Assessing the Effect of Reference-Dependent Income and Uncertainty On Households Saving

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Abstract

This study examines three reference-dependent income and uncertainty variables—deviation from normal income, expected income change, and income uncertainty change—on saving decisions to empirically test gain-loss utility in a two-period model to (1) find suboptimal decisions and (2) suggest ways to improve household saving behavior. Using the 2007 and 2009 Survey of Consumer Finances panel dataset, this paper's logistic regression results show that reference-dependent income and uncertainty variables have significant effects on saving decisions. The asymmetry of saving decisions between negative and positive changes in these variables were also found: although there were different effects on the likelihood of saving, overall households with negative changes were less likely to save than those with positive changes.

Introduction

Ideally, a household should consider lifetime wealth and the distinction between transitory and permanent income changes in making saving decisions. However, when economic volatility increases, such as during the Great Recession, predicting future income change is difficult for households. In these specific economic situations, gain-loss utility may thus play a more prominent role in inter-temporal decision-making. The prospect theory proposed by Kahneman and Tversky (1979) focuses on relative gains and losses to explain the utility of choice and consumption decisions. This theory focuses on relative changes in income and consumption: how much one's current deviates from previous income, or how far one's current is from past consumption, creates expectations about future income changes, thus influencing saving and consumption in the current period. A consumer's well-being depends not only on the amount of their current consumption, but also on how their current deviates from past their consumption. This study has the following research purposes: (1) this study will assess how the deviation from normal income, expected income growth, and subjective income uncertainty change affected saving decisions; (2) this study will measure expected income change in two ways; and (3) this study will assess the different effects on saving between positive and negative changes in reference-dependent income and income uncertainty to capture any possible asymmetry.

Literature Review

Classical economic models theoretically assume that if a household is sure about its future income, the desire for smooth consumption indicates that changes in permanent income immediately affect borrowing and saving (Chang, 1994) and that predictable income changes should not affect consumption decisions. Consumption is thus not expected to respond to transitory income changes, such as lagged income changes and expected income changes (Ando & Modigliani, 1963).Under the assumptions of the LCH and PIH, households should save more when they expect their income to decrease for smooth consumption (Feigenbaum & Li, 2011).

Many empirical studies, however, have verified the predictive power of one's expectations about future income change and the relative change in lagged income on both saving and consumption decisions in the next period, doing so by either testing coefficients, marginal propensity to consume, or one's sensitivity of consumption to income change, which are inconsistent with the LCH/PIH (Alessie & Lusardi, 1997; Campbell & Mankiw, 1991; Shea, 1995). Also, studies have found that relative changes,

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when compared to past income or consumption as a reference point, have asymmetry between

consumption and saving (Bowman, Minehart, & Rabin, 1999; Shea, 1995; van Treeck, 2010). Probing the role of expectations, however, goes beyond dealing with mere pessimism/optimism or skepticism/trust—if saving is determined not only by income but also by psychological factors (Wärneryd, 1989), then various forms of reference-dependent changes could also affect saving decisions besides expectations of income. In particular, Bowman et al. (1999) tested the asymmetry of consumption responses based on the loss aversion theory, assuming that utility from consumption depends on the relative difference between the reference point and current consumption level. Households do not necessarily decrease their consumption if there is a sufficient probability of income uncertainty under the hope that their income will not be too low to cover their current spending. This causes negative changes in saving in the next period.

Method

The 2007 and 2009 Survey of Consumer Finances (SCF) panel dataset was used. 2,744 households were analyzed after excluding households with credit access limitations as suggested by Bowman et al (1999) and Shea (1995). This study measures credit access as a dichotomous variable, considering whether households had experienced any of the following two credit constraints in the past five years: (1) whether households have been turned down and were thus unable to obtain the full amount requested either by reapplying to the same institution or applying elsewhere; and (2) to measure fear of being turned down, we considered whether households did not apply for credit because they thought they might be turned down even if they thought of applying for credit. 17.71% of households, which were considered to have limited credit access, were thus excluded. Furthermore, to see the effects of marital status in 2007 on the expected income change between 2007 and 2009, households whose marital status changed over that period (15.54%) were also excluded. Whether households are savers or not was used as the dependent variable. For explanatory variables, reference-dependent income and uncertainty variables consisted of three measurements: (1) deviation from normal income measures how a household evaluates their last year's income compared to a normal year's income as a reference point (positive, negative, same); (2) expected income change was measured through both objective expectations, estimated by regressing actual normal income change between 2007 and 2009 through a set of demographic variables in 2007 and subjective expectations (positive, negative, same). Income uncertainty change was measured by combining the answers (increased, decreased, stayed positive, stayed negative) in 2007 and 2009 with the following question, "whether they have a good idea of income next year". Self-control variables (foreseeable expense, saving rules, saving goal), socio-demographic variables (age, education, income), and financial attitude (planning horizon, risk tolerance) were used as control variables. For descriptive statistics, the results of weighted analyses averaged across all implicates were performed. For multivariate analyses, the logistic regression was used and data was not weighted as suggested by Lindamood, Hanna, and Bi (2007). The repeated imputation inference (RII) techniques were used to obtain inference of greater validity based on the variance estimates for the logistic regression analysis (Montalto & Sung, 1996).

Results

Table 1 describes the reference-dependent income and uncertainty variables of the sample households. More than 70% of households evaluated their 2007 income as normal, while 42.98% of households expected about the same real income change in 2007. In both objective and subjective measures, negative expectations for income changes in 2007 were approximately 40%. For income uncertainty between 2007 and 2009, half of households responded that their income uncertainty stayed positive. Table 2 shows that the three reference-dependent income and uncertainty variables were significantly related to the likelihood of saving in 2009 and there were asymmetry of saving decisions between negative and positive changes in these variables. Overall households with negative changes were less likely to save than those with positive changes. This study also found a positive effect of self-control variables in 2007 on the likelihood of saving in 2009.

Conclusions

This study is the first to use a microeconomic nationwide panel dataset to test hypotheses derived from the loss aversion theory of saving to empirically test saving and loss aversion in two period model of Bowman et al (1999). Results support gain-loss comparison utility, which depends not only on the level of income but also income compared to the reference point, and loss aversion tendency. Households compare future income or standard of living to those of their own past experience (McBride, 2001) and do not necessarily decrease their consumption under the hope that their income will not be too low to cover their current spending (Bowman et al., 1999). Consequently, this study can also emphasize the importance of constructing more correct expectations and evaluations for future saving decisions. Most studies (1) focused on expected income change only, (2) used either, but not both of, of one the expected income measurements (Campbell & Mankiw, 1990; Shea, 1995), or (3) empirically analyzed the asymmetry in consumption rather than savings (Bowman et al., 1999).

Implications

Findings can thus contribute to an understanding of asymmetrical saving responses based on loss aversion as well as the relative gains and losses by controlling other influences besides loss aversion, such as credit constraints. The opposite results of asymmetry between objective and subjective measurements form more correct expectations and evaluations about income and income uncertainty, which is important. The findings provide insights for financial planners and educators to improve saving decisions. Guiding households to make the right decisions beyond mere optimism or skepticism can improve their saving decisions. Advice on the difference between subjectively and objectively estimated income and uncertainty, or between the disutility of losses and utility of gains, can control such unwillingness to avoid unrealized losses. Additionally, households should utilize self-control as a commitment device to control loss aversion to improve household saving (e.g., having regular rules).

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Table 1. Descriptive Results of Reference-dependent Income and Uncertainty Variables

Variable	%
Deviation from Normal Income in 2007	
Positive	9.1
Negative	12.97
About the Same	77.93
Expected Income Change in 2007	
Objective measure	
Positive	60.98
Negative	39.02
Subjective measure	
Positive	18.67
Negative	38.35
About the Same	42.98
Income Uncertainty Change between 2007 and 2009	
Decrease	14.24
Increase	17.92
Stays positive	54.33
Stays negative	13.51

Note: 2007-2009 Survey of Consumer Finances. Percentages are based on the weighted numbers.

Table 2. Results from Logistic Regressions

Variable [a]	Model 1 (Objective)				Model 2 (Subjective)			
	Coeffi.	P-value	S.E.	Exp(B)	Coeff.	P-value	S.E.	Exp(B)
Reference-dependent Income and Uncertainty Variables								
Deviation from Normal (Positive)								
Negative	-0.5248	0.0020	0.1695	0.5917	-0.5435	0.0014	0.1706	0.5807
Same	-0.1434	0.2669	0.1291	0.8664	-0.1683	0.1938	0.1296	0.8451
Expected Income Change (Positive)								
Negative	0.2514	0.0042	0.0877	1.2859	-0.4008	0.0004	0.1122	0.6698
Same					-0.2364	0.0263	0.1064	0.7895
Income Uncertainty Change (Decreased)								
Increased	-0.2871	0.0414	0.1408	0.7504	-0.2731	0.0525	0.1408	0.7610
Stayed positive	0.2151	0.0816	0.1235	1.2400	0.2267	0.0669	0.1237	1.2544
Stayed negative	-0.2817	0.0589	0.1491	0.7545	-0.2893	0.0526	0.1493	0.7488
Financial Attitude Variables								
Risk tolerance(No risk)								
Average	0.2613	0.0155	0.1080	1.2986	0.2710	0.0119	0.1078	1.3113
Above average	0.4399	0.0007	0.1298	1.5525	0.4449	0.0006	0.1293	1.5603
Sub risk	-0.0108	0.9570	0.2007	0.9892	-0.0140	0.9447	0.2012	0.9861
Planning horizon(Next few month)								
Next year	0.0014	0.9934	0.1727	1.0014	0.0185	0.9145	0.1723	1.0187
Next few year	0.3428	0.0113	0.1353	1.4089	0.3677	0.0064	0.1350	1.4444
Next 5 to 7 years	0.5540	0.0000	0.1360	1.7402	0.5825	0.0000	0.1356	1.7905
Longer than	0.3472	0.0192	0.1483	1.4152	0.3906	0.0077	0.1465	1.4778
Demographic Variables								
Log Age	0.0806	0.5637	0.1397	1.0840	0.2180	0.1158	0.1386	1.2436
Education	0.0470	0.0073	0.0175	1.0481	0.0369	0.0352	0.0175	1.0376
Income	0.00004	0.0015	0.0000	1.0000	0.00004	0.0014	0.0000	1.0000
Foreseeable expense in the next 5 to 10 years (No)								
Yes	0.0425	0.0466	0.0214	1.0435	0.0406	0.0583	0.0214	1.0414
Saving Rule and Goals Variables								
Saving Rule								
Yes	0.7603	0.0000	0.0858	2.1389	0.7618	0.0000	0.0858	2.1422
Saving Goal								
Yes	-0.1469	0.5582	0.2510	0.8634	-0.1184	0.6396	0.2528	0.8884
Intercept	-1.5724	0.0094	0.6053	0.2075	-1.6213	0.0075	0.6062	0.1976
Model Fit Statistics								
Likelihood ratio test-2LogL *(df)*	3552.731~3559.501 *(19)*				3547.882~3554.172 *(20)*			
Likelihood ratio testχ^2 *(df)*	53.422~55.378 *(6), <p=0.001*				58.751~60.227 *(7), <p=0.001*			
Concordance	70.5~70.6				70.5~70.6			
Adjusted R^2	0.1557 ~ 0.158				0.1579~0.16			

Note: Non weighted data; RII technique is used
[a] Reference category in parentheses