A Comparison of Three Measures of Risk Tolerance

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Abstract

Accurate measures of risk tolerance are vital to consumers and those who serve consumers— Policy makers, researchers and financial professionals. There is a significant amount of research on how to improve the existing measures of risk tolerance (Grable and Lytton, 1999; Hanna, Gutter and Fan, 2001). Nevertheless, there has been little research on the inter-reliability of the existing instruments. The purpose of this study is to discover if there is consistency between measures of risk tolerance among the specific instruments used in this research. This study will compare three measures of risk tolerance: Grable and Lytton (1999), Barsky, Juster, Kimball and Shapiro (1997), and the Survey of Consumer Finances question on risk tolerance.

Literature Review

According to Hanna, Gutter and Fan (2001), there is a minimum of four different ways to measure risk tolerance: investments choice measurements, a combination of investment and subjective questions, hypothetical questions, and the measure of actual behaviors. For the purpose of this current study, we will consider and examine all but the latter—the observation of actual portfolio allocation. Hanna, Gutter and Fan's (2001) improved version of Barsky et al. (1997) asks hypothetical questions about retirement income instead of the original scenarios about taking risks with current income. Alternatively, the Survey of Consumer Finances includes a question asking how much risk a consumer is comfortable and willing to take in investments. Therefore, the investment choice perspective is evaluated through this question. Finally, Grable and Lytton's (1999) measure of risk tolerance is a mixed bi-dimensional measure; more precisely, subjective questions and hypothetical investment are captured through these questions.

Methods

Data was collected using an online survey. Participants completed each of the three measures of risk tolerance along with demographic information. The sample population for this study was undergraduate students currently enrolled at a large Southeastern University. Participants were recruited using a random sample of official university email address. We used a random sample of 2,000 undergraduate email addresses as provided by the university registrar office. We received 200 respondents—a 10% response rate. We eliminated responses from those who were under 18, did not specify an age or did not complete all three measures of risk tolerance; this resulted in 173 valid responses.

We scored the responses to the risk tolerance measures (Grable and Lytton (1999) and Barsky et al. (1997)), based on the author's specifications. We collapsed the lower categories from each of these to match the Survey of Consumer Finances' four categories. See Table 1.

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Table 1
Comparison of Risk Tolerance-Categories

We did a Pearson Chi-Square test of independence to see how well scores on one measure predict scores on the other two. If a respondent scored in the low risk category on one measure, did they score the same on the other measures?

Results

The three measures of risk tolerance were not found to be consistent measures when tested with college students. While we found that the Barsky et al. (1997) measure and the Grable and Lytton (1999) measure were not statistically different, the Survey of Consumer Finances question differed significantly in how respondents were categorized. Risk tolerance was found to be higher for respondents on the SCF questions than the other two measures, even after collapsing the lower categories in Barsky et al. (1997) and Grable and Lytton (1997). See Tables 2-5.

Table 2
Pearson Chi Square Test

Comparison	Chi Square	P-Value
SCF and Barsky et al.	17.260	0.045*
SCF and Grable and Lytton	48.785	0.000**
Barsky and Grable and Lytton	6.352	.704

*P<0.05. **P<0.0001*

Table 3
Grable and Lytton (1999) and Barsky et al. (1997) comparison

	Grable and Lytton			
Barsky et al.	Low	Moderate	Above Average	High
Low	21.39%	23.12%	3.47%	1.16%
Moderate	11.56%	19.08%	3.47%	0.00%
Above Average	2.89%	6.36%	1.73%	0.00%
High	2.89%	2.31%	0.58%	0.00%

Table 4
Barsky et al. (1997) and SCF comparison

SCF	Barsky et al.			
	Low	Moderate	Above Average	High
Low	0.58%	2.31%	0.00%	0.58%
Moderate	4.62%	5.20%	3.47%	1.16%
Above Average	36.42%	22.54%	4.62%	2.31%
High	7.51%	4.05%	2.89%	1.73%

Table 5
Grable and Lytton (1999) and SCF comparison

SCF	Grable and Lytton			
	Low	Moderate	Above Average	High
Low	0.58%	2.31%	0.58%	0.00%
Moderate	1.73%	6.36%	5.78%	0.58%
Above Average	25.43%	37.57%	2.31%	0.58%
High	10.98%	4.62%	0.58%	0.00%

Discussion

Since the respondents' scores are found to be inconsistent across the three measures, then there needs be future research on subjective risk tolerance. This research should focus on a) the different dimensions proposed by Grable and Lytton (1999): investment risk, risk comfort and experience, and speculative risk b) the context specificity allowed by Barsky Juster, Kimball & Shapiro (1997) measure and revisions c) the concision of the Survey of Consumer Finances. Further research is needed to explore the relationship between these three measures of risk tolerance. Barsky et al. (1997) and Grable and Lytton (1999) are both theoretical based measures of subjective risk tolerance and were the only measures that were consistent with each other. Policy makers, researchers and financial professionals should consider using a risk tolerance measure based on theory. How do hypothetical scenario-based measures differ from self-assessments of investment choice? Investigation into the interaction between age, gender, and other preference shifters is needed.

References

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