years living in the household. Homeownership rates were not as homogeneous across each of the samples; for both the Stage 1 samples homeownership was about 45%, whereas in both the Stage 2 samples homeownership was about 52%. For samples

TABLE 2. Characteristics of Sample Households: 2007 and 2010 and 2013 Survey of Consumer Finances

	2007 SCF		2010 and 2013 SCF	
	Stage 1 (n = 1,063)	**Stage 2 (n = 812)**	**Stage 1 (n = 3,983)**	**Stage 2 (n = 2,884)**
Poverty category (%)				
100% of poverty or less	21.5	16.4	22.3	18.7
101%–150% of poverty	18.9	18.5	21.7	19.6
151%–200% of poverty	19.2	19.9	19.3	20.0
201%–300% of poverty	40.4	45.1	36.7	41.7
Mean age of respondent	40.3 years	40.4 years	41.2 years	41.4 years
Education of respondent (%)				
Less than high school	20.0	15.9	16.3	12.8
High school	39.8	39.8	37.0	35.8
Some college	26.2	28.4	29.8	32.6
Bachelor degree	11.0	12.5	12.9	14.3
Postbachelor degree	3.0	3.4	4.1	4.5
Marital status (%)				
Married	40.8	44.2	38.0	42.1
Single male	14.6	12.2	17.0	14.3
Single female	33.8	33.0	32.9	31.9
Partner	10.8	10.6	12.1	11.7
Employment status of respondent (%)				
Salary worker	78.1	79.6	75.9	76.1
Self-employment	12.2	13.0	13.4	14.4
Not working	9.8	7.4	10.7	9.6
Racial/ethnic category (%)				
White	60.1	63.4	56.6	59.8
Black	19.8	18.4	19.7	18.8
Hispanic	17.0	14.8	19.4	17.5
Asian or others	3.1	3.4	4.3	3.9
Expected income (%)				
Sure decrease	20.0	21.5	15.8	16.7
Sure same	22.1	22.1	23.9	24.6
Sure grow	10.5	11.7	9.4	10.2
Not sure	47.5	44.8	50.9	48.5
Presence of a child younger than age 18 years (%; reference: no)	60.6	63.8	58.5	62.0
Homeowner (%; reference: no)	45.9	52.3	45.1	52.9
Current income is lower relative to normal (%; reference: no)	—	25.6	—	35.0
Being unbanked (%; reference: no)	—	14.0	—	12.0

Note. Weighted proportion. SCF = Survey of Consumer Finances.

in Stage 2, about 26% of households had lower current income than normal in 2007, whereas 35% of households had experienced a shock following the recession. Unbanked households represented 14% of the sample before the recession and represented 12% of the sample following the recession.

Repeated Imputation Inference Means Test

To examine the differences between three debt profiles at different poverty levels, we present the results of RII means tests in Table 3. Results from the 2010 and 2013 SCF showed that mean household debt levels at different poverty levels were $61,899, $48,012, $69,175, and $83,416, respectively. There was no specific pattern of household debt across poverty categories, but households in the lowest poverty category had a higher amount of debt than those at 101%–150% and slightly lower than those at 151%–200%. There was an increasing pattern to meet the debt-to-income ratio threshold with higher income levels (less severe poverty). In particular, the rate that met the debt-to-income ratio threshold was 24.0% for households at 0%–100% of poverty, whereas 74.0% for those in 201%–300%. By contrast, the results showed a decreasing tendency of debt delinquency as income level increased. The proportion was 24.3% in households at 0%–100% of poverty and decreased steadily by 12.8% for households at 201%–300%. Results from the 2007 SCF show similar patterns across three debt profiles.

Multivariate Results

Selection Stage (Stage 1). To identify factors related to the likelihood of holding debt, we used a probit regression analysis in the selection stage. The results from the probit models are presented in Table 4. Results showed that the probability of holding debt for households increased as the income level increased, before and after the Great Recession. To discuss the magnitude of the results on different poverty levels, we reported marginal effects. Compared to the lowest income category (100% of poverty or less), the probability of holding debt increased by 8% (101%–150%), 13% (151%–200%), and 16% (201%–300%) from the 2007 SCF. Similarly, results from the 2010 and 2013 SCF indicated that the probability of holding debt by households in 151%–200%, and 201%–300% of poverty were 8% and 14% higher, respectively, than those below 100% of poverty threshold, whereas there was not a significant difference between households between 101% and 150% of the poverty threshold and those below 100% of the poverty threshold.

Six control variables were found to be significant regarding holding debt before and after the Great Recession, including age of the respondent, education, marital status, race/ethnicity, the presence of a dependent child, and homeownership. The age of the respondent was negatively related to holding debt. Compared to households with less than a

TABLE 3. Means Test on Debt Profile of Poverty Category: 2007 and 2010 and 2013 Survey of Consumer Finances

	2007 SCF (n = 812)			2010 and 2013 SCF (n = 2,884)		
	Amount of Debt	Meeting Debt-to-Income Threshold	Debt Delinquency	Amount of Debt	Meeting Debt-to-Income Threshold	Debt Delinquency
Poverty category (reference: 100% of poverty or less)						
100% of poverty or less (reference)	$53,740.00	26.72%	18.76%	$61,898.76	24.01%	24.25%
101%–150% of poverty	$37,826.81	53.59%***	18.36%	$48,012.27***	50.14%***	19.74%***
151%–200% of poverty	$53,498.78***	62.16%***	15.32%	$69,174.65***	62.76%***	18.58%***
201%–300% of poverty	$73,832.92***	73.87%***	7.88%***	$83,415.97***	73.97%***	12.83%***

Note. Weighted repeated imputation inference (RII) analysis. SCF = Survey of Consumer Finances.
*$p < .05$. **$p < .01$. ***$p < .001$.

TABLE 4. Probit Analysis of Holding Debt (Stage 1): 2007 and 2010 and 2013 Survey of Consumer Finances

	2007 SCF				2010 and 2013 SCF			
	Coefficient	*SE*	Chi-square	*p* value	Coefficient	*SE*	Chi-square	*p* value
Poverty category (reference: 100% of poverty or less)								
101%–150% of poverty	**0.3158 (0.0806)**	**0.1373**	**5.2881**	**.0215**	0.0547 (0.0169)	0.0771	0.5038	.4778
151%–200% of poverty	**0.5205 (0.1254)**	**0.1609**	**10.4588**	**.0012**	**0.2695 (0.0792)**	**0.0728**	**13.6944**	**.0002**
201%–300% of poverty	**0.5935 (0.1561)**	**0.1346**	**19.4546**	**<.0001**	**0.4716 (0.1398)**	**0.0691**	**46.6101**	**<.0001**
Age of respondent	**−0.0095**	**0.0042**	**5.2849**	**.0215**	**−0.0089**	**0.0020**	**20.3184**	**<.0001**
Education of respondent (reference: less than high school)								
High school	**0.3071**	**0.1249**	**6.0411**	**.0139**	**0.2836**	**0.0667**	**18.0760**	**<.0001**
Some college	**0.6989**	**0.1464**	**22.8015**	**<.0001**	**0.6437**	**0.0746**	**74.4821**	**<.0001**
Bachelor degree	**0.7694**	**0.2017**	**14.5458**	**.0001**	**0.6047**	**0.0927**	**42.5978**	**<.0001**
Postbachelor degree	0.4454	0.2682	2.7576	.0968	**0.5177**	**0.1288**	**16.1537**	**<.0001**
Marital status (reference: married)								
Single male	−0.2643	0.1544	2.9282	.0870	**−0.3661**	**0.0740**	**24.4723**	**<.0001**
Single female	−0.1269	0.1218	1.0871	.2971	**−0.1574**	**0.0605**	**6.7561**	**.0093**
Partner	−0.0656	0.1629	0.1621	.6872	−0.0832	0.0790	1.1082	.2925
Employment status of respondent (reference: salary worker)								
Self-employment	0.0792	0.1495	0.2805	.5964	0.0578	0.0698	0.6867	.4073
Not working	−0.2518	0.1572	2.5661	.1092	0.0527	0.0750	0.4942	.4820
Racial/ethnic category (reference: White)								
Black	−0.2010	0.1222	2.7047	.1001	−0.0509	0.0611	0.6940	.4048
Hispanic	**−0.2792**	**0.1339**	**4.3441**	**.0371**	**−0.1508**	**0.0639**	**5.5727**	**.0182**
Asian or others	−0.1656	0.2742	0.3647	.5459	**−0.2909**	**0.1107**	**6.9044**	**.0086**
Expected income (reference: sure decrease)								
Sure same	−0.1051	0.1517	0.4799	.4885	0.0148	0.0804	0.0338	.8542
Sure grow	0.1895	0.1963	0.9320	.3343	0.1002	0.1004	0.9967	.3181
Not sure	−0.0308	0.1346	0.0524	.8189	−0.0787	0.0710	1.2286	.2677
Presence of a child younger than age 18 years (reference: no)	**0.3645**	**0.1089**	**11.1959**	**.0008**	**0.2684**	**0.0529**	**25.7140**	**<.0001**
Homeowner (reference: no)	**0.5825**	**0.1135**	**26.3218**	**<.0001**	**0.7236**	**0.0564**	**164.6588**	**<.0001**
Year (reference: 2010)	—	—	—	—	−0.0093	0.0153	0.3686	.5438

Note. Unweighted repeated imputation inference (RII) analysis. Marginal effect in parentheses below coefficient for poverty category was calculated by STATA 13.1. Effects significantly different from 0 at $p < .05$ are in boldface. SCF = Survey of Consumer Finances.

high school education, the probability of holding debt increased as the level of education increased. Married couples were more likely to have debt than single households (only for postrecession). Hispanic and Asian/others respondents (only for postrecession) were less likely to hold debt than White respondents. Last, the presence of a child younger than 18 years and homeownership were positively associated with the likelihood of holding debt.

Outcome Stage (Stage 2). As discussed earlier, three different debt characteristics were included in the outcome stage of the Heckman selection model: (a) amount of debt, (b) debt-to-income ratio, and (c) debt delinquency. Furthermore, the inverse Mills ratio reflecting the selection bias in the analysis of each debt behavior was added to each regression model. We estimated two different time frames—prerecession and postrecession—separately to observe any particular pattern affected by the timing of the Great Recession. Results of the outcome stages are presented in Table 5 (2007 SCF) and Table 6 (2010 and 2013 SCF).

Hypothesis 1: The Amount of Debt. The total amount of debt included both installment loans and credit card debt, and it was transformed by logarithm. Households in the 101%–150% and 151%–200% of poverty thresholds had about 21% and 25% less debt than similar households below 100% of poverty threshold after the Great Recession. By contrast, there was no significant relationship for the amount of debt and different poverty levels before the recession.

With respect to control variables, the age of the respondent was negatively related to the amount of debt before and after the recession. On the other hand, educated households, self-employed, homeowners, and those with a lower current income than normal had higher amounts of debt compared to reference categories over the survey periods. In addition, single female households, those not working, Hispanics, and those who were unbanked had lower amounts of debt, whereas the presence of a dependent child was associated with higher amounts of debt following the recession.

Hypothesis 2: Debt-to-Income Ratio. Logistic regression results showed that the likelihood of meeting the debt-to-income ratio guideline (below 40%) increased as income level increased (less severe poverty) before and after the Great Recession. In particular, households with 101%–150%, 151%–200%, and 201%–300% of poverty thresholds had higher odds of meeting the debt-to-income ratio guideline by 170%, 205%, and 392% (prerecession period) and by 221%, 399%, and 683% (postrecession period), respectively, compared with those below 100% of poverty threshold. These results imply that the divergence of the financial obligation between poverty categories were found to be more severe after the Great Recession than before.

Four variables were found to be consistently significant before and after the Great Recession. Hispanic respondents were less likely to meet the debt-to-income ratio than White respondents. Self-employed respondents and households with lower-than-normal income had a lower likelihood of meeting the guideline. Those who were unbanked were more likely to meet the guideline than similar households with a bank account.

Furthermore, results from the 2007 SCF indicated that the likelihood of meeting the debt-to-income guideline increased with the age of the respondent. Partnership households were more likely, whereas Asian respondents were less likely to meet the guideline than married couples and White respondents, respectively. By contrast, following the Great Recession, college-educated households and single females had a lower likelihood of meeting the debt-to-income ratio guideline than the reference categories, whereas the presence of a child was positively associated with the likelihood of meeting the ratio.

Hypothesis 3: Debt Delinquency. The effect of different poverty levels was not found to be significant regarding the odds of having a debt delinquency before the Great Recession. By contrast, following the recession, households in the 201%–300% poverty threshold category had 50% lower odds of being debt delinquent as compared to those below 100% of the poverty threshold.

In addition, having income lower than normal and being unbanked increased the probability of debt delinquency before and after the Great Recession. Results from the 2010 and 2013 SCF showed the likelihood of debt payment problems decreased with the higher level of education (postbachelor degree), expected household income growth (sure same), and homeownership, whereas the likelihood increased with the age of the respondent. Black respondents were more likely to have debt delinquency than White respondents. Last, the

TABLE 5. Stage 2 From the Heckman Selection Model: 2007 Survey of Consumer Finances

	Amount of Debt (OLS Regression)		Meeting Debt-to-Income Ratio Threshold (Logit Regression)		Debt Delinquency (Logit Regression)	
	Coefficient	*SE*	Odds Ratio	Chi-square	Odds Ratio	Chi-square
Poverty category (reference: 100% of poverty or less)						
101%–150% of poverty	−0.4520	0.2642	**2.697****	**6.6428**	1.145	0.0480
151%–200% of poverty	−0.1296	0.3146	**3.051***	**5.5706**	0.920	0.0128
201%–300% of poverty	0.0405	0.3227	**4.916*****	**10.8242**	0.525	0.7405
Age of respondent	**−0.0151***	**0.0066**	**1.029****	**7.7342**	1.002	0.0183
Education of respondent (reference: less than high school)						
High school	−0.2119	0.2430	0.794	0.4135	0.907	0.0274
Some college	0.1189	0.3790	0.539	1.1927	1.071	0.0113
Bachelor degree	0.6233	0.4050	0.381	2.6011	1.351	0.1390
Postbachelor degree	**0.8889***	**0.4504**	0.417	1.8665	0.809	0.0454
Marital status (reference: married)						
Single male	−0.4438	0.2450	0.716	0.9572	1.482	0.6215
Single female	−0.2062	0.1591	0.644	3.5437	0.705	1.2629
Partner	−0.3861	0.2074	**1.956***	**4.5307**	1.784	2.5659
Employment status of respondent (reference: salary worker)						
Self-employment	**0.4724****	**0.1748**	**0.503****	**7.3484**	0.580	1.5090
Not working	−0.2524	0.2774	1.346	0.5301	1.366	0.3712
Racial/ethnic category (reference: White)						
Black	−0.1299	0.1849	0.917	0.1048	0.991	0.0012
Hispanic	−0.2710	0.2178	**0.488***	**4.7825**	0.964	0.0097
Asian or others	0.3269	0.3218	**0.358***	**4.5526**	0.404	0.8665
Expected income (reference: sure decrease)						
Sure same	0.2909	0.1948	0.924	0.0852	0.887	0.0930
Sure grow	−0.1474	0.2307	0.667	1.5010	0.642	0.7709
Not sure	0.0039	0.1766	0.701	2.2669	0.894	0.1179
Presence of a child younger than age 18 years (reference: no)	0.3230	0.2028	1.081	0.0598	1.327	0.4071
Homeowner (reference: no)	**1.9836*****	**0.2818**	0.701	0.6868	0.787	0.1799
Current income is lower relative to normal (reference: no)	**0.4529*****	**0.1385**	**0.401*****	**21.8009**	**1.94****	**6.9681**
Being unbanked (reference: no)	−0.3335	0.1762	**2.016****	**6.8961**	**3.373*****	**19.4231**
Inverse Mills ratio	−0.7569	1.1217	0.232	0.7441	0.472	0.1034
Model fit	Adj. R-squared	0.4181	Concordance	77.1	Concordance	71.8

Note. Unweighted repeated imputation inference (RII) analysis. Effects significantly different from 0 at $p < .05$ are in boldface. *$p < .05$. **$p < .01$. ***$p < .001$.

TABLE 6. Stage 2 From the Heckman Selection Model: 2010 and 2013 Survey of Consumer Finances

	Amount of Debt (OLS Regression)		Meeting Debt-to-Income Ratio Threshold (Logit Regression)		Debt Delinquency (Logit Regression)	
	Coefficient	*SE*	Odds Ratio	Chi-square	Odds Ratio	Chi-square
Poverty category (reference: 100% of poverty or less)						
101%–150% of poverty	**−0.2120***	**0.1084**	**3.211*****	**56.4299**	0.918	0.2883
151%–200% of poverty	**−0.2537***	**0.1315**	**4.991*****	**68.2473**	0.783	1.1404
201%–300% of poverty	−0.1522	0.1484	**7.832*****	**79.9392**	**0.499****	**6.8143**
Age of respondent	**−0.0068***	**0.0034**	1.001	0.0313	**1.015***	**5.2416**
Education of respondent (reference: less than high school)						
High school	0.2092	0.1338	0.874	0.4051	0.913	0.1405
Some college	**0.5549****	**0.2025**	0.582	2.8489	0.692	0.9502
Bachelor degree	**1.0630*****	**0.2015**	**0.378****	**9.2588**	0.551	2.3689
Postbachelor degree	**1.8172*****	**0.2191**	**0.350****	**8.7078**	**0.361***	**5.6377**
Marital status (reference: married)						
Single male	−0.2598	0.1413	0.891	0.2667	1.552	2.9592
Single female	**−0.3247*****	**0.0852**	**0.678****	**8.8524**	1.101	0.4129
Partner	−0.0438	0.1062	1.057	0.1056	1.028	0.0237
Employment status of respondent (reference: salary worker)						
Self-employment	**0.4042*****	**0.0884**	**0.526*****	**24.9811**	0.931	0.2260
Not working	**−0.2300***	**0.1099**	1.330	2.9539	0.971	0.0297
Racial-ethnic category (reference: White)						
Black	−0.1427	0.8331	1.042	0.0972	**1.337***	**4.2883**
Hispanic	**−0.3373*****	**0.0942**	**0.684****	**6.9444**	1.074	0.1559
Asian or others	0.0961	0.1744	0.738	1.3505	0.902	0.0965
Expected income (reference: sure decrease)						
Sure same	−0.0778	0.0981	0.934	0.2014	**0.667***	**4.6722**
Sure grow	0.0028	0.1240	0.791	1.4267	0.678	2.9099
Not sure	−0.0450	0.0914	0.857	1.0096	1.215	1.5040
Presence of a child younger than age 18 years (reference: no)	**0.1917***	**0.0958**	**1.322***	**3.9754**	1.15	0.6279
Homeowner (reference: no)	**1.7674*****	**0.1888**	1.376	1.1975	**0.416***	**5.8371**
Current income is lower relative to normal (reference: no)	**0.2116****	**0.0686**	**0.519*****	**46.2315**	**1.931*****	**35.0224**
Being unbanked (reference: no)	**−0.4044*****	**0.9578**	**1.391***	**5.1515**	**1.872*****	**18.7408**
Year (reference: 2010)	−0.0298	0.0201	1.017	0.3378	1.01	0.0716
Inverse Mills ratio	−0.4913	0.5986	0.534	0.4425	**0.11***	**3.8251**
Model fit	Adj. R-squared	0.3909	Concordance	76.9	Concordance	67.3

Note. Unweighted repeated imputation inference (RII) analysis. Effects significantly different from 0 at $p < .05$ are in boldface. OLS = ordinary least squares.

*$p < .05$. **$p < .01$. ***$p < .001$.

inverse Mills ratio was found to be significant, which reflects a possible sampling bias in the analysis of debt delinquency, therefore justifying the use of the Heckman selection model as necessary to prevent bias in the analysis.

Discussion

This study examined the debt profile of low-income households before and after the Great Recession. We used the Heckman two-stage selection model to manage any sample selection bias. Results from a probit regression analysis of debt holding (Stage 1) showed that the probability of households holding debt increased as income level increased. This was significant both before and after the Great Recession.

In the outcome stage, we analyzed three different debt characteristics including the amount of debt, debt-to-income ratio, and debt delinquency, separately. First, controlling for age, education, and other household characteristics, those below 100% of the poverty threshold had more debt than those in the other poverty categories. This specific pattern was only found following the Great Recession, which supports existing concerns about debt difficulties of low-income households and their resiliency. With the increase in the supply of credit before the Great Recession, households' debt burden increased with the increase in demand for home purchases. Our findings identify that households in the most severe poverty category (below 100% of the poverty threshold) were affected more severely by an increased debt load during the Great Recession than those in higher income level (less severe poverty), demonstrating the increased vulnerability of the lowest income households.

Second, results from the first logit regression showed that the likelihood of meeting the debt-to-income ratio guideline increased as income level increased, implying that the households below 100% of the poverty threshold were more likely to have an increasingly heavy debt burden. The pattern of financial burden was found before and after the recession consistently. Maintaining a manageable debt-to-income ratio was more difficult for the low-income household according to O'Neill and Xiao (2014). Our findings identify that the Great Recession magnified this problematic area for low-income households. Given the lack of emergency funds, high debt-to-income ratios, overbearing mortgage payments, and debt delinquency issues, low-income households struggled more than other households through the Great Recession.

Third, results from the second logit regression indicated that households in the lowest income level (below 100% of the poverty) were more likely to be delinquent than those in the highest income level (201%–300% of poverty); this was found only following the Great Recession. In light of previous research, our findings augment those of others, for example, low-income homeowners were not able to sustain mortgage payments over the course of 2 years because of unexpected expenses (Van Zandt & Rohe, 2011), highlighting the vulnerable position of these households. When using delinquency as a measure of financial strain, Bieker and Yuh (2015) found that the likelihood of being delinquent decreased with increases in income and net worth. The push to increase low-income homeownership may need to be balanced by efforts to help consumers accurately assess their debt levels prior to taking on a home mortgage. Low-income consumers often underestimate their nonmortgage debt and can be overconfident when inexperienced in financial matters. This often leads to the inability to continue making mortgage payments (Moulton, Loibl, Samak, & Collins, 2013).

According to the life-cycle hypothesis, households will borrow to smooth their consumption over time. In the event of an economic shock, such as a recession, it is important to have access to loanable funds or other savings to maintain current consumption. This smoothing process occurs at all income levels, but it can be more difficult for low-income consumers to access because of low credit limits or credit denial (J. Sullivan, 2008). This study found that low-income households faced more severe debt problems following the Great Recession, especially for the amount of debt and debt delinquency issues. Furthermore, if the household's current income is lower than their normal income, households could be more likely to borrow to smooth consumption. This study found that this lower transitory income may trigger debt problems of low-income households, similar to previous results in terms of the impact of adverse event on debt delinquency problems.

U.S. households faced increasing financial distress during the Great Recession, and economically vulnerable households experienced even more severe financial troubles and were especially at greater risk for experiencing debt problems. Overall, three research hypotheses were supported by the results from the 2010 and 2013 SCF covering the post-recession period. Although the financial crisis caused loss

of wealth, delinquencies, foreclosures, and higher unemployment, our findings suggest that low-income households faced severe debt distress in the form of high amount of debt, high debt-to-income ratio, and delinquency problems. These findings suggest that there is a salient need for more attention to low-income households to sustain their financial security especially when dealing with debt.

Although this study examined the debt profile of low-income households before and after the Great Recession, it is not without some limitations. First, the public version of the SCF does not provide specific geographic information (e.g., state of residence), so we could not control for specific unemployment rates and local policies related to alternative financial services which may impact a household's debt. Future research in the area of low-income households and debt may want to consider specifically examining the influence of alternative financial services as it relates to mainstream banking and financial outcomes.

In addition, we did not control for the type of debt with specific interest rates paid on debt by the consumers. Being able to control for and investigate this may help researchers better understand and develop strategies to improve the household's financial and debt management strategies and overall resiliency. To expand this area of research, future research could incorporate an investigation of specific debt types and the related interest rates paid by households, particularly as it relates to debt payments and the debt balance over time.

Implications for Policies and Practices

Findings from this study support existing concerns about the debt problems of low-income households. How can we help the low-income household prepare for a future possible financial emergency or crisis? As unexpected economic downturns occur, we need to be cognizant of the fragility of families who are already struggling and will be hit harder than those with greater resources. Implications are relevant to policymakers, practitioners, consumers, and researchers.

Regarding policymakers, understanding that low-income households are at greater risk for debt distress is salient to better serve the specific needs of this population. One issue is the decision to own a bank account, which reflects households' participation in the financial mainstream. This study found mixed results regarding the relationship between bank account ownership and debt problems. Unbanked households had lower amounts of debt and higher likelihoods of meeting the debt-to-income ratio guideline, yet they had higher rates of debt delinquency than those with bank accounts. Lack of mainstream banking options may be helping these households' debt management, because they have less access to bank credit options. In addition, unbanked households may not be as comfortable with mainstream banking options and may choose other nontraditional methods for financial management (Mauldin, Henager, Bowen, & Cheng, 2016). Unbanked households may be using debt options from alternative financial services (e.g., pay day loans, title loans). The other issue is experiencing debt delinquency and high debt-to-income ratios could be precursors to larger debt problems such as filing for bankruptcy. Improving the timing of debt counseling to prior to a bankruptcy filing, instead of following it, would be of greater help, as mandated counseling is occurring too late (Moorman & Garasky, 2008).

As households face financial difficulties, they turn to outside resources to make ends meet. Government assistance programs are one option for economically vulnerable households, but not all households meet the eligibility for benefits. Many households turned to the plastic safety net to make ends meet during the recession (Traub & Ruetschlin, 2012). Efforts from policymakers regarding low-income households can help address the concerns and consequences of low-income households relying too heavily on debt. Households could be better protected from turning to debt if policymakers increased the access, eligibility, and dissemination of information about assistance programs for households experiencing severe financial difficulties. An example of a program aimed at debt prevention is the IDA program. Findings from studies of IDAs show the importance of providing low-income households with knowledge and basic skills regarding saving and asset accumulation strategies (Zhan, Anderson, & Scott, 2006). As suggested by previous research, the IDA program could be a conduit for information dissemination aimed at helping families prepare for the future and potential financial volatility (e.g., Grinstead et al., 2011).

Practitioners working with low-income households could disseminate information regarding the risk factors in an effort to help households become more knowledgeable of such risks and perhaps avoid such debt difficulties. Understanding that low-income households are at greater risk for debt distress, and may be less resilient to economic downturns, will

help practitioners working with this population. Furthermore, some states provide debt relief programs (e.g., debt settlement or negotiation) if households have substantial amounts of debt. Efforts from these types of programs could reduce the household's amount of debt payments with existing creditors into one low monthly payment provided through government debt relief programs. Participating in debt management programs through credit counseling agencies have been found to have positive effects not only on financial outcomes but also on health outcomes (O'Neill, Sorhaindo, Xiao, & Garman, 2005). Practitioners working in financial counseling and education with low-income households may be able to improve their debt profile by assisting them in identifying eligibility for various government assistance programs and credit management programs.

Consumers benefit from the information found in this study as it increases awareness of vulnerable populations and can help prepare households for potential hardship. For example, a better understanding of the unbanked issues and preventive measures regarding debt delinquency can positively impact household preparedness. In addition, researchers can use results from this study to continue to examine low-income households' access and use of debt. More work is needed to study the impact of overwhelming debt on low-income households to develop better strategies to improve the household's financial and debt management strategies and overall resiliency. To expand this area of research, future research could incorporate an investigation of the interest rates paid by households, particularly as it relates to debt payments and the debt balance over time. This study analyzed the debt profile of low-income households before and after the Great Recession. Further research about the implications of debt for low-income households is still necessary. With the effects of the Great Recession fresh in the minds of U.S. households, preparing strategies and resources to help economically challenged households is important.

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