

Income Dynamics and Household Savings During the Great Recession

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Introduction

This study was designed to investigate the heterogeneity in demand for household savings in the U.S. after the Great Recession. We differentiated between groups of households that assessed changes in their income between pre- and post the Great Recession more or less accurately. We categorized households into three groups: realists who evaluated their income correctly, optimists who overestimated their income, and pessimists who underestimated changes in income. First, we determined contributing factors associated with each group of households that were realists, optimists, or pessimists. This approach enabled us to identify which households were more likely to be realists, optimists, and pessimists in the context of facing negative shocks caused by a macroeconomic event. Next, we tested our hypotheses that households save differently by heterogeneous perceptions of changes in income, even after controlling for other household characteristics. We assumed that the group specification would reveal important unobserved heterogeneity among households. To our knowledge, this is the first attempt to analyze household saving behavior in the framework of income dynamics that incorporate subjective and actual income changes. Using this framework, we were able to investigate whether or not household saving behavior was consistent with normative predictions. If it was not, we also investigated whether or not household savings were affected by the availability bias (Tversky & Kahneman; 1973) and gambler's fallacy (Cohen, Etner, & Jeleva, 2008).

Method

For our empirical analyses, we used the 2007-2009 Survey of Consumer Finances (SCF) panel dataset with a total sample of 3,857 households for our analyses. We categorized our sample into three groups based on whether or not households assessed changes in total household income correctly during the period between 2007 and 2009, and if they did not, whether they overestimated or underestimated the changes. We calculated actual differences in income between 2007 and 2009, and divided them into five groups based on quintile measures of the actual difference in income during the survey period. We used the question: "Is this income unusually high or low compared to what you would expect in a 'normal' year, or is it normal?" in 2009 for self-assessed changes in income. The responses were "high," "low," or "normal." Households were categorized as realists if their actual and perceived income changes were consistent, as optimists if they overestimated their income changes or pessimists if they underestimated their income changes. Table 1 provides detailed information about how we categorized each group. 34.16% of households in our sample were realists, 28.68% were optimists, and 37.16% were pessimists.

We used a multinomial logit analysis to estimate which households were more likely to be optimists or pessimists compared to realists, and pessimists relative to optimists. Our dependent variable was a categorical variable with zero indicating realists, one, optimists, and two, pessimists. Independent variables were: race/ethnicity; perceived projection of future income; household income; age of head; net worth; education; risk tolerance; health status; presence of a dependent child under age 18; occupation/employment status of head; home ownership, and household type.

We estimated a logit model to explain which households were likely to save. Our dependent variable of household savings was defined as in Yuh and Hanna's (2010) study. We defined households as savers if they spent less than their income during the previous year. Households that spent about the

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same as their income were also defined as savers if investments in durables such as a house or automobile were included in spending. We included race/ethnicity, subjective projection about future income, household income, age of head, age squared, household net worth, education, health status, presence of a child under age 18, home ownership, household type, employment status of head, ownership of health insurance covering all members in household, and availability of emergency funds from friends and relatives. We followed Yuh and Hanna's (2010) study for the selection of independent variables. With our pooled sample, we also included group indicators of optimists and pessimists by setting realists as a reference group to investigate the existence of a heterogeneous demand for saving by bias group indicators. For our analyses, we used the repeated-imputation inference (RII) technique which produce better standard errors and hypothesis tests both for multinomial logit and logit analyses recommended by Lindamood, Hanna, and Bi (2007).

Results

Saving rates

Figure 1 shows actual saving rates of households by groups based on income dynamics in each year. Before the recession, the proportion of savers was the highest among optimists, and the percent of savers was slightly higher among pessimists than realists. We found that this pattern changed after the recession. The percentage of pessimists who saved was the highest, and realists had the lowest proportion of savers. Pessimists might have had more incentive to save after than before the recession.

Multinomial logit regression analyses

Results from the multinomial logistic regression showed the effects of our independent variables on the likelihood of being in each of the bias groups. We conducted pairwise comparisons between realists-optimists, realists-pessimists, and optimists-pessimists (Table 2). In summary, married households and households with better health status were more likely to be realists. Households with higher income were more likely to be optimists. Households with higher net worth, lower income, with younger heads, and non-married households were more likely to be pessimists.

Logit regression analyses

Results from logit regression analyses provided the likelihood of saving given household characteristics, including bias group indicators of optimists and pessimists compared to realists (Table 3). The most important discovery of this study is that both optimists and pessimists were more likely to save than were realists. The result that optimists save more than realists is consistent with the life-cycle hypothesis (Ando & Modigliani, 1963). Because optimists perceive their income to be higher than it is, they will save more to smooth consumption. The gambler's fallacy bias does not occur in this case (Cohen et al., 2008). If optimists demonstrated the gambler's fallacy, they would underestimate the magnitude of negative outcomes and the probability of the recession to last longer and to occur again, and thus they would save less than realists.

The result that pessimists save more than realists seems to be contradictory to theoretical predictions based on the life-cycle hypothesis. If this is true, pessimists are less likely to save because they assess their income to be lower than it is. The opposite direction of the effect on household saving of being a pessimist may be explained by availability bias (Tversky & Kahneman, 1973). Availability bias occurs when households experience salient events, such as the Great Recession, and become preoccupied with the highly undesirable outcomes caused by this event, including high unemployment rates, sharp drops in income and net worth, and foreclosures. As an overreaction to these negative outcomes, pessimists may choose to save more than they should have as precautionary behaviors. The overreaction to the recession may explain in part why pessimists saved more after the recession than did realists. In addition to bias groups, income uncertainty, income, age of head, net worth, presence of child under age of 18, household type, employment status, ownership of health insurance, emergency fund from friends and relatives were significant.

Table 3 also displays estimators obtained from logit regression models that included indicators of being optimists and pessimists with three different measurements of savings (Horgarth & Anguelov, 2003; Fisher, 2010; Avery & Kennickell, 1991; Kennickell & Starr-McCluer, 1996). Our results were robust for

pessimists across different measurements of savers. We found consistent evidence of the existence of the availability bias after the Great Recession in household saving behaviors.

Conclusion

We discovered a new piece in the puzzle to explain the relationship between income and savings. For our analyses, we created a variable that incorporated income dynamics that combined actual and perceived changes in income, and categorized households as realists, optimists, or pessimists based on how correctly they perceived their income changes during the recession. Under the assumption that this group specification would reveal unobserved household heterogeneity, we showed that households have heterogeneous demands for savings by bias groups. Our results also provide convincing evidence of the existence of possible biases in perceiving income in the period of the Great Recession.

We found that approximately 66% of household either over- or underestimated their income changes. Assessing household income correctly matters in household financial management because households make a decision to save based on their expected lifetime income. Households with biases in perceived income may make a saving decision that deviates from the optimum. Both financial planners and educators should be aware of the existence of bias in perceptions of household economic status, be able to identify each type, and provide appropriate financial advice or educational programs for each group. Further analyses are required to determine whether or not biases in perceived household economic status are consistent or exist only temporarily because of the Great Recession. Panel data covering longer than two periods will help researchers verify whether or not households show consistent biases for longer periods of time.

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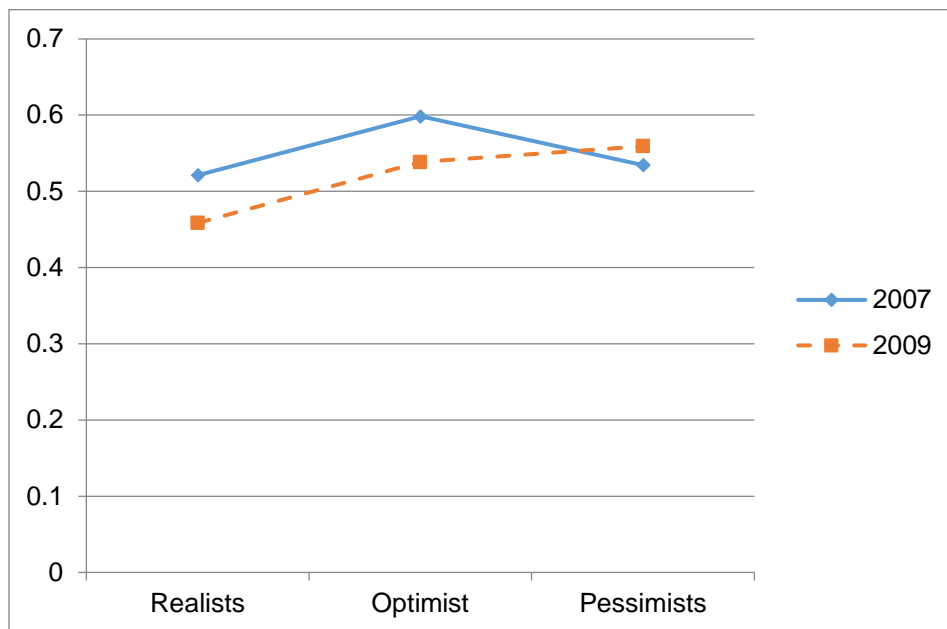


Figure 1 Household Saving Rates by Each Bias Group by Year

Table 1 .
Categorization of Group based on Income Dynamics

		Self-assessment of changes in income (Income relative to normal years)		
		Lower	Same as normal	Higher
Actual changes in household income	Decrease	Realists	Optimists	Optimists
	Little change	Pessimists	Realists	Optimists
	Increase	Pessimists	Pessimists	Realists

Table 2. Results from Multinomial Logit Regression Analyses

	Base: Realists						Base: Optimists		
	Optimists			Pessimists			Pessimists		
	Coef.	Std. Err.	P> z	Coef.	Std. Err.	P> z	Coef.	Std. Err.	P> z
Constant	-2.1188	0.5794	0.000	5.7609	0.6599	0.000	7.8797	0.6538	0.000
Household income									
Ln(income) [if ≤ 0, ln(.01)]	0.2006	0.0409	0.000	-0.4782	0.0548	0.000	-0.6788	0.0551	0.000
Age of head									
Age	0.0047	0.0041	0.253	-0.0075	0.0043	0.083	-0.0122	0.0044	0.006
Net worth									
Ln(positive) [if ≤ 0, ln(.01)]	-0.0673	0.0234	0.004	0.0043	0.0236	0.857	0.0715	0.0242	0.003
Ln(-negative) [if ≥ 0, ln(.01)]	-0.0580	0.0293	0.048	0.0208	0.0265	0.433	0.0787	0.0297	0.008
Education									
High school degree	-0.0622	0.2067	0.764	0.0580	0.2057	0.778	0.1201	0.2082	0.564
Some college	0.0875	0.2240	0.696	0.1472	0.2076	0.478	0.0597	0.2165	0.783
Bachelor's degree	-0.0129	0.2394	0.957	0.2247	0.2301	0.329	0.2376	0.2322	0.306
Post bachelor's degree	0.1399	0.2471	0.571	0.5263	0.2315	0.023	0.3864	0.2387	0.106
Health status									
Fair	-0.5674	0.1525	0.000	-0.2737	0.1467	0.062	0.2937	0.1509	0.052
Good	-0.4762	0.1518	0.002	-0.2805	0.1501	0.062	0.1957	0.1595	0.220
Excellent	-0.4491	0.1785	0.012	-0.0107	0.1770	0.952	0.4384	0.1851	0.018
Household type									
Partnered	0.2289	0.1799	0.203	-0.4008	0.1899	0.035	-0.6297	0.1906	0.001
Single male	-0.2372	0.1472	0.107	-0.3532	0.1482	0.017	-0.1160	0.1571	0.460
Single female	-0.4290	0.1447	0.003	-0.3831	0.1342	0.004	0.0460	0.1444	0.750

Note. RII technique is used for significance level and standard errors. Variables are from the 2007 wave of the SCF. Race/ethnicity, Perceived projection of future income, Risk tolerance, Presence of a dependent child under age 18, Occupation/employment status of head, and homeownership are included in our multinomial logit models.

Table 3. Results from Logit Regression Analyses with Different Measurements of Savings (Robustness test)

	Savers			Usual savers ^a			Long-term savers ^b			Savers (net worth) ^c		
	Coef.	Std. Err.	P> z	Coef.	Std. Err.	P> z	Coef.	Std. Err.	P> z	Coef.	Std. Err.	P> z
Bias group												
Optimists	0.2749	0.0910	0.003	0.1437	0.1106	0.194	0.1724	0.0923	0.062	0.0533	0.0952	0.576
Pessimists	0.3130	0.0889	0.000	0.1673	0.1080	0.121	0.3467	0.0889	0.000	0.5350	0.1001	0.000

Note. ^a Hogarth & Anguelov, 2003 ^b Fisher, 2010 ^c Avery & Kennickell, 1991; Kennickell & Starr-McCluer, 1996

RII technique is used for significance level and standard errors. Variables are from the 2009 wave of the SCF.

Each logistics regression model includes race/ethnicity, subjective projection about future income, household income, age of head, age squared, household net worth, education, health status, presence of a child under age 18, home ownership, household type, employment status, ownership of health insurance covering all members in household, and availability of emergency funds from friends and relatives.