Perceived Income Changes, Saving Motives, and Household Savings

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Using the 2007–2009 Survey of Consumer Finances panel dataset, we investigate whether and how changes in perceived income and saving motives are related to demand for household savings in the United States after the Great Recession. Households that perceive their current income as lower, relative to normal years are less likely to save than those who view that their income is the same as the reference point. This result holds only for those who experienced a significant negative income shock during the Great Recession. Among five major saving motives, saving for an emergency is an important factor in explaining the likelihood of saving. This study suggests that financial planners and educators should pay close attention to the role of households' income perception and saving motives and should account for the resulting potential psychological biases in households' saving decisions.

Keywords: household savings, income perception, saving motives, survey of consumer finances

Saving is an important means by which U.S. households accumulate wealth to meet their financial goals, such as preparing for retirement, saving for a college education, and protecting their assets against unpredictable stochastic risks. Because of the important role of saving in determining households' economic well-being, researchers have spent considerable effort studying households' savings decisions. The life-cycle hypothesis (LCH) predicts that households decide how much to save in order to maximize their expected lifetime utility (Ando & Modigliani, 1963). However, empirical analyses have shown that households make mistakes when they decide whether and how much to save (Campbell, 2006), leading some to undersave. Minority households, in particular, are more likely to make mistakes because they earn less income and are less educated than the majority households (Campbell, 2006).

Carroll, Hall, and Zeldes (1992), Carroll (1997), and Deaton (1991) tried to fill the gap between theoretical predictions and empirical findings by suggesting a precautionary motive to save. Based on their models, households hold their assets to buffer their consumption against unpredictable risks in income. Thus, households respond not only to expected income growth when saving but also to the variance in expected income growth (i.e., income risks; Lusardi, 1997). Katona (1974) suggested that psychological factors may play a role in explaining deviations between actual behavior and the prescriptions of normative economic theory about household savings. Katona postulated that saving depends not only on the ability to save but also on the willingness to do so. Willingness to save is associated with time-variant subjective factors such as households' expectations and attitudes in predicting their economic and financial situations. These expectations and perceptions may matter more when households experience significant events that are more salient such as the Great Recession. Given the unique circumstances during the recession, for example, unemployment rates rose from 7.3% in December 2008 to 9.9% in November 2009 (Bureau of Labor Statistics, 2016), psychological factors may have influenced households more than during normal times.

According to Tversky and Kahneman (1973), individuals use a cognitive shortcut, a heuristic, to simplify the process when they make decisions. When households suffer from availability bias, they may overestimate negative shocks to

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their income and save more in response to economic shocks. Concerns about the gambler's fallacy may arise if households underestimate the possibility of negative outcomes (Cohen, Etner, & Jeleva, 2008). Households suffering from the gambler's fallacy may underestimate the negative effects of the recession on their economic status and may have a propensity to save less than they should. In this study, we attempt to test whether or not these two behavioral biases explain household saving behavior after the Great Recession better than normative predictions.

The goal of this study is to test whether households saved differently according to heterogeneous perceptions of current income to normal years and saving motives even after controlling for other household characteristics. We contributed to the extant literature studying household savings in several ways. First, using a nationally representative sample from the Survey of Consumer Finances (SCF) dataset, we adopted a new approach for our empirical analyses. That is, we partitioned our sample by quartile measures based on percentage changes in their household income before and after the recession and investigated whether their perceptions of income and saving motives are related to their probability of savings in different ways across subgroups categorized using the income quartiles. By splitting households into four groups, we were able to control for unobserved differences in their characteristics. Second, as a robustness test, we used different measurements of savings to determine whether or not we were able to obtain consistent results across different measurements. Lastly, we contributed to the previous literature because we also accounted for whether or not households received government subsidies, such as food stamps and Medicaid. These government welfare programs may affect some households'—especially minority households'—financial well-being significantly (Forry, 2009).

Literature Review and Hypotheses

Income and Savings

Researchers have emphasized the importance of precautionary saving to help explain household financial decisions. The model of precautionary saving is built based on the "buffer-stock" model of saving (Carroll et al., 1992; Carroll, 1997). Carroll et al. (1992) suggested that households driven by unemployment expectations save to insure their consumption against stochastic income risks. In this model, if households are uncertain about their future income, they tend to save more to accumulate assets to their target level. Empirical findings have been mixed depending on the way in which researchers measured income uncertainty. For example, Dardanoni (1991) used occupational categories that combined occupation, industry, and economic position of the household head as a proxy for income uncertainty. Guiso, Jappelli, and Terlizzese (1992, 1996) measured income uncertainty using a direct question on the 1989 Survey of Household Income and Wealth about the percentage increases in nominal earnings and inflation for the following year. Researchers who have used the SCF dataset measured income risks with a question about income uncertainty in the following year (e.g., Yuh & Hanna, 2010). The previous empirical findings were inconsistent because they are very sensitive to measures of income risks (Lusardi, 1997).

Under uncertainty, households do not always make optimal decisions that maximize their expected lifetime utilities. Households have limited cognitive ability to gather all information about their alternatives and the utilities corresponding to each choice to determine the best alternative to maximize their utilities (Simon, 1955). Households also make choices depending on their expectations and attitudes about economic circumstances and financial status (Katona, 1974, 1975). However, based on Katona's (1974) studies, individuals' ability to forecast future economic circumstances might be biased and inefficient. Macro-economic events, such as the economic recession, might influence these perceptual factors greatly, such that, based on their characteristics, households might differ systematically in their response to the shock.

Researchers have found that the recession might have two contradictory effects on households. The first is that households perceived that the probability of negative events and the losses associated with them was greater after they experienced them personally (Tversky & Kahneman, 1973). They overestimated these negative outcomes because the information was easy to retrieve if the household suffered from availability bias, which previous studies have well documented. For example, after the earthquakes in Santa Barbara in 1925 and 1976, the demand for insurance against catastrophic natural disasters increased dramatically (Kunreuther, 1978, p. 26). Similarly, during the recession, households with availability bias might be more likely to save to buffer against the economic downturn. The opposite case occurs when households underestimate the probability that similar events will recur and ignore such negative

outcomes completely when they make economic decisions (Cohen et al., 2008). Households that suffer from the gambler's fallacy are less likely to save because they are overly optimistic about their financial situations. In this context, households may believe their changes in income are different than they actually are and thus may make suboptimal decisions in saving in response to their perceptions.

H1: Households' perceived income change is related to the likelihood of household savings.

Saving Motives and Savings

Furthermore, researchers have addressed the role of saving motives to explain household savings and have found that households with saving motives have a higher propensity to save. Hogarth and Anguelov (2003) showed that low-income households that reported any reason for saving (saving motives) were more likely to be savers compared to those without saving motives. More recently, households were more likely to save if they had saving motives for emergency and retirement (Fisher & Montalto, 2010; Fisher & Anong, 2012). Other researchers have proposed a hierarchical model of saving motives (Canova, Rattazzi, & Webley, 2005; DeVaney, Anong, & Whirl, 2007; Lee & Hanna, 2015; Xiao & Noring, 1994; Xiao & Anderson, 1997). For example, DeVaney et al. (2007) identified the characteristics of households that lead them to shift from lower to higher saving motives and found that the hierarchical structure consisted of physiological (basic), safety, security, love/societal, esteem/luxuries, and self-actualization motives. This indicates that households may have different saving motives or place different degrees of importance on each based on their characteristics. Lee and Hanna (2015) found that self-actualization and retirement/security motive increased the likelihood of saving, and the effects were greater than those of other types of saving motives. Based on the previous findings, this study tested the following hypothesis:

H2: Saving motives are associated with the likelihood of household savings.

Method

Dataset and Sample Selection

This study used the 2007–2009 SCF panel dataset released by the Federal Reserve Board. The data provided an excellent opportunity to examine whether the economic recession influenced perceived and actual changes in the economic status of U.S. households and whether those changes affected the demand for household savings. We used a total sample of 3,857 households, 87% of households from the original 2007 cross-sectional dataset. For our main analyses, we divided our sample into four subgroups based on the percentage change in their income between 2007 and 2009. When we estimated the quartile measures, we adjusted them for population weights provided by the SCF to account for the fact that the survey oversamples high-income individuals.

Dependent Variable

To measure whether or not households save, this study used the question: "Over the past year, would you say that your spending exceeded your income, was about the same as your income, or that you spent less than your income?" Kennickell (1995) stated that this variable is useful to describe whether households perceive that they are able to save and predict which will do so. Following previous studies on saving behavior, we defined as savers those households in which spending was less than income, excluding spending on investments or durables such as a home or automobile (Fisher, 2010; Fisher & Montalto, 2010; Hogarth & Anguelov, 2003; Kennickell, 1995; Rha, Montalto, & Hanna, 2006; Yuh & Hanna, 2010).

Independent Variables

As our main explanatory variable, we used the following question, which was asked in 2009: "Is this income unusually high or low compared to what you would expect in a 'normal' year, or is it normal?" The possible responses were "high," "low," or "normal." We included two indicators of "current income higher than normal years" and "current income lower than normal years." Households that responded that their income was the same as they earned in normal years served as a reference group. We measured saving motives following Fisher and Montalto (2010). The SCF asks a question about the most important reasons for saving that includes 36 different categories, and respondents can report up to six saving motives. Among these, we included five in our models: (a) emergency; (b) down payment; (c) lifecycle/retirement; (d) education for children and/or grandchildren; and (e) bequest for the family.

Following Yuh and Hanna's (2010) study, we selected the following control variables: race/ethnicity, age of head, age squared, education, marital status, health status of households, employment status of head, home ownership,

presence of a child under age 18 years, household income, household net worth, ownership of health insurance covering all members in household, and the availability of emergency funds from friends and relatives. We used variables from the 2009 follow-up wave of the 2007–2009 SCF because this study explained *ex-post* saving behaviors (postrecession) by groups classified based on *ex-ante* household characteristics. By doing so, we avoided reverse causality between the likelihood of saving and the dynamics between actual and subjective income changes. Table 1 provides detailed definitions for each variable.

Empirical Specification

We first used a pooled sample to estimate a logit model to ascertain which factors were related to the likelihood of saving. The model for the probabilities that households would be savers is as follows:

$$Prob\left(Saving_i = 1\right) = \frac{\exp\left(\beta_1 subjective\ income_i + \beta_2 x_i + \beta_3 m_i\right)}{1+\exp\left(\beta_1 subjective\ income_i + \beta_2 x_i + \beta_3 m_i\right)}$$

where $Saving_i$ indicates whether or not ith household saved, x_i denotes household characteristics, and m_i is saving motives. $Subjective\ income_i$ denotes households' perception of their current income with respect to the reference point.

Furthermore, this study was designed to evaluate household savings by household subgroups based on percentage changes in their income between 2007 and 2009. We categorized our sample into four groups using quartile measures: highest, third, second, and lowest quartile. Then, conditional on households' group specifications, we estimated a logit model to investigate households' heterogeneous demand for savings in response to their perception of current to normal income. This model predicted the likelihood of saving by each subgroup of households after other household characteristics were controlled, including perceptions of their current income and saving motives. We estimated the model as:

$$Prob\left(Saving_i = 1 | \ G_i\right) = \frac{\exp\left(\beta_1 subjective\ income_i + \beta_2 x_i + \beta_3 m_i\right)}{1 + \exp\left(\beta_1 subjective\ income_i + \beta_2 x_i + \beta_3 m_i\right)}$$

G_i denotes four subgroups of our sample based on percentage changes in income during the recession.

To handle missing data, Lindamood, Hanna, and Bi (2007) recommended that researchers use the repeated-imputation inference (RII) technique to incorporate five implicates to produce better standard errors and hypothesis tests because when models are run with different implicates, they yield different estimates (Montalto & Sung, 1996). We used the RII technique for all multivariate analyses.

Results

Descriptive Analyses

We divided our sample into four groups based on quartile measures of percentage changes in income between 2007 and 2009. Table 2 shows the distributions of selected household characteristics by quartiles. The median values of percentage changes in income for subgroups in the highest, third, second, and lowest quartiles are 70.08%, 10.25%, −14.25%, and −50.49%, respectively. In this descriptive analysis, we used the variables from the 2007 wave under the assumption that the *ex-ante* household characteristics (baseline characteristics prerecession) would determine the direction and magnitude of percentage changes in actual income during the period.

The proportion of the top quartile (i.e., those with a positive income shock) was the lowest for White respondents, and the highest for Black and Hispanic respondents. The rate of the highest quartile decreased with age and education while there was a mixed pattern for those in lower quartiles. The proportion of the top quartile was also the highest for people who were single female, in excellent health, unemployed, and with income uncertainty. The rate of the lowest quartile was highest for people who were single male, in poor/good health, and self-employed. Household income of those in the highest quartile was lowest in 2007, and highest in 2009. Net worth was highest in both waves for those in the lowest quartile.

Multivariate Analyses

Results from the logistic regression analysis provided the likelihood of saving, given household characteristics, including indicators of households' perceived income and saving motives (Table 3). We used the pooled sample for this analysis, and the last column shows the marginal effect of each independent variable. Households that perceived that their income was lower than the reference point were 13.57 percentage points less likely to save compared to those whose current income was approximately the same as normal. The saving rate of households that perceived that their income was higher

TABLE 1. Definitions of Variables

Variables	Description
Current income relative to normal year	(Reference group = current income is normal)
Higher	=1 if current income is unusually high
Lower	=1 if current income is unusually low
Saving motives	(Reference group = if household have other saving motives)
Emergency	=1 if household has a motive to save in case of unemployment, illness, medical/dental expenses, for emergencies and unexpected needs, to have cash available
Retirement	=1 if household has a motive to save for retirement
Education for child	=1 if household has a motive to save for education for child or grand child
Down payment	=1 if household has a motive to save for a home, car, boat, or other vehicle
Bequest	=1 if household has a motive to save for estate
Race/ethnicity	(Reference group = White)
Black	=1 if household self-identified as Black
Hispanic	=1 if household self-identified as Hispanic
Asian/other	=1 if household self-identified as Asian/other
Household income	Natural log of household total income ln(0.01) if income ≤0
Future income uncertainty	=1 if household has an uncertainty about future income
Age	Continuous measure of the age of head
Age-squared	Continuous measure of the age of head, squared
Household net worth	Natural log of household total net worth
Positive net worth	= ln(net worth) if net worth>0, ln(0.01) otherwise
Negative net worth	=ln(-net worth) if net worth <0, ln(0.01) otherwise
Education	(Reference group = less than high school degree)
High school degree	=1 if household attained high school degree
Some college without degree	=1 if household attained some college education
Bachelor degree	=1 if household attained bachelor degree
Post-bachelor degree	=1 if household attained post -bachelor education
Health status	(Reference group = poor health)
Fair	=1 if household haves fair health
Good	=1 if household have good health
Excellent	=1 if household haves excellent health
Presence of children <18	(Reference group = no dependent children in household)
Child <18	= 1 if have kids aged under 18
Employment status of head	(Reference group = head not working)
Employed	=1 if head works for someone else
Self-employed	=1 if head is self-employed
Retired	=1 if head is retired
Home ownership	(Reference group = renter)
Home owner	=1 if household is a homeowner
Household type	(Reference group = married)
Partnered	=1 if household type is partnered
Single female	=1 if household type is single female
Single male	=1 if household type is single male
Health insurance	(Reference group = no health insurance covering all members)
Insured	=1 if all members in household are covered by health insurance
Availability of emergency fund	(Reference group = financial assistance of $3,000 or more unavailable from any friends or relatives in an emergency)
Available	=1 if emergency fund is available to household

than the reference point did not differ significantly from that of those that perceived their income was the same as in normal years. Our hypothesis H1 is supported only when households perceived their income to be lower than the reference point.

Households that saved for emergencies and retirement were more likely to be savers. In particular, a household that saved for emergencies and/or for retirement was 5.62 percentage points and 3.91 percentage points more likely, respectively, to

TABLE 2. Percent Distribution of Quartiles of Income Change Between 2007 and 2009 by Household Characteristics

Variables	Highest Quartile	Third Quartile	Second Quartile	Lowest Quartile
% change in household income between 2007 and 2009 (Median)	70.08	10.25	−14.25	−50.49
Race/ethnicity				
White	23.14	26.48	25.81	24.57
Black	32.83	19.86	20.45	26.87
Hispanic	28.71	18.95	24.34	28.01
Asian/other	24.83	25.81	28.65	20.71
Age of head				
Younger than 30	39.13	23.97	18.80	18.10
30–39	25.41	27.29	21.55	25.75
40–49	24.23	26.26	25.64	23.86
50–59	20.86	23.40	30.25	25.49
60–69	21.83	22.79	23.97	31.41
70 and over	21.07	24.64	28.62	25.67
Education				
Less than high school	27.41	25.42	19.61	27.55
High school degree	25.01	23.61	27.26	24.12
Some college	25.68	23.13	24.26	26.93
Bachelor degree	24.64	26.51	25.75	23.10
Post-bachelor degree	22.77	27.95	24.97	24.31
Marital status				
Married	22.23	24.57	26.87	26.33
Single male	18.78	20.95	20.02	40.25
Single female	28.24	26.79	23.40	21.57
Partnered	24.99	24.90	25.09	25.02
Health status				
Poor health	25.21	22.95	24.72	27.11
Fair health	25.79	25.20	26.08	22.93
Good health	23.34	24.81	25.42	26.44
Excellent health	27.47	26.46	22.04	24.02
Employment status of head				
Not working	43.03	16.22	15.01	25.74
Employed	24.21	27.37	26.52	21.91
Self-employed	23.33	15.35	18.45	42.86
Retired	24.24	24.48	26.33	24.95
Future income uncertainty	30.81	19.39	19.40	30.40
Home ownership	21.27	25.47	27.18	26.08
Presence of children < 18 years	25.88	25.96	23.53	24.62
Income in 2007 ($)	53,040	71,131	85,026	147,199
Income in 2009 ($)	104,685	78,583	76,851	63,275
Net worth in 2007 ($)	432,716	379,460	510,263	1,051,335
Net worth in 2009 ($)	398,625	315,174	425,967	778,334
All covered by health insurance	24.45	25.62	25.70	24.23
Sample size	867	801	861	1,328

Note. Weighted results. If the survey year is not specified, variables are from the 2007 wave of the SCF.

TABLE 3. The Likelihood of Saving of Pooled Sample, Multivariate Logit Analysis

Variables	Coefficient	Standard Error	$p > \|z\|$	Marginal Effect
Constant	−0.7897	0.5132	.124	–
Current income (reference = normal)				
Higher	0.0001	0.1260	1.000	0.0000
Lower	**−0.5506**	**0.0875**	**<.0001**	**−0.1357**
Saving motives (reference = other saving motives)				
Emergency	**0.2316**	**0.0770**	**.003**	**0.0562**
Retirement	**0.1607**	**0.0802**	**.045**	**0.0391**
Education for child or grandchild	−0.0120	0.1156	.917	−0.0029
Down payment	−0.0233	0.1608	.885	−0.0057
Bequest	−0.1333	0.1210	.270	−0.0328
Uncertainty about future income	−0.1255	0.0821	.126	−0.0307
Race/ethnicity (reference = White)				
Black	0.0215	0.1325	.871	0.0052
Hispanic	−0.0304	0.1330	.819	−0.0074
Asian/other	0.2612	0.1888	.166	0.0622
Age of head	**−0.0670**	**0.0156**	**<.0001**	**−0.0164**
Age squared	**0.0006**	**0.0001**	**<.0001**	**0.0002**
Education (reference = less than high school degree)				
High school	0.2041	0.1704	.231	0.0492
Some college	0.2546	0.1755	.147	0.0613
Bachelor degree	0.2253	0.1832	.219	0.0543
Post-bachelor degree	**0.4007**	**0.1879**	**.033**	**0.0958**
Marital status (reference = married)				
Single male	0.0904	0.1212	.456	0.0219
Single female	**−0.2272**	**0.1041**	**.029**	**−0.0559**
Partnered	0.0235	0.1757	.894	0.0057
Health status (reference = poor health)				
Fair	0.0154	0.1218	.899	0.0038
Good	0.0484	0.1224	.692	0.0118
Excellent	0.1378	0.1411	.329	0.0334
Employment status of head (reference = not working)				
Employed	**0.4237**	**0.1578**	**.007**	**0.1027**
Self-employed	0.2441	0.1736	.160	0.0589
Retired	−0.1938	0.1855	.296	−0.0476
Home ownership	−0.1529	0.1126	.174	−0.0370
The presence of a child under 18 years	**−0.2730**	**0.1030**	**.008**	**−0.0671**
Log of household income	**0.0671**	**0.0143**	**<.0001**	**0.0164**
Household net worth				
ln(net worth) if >=0	**0.1481**	**0.0199**	**<.0001**	**0.0361**
ln(-net worth) if <0	**0.1055**	**0.0225**	**<.0001**	**0.0257**
All covered by health insurance				
Insured	0.2688	0.1566	.086	0.0665

(Continued)

TABLE 3. The Likelihood of Saving of Pooled Sample, Multivariate Logit Analysis *(Continued)*

Variables	Coefficient	Standard Error	$p > \|z\|$	Marginal Effect
Emergency fund from friends and relatives				
Available	**0.3132**	**0.0845**	**<.0001**	**0.0769**
N	3,857			
R^2	0.1158			

Note. Repeated-imputation inference technique is used for significance level and standard errors. Variables are from the 2009 wave of the Survey of Consumer Finances. Effects significantly different from 0 at $P < .05$ are in boldface.

be a saver than was a household that had other saving motives. H2 is partially supported because only two of the saving motives have significant effects on the likelihood of savings.

Age of the household head was a significant factor in explaining household saving. All households increased their saving until the head reached age 56 years and began to dissave thereafter. This result is consistent with the theoretical prediction of the LCH that households rationally choose to save more when the heads are younger and to dissave after retirement to smooth consumption. Both household income and net worth were positively related to the likelihood of saving. If households held graduate degrees, they were more likely to save than were those that had less than high school degrees. The probability that a household with a graduate degree was a saver was 9.58 percentage points higher than that of a household with less than a high school degree. Households with more education saved more perhaps because they are more future-oriented in saving and consumption than are those who are less educated.

Single female households were less likely to save. Single females' probability of saving was 5.59 percentage points lower than that of married households. Households with employed heads were more likely to save than were those with unemployed heads. An average household with an employed head was 10.27 percentage points more likely to save than was a household with a head who did not work. A household that expected to receive financial assistance from friends or relatives was 7.69 percentage points more likely to save than was one that did not have access to such resources.

Using the partitioned samples, we present the results of four logistic regression models in Table 4. Column (1) shows the results using households that are in the highest quartile in percentage changes in income during two periods (those who experienced a significant increase in income). It is interesting to observe that for these households, among the five saving motives, only saving for an emergency had a positive effect on the probability of saving (hence, H2 is partly supported). Because those who are in the highest quartile are relatively younger than are those who are in the other subgroups, they may have a shorter time horizon for saving than the others. Thus, for this group, the shorter-term saving motive (e.g., saving for emergency) has a significant effect on increasing households' savings. Other savings goals that they set to use the required amount of funds in the far future (e.g., retirement savings) are unrelated to the probability of saving.

Column (4) shows estimates from the model using the subsample that had a substantial income drop during the period. Among these households, those who perceived their income as lower than normal saved less than did those with current income that is approximately normal (hence, H1 is partly supported). Households may rationally choose to save less in response to a negative shock in their income. Even after taking into account uncertainty about future income, they saved less because they did not have sufficient resources to do so. Specifically, among households with heads who were not working or retired, the proportion of those in the highest quartile increased from 25.74% to 34.80% and from 24.95% to 28.90%, respectively. Estimates for control variables are not reported, but they are available from the authors upon request. These proportionate changes in employment status may provide evidence that some of the households in this group earned less income and thus save less.

Among other household subgroups (columns (2) and (3)), their perceptions of negative income shocks in the current year had no significant effect on their decision to save (hence, H1 is not supported). Based on the LCH, if these households are rational, they should save less than those who did not experience any change in their income. One possible explanation might be the availability bias. After experiencing a dramatic

TABLE 4. Logistic Regression Analyses by Quartiles of Income Changes Between 2007 and 2009

	Highest Quartile (1)			Third Quartile (2)			Second Quartile (3)			Lowest Quartile (4)		
Variables	**Coefficient**	***SE***	***p* > |z|**	**Coefficient**	***SE***	***p* > |z|**	**Coefficient**	***SE***	***p* > |z|**	**Coefficient**	***SE***	***p* > |z|**
Current Income (reference = normal)												
Higher	0.0216	0.2308	.926	−0.3903	0.2900	.178	0.1628	0.3910	.677	0.0976	0.3658	.790
Lower	−0.3557	0.2354	.131	-0.3055	0.2755	.267	−0.3011	0.2290	.189	**−0.7304**	**0.1449**	**<.001**
Saving motives (reference = other saving motives)												
Emergency	**0.4636**	**0.1983**	**.019**	0.2070	0.1948	.288	0.2627	0.1702	.123	0.1779	0.1373	.195
Retirement	0.1316	0.1882	.484	0.1158	0.2421	.632	0.2146	0.1984	.279	0.1406	0.1421	.322
Education for child	0.0247	0.2560	.923	0.0896	0.2801	.749	0.2686	0.2721	.323	−0.3279	0.2307	.155
Down payment	0.0440	0.3037	.885	−0.4578	0.3536	.195	0.4659	0.4723	.324	−0.2403	0.3705	.517
Bequest	0.0576	0.3070	.851	0.2328	0.4036	.564	−0.0932	0.3016	.757	−0.3966	0.2068	.055
Sample size	867			801			861			1,328		
R^2	0.1538			0.1414			0.1173			0.1428		

Note. Repeated-imputation inference technique is used for significance level and standard errors. Variables are from the 2009 wave of the SCF. Effects significantly different from 0 at $p < .05$ are in boldface. We control for race/ethnicity, household income, age of head, age squared, household net worth, education, health status, presence of a child under age 18 years, home ownership, household type, employment status, ownership of health insurance covering all members in household, and availability of emergency funds from friends and relatives. *SE* = standard error.

economic event, such as the recession, households may overestimate the negative shocks on their economic status and expect that the recovery might be slow. If this is the case, these households may overreact to the negative shock and choose to save more than they should, even if they think that they earn less than their reference point.

Robustness Checks

For the robustness checks, we first estimated the same logistic regression models using different measures of savings as shown in Table 5. The four additional saving measures we used were (a) "usual savers" (Hogarth & Anguelov, 2003); (b) "long-term savers" (Fisher, 2010); (c) "savers" if changes in net worth are greater than zero; and (d) the amount of savings (the dollar amount of changes in net worth; Avery & Kennickell, 1991; Kennickell & Starr-Mccluer, 1997). Following the measures used in previous studies, this study tested whether or not the results were robust across different definitions of saving.

Among households in the lowest quartile, those that perceived their current income as lower than normal were less likely to save than those with current income that was approximately normal. These results were robust across all saving measures. For those in the third quartile, if households perceived that their current income was higher than the reference point, they were less likely to save (Panel (a)) and saved less (Panel (d)) than those who earned the same as the reference point. There could be bias in the measures of savings. González and Özcan (2013) stated that saving measures defined as changes in net worth might suffer from errors and noise.

We found an inconsistency in the relationship between saving motives and households' decisions to save across different measures of savings. When we defined savers as "usual savers," households that raised funds for an emergency saved more than those who saved for other reasons. This relationship was significant for all four subgroups. The measure of saving as a habit is susceptible to the desirability bias if society considers saving desirable (Kennickell, 1995). On average, after a significant negative economic shock, it is possible that households considered saving as a desirable behavior, especially when their motive to save is to protect themselves against uncertain events. If we defined savers as "long-term savers," those who had motives to accumulate funds for retirement saved more than did those who had other savings goals in all subgroups.

We also conducted robustness tests after controlling for whether households received any government support, such

TABLE 5. Logistic Regression Analyses With Different Measurements of Savings, Robustness Check

Variables	Highest Quartile	Third Quartile	Second Quartile	Lowest Quartile	Highest Quartile	Third Quartile	Second Quartile	Lowest Quartile
	Usual Savers Panel (a)				Long-Term Savers Panel (b)			
Current income (reference = normal)								
Higher	−0.2480	**−0.8899**	0.1754	0.1034	−0.2523	−0.4433	−0.2561	−0.2999
Lower	−0.0191	−0.291	−0.2639	**−0.4382**	−0.4061	−0.0704	−0.3846	**−0.411**
Saving motives (reference = other saving motives)								
Emergency	**0.7929**	**0.6017**	**0.6848**	**0.5064**	0.1967	0.1248	0.2645	0.2061
Retirement	0.2777	0.41	0.4332	0.0958	**0.4002**	**0.4349**	**0.5535**	**0.4579**
Education for child	**0.7652**	0.3116	−0.1015	0.0472	0.2445	0.0102	0.1617	0.0765
Down payment	0.0398	0.4199	0.4125	0.9678	0.0836	0.3536	0.3031	0.2043
Bequest	0.1691	-0.0967	0.2578	0.1607	0.5706	−0.3016	−0.3142	−0.5346
	Savers (If Changes in Net Worth > 0)[a] Panel (c)				Amount of Savings (Changes in Net Worth)[b] Panel (d)			
Current income (reference = normal)								
Higher	−0.2099	−0.5606	0.0400	0.153	−1.2024	**−3.0594**	0.4655	1.1139
Lower	−0.3538	−0.3048	0.0212	**−0.3159**	−1.941	−1.1092	−0.065	**−1.6368**
Saving motives (reference = other saving motives)								
Emergency	−0.0819	−0.0754	0.1791	0.0143	−0.5734	−0.1944	0.7212	0.1695
Retirement	−0.2173	−0.0486	0.1549	−0.0221	−1.4664	−0.1118	0.6851	−0.2556
Education for child	0.2594	0.0053	0.0452	0.3153	1.8228	0.7072	0.6143	1.4099
Down payment	0.1354	0.2236	0.2499	0.0254	0.2514	0.5144	0.703	−0.2037
Bequest	0.2181	0.2734	−0.1624	0.0178	1.5002	2.1838	−0.5655	−0.1853

Note. Repeated-imputation inference technique is used for significance level and standard errors. Variables are from the 2009 wave of the Survey of Consumer Finances. Effects significantly different from 0 at $P < .05$ are in boldface. We control for race/ethnicity, household income, age of head, age squared, household net worth, education, health status, presence of a child under age 18 years, home ownership, household type, employment status, ownership of health insurance covering all members in household, and availability of emergency funds from friends and relatives.

[a]We used logistic regression analyses.

[b]We used linear regression analyses after taking an inverse hyperbolic sine transformation (Pence, 2006).

as food stamps and Medicaid. For low-income or minority households in particular, the availability of such resources may considerably improve their financial status or economic well-being (Forry, 2009). In the first specification, we included the indicator of whether a household had income in the previous year from Temporary Assistance for Needy Families, food stamps, or other forms of welfare or assistance, such as Supplemental Security Income. In the second specification, we controlled whether households had Medicaid or state variants thereof. We do not present full results here, but they are available upon request. Overall, the results were consistent with those in Table 4. Receiving benefits from government support programs was unrelated to the probability of household savings.

Discussion and Implications

In this study, using a nationally representative sample collected before and after the recession, we investigate whether households' decisions to save changes based on a heterogeneous perception of current income compared to their reference point and saving motives. We assume that households' decisions may systematically differ depending on the direction and magnitude of the income shocks that happened before and after the recession. For our analyses, we split our sample into four subgroups of households based on the quartile measures of percentage changes in income during the two periods.

With a pooled sample, households that perceive their current income to be lower than that which they could earn during normal years are less likely to save than those that believe that their income is the same as the reference point. This result is consistent with previous studies (e.g., Yuh & Hanna, 2010). Based on our analyses of the split sample, this relationship holds only for those who experienced a significant negative shock to their income (those in the lowest quartile). This negative correlation between households' perceptions of a decrease in their income and their probability of saving may be consistent with the LCH (Ando & Modigliani, 1963; Yuh & Hanna, 2010). On average, households may rationally choose to save less because they perceive that they do not have sufficient resources, especially after a significant income drop. We do not observe the same relationship in the other subgroups of households (those in the highest, third, and second quartiles). This indicator may not be significant because an insufficient number of households responded that their income was lower than the reference income in each subgroup. This small sample size may contribute to lower statistical power for the hypothesis tests. Moreover, one type of behavioral bias may explain this relationship. People may overestimate the magnitude of their negative income shocks and choose to save more to be prepared for similar shocks that may recur in the future (availability bias).

In our analyses of both the pooled and partitioned samples, households' perceptions of a positive income shock do not have a significant effect on their probability of saving. Fisher and Montalto (2011) explain this insignificant effect using Bowman et al.'s (1999) two-period consumption–savings model based on the concept of loss aversion (Kahneman & Tversky, 1979). This may be true, but we suggest another explanation. In our sample, only a few households responded that their income was higher than the reference point after the recession. A small number of observations decreases the power of hypothesis tests and may distort the results because of outliers. Thus, researchers should interpret this result with caution.

In some of the robustness tests for those who experienced a slight increase in their income, if they perceive that their income is higher than the reference point, they are less likely to save than are those who earn the same income as normal. A small number of outliers may drive this result as well. We also may be able to explain this relationship with the gambler's fallacy (Cohen et al., 2008). Some households might overestimate the magnitude of the increase in their income and thus consume more and save less than they should. Our data are limited in determining the best explanation of this relationship. Panel data collected for more than two periods may help us identify the main cause of this relationship. Even if we used the 2007–2009 SCF panel data, we conducted empirical analyses based on cross-sectional data from the 2009 wave because there is only a slight variation in factors during this period.

In the pooled sample, households are more likely to save if they save for emergencies and retirement. Based on our analyses of the split sample, the only motive that is positively associated with the probability of saving is for emergencies, and this effect holds only for households that experience a considerable positive income shock. Among five different saving motives, saving for an emergency may be an important factor that explains their likelihood of saving because households may have an incentive to prepare for high-risk events, especially after the Great Recession.

Our study has some limitations that are due to the nature of the dataset used. We are not able to identify whether households' income shocks were temporal or permanent because this dataset surveyed the same households only twice. Also, we are not able to reduce the potential endogeneity in the relationship between our group specification and household savings. Those who experience negative income shocks may withdraw cash from their savings account to meet their needs. Using the currently available datasets, it is impossible to determine whether the lower savings rate of the households with income drops are a function of their behavior (they actually saved less from income earned this year) or a function of income constraints inducing them to draw down from their savings to maintain their consumption to the same level as before the income drop. Thus, researchers should use caution when interpreting our results.

Implications for Financial Practitioners

Financial practitioners should note that households' perceptions of income are significant in explaining their likelihood of saving. Their perceptions of current income may not be consistent with their actual amount of income. For example, if households consider their previous year's income as their reference point, in the highest quartile, none or only a few households should have reported that their income was lower than normal. Households' perceptions of their income may fail to adjust for inflation rates. They may not update their information about sources of and changes in income regularly. Furthermore, they may choose to ignore information about their economic status because, for some households, it is cognitively demanding to process such information. For these reasons, financial planners and educators should help their clients assess their financial status correctly. This process is important because households make decisions to save based on their expected lifetime income.

In the current study, we show the potential existence of behavioral biases in the relationship between households' perceptions of current income and their decisions to save. Households with the availability bias may make a saving decision that deviates from the optimum. They may oversave because they overreact to their negative income shocks. Over-saving is not always optimal because they may have to sacrifice more utilities from current consumption than they should, which hinders them from maximizing their lifetime utilities. Households with the gambler's fallacy may undersave because they overestimate their positive income shocks and thus consume more than they should. If they under-save, they cannot accumulate sufficient assets to maintain smooth consumption after retirement. Financial practitioners should be aware of such biased perceptions of household economic status and provide appropriate financial advice or educational programs for households with these biases, which may occur in subgroups of households with specific characteristics. Thus, financial practitioners should provide personalized information.

We find that households are more likely to save if they have a motive to save for emergencies, such as unexpected unemployment and health shocks; therefore, financial planners and educators should emphasize to their clients that, to maintain their standard of living, it is important to be prepared for financial uncertainty. We also find that saving motives have different effects on households' decisions to save depending on subgroups of households. Financial practitioners also need to provide incentives that encourage their clients to save and tailor their savings goals based on their financial situations.

Implications for Policy Makers

Results from this study found that government support programs are not a significant factor in explaining the probability of household savings. Forry (2009) points out that the government's assistance may improve households' economic well-being, especially among those who earn low incomes and/or are minorities. Food stamps may ensure that these households have sufficient food to maintain their standard of living, and Medicaid may help them receive at least the minimum level of medical care. The government supports the cost of these types of necessities for low-income households, which may increase their savings; however, we find no empirical evidence to support for this. It is possible that these government programs crowd out demand for savings for some of the households. They may acknowledge that they are eligible for such programs only when they have fewer assets (before Obamacare removed the asset eligibility threshold for Medicaid). The eligibility rule may eliminate the demand for savings and thus make such households less likely to save. Among those who receive any government assistance, some households save more, and others do not. If the government programs have opposite effects on savings, the total effect may be offset. Thus, researchers should investigate these factors more to explain this relationship.

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