An Assessment of the Strength of Association between Stated and Revealed Risk-Preference Measures

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Individual financial decision making is known to be associated with each decision maker's risk preference. In general, risk preference has been measured either as a stated preference or as a revealed preference. While each assessment method has its own strengths and weaknesses, little research has been conducted to determine the level of association between these two measurement techniques. The purpose of this study was to provide evidence regarding the degree of association between stated and revealed risk-preference assessments. In addition, the extent to which people under- or over-state their preference for financial risk was evaluated by estimating how risk-preference assessment congruency is associated with risk-taking behavior. Using a survey with 534 adults, results from the present study suggest that while scores from stated and revealed financial risk-preference tests are not perfectly fungible, for over one third of individuals, there appears to be congruency between what is stated and what is revealed. For those who exhibit less preference congruency, differences do not appear to be related to risk-taking behavior. A financial decision maker's revealed risk preference and the same person's stated risk preference are related to financial risk-taking behavior. This finding suggests that the choice of one measurement technique over another by researchers, policy makers, and investors should not necessarily be made with an assumption that one assessment procedure is better than the other. What may be more important is understanding what is needed in the context of the risky decision being faced by a decision maker, be it a measure of choice or a measure of willingness.

※ Keywords: risk preference, stated preference, revealed preference, financial risk taking behavior, financial risk tolerance

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Ⅰ. Introduction

A decision maker's preference for risk is an important input into many financial and investment decisions, particularly those decisions that entail the possibility of gains and losses (Kübilay & Bayrakdaroglu, 2016). As conceptualized in this paper, risk preference refers to the propensity to engage in behaviors or activities that are rewarding but involve a potential for loss (Mata, Frey, Richter, Schupp, & Hertwig, 2018; Steinberg, 2013). This definition differs slightly from the traditional economic notion of risk preference, which is more precisely defined as someone's inclination to avoid engaging in behaviors that exhibit high variance in returns (Harrison & Rutström, 2008) or what Charness, Gneezy, and Imas (2013) referred to as the "extent to which people are willing to take on risk" (p. 43). Although slightly different, a common theme unites these definitions. Each definition describes an individual's inclination to engage in a behavior in which the outcome is both unknown and potentially negative (Grable, 2016). Two approaches are typically used to assess someone's financial risk preference. Among finance and economics researchers, revealed preference measures are the norm, whereas psychologists and applied social science researchers favor stated preference measures (Charness et al., 2013; Mata et al., 2018). The degree to which stated and revealed preference measurement approaches correspond to each other has not been widely studied in the previous literature.

Revealed preference measures are typically built around choice scenarios in which an individual is asked to choose between lottery outcomes or income/asset gambles. Revealed preference questions and tests generally include some type of incentive structure (Holt & Laury, 2002). Stated preference measures, on the other hand, use self-reported answers associated with hypothetical (and sometimes real-life) situations. As noted by Mata et al. (2018), both approaches have been subject to criticism. According to Friedman, Isaac, James, and Sunder (2014), and quoted by Mata et al., "Lack of generalizability across behavioral elicitation methods" is a common concern when revealed preference measure data are evaluated (p. 159). Stated preference measures have also been criticized. As noted by Haeffel and Howard (2010), self-reports are sometimes thought to be unrelated to actual risk-taking behavior.

Given the diverse manner in which risk preferences are assessed in practice, and the

ongoing debate about the optimal way to measure someone's preference for financial risk, it is important to know if a person's revealed risk preference matches the person's stated risk preference. In this regard, Mata et al. (2018) asked the following question: "Do different measures of risk preference such as behavioral [revealed] and self-report [stated] measures speak with one voice and converge in what they suggest about the individual" (p. 163)? This is an important question because, in practice, financial advisors and investors—those who are most likely to use a stated preference measure—may allocate assets inappropriately if it turns out that stated preferences fail to correlate with revealed preferences. Outside of investing and household financial situations, evidence exists that consumers likely do exhibit consistency between stated and revealed risk preferences (Fossen & Glocker, 2017). However, within the domain of household finance, the literature tends to indicate that associations between these types of measures is weak, or at best, statistically marginal (Galizzi, Machado & Miniaci, 2016). Mata et al. summarized the literature as follows: "We find a divide between stated (self-report) and revealed (behavioral) preference measures" (pp. 163-164.). The purpose of the present paper is two-fold. The first purpose is to provide evidence regarding the degree of association between stated and revealed preference risk assessments. The second purpose is to estimate the extent to which people under- or over-state their preference for financial risk and to link these estimates to financial risk-taking behavior.

Ⅱ. Background

Investors, and those who advise investors, face multiple choice alternatives when attempting to build diversified and efficient portfolios. Possible investment choices carry varying degrees of risk, which requires an investor to align portfolio choices with the risk preference of the investor. In order to do this, investors (and their advisors) need robust measures of financial risk preference as an input into portfolio selection models. Similarly, household decision makers who are tasked with making choices among risky alternatives generally strive to do so in a way that matches the decision maker's willingness to take risk. Household decisions makers also need a way to validly assess their own risk preference.

This helps explain the large and growing body of literature that is focused on describing risk-preference, risk-aversion, and risk-tolerance assessment methodologies. Generally speaking, this literature is fragmented in terms of describing the optimal way to measure someone's risk preference. Two methods are commonly recommended to evaluate someone's risk preference: revealed preference tests and stated preference measures. Revealed preference tests are designed to record a person's actual choice (i.e., revealed behavior), whereas a stated preference measure is one that is designed to measure intended behavior (Boyle, 2003).

Utility functions that rationalize empirical observations of choices and budget constraints are typically constructed according to revealed preference theory (Beshears, Choi, Laibson, & Madrian, 2008), which implies the use of revealed preference tests. This theory assumes that a revealed preference test score represents a person's normative preference (i.e., someone's true inclination), particularly in relation to financial risk aversion. It is further assumed that tests of revealed preference provide a more accurate insight into someone's willingness to take financial risk compared to a measure of stated preference. Beshears at al. (2008) noted that economists typically consider stated preferences (i.e., self-reports) 'cheap talk'. Even so, Beshears et al. did point out that self-reports provide a mechanism to discover someone's true preference because stated preferences provide insights into a person's goals and values.

Nevertheless, a general skepticism regarding the validity and usefulness of stated preference measures continues to exist. This skepticism was summarized by Wardman (1988) this way (p. 71):

> The principal drawback is that individuals' stated preferences may not correspond closely to their actual preferences. They may diverge because of systematic bias in stated preference responses (Bonsall, 1983) or because of difficulty in carrying out the stated preference task … Economists have generally regarded stated preference methods with some scepticism (sic), preferring to use choices observed in the marketplace. A natural response to the concerns surrounding the use of stated preference methods it to test their validity.

One outcome associated with the current study is to provide insights into the comparative validity of stated preference methods in relation to financial risk aversion and risk taking. It is possible that stated preference measures are more robust than previously thought.

Wardman (1988) provided some support for this assertion by noting that there appears to be a high degree of association between stated and revealed preference measures, especially when controlling for socioeconomic factors.

While numerous socioeconomic factors have been used both to describe risk preferences and as control variables in studies designed to evaluate financial risk aversion, seven characteristics dominate the literature. The following variables were included in the robustness tests conducted in this study: gender, age, household size, household income, marital status, race/ethnicity, and education. In general men are considered to be less risk averse compared to women (Anbar & Eker, 2010; Chavali & Mohanraj, 2016; Dickason & Ferreira, 2018; Hartnett, Gerrans, & Faff, 2019; Koekemoer, 2018; Larkin, Lucey, & Mulholland, 2013). The preponderance of literature suggests that age and risk aversion are positively associated (Brooks, Sangiorgi, Hillenbrand, & Money, 2018; Cardak & Martin, 2019; Gibson, Michayluk, & Van de Venter, 2013; Hartnett et al., 2019; Koekemoer, 2018; Pinjisakikool, 2017; Wong, 2011), with older individuals preferring less risk. There is less consensus in the literature regarding the relationship between financial risk aversion and household size. Coleman (2003) and Eisenhauer and Ventura (2003) noted that heads of larger households tend to be more risk averse, whereas Anbar and Eker (2010) failed to find a relationship between these variables. Similar contradictory relationships have been reported in relation to marital status and financial risk aversion. Some have reported that singles are less risk averse (e.g., Grable & Joo, 2004; Hallahan et al., 2004; Koekemoer, 2018; Wong, 2011), whereas others (e.g., Anbar & Eker, 2010) have reported no association between marital status and financial risk aversion. The literature is more uniform in reporting a negative relationship between household income and financial risk aversion (Faff, Hallahan, & McKenzie, 2009; Fang, Li, & Wang, 2020; Grable & Joo, 2004; Pinjisakikool, 2017; Wong, 2011). Racial/ethnic background is another characteristic thought to be associated with risk aversion, with Hispanic household heads exhibiting greater risk aversion (Coleman, 2003) and Whites and Asians exhibiting more risk aversion than Blacks (Dickason et al., 2018). Finally, attained education is generally thought to be negatively associated with financial risk aversion (Grable, 2000; Grable & Joo, 2004; Hallahan et al., 2004; Larkin et al., 2013; Pinjisakikool, 2017; Wong, 2011), with those with low educational levels preferring less financial risk.

The remainder of this paper describes the methodology used to determine the extent to

which stated preference and revealed preference assessment scores align and how well each type of measurement technique describes financial risk taking behavior. This is followed by a presentation of results and a discussion of findings.

III. Methods

3.1 Sample

The tests reported in this study were made using data collected from 534 adults who were age 18 or older at the time of the survey. Data were gathered in 2019 from a Qualtrics survey that was distributed by Dynata. The survey and data collection procedure were approved by the lead researcher's university institutional review board. The sample was screened to include participants who had or were likely to make an investment decision. In this regard, the sample was not intended to be representative of the U.S. population. Table 1 shows the descriptive statistics for the sample and variables used in this study. The sample can be described as primarily comprised of middle-aged, White, high income, and well-educated individuals.

3.2 Measures

Two measures were used as indicators of stated and revealed risk preference. The following question, adapted from Grable, Fulk, Kwak, and Routh (in press), was used as the revealed preference proxy:

Suppose you are considering making an investment. You have a chance to make an investment that will return either $50,000 or $100,000. Your financial advisor estimates that the probability of receiving $50,000 is 50% and the probability of receiving $100,000 is also 50%. You also learn from your financial advisor that shares in this investment are limited and difficult to obtain. Therefore, the less you are willing to invest, the lower the chance that you will be able to participate in the investment. Based on this information, what is the largest amount of money you would be willing to pay to participate in this investment, assuming you had the money?

<Table 1> Sample Descriptive Statistics

Variable	Percentage	$M(SD)$
Gender		
Male	49.2%	
Female	50.8%	
Age (years)		45.50(16.34)
~29	20.2%	
30 ~39	20.2%	
40 ~ 49	17.5%	
50 ~ 59	17.9%	
60 and over	24.2%	
Marital Status		
Never Married	27.5%	
Not Married/Living w/Sig. Other	10.3%	
Married	49.4%	
Separated	1.7%	
Divorced	8.3%	
Widowed	2.8%	
Retired (1 = Yes)	18.2%	
Racial/Ethnic Background		
Caucasian/White	62.0%	
African-American/Black	13.5%	
Hispanic/Latino/LatinX	10.7%	
Native American	2.6%	
Asian or Pacific Islander	6.2%	
Other	4.9%	
Housing Ownership (1 = Yes)	60.5%	
Household Income		
$0	3.4%	
Less than $20,001	11.7%	
$20,001 - $30,000	9.1%	
$30,001 - $40,000	7.6%	
$40,001 - $50,000	9.1%	
$50,001 - $60,000	8.3%	
$60,001 - $70,000	7.0%	
$70,001 - $80,000	6.1%	
$80,001 - $90,000	8.1%	
$90,001 - $100,000	6.1%	
Above $100,000	23.5%	
Household Size		2.57(1.34)
Education		
Some High School or Less	4.0%	
High School Graduate	18.6%	
Some College/Trade/Vocation Training	22.8%	
Associate's Degree	10.1%	
Bachelor's Degree	27.7%	
Graduate or Professional Degree	16.9%	
% Portfolio Equities		16.99(25.45)

The question was originally developed to describe an investor's level of risk aversion. In this study, participants were asked to choose from among pre-determined certainty equivalent amounts associated with the stated outcomes in the question. The choice options were: (a) $70,711, coded 10; (b) $66,667, coded 9; (c) $63,246, coded 8; (d) $60,571, coded 7; (e) $58,566, coded 6; (f) $57,083, coded 5; (g) $55,987, coded 4; (h) $55,143, coded 3; (i) $54,499, coded 2; and (j) $53,991, coded 1. The mean, median, and standard deviation scores for the question were 4.54, 4.00, and 3.34, respectively. These dollar amounts are equivalent to the inverse of lambda (χ). For interpretation purposes, someone who selected $70,711 was given a score of 10. This person was classified as preferring risk (i.e., risk tolerant) because they are willing to theoretically lose over $20,000 if the investment returns only $50,000, whereas they will gain only $30,000 if the investment turns out successfully. Someone who selected $53,991 was assigned a score of 1. This person was classified as preferring little to no risk (i.e., very risk averse). Someone who chose this dollar amount was willing to lose approximately $4,000 in pursuit of gaining over $45,000. The validity of the questioning technique was assessed by correlating scores with other measures of risk aversion. Specifically, scores were found to be positively correlated with outcome assessments from the Barsky, Juster, Kimball, and Shapiro (1997) risk-aversion measure,[1] the Hanna and Lindamood (2004) risk-aversion measure,[2] and the Grable and Lytton (1999) risk-tolerance scale.[3]

The single-item risk-aversion question from the Survey of Consumer Finances (SCF) was used as the stated risk-preference measure. The question has been used by numerous researchers over the past three decades as a measure of financial risk aversion and risk

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1) The Barsky et al. (1997) measure is an income gamble test. Risk-aversion scores are based on summing responses to a series of skip-pattern questions that require a test taker to choose between two jobs where a 50/50 probability outcome exists that one job will maintain current income, whereas the other job could increase or decrease income by a given percentage. This test has been widely used by researchers who are interested in matching risk-aversion scores to health and retirement outcomes at the household level. Test scores can range from 1 (risk averse) to 4 (risk tolerant). In this study, the modal response category for this measure was 1.00.

2) The Hanna and Lindamood (2004) measure requires participants to choose between pension choices where the reference point of success (50% probability) or failure (50% probability) is retirement income greater or less than pre-retirement income. Test scores can range from 1 to 7. The modal response categories in this study were 1.00 (risk averse) and 7.00 (risk tolerant).

3) The Grable and Lytton (1999) risk-tolerance scale is a propensity measure that matches traditional psychometric questionnaire designs. Questions in the scale measure an investor's willingness to take financial risk. Scale scores are estimated by summing answers to 13 items. Higher scores are indicative of low (high) risk aversion (tolerance). In this study, scale scores ranged from 13 to 41, with a mean score of 24.85 (SD = 5.53).

preference (Kim, Hanna, & Ying, 2020). Participants were asked to answer the following question: "Which of the following statements comes closest to the amount of financial risk that you are willing to take when you save or make investments?" Four answer choices were provided: (a) take substantial financial risk expecting to earn substantial returns, (b) take above average risks expecting to earn above average returns, (c) take average financial risks expecting to earn average returns, or (d) not willing to take any financial risk. Answers were coded so that 4 indicated a preference for taking risk (i.e., low risk aversion [take substantial financial risk]) and 1 indicated a preference for no risk (i.e., high risk aversion [not willing to take any financial risk]). The mean, median, and standard deviation scores for the question were 2.31, 2.00, and 1.02, respectively. A validity test was conducted to determine the robustness of respondent answers. Scores on the SCF item were found to be positively correlated with scores from the Grable and Lytton (1999) risk-tolerance scale, suggesting a degree of item validity.

3.3 Control Variables

Several participant characteristic variables were included as control variables in this study. Sex was coded 1 = male and 0 = female. Slightly more than 50% of participants were female. Age was measured in years. The average age of participants was 45.50 years (SD = 16.34). Household size was assessed by asking how many people lived in the participant's household at the time of the survey. The mean response was 2.57 (SD = 1.34). Household income was assessed using 11 income classifications ranging from 1 = none to 11 = above $100,000. The modal category was $100,000 or above. Marital status was assessed using four categories: (a) never married, (b) single but living with a significant other, (c) separated/divorced/widowed, and (d) married [the reference category]. Most participants were married (49.4%). Retirement status was coded 1 = retired, otherwise 0. Approximately 18% of participants indicted being currently retired. Racial/ethnic background was measured using six categories: (a) Caucasian/White [the reference category], (b) African-American/Black, (c) Hispanic/Latino/LatinX, (d) Native American, (e) Asian or Pacific Islander, and (f) other. Given limited data, the other category was combined with Native American. The modal category was Caucasian/White. Home ownership was coded homeowner = 1, otherwise 0. Approximately 60% of participants

were homeowners. Finally, attained education was measured using the following six categories: (a) some high school or less, (b) high school graduate, (c) some college/ trade/vocational training, (d) Associate's degree, (e) Bachelor's degree, and (f) graduate or professional degree. The some high school or less and high school graduate categories were combined and used as the reference category. The modal education classification was a Bachelor's degree (See Table 1 above).

3.4 Robustness Check Variable

A direct measure of risk taking was included in the study to determine the extent to which the stated preference and revealed preference measures described financial risk taking (measured as portfolio choice). Participants were asked to answer this question: "Suppose that you were to take a snap-shot of your current financial position. Approximately what percent of your total savings and investments are invested in equities (e.g., stock mutual funds, stocks)?" Participants, on average, indicated holding about 17% (SD = 25.44%) of portfolio assets in equities. It was anticipated that those who exhibited a preference for less risk (i.e., more risk aversion) would report holding less wealth in equities.

3.5 Statistical Tests

A correlation analysis was used to estimate the association between the stated preference and revealed preference risk assessments. This was followed by a series of regression analyses that were designed to describe the association with more precision. Congruency in stated and revealed preference scores was estimated by regressing SCF scores on scores from the revealed preference question. Scores were saved for each participant and coded so that -1 indicated an under-statement, 0 indicated congruency, and 1 indicated an over-statement. A regression model was estimated to determine if the characteristics of participants could be used to describe who was more or less likely to under- or over- state their risk preference. This was followed by a robustness check where under- and over-statement scores and stated and revealed preference scores were used to describe equity portfolio ownership.

Ⅳ. Results

Table 2 shows the frequency distribution statistics for the stated preference and revealed preference measures. On average, participants exhibited a general pattern of risk aversion across the two measures, although each category of risk aversion was represented in the sample.

〈Table 2〉 Score Frequency Distributions for the Two Risk-Preference measures

Response Category	Stated Preference (SCF) Item		Revealed Preference Item		
	Frequency	%	Response Category	Frequency	%
1. Not willing to take any financial risks.	136	25.5	$53,991	195	36.5
2. Take average financial risks expecting to earn average returns.	180	33.7	$54,499	17	3.2
3. Take above average financial risks expecting to earn above average returns.	135	25.3	$55,143	29	5.4
4. Take substantial financial risk expecting to earn substantial returns.	83	15.5	$55,978	38	7.1
			$57,083	21	3.5
			$58,566	55	10.3
			$60,571	62	11.6
			$63,246	28	5.2
			$66,667	25	4.9
			$70,711	64	12.0

The two measures were found to be statistically associated. The Spearman's rho coefficient was .351, which was significant at the $p < .001$ level. Although the effect size of the relationship was not large, the association was significant, indicating that the level of risk a participant stated that they were willing to take did match, to some extent, the level of risk aversion indicated by their revealed preference.

A further step was taken to describe the association with more accuracy. It was thought that within the sample, some participants might exhibit high congruency between their

stated and revealed preference, whereas others might systematical under- or over-state their measured risk preference. This possibility was evaluated using an ordered logit model by regressing SCF scores on scores from the revealed preference question. The model was statistically significant ($\chi^2 = 65.93$, p $<$ .001; Nagelkerke pseudo $R^2 = .12$). The predicted score was saved for each participant. Table 3 shows the regression estimates.

〈Table 3〉 Ordered Logit Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.
Threshold	[Q = 1]	-.287	.140	4.209	1	.040
	[Q = 2]	1.303	.151	74.531	1	.000
	[Q = 3]	2.742	.186	217.450	1	.000
Location	Revealed Preference	.199	.025	63.553	1	.000

Table 4 reports the frequency distributions of the predicted SCF scores matched to the original SCF scores. Two shifts in scores were noted. First, predicted scores were more likely to fall into the not willing to take any financial risk category and less likely to fall into the take substantial risk category. In fact, no participant was predicted to take substantial risk. Second, more participants were predicted to be classified as being willing to take average financial risk.

〈Table 4〉 Score Frequency Distributions for the Original and Predicted SCF Question

	Original SCF Item		Predicted SCF Item	
Score	Frequency	%	Frequency	%
1. Not willing to take any financial risks.	138	25.8	195	36.5
2. Take average financial risks expecting to earn average returns.	176	32.9	222	41.6
3. Take above average financial risks expecting to earn above average returns.	139	26.0	117	21.9
4. Take substantial financial risk expecting to earn substantial returns.	82	15.3	0	0.0%

A chi-square test was conducted to determine if the original SCF score categories were significantly different from the predicted scores. The chi-square test was significant, $\chi_{6,531}$

= 74.58, $p < .001$. Results showed that three of the four categories differed. The only classification where the original category matched the predicted category was being willing to take average financial risks expecting to earn average returns. As shown in Table 4, it is apparent that the most significant difference was in relation to the substantial risk category where no cases were predicted, when in actuality 82 participants selected this option.

Next, each participant's predicted SCF score was subtracted from the person's score on the original SCF item. The result was an estimate of risk preference congruency. A positive score was indicative of over-stating one's risk preference, whereas a negative score represented an under-statement of one's risk preference. An estimate of zero indicated a congruent preference assessment (i.e., congruency) on the part of a participant. Table 5 shows the results from the calculation.

<Table 5> Stated Preference Congruency Estimates

Score Congruency	Frequency	%
-2.00	16	3.0
-1.00	67	12.5
.00	192	36.0
1.00	186	34.8
2.00	63	11.8
3.00	10	1.9

The congruency scores were then recoded into three dichotomous variables: (a) under-stated risk preference (i.e., negative scores), (b) congruent risk preference (i.e., scores of zero), and (c) over-stated risk preference (i.e., positive scores). As shown in Table 5 a little over one third of the respondents were classified as congruent, whereas almost half of the respondents were classified into the over-stated category. This means that respondents tended to over-state their risk preference when asked the SCF risk-preference question. A multinomial regression was estimated to determine if participant characteristics could be used to describe congruency (or lack thereof) in risk-preference scores. The model was not statistically significant, which indicated that personal characteristics cannot be used with confidence to describe differences between stated and revealed risk preferences.

A robustness check was made to determine if congruency in stated and revealed risk-preference scores was associated with actual risk taking. A regression analysis was undertaken to estimate the statistical strength of stated, revealed, and congruency scores when describing equity portfolio ownership. In Model 1, SCF stated preference scores were used in the model, whereas revealed preference scores were used in Model 2. Both models were statistically significant. Equity ownership was found to be positively associated with risk preference in the models. This indicates that stated and revealed risk-preference scores were useful in describing risk-taking behavior. Given the level of explained variance across the models shown in Table 6, it is reasonable to conclude that neither revealed preference nor stated preference scores provide a significant improvement in model fit. Both measures accurately described financial risk-taking. While neither can be considered a perfect substitute for the other, both measures were found to offer acceptable descriptive power.

Congruency scores were used in Model 3. Results, as shown in the last five columns of Table 6, indicated that there was no relationship between equity ownership and under- or over-statement of risk preference (congruency was the reference category). This finding suggests that whether or not someone's stated risk preference was lower, higher, or in alignment with their revealed risk preference was not related to actual risk-taking behavior.

Other variables were also found to be significant in the models, which confirmed findings from the literature. Women were observed to hold fewer risky assets. Household income was found to be positively associated with equity ownership, as was holding a Bachelor's and graduate school level of education. Those who were separated, divorced, or widowed reported holding fewer equity assets. Retirees reported owning a higher percentage of risky assets in their portfolios. Two differences between the stated preference and revealed preference models were noted. In the stated preference model, being Black was negatively associated with equity ownership; however, in the revealed preference model, ethnic/racial characteristics were not statistically significant at the $p < .05$ level (significance at the $p < .10$ level was noted).

⟨Table 6⟩ Equity Portfolio Ownership Described by Stated Preference, Revealed Preference, and Congruency Scores

	Model 1: SCF Stated Preference					Model 2: Revealed Preference					Model 3: Over- and Under-Statement				
	B	SE	β	t	p	B	SE	β	t	p	B	SE	β	t	p
(Constant)	-10.882	7.039		-1.546	.123	-7.160	6.727		-1.064	.288	-3.302	6.697		-.493	.622
Sex	6.889	2.261	.137	3.047	.002	7.310	2.249	.145	3.251	.001	8.024	2.246	.160	3.572	.000
Age	.102	.092	.066	1.103	.271	.073	.091	.047	.799	.425	.055	.091	.036	.600	.549
Household Size	-.532	.888	-.028	-.599	.550	-.491	.890	-.026	-.552	.581	-.474	.900	-.025	-.526	.599
Household Income	1.343	.398	.181	3.378	.001	1.396	.398	.188	3.507	.000	1.382	.401	.186	3.444	.001
Never Married	1.273	3.056	.023	.416	.677	.356	3.069	.006	.116	.908	1.344	3.098	.024	.434	.665
Live w/Sig Other	2.546	3.986	.031	.639	.523	2.816	3.990	.034	.706	.481	3.157	4.017	.038	.786	.432
Sep/Div/Widowed	-7.835	3.339	-.108	-2.346	.019	-7.963	3.346	-.110	-2.380	.018	-7.944	3.373	-.109	-2.355	.019
Retired	9.632	3.287	.152	2.930	.004	9.398	3.292	.148	2.854	.005	9.310	3.316	.147	2.808	.005
Black	-6.555	3.248	-.089	-2.018	.044	-5.658	3.241	-.077	-1.746	.081	-5.945	3.272	-.081	-1.817	.070
Hispanic	-6.762	3.568	-.081	-1.895	.059	-6.040	3.570	-.073	-1.692	.091	-6.418	3.601	-.077	-1.782	.075
Asian	-3.642	4.422	-.034	-.824	.411	-3.438	4.431	-.032	-.776	.438	-3.779	4.466	-.035	-.846	.398
Other Race	-1.205	4.183	-.012	-.288	.773	-2.694	4.203	-.028	-.641	.522	-1.438	4.223	-.015	-.341	.734
Own Home	-1.919	2.543	-.037	-.755	.451	-1.180	2.523	-.023	-.468	.640	-.968	2.542	-.019	-.381	.704
Some College	4.609	3.148	.077	1.464	.144	4.973	3.160	.083	1.574	.116	4.159	3.184	.069	1.306	.192
Associate's Degree	1.448	3.950	.018	.367	.714	2.040	3.956	.025	.516	.606	1.760	3.987	.021	.441	.659
Bachelor's Degree	9.122	3.276	.162	2.784	.006	9.859	3.275	.175	3.010	.003	9.406	3.314	.167	2.838	.005
Graduate Degree	13.101	3.762	.194	3.483	.001	13.720	3.764	.204	3.645	.000	13.282	3.805	.197	3.490	.001
SCF Stated Risk Pref	3.337	1.098	.134	3.038	.003										
Revealed Preference						.865	.319	.114	2.710	.007					
Understated Risk Pref											-2.177	3.148	-.032	-.692	.490
Overstated Risk Pref											1.810	2.316	.036	.781	.435
	$F_{18,455} = 8.887, p < .001$					$F_{18,455} = 8.742, p < .001$					$F_{19,454} = 7.879, p < .001$				
	$R^2 = .26$					$R^2 = .26$					$R^2 = .25$				

Ⅴ. Discussion

The findings from this study add additional evidence in support of the following conclusion made by Mata et al. (2018): "… the current scant evidence suggests no advantage of revealed (behavioral) preference measures in predicting real-world outcomes" (p. 166). Results from the present study indicate that while scores from stated and revealed financial risk-preference tests are not perfectly fungible, for over one-third of individuals, there appears to be congruency between what is stated and what is revealed. It was found that more people tend to over-state their risk preferences rather than under-state when they are asked a SCF type risk-aversion (preference) question. However, for those who exhibit less congruency between stated and revealed preferences, differences do not appear to be related to risk-taking behavior. Essentially, any difference in congruency may not be large enough to make a significant difference in descriptions of actual financial risk-taking behavior. A key takeaway from this study is that both measures (based on the way answers were coded) were positively associated with financial risk taking.

There are several possibilities that come to mind in explaining the results presented in this paper. To begin with, it is possible that the measures used as indicators of stated and revealed preferences were invalid or inappropriate. The revealed preference question used in this study is a new measure that needs additional testing. The question may be inadvertently measuring a respondent's mathematical ability rather than the person's preference for risk, although the correlational tests showed that scores from the question aligned appropriately with other measures of risk preference, suggesting some degree of validity. Similarly, some may find fault with the single-item SCF risk-aversion question. Even accounting for peculiarities with the question wording, the item has been used in hundreds of peer-reviewed papers over the past three decades as a measure of risk aversion and risk preference. Grable and Schumm (2010) noted that while the question does suffer from some psychometric deficiencies, the estimated reliability of the item may be acceptable as a rough measure of someone's willingness to take financial risk. Another explanation for the findings from this study is that the sample was not designed to be representative of the U.S. population. While this is certainly true, the sample was reasonably representative of those who are likely to make financial and investment

decisions. Research participants were wealthier and better educated than the average American—a profile of those who are in a position to accumulate assets that will likely be allocated in a way that matches preferences for risk. With this sample, no meaningful difference was noted between risk-taking behavior and the use of revealed or stated risk-preference scores. It is also possible that the time frame in which data were collected skewed results in a way that reduced the gap between stated and revealed preferences. A replication of the current study in the future is one way to determine if macroeconomic market conditions play a role in explaining the way individuals conceptualize risk and derive preferences for risk taking.

In summary, the findings from this study add to the existing body of literature on financial risk taking by showing that a financial decision maker's revealed risk preference appears to align reasonably well with the same person's stated risk preference. This finding suggests that the choice of one measurement technique over another by researchers, policy makers, and investors should not necessarily be made with an assumption that one question type is better than the other. What may be more important is understanding what is needed in the context of the risky decision being faced by a decision maker, be it a measure of choice or a measure of willingness. To further improve the accuracy of risk measurement in predicting risk-taking behavior, a best practice recommendation is to use a combination of revealed- and stated-preference measurements in addition to risk capacity and experience. Future research with the use of more comprehensive financial behavior, including the ownership of a diverse range of financial products, is recommended to further test the predictability of risk-preference measures.

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위험선호가 드러나도록 측정하는 방식과 위험선호를 지정하도록 측정하는 방식의 상호 관련성 평가

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요 약

　개인의 재무의사결정은 위험에 대한 선호와 밀접한 관련이 있다고 알려져 왔다. 일반적으로 위험에 대한 선호는 위험선호가 응답에 의해 드러나도록 측정하는 방식과 자신의 선호를 직접 지정하도록 하는 방식으로 측정한다. 이러한 방식은 각각 장단점을 가지고 있지만 두 가지 방식의 상호 관련성을 평가한 연구는 많이 존재하지 않는다. 본 연구의 목적은 위험선호가 드러나도록 측정하는 방식과 자신의 위험선호를 지정하는 방식이 서로 어느 정도 관련이 있는가에 대하여 평가하고자 하는 것이다. 추가적으로 본 연구에서는 개인들이 자신의 위험선호를 지정할 때 얼마나 과대 혹은 과소 평가 하는가와 평가에 의한 위험선호가 실제 위험추구 행동과는 어떠한 관련을 보이는지를 살펴보았다. 이러한 목적을 위하여 534명의 성인을 대상으로 온라인 조사를 실시한 결과 드러난 위험선호와 지정한 위험선호가 동일하게 나타난 사람들은 응답자의 약 36%였으며, 자신의 위험선호를 지정하는 경우 드러나는 경우보다 과대평가하는 사람이 많은 것으로 나타났다. 하지만, 개인의 위험선호를 드러나도록 측정하는 방식과 지정하여 측정하는 방식은 실제 위험추구행동과 관련을 보이는 것으로 나타나, 두 가지 방식 중에서 어떠한 방식이 더 우위에 있다고 평가하기는 어렵다고 판단되었다. 개인의 위험선호를 측정함에 있어서 중요한 것은 투자의사결정에서 개인의 선택을 측정할 것인지 혹은 위험추구 행동에 참여하려는 의향을 측정할 것인지를 파악해야 하는 것이라고 할 수 있다.

　핵심단어: 위험선호, 드러난 위험선호, 지정한 위험선호, 위험선택행동, 투자위험수용성향

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