

Focusing on Both Sides of the Balance Sheet: The Benefit of Liability Optimization

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Abstract

Debt has become a significant issue among US households. Based on our analysis using the 2016 Survey of Consumer Finances (SCF), average household interest payments on liabilities exceed expected returns on investment assets by more than 50%. In this study, we first explore the role of US household debt and analyze the impact of different economic, demographic, and behavioral factors on household borrowing decisions. We then separate “good” and “bad” debts depending on type and interest rates, and investigate household characteristics associated with these categories. Lastly, our “alpha-equivalent analysis” reveals substantial potential benefits associated with improving household liability management. For households in the 75th percentile ranked by debt interest rate, reducing rates by five percentiles is equivalent to a return increase of 550 basis points on their investment portfolios. Our results indicate that households with lower asset, income, and education levels could benefit most from assistance with debt optimization.

Objective

Financial firms and advisors tend to spend significantly more time focusing on the assets side of the household balance sheet compared with the liability side. This focus is consistent with the primary skill set of financial advisors—building portfolios—and reflects how they are typically compensated (e.g., as a percentage of assets under management). However, in this study, we demonstrated that this predominant attention paid to the assets does not necessarily reflect the economic importance within the context of the household’s entire balance sheet (i.e., when liabilities are taken into consideration). For example, data from the 2016 Survey of Consumer Finances (SCF) suggest that among mass-affluent American households,³ the total interest payments on debts exceed the expected gains from their financial assets (Federal Reserve Board 2016). Therefore, spending time on “debt optimization” is likely to result in better outcomes than focusing on assets alone.

In this paper, we explore the composition of household balance sheets in the United States to understand the potential benefits associated with making more intelligent debt decisions. The objective of this study was to demonstrate the urgency, importance, and potential impact of household liability management by answering the following questions: What are the current financial situation and retirement outlook of mass-affluent US households? What factors are associated with household debts and leverage ratios? What is the difference between “good” and “bad” debts? Will the attributes related to households carrying different types of debts be similar? What kinds of families are more likely to be in the higher debt category, and how much could they save by accessing liability optimization?

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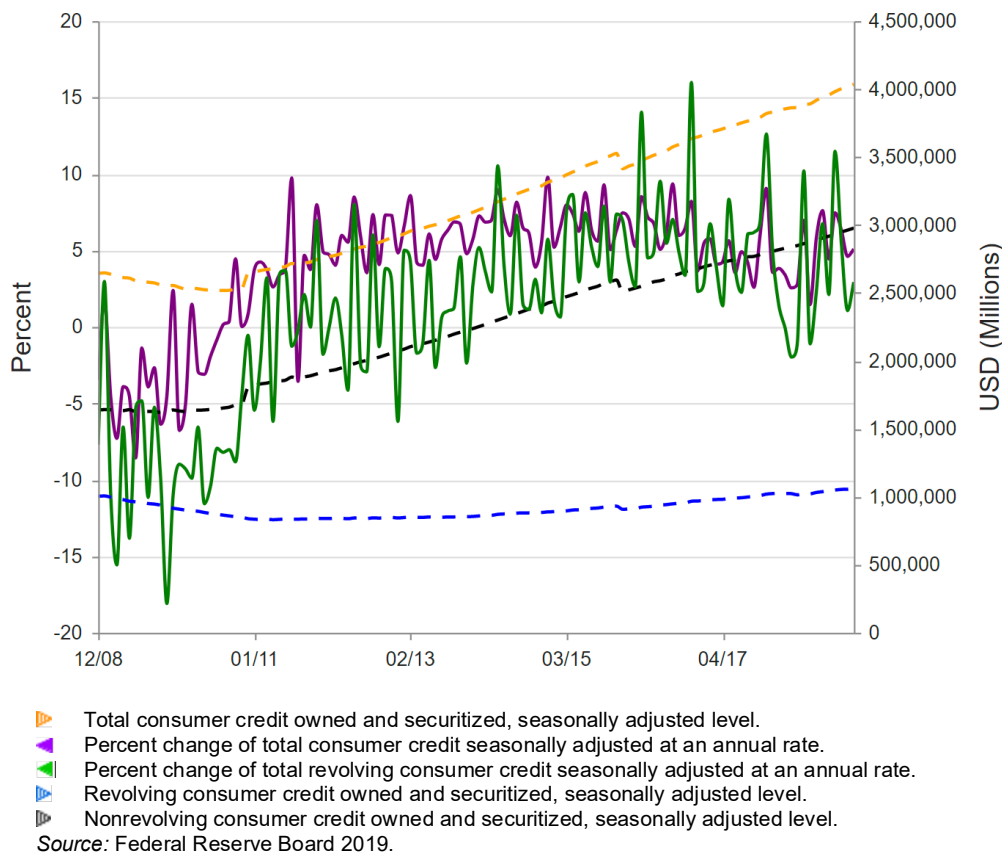
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³ Defined as households with a net worth not exceeding \$1 million. High net worth households, defined as those with net worth over \$1 million, often have their own unique leveraging and investment strategies, and optimizing these special strategies is beyond the scope of this paper. Our definition of “mass-affluent” households includes those in the middle-to-low income range because these households are most likely to need debt management assistance. Detailed descriptions of the analysis sample can be found in the data and methodology section of this paper.

Significance

Debt is an increasingly significant part of the US household balance sheet. After the 2007–2009 economic recession, debt levels of American households have increased significantly (Bricker et al. 2017). The total US household indebtedness was approximately \$13.5 trillion as of December 31, 2018, according to the Federal Reserve Bank of New York. This is higher than the previous peak of \$12.7 trillion in the third quarter of 2008 (adjusted to 2018 dollars) and has increased by 21.4% since the second quarter of 2013 (Federal Reserve Bank of New York 2019). Additional information on this effect is shown in Figure 1.

FIGURE 1
Growth Trends in US Consumer Credit Owned

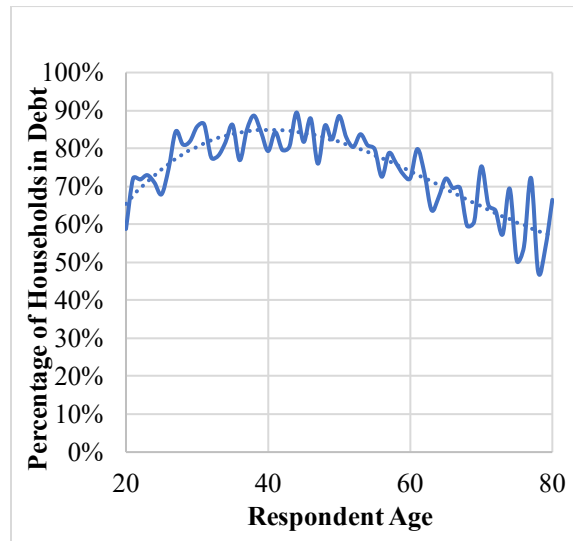


Among the different categories of household liabilities, high-interest debts such as consumer revolving credit debts have significant negative impacts on household balance sheets and cash flows. Based on information from the Federal Reserve Bank of New York (2019), credit card balances stood at \$870 billion as of the last quarter of 2018, with a seasonally adjusted annual growth rate of 3%. Auto loan originations reached the highest amount in the 19-year recorded history of the New York Fed in 2018, amounting to \$584 billion. Unlike certain “good” debts, which tend to have lower relative interest rates and are typically used to purchase assets that are expected to generate long-term income or grow in value (e.g., mortgages), “bad” debts such as credit cards, payday loans, and some auto loans typically have higher interest rates and are generally associated with purchases (and assets) that do not generate positive long-term returns. Bad debts are not only expensive, but they may also negatively influence the borrowers’ credit scores, hinder their financial and retirement goals, and even cause stress and

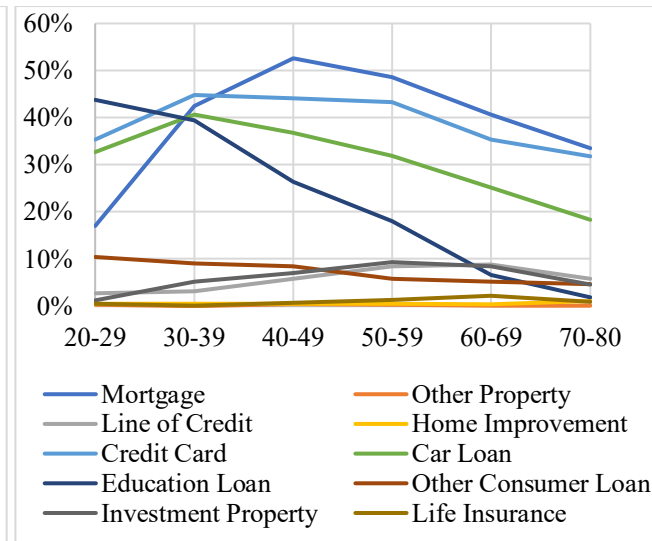
health issues. Our study explores the urgency and importance of liability management for American households.

FIGURE 2
Probability of a Household Having Debt

Panel A: Has Any Debt



Panel B: Type of Debt



Source: Federal Reserve Board Survey of Consumer Finances 2016 survey wave.

Notes: Weights applied.

Other consumer loans include loans for household appliances, furniture, hobby or recreational equipment, medical bills, friends or relatives, etc. This category does not include credit cards, margin loans, or loans against life insurance or pensions

Model and Method

Using the 2016 SCF data, we studied the characteristics of the balance sheets of American households, explored the factors that are associated with high debt-to-asset ratios for certain households, and investigated the benefit of liability management for these households. To better analyze the liability management of American households, we structured our theoretical framework according to the life-cycle hypothesis (Modigliani 1986; Jappelli and Pagano 1989), which holds that a household chooses a consumption path to maximize its lifetime utility subject to an intertemporal budget constraint. We started with a simple two-period life-cycle model to understand the dynamic intertemporal choice issue. Then we generalized this model to multiple periods to capture the households’ liability decisions for different life stages.

The regression analyses used in this paper followed these steps: First, we used probit and ordinary least squares (OLS) regressions to study what factors are associated with household debt. We looked at the economic, demographic, and behavioral factors that could potentially impact the likelihood of carrying household debt, the total debt amount, the debt-to-financial-asset ratio, and the debt-to-income ratio. Second, we divided the analysis sample into quintiles according to the households’ debt amount and examined what factors are associated with households in the top debt quintiles. Next, we isolated what are frequently considered “bad” debts (represented by credit card debts) and compared them with debts that are typically viewed as “good” debts (represented by mortgages) to see whether the factors associated with different debt categories are similar. Then, we utilized different interest rate measures to check the attributes that relate to high interest rates. Finally, we performed alpha-equivalent

analyses and calculated the potential savings to demonstrate the impact of liability management and interest rate reduction from a financial asset perspective.

Results

Our study indicates that households with lower assets, income, and education levels need assistance the most and could significantly benefit from debt management. Households’ time discounting preferences also play an important role in their borrowing decisions. Families with longer financial planning horizons are less likely to carry loans. Among the borrowers, a shorter financial planning horizon is usually an indicator of a higher debt amount as well as higher debt-to-asset and debt-to-income ratios. Families with myopic planning horizons are also more likely to carry a higher amount of “bad” debts, such as credit card balances.

(Due to word limits, the results of the four regressions are attached in the Appendix/Supporting Details Section below.)

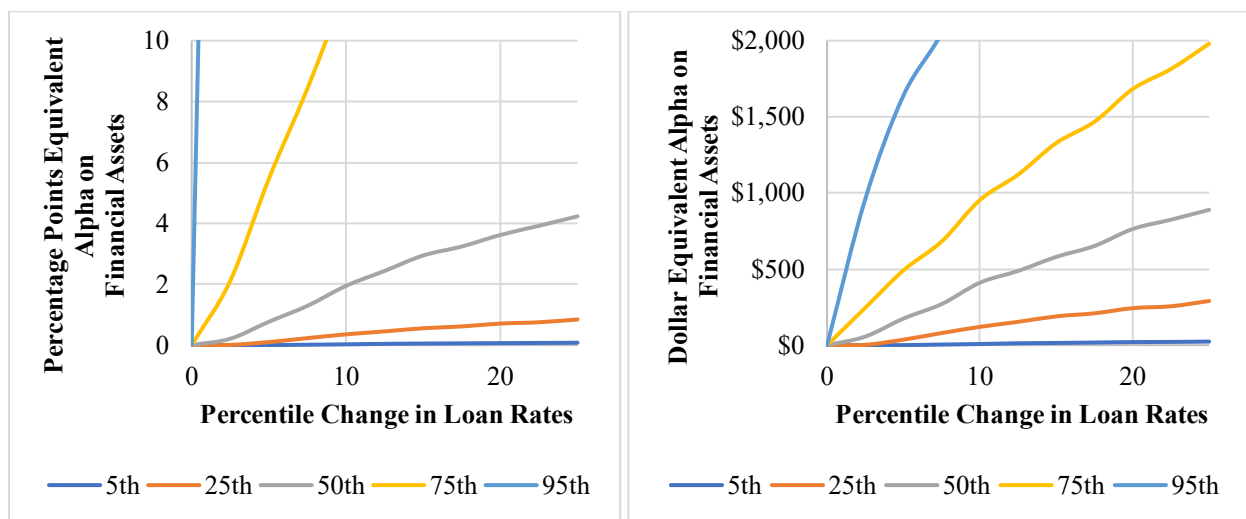
In order to know how much impact liability management could potentially bring to the American family’s financial wellbeing, we perform the following “alpha equivalent” analysis and calculate the potential benefit associated with an interest rate reduction and put it in the context of financial assets. For instance, consider a household that is currently at the 75th percentile in terms of their debt interest rate. If this household can reduce the loan rates through liability management and drop to the 70th percentile, the benefit of this rate reduction is equivalent to a 5.5% “alpha”, or 550 basis points extra return in investments. In terms of dollar amount, this five-percentile drop is equal to \$492 extra annual returns from this family’s investment assets return. If this household can reduce the loan rates and drop ten-percentile, the equivalent alpha generated by this improvement is equal to 11.7%, or \$953.

The positive impact of debt management is more significant for households who are in higher interest percentiles. Based on the 2016 SCF data, if a household’s weighted average debt interest rate is currently in the 95th percentile, a five-percentile drop could generate 113.5% equivalent alpha or \$1,641 in investment return. If the percentile drop reaches ten percent, \$2,614 can be saved for this household, which equals to 237.5% investment alpha!

FIGURE 3
Benefit of Reducing Interest Rates on Debt

Panel A: Alpha Equivalent

Panel B: Dollar Amount



Percentage Points Equivalent Alpha

Change in Interest Rate Percentile											
Current Interest Rate Percentile	Δ0	Δ2.5	Δ5	Δ7.5	Δ10	Δ12.5	Δ15	Δ17.5	Δ20	Δ22.5	Δ25
5th	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.10%	0.10%	0.10%	0.10%
25th	0.00%	0.00%	0.10%	0.20%	0.40%	0.50%	0.60%	0.60%	0.70%	0.80%	0.80%
50th	0.00%	0.20%	0.80%	1.30%	1.90%	2.40%	2.90%	3.20%	3.60%	3.90%	4.20%
75th	0.00%	2.10%	5.50%	8.40%	11.70%	14.40%	16.90%	18.90%	21.70%	22.80%	24.70%
95th	0.00%	57.20%	113.50%	159.60%	237.50%	254.40%	302.80%	336.50%	382.20%	410.60%	455.40%
Dollar Equivalent Alpha											
Change in Interest Rate Percentile											
Current Interest Rate Percentile	Δ0	Δ2.5	Δ5	Δ7.5	Δ10	Δ12.5	Δ15	Δ17.5	Δ20	Δ22.5	Δ25
5th	\$0	\$0	\$0	\$4	\$7	\$12	\$14	\$17	\$20	\$21	\$23
25th	\$0	\$2	\$36	\$79	\$120	\$153	\$189	\$209	\$243	\$255	\$290
50th	\$0	\$56	\$175	\$270	\$410	\$488	\$580	\$652	\$763	\$824	\$889
75th	\$0	\$245	\$492	\$681	\$953	\$1,120	\$1,328	\$1,468	\$1,683	\$1,814	\$1,980
95th	\$0	\$960	\$1,641	\$2,053	\$2,614	\$2,952	\$3,409	\$3,785	\$4,278	\$4,443	\$4,840

Source: Federal Reserve Board Survey of Consumer Finances 2016 survey wave.

Notes: The subsample is restricted to households that carry loans, reported complete data on all loan types, and have more than \$1 in financial assets. The number of observations is 3,371. The 2016 SCF sample weights were applied.

Conclusion/Relevance

Debt is a significant and growing component of US household balance sheets. With total interest rate payments on loans exceeding the expected returns on household financial assets, the impact of liability optimization should draw more focus from financial advisors, financial firms, and consumers. Our study indicates that households with lower asset, income, and education levels could benefit most from assistance with debt optimization.

The results of this study can also inspire advisors and financial services firms to consider alternative approaches to helping consumers improve their financial well-being. For example, advisors could help their clients design a road map for debt restructuring and interest rate reduction along with building portfolio investment strategies. By reviewing both sides of the household balance sheet extensively and periodically, advisors can integrate both investment and liability management strategies to better improve their clients' economic outlooks. These strategies would be particularly effective for households with lower income, education, and asset levels.

Large retirement firms could explore the possibility of building a bridge between their retirement plan participants and lending institutions to help their participants gain access to loans with competitive rates. Participants could utilize these lower "group rate" loans to restructure and reduce the interest payments on their existing debts. Financial planners could also implement different behavior coaching strategies (such as behavioral nudging devices) to help their clients increase their financial planning horizons and avoid the consequences of myopic planning.

Appendix/Supporting Detail

TABLE 1
Probit and OLS Regressions on Factors Associated with Household Debts

Variables	Probit (ME) ^a	OLS	OLS	OLS
	Have Debt	Total Debt Amount (\$)	Debt-to-Financial-Asset Ratio	Debt-to-Income Ratio
Married	0.115** (0.039)	-819.6 (3,577.505)	-119.2 (186.344)	-0.223* (0.102)
Number of kids	0.0787*** (0.019)	5,433.1*** (762.826)	151.1 (142.587)	0.0172 (0.025)
Education level	0.0593*** (0.007)	2,830.9*** (658.963)	-62.01 (33.751)	0.102*** (0.020)
Real assets (per \$10K)	0.0109*** (0.002)	4,314.9*** (207.030)	6.767 (8.760)	0.0416*** (0.003)
Liquid assets (per \$10K)	-0.0794*** (0.010)	-4,076.7*** (0.051)	7.407 (0.001)	-0.0459*** (0.000)
Have houses	0.583*** (0.057)	6,711.6** (2,509.261)	123.3 (253.975)	0.750*** (0.069)
Have savings	0.298*** (0.035)	3,114.6 (1,963.956)	-853.9*** (149.459)	0.109 (0.089)
Race black	0.126* (0.052)	8,291.1*** (1,863.746)	216.5 (300.610)	0.116 (0.067)
Race Hispanic	-0.0300 (0.052)	-525.3 (4,670.203)	-177.6 (300.430)	0.116 (0.088)
Race other	-0.0178 (0.062)	4,989.8 (2,683.881)	-511.6** (184.211)	0.443 (0.226)
Income (per \$10K)	0.0578*** (0.011)	3,410.2** (1,128.458)	-35.24 (18.272)	-0.0950** (0.029)
Age	-0.0161*** (0.001)	-1,237.7*** (52.300)	-12.94*** (3.904)	-0.0238*** (0.002)
Financial planning horizon (omitted baseline category "next few months")				
Next year	-0.150** (0.052)	-3,839.2 (2,043.248)	-930.4** (286.531)	0.136 (0.160)
Next few years	-0.0195 (0.043)	-5439.2* (2,269.333)	-734.6* (293.134)	-0.123* (0.057)
Next 5 to 10 years	-0.202*** (0.050)	-11,861.2*** (2,530.713)	-969.5*** (262.833)	-0.193** (0.070)
Longer than 10 years	-0.245*** (0.060)	-6,553.9* (3,156.322)	-630.7* (306.992)	-0.276** (0.090)
<i>N</i>	4,481	4,481	4,481	4,481

a. This column reports the average marginal effect of the probit regression. The 2016 SCF sample weights were applied to the regressions.

Standard errors in parentheses.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

TABLE 2
Categorical Analysis of Debt Amount (Average Marginal Effects of Ordered-Probit Regression)

Variables	Bottom Quintile	Second Quintile	Third Quintile	Fourth Quintile	Top Quintile
Married	-0.0191* (0.008)	-0.00534* (0.002)	0.00110* (0.000)	0.00852* (0.004)	0.0149* (0.006)
Number of kids	-0.0158*** (0.003)	-0.00440*** (0.001)	0.000904*** (0.000)	0.00703*** (0.002)	0.0123*** (0.003)
Education level	-0.0150*** (0.001)	-0.00419*** (0.000)	0.000861*** (0.000)	0.00669*** (0.001)	0.0117*** (0.001)
Real assets	-6.55e-07*** (0.000)	-1.83e-07*** (0.000)	3.75e-08*** (0.000)	2.92e-07*** (0.000)	5.08e-07*** (0.000)
Liquid assets	1.75e-06*** (0.000)	4.88e-07*** (0.000)	-1.00e-07*** (0.000)	-7.79e-07*** (0.000)	-1.36e-06*** (0.000)
Have houses	-0.164*** (0.009)	-0.0459*** (0.003)	0.00943*** (0.002)	0.0733*** (0.004)	0.128*** (0.008)
Have savings	-0.0462*** (0.007)	-0.0129*** (0.002)	0.00265*** (0.001)	0.0206*** (0.003)	0.0358*** (0.006)
Race black	-0.0312** (0.010)	-0.00871** (0.003)	0.00179** (0.001)	0.0139** (0.004)	0.0243** (0.008)
Race Hispanic	0.00876 (0.012)	0.00244 (0.003)	-0.000502 (0.001)	-0.00390 (0.005)	-0.00680 (0.009)
Race other	-0.000452 (0.012)	-0.000126 (0.003)	0.0000259 (0.001)	0.000201 (0.005)	0.000351 (0.009)
Income (per \$10K)	-0.0128*** (0.001)	-0.00357*** (0.000)	0.000733*** (0.000)	0.00569*** (0.000)	0.00993*** (0.001)
Age	0.00451*** (0.000)	0.00126*** (0.000)	-0.000258*** (0.000)	-0.00201*** (0.000)	-0.00350*** (0.000)
Financial planning horizon (omitted baseline category "next few months")					
Next year	0.0286* (0.011)	0.00798* (0.003)	-0.00164* (0.001)	-0.0127* (0.005)	-0.0222* (0.009)
Next few years	0.0193* (0.010)	0.00539* (0.003)	-0.00111 (0.001)	-0.00860* (0.004)	-0.0150* (0.008)
Next 5 to 10 years	0.0373*** (0.010)	0.0104*** (0.003)	-0.00214** (0.001)	-0.0166*** (0.005)	-0.0289*** (0.008)
Longer than 10 years	0.0418** (0.013)	0.0117** (0.004)	-0.00239** (0.001)	-0.0186** (0.006)	-0.0324** (0.010)
<i>N</i>	4,481	4,481	4,481	4,481	4,481

Notes: The 2016 SCF sample weights were applied to the regressions. The descriptive statistics of the five quintiles are as follows:

Five Quintiles According to Debt Amount	Summary of Debt				
	Mean	Min	Max	Std. Deviation	Freq.
1	\$0	\$0	\$0	\$0	920
2	\$3,837	\$20	\$10,750	\$3,312	875
3	\$26,144	\$10,800	\$49,100	\$10,998	894
4	\$91,860	\$49,300	\$148,100	\$27,957	896
5	\$272,372	\$148,160	\$2,630,000	\$146,520	896
Total					4,481

Standard errors in parentheses.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

TABLE 3
 OLS on Different Debt Categories

Variables	“Bad” Debts (Credit and Store Cards Balance)	“Good” Debts (Mortgages)
Interest rate	-28.40 (18.556)	-1,673.5* (677.040)
Married	265.1 (364.032)	-4,993.6 (4,070.197)
Number of kids	275.3* (122.659)	5,148.3*** (1,183.437)
Education level	76.84 (54.142)	1,626.4* (771.444)
Real assets	0.00197 (0.001)	0.393*** (0.020)
Liquid assets	-0.0328*** (0.003)	-0.0817 (0.067)
Have houses	519.9 (388.969)	Omitted
Have savings	-419.8 (262.935)	-823.7 (3,076.358)
Race black	-528.6 (345.616)	7695.6 (4,149.247)
Race Hispanic	-685.3* (314.295)	6,027.6 (9,231.032)
Race other	-247.4 (311.224)	4,493.5 (5,760.525)
Income	0.0201** (0.007)	0.144 (0.090)
Age	13.30 (6.916)	-1,009.6*** (106.106)
Financial planning horizon (omitted baseline category “next few months”)		
Next year	-685.5 (386.068)	1,138.5 (4,312.770)
Next few years	-861.4** (322.013)	-6,064.8 (4,592.322)
Next 5 to 10 years	-1,109.0*** (329.694)	-9,363.6** (3,520.808)
Longer than 10 years	-1,368.6** (483.781)	-12,236.5** (4,396.354)
<i>N</i>	2,808	1,661

Notes: Not all of the respondents in our analysis sample reported the interest of different kinds of loans. Therefore, the number of observations was reduced in the regressions above. The 2016 SCF sample weights were applied to the regressions.

Standard errors in parentheses.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

TABLE 4
 OLS on Average Interest Rate Measures

Variables	Weighted ^a Average Interest Rate	Weighted Average Interest Rate Percentile	Simple ^b Average Interest Rate	Simple Average Interest Rate Percentile
Married	-1.187** (0.378)	0.00524 (0.009)	-0.789* (0.350)	0.00903 (0.009)
Number of kids	0.0337 (0.102)	0.0108*** (0.003)	0.164 (0.102)	0.0110*** (0.003)
Education level	-0.319*** (0.054)	-0.00613*** (0.002)	-0.277*** (0.051)	-0.00680*** (0.001)
Real assets (per \$10K)	-0.0381*** (0.007)	-0.00128*** (0.000)	-0.0431*** (0.008)	-0.00142*** (0.000)
Liquid assets (per \$10K)	-0.141*** (0.000)	-0.00348** (0.000)	-0.166*** (0.000)	-0.00388*** (0.000)
Have houses	-0.888** (0.342)	-0.00484 (0.010)	-0.368 (0.402)	-0.00774 (0.009)
Have savings	-0.826* (0.364)	-0.0164** (0.006)	-0.851* (0.354)	-0.0174** (0.005)
Race black	-0.506 (0.384)	0.0307** (0.009)	0.0127 (0.336)	0.0284*** (0.008)
Race Hispanic	0.749 (0.413)	0.0452*** (0.011)	1.332** (0.509)	0.0358*** (0.010)
Race other	0.0260 (0.420)	0.0126 (0.011)	0.627 (0.473)	0.0166 (0.011)
Income (per \$10K)	-0.0255 (0.040)	-0.00109 (0.001)	-0.0302 (0.041)	-0.00166 (0.001)
Age	0.0462*** (0.010)	0.000589* (0.000)	0.0297*** (0.009)	0.000559* (0.000)
Financial planning horizon (omitted baseline category "next few months")				
Next year	-1.343*** (0.406)	-0.00407 (0.011)	-0.396 (0.416)	-0.0109 (0.010)
Next few years	-0.505 (0.507)	-0.0188* (0.009)	-0.335 (0.447)	-0.0128 (0.008)
Next 5 to 10 years	-1.359*** (0.346)	-0.0185 (0.011)	-1.188*** (0.253)	-0.0194* (0.009)
Longer than 10 years	-0.692 (0.436)	-0.0111 (0.012)	-0.477 (0.356)	-0.00924 (0.011)
<i>N</i>	3,398	3,398	3,398	3,398

Notes: Interest information for some loans was not reported in the 2016 SCF data, therefore the total number of households was reduced from 4,481 to 3,398. The 2016 SCF sample weights were applied.

a. "Weighted" means this interest rate measure takes the dollar amount weighted average of the interest rates across all loan types into account. That is, for each household, the dollar amounts of different loans are multiplied by their interest rates to calculate the overall liability cost per year. Then this liability cost is divided by the total loan amount to acquire the weighted average interest rate for each household.

b. "Simple" means this interest measure is based on the simple arithmetic average of the interest rates across all loan types. This measurement serves as a robust check for the weighted average interest measure.

Standard errors in parentheses.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

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