FMS

UNIVERSITY OF KWAZULU-NATAL

SCHOOL OF ECONOMICS & FINANCE

WORKING PAPERS IN FINANCE

The Effect of Framing on Subjective Risk Tolerance

Barry Strydom*
Andrew Christison
And
Njabulo Mathe

Working Paper No. 01-2010

* Corresponding author: Barry Strydom
School of Economics & Finance
University of KwaZulu-Natal
strydomb@ukzn.zc.za
Tel. (+27)33-2605794 Fax. (+27)33-2606051

The Effect of Framing on Subjective Risk Tolerance

Barry Strydom[1]

Andrew Christison[2]

& Njabul Mathe[3]

Abstract

Modern Portfolio Theory argues that an individual's optimal investment portfolio is partly determined by their individual preference for risk. Despite this, no generally accepted approach for measuring individual subjective risk tolerance exists. In addition, there is some evidence that risk tolerance questionnaires may be subject to a framing bias. This paper employs a subjective risk tolerance questionnaire, developed by Hanna and Lindamood to explicitly test for framing. The questionnaire was modified to reflect three scenarios, namely Pension, Investment and Gambling, and administered to a class of Economics 2 students at the University of KwaZulu-Natal. Significant differences in risk tolerances were observed across the three scenarios providing evidence of framing. This effect was much greater for males than females. Experience in a particular scenario was not, however, found to significantly affect risk tolerance.

Keywords: risk tolerance, risk aversion, framing, gender, experience

JEL Codes: G11, G23, D14, D81.

[1] Barry Strydom is Senior Lecturer in the School of Economics & Finance, University of Kwazulu-Natal, South Africa.
[2] Andrew Christison is a part-time lecturer in the School of Economics & Finance, University of Kwazulu-Natal, South Africa.
[3] Njabulo Mathe is a post-graduate student in the School of Economics & Finance, University of Kwazulu-Natal, South Africa

1. INTRODUCTION

As Markowitz's modern portfolio theory points out, individual risk attitudes play a crucial role in determining where along the efficient frontier, one would be willing to invest. In other words an individual's attitude towards risk plays a key role in how individuals construct their portfolio of assets/ makes investment decisions, (Markowitz; 1952:79). The importance of individual risk attitudes in investment decision making emphasises the need for a better understanding of financial risk tolerance and more importantly how to measure it. This is particularly useful for portfolio managers trying to tailor portfolios in accordance with their client's risk tolerance levels (Hillson and Webster; 2004:1); (Hallahan; Faff and McKenzie; 2004: 59) and for individual/group investors to best determine their optimal risk to return trade-off levels. (Markowitz; 1952).

A growing field of study in finance has focused on , how individuals make financial decisions. (Bodie, Kane and Marcus; 2007: 381). Two aspects of this question are the role of an individual's attitude towards risk and the impact of how investment decisions are framed, (Tversky and Kahneman; 1981: 31). Framing refers to the situation where objectively equivalent information results in different judgement and decisions, depending on the way in which the information was labelled or "framed" (Levin, Schneider & Gaeth; 1998: 3).

Subjective questionnaires/surveys are the primary measurement tool used to asses financial risk tolerance levels (Hallahan *et al*; 2004: 62; Hana and Lindamood; 2001: 3). This can greatly help understand individual's risk tolerance levels, but unfortunately this method of analysis is not without its drawbacks (Hana, Gutter and Fan; 2001: 27) .The existence of framing biases, within subjective risk tolerance questionnaires has been highlighted by a number of studies (Powell and Ansic, 1997; Hana, Gutter and Fan, 2001; Strydom, Christison and Gokul, 2009). None of these studies, however explicitly tested for framing biases and they also did not attempt to see what effects framing has on subjective risk tolerance questionnaires. The purpose of this paper is therefore to investigate, the effects of framing on subjective risk tolerance questionnaires.

2. LITERATURE REVIEW

2.1Framing

Tversky and Kahneman formally introduced the concept of framing in their 1981 paper, "The Framing of Decisions and the Psychology of Choice". They concluded that "… [the] psychological principles that govern the perception of decision problems and the evaluation of probabilities and outcomes produce predictable shifts of preference when the same problem is framed in different ways." (Tversky & Kahneman; 1981:38). A simpler definition of framing is that it describes the situation where objectively equivalent information results in different judgement and decisions, depending on the way in which the information was labelled or "framed" (Levin, Schneider and Gaeth; 1998: 3). Frisch, (2002:37) concludes that framing effects mean that subjects often respond differently to different descriptions of the same problem.

Kuhberger; 1998 points out that in decision theory, the term framing can be used in a so called (strict) and in a (loose) sense. "The strict definition relates to the wording of formally identical problems, i.e. to a 'semantic manipulation' of prospects whereby the exact same situation is simply redescribed." (Kuhberger; 1998:2)[1]. "The loose definition of framing refers to framing as an internal event that can be induced not only by semantic manipulations but may result also from other contextual features of a situation and from individual factors, provided that problems are equivalent from the perspective of economic theory." (Kuhberger; 1998:3) [2]

Stevenson, Busemeyer, and Naylor(1990:22) point out that the most perplexing aspects of human decision-making behaviour under risk is the sensitivity of preference to seemingly minor changes in the way a problem is presented. This is evidence that framing biases have powerful implications on decision making, more especially when uncertainty is presented in outcomes. Tversky and Kahneman (1981: 456) concluded that the way in which a situation, with identical payoffs/outcomes, is

[1] (See Tversky and Kahneman; 1981where they test for this strict type of framing bias in their famous Asian disease problem).

[2] See Aquino, Steisel, & Kay, 1992 for an illustration of a "loose" approach to framing.

framed will result in individuals generally showing great risk aversion or risk tolerance. Changes in attitude to risk as a result of framing effects creates the possibility of framing biases resulting in less accurate measures of individual risk tolerance levels.

2.2 Risk Tolerance

Droms 1987:3 defines risk tolerance, as a person/s attitude towards accepting risk. Risk tolerance is generally regarded as the inverse of risk aversion (Walls and Dyer, 1996: 1007; Barsky, Juster, Kimball and Shapiro, 1997: 542; and Gron &Winton, 2001: 593). The concept of an individual's specific utility indifference curve was a result of the seminal work by Arrow (1971) and Pratt (1964) who further refined the issue of risk aversion by categorising it into absolute and relative risk aversion. These measures are calculated using the individual's utility function in conjunction with their own wealth base. However, in practise it is difficult to accurately measure an individual's risk tolerance due to the subjective nature of risk taking (Grable; 2000:625).

There are three dominant methods for assessing an individual's financial risk tolerance (Hallahan, *et al*; 2004: 63). The first method involves some variation of assessing an individual's actual behaviour, for example Schooley and Worden (1996: 18) analysed people's portfolio allocations and deducted their attitudes towards risk, from their portfolio. The second method is to analyse an individual's preferences from various investment type questions, see for example Faff, *et al* (2004) and Subedar, McCrae and Gerace (2006). The third method deals with the answers to subjective questions posed to the individual. Numerous academics, such as Hanna and Lindamood (2004: 1); Yao, Gutter and Hanna (2005: 3) and Yook and Everett (2003: 5) believe that surveys are the easiest and fastest method of assessing risk aversion. "Questionnaires have the ability to scale responses, increase validity (eliminating response bias if being assessed by several financial advisors) (Grable and Lytton; 1999), and can include a variety of questions that form the risk attitude construct" (Subedar, McCrae and Gerace; 2006:10).

A good example of this final approach is the survey technique proposed by Hanna and Lindamood (2004). Their approach was based on a pension risk question created by Hanna, *et al* (2001) which was in turn a modified form of a job risk type question used by Barsky, *et al* (1997: 540). Hanna, *et al* (2001) identified a concern that it was not clear to respondents in the Barsky *et al* study that income changes would be permanent and they therefore converted the Barsky *et al* question into a pension scenario in an attempt to reflect that losses in wealth would be permanent.

Implicit in this modification is the suggestion that changing the frame or context of the question from an investment scenario to a pension scenario would affect the results obtained. Strydom, Christison and Gokul (2009) employed the Hanna and Lindamood survey to measure risk tolerance amongst students at the University of KwaZulu-Natal. In line with Powell and Ansic (1997:609), who suggested that differences in risk preference could be explained by the way tasks were framed, they found evidence suggesting that framing was a factor in determining the results obtained and that female respondents were more sensitive to framing bias than male respondents (Strydom *et al*; 2009: 17). This conclusion is similar to that of Schubert, Brown, Gysler and Brachinger (1999: 384) who stated that "the comparative risk propensity of male and female subjects in financial choices strongly depends on the decision frame".

In addition, in certain situations prior experience can affect an individual's objective decision making ability. People can assess the probability of an event by the ease with which an example of such an occurrence (for example a market crash) can be brought to mind (Tversky and Kahneman; 1982: 11). Evidence also indicates that individuals who are familiar with a particular situation tend to be less risk averse, relative to individuals that are unfamiliar with the same situation. This can be attributed to the fact that the more knowledge about the risky situation one has, the more comfortable one is in the situation and thus willing one is to take on risk (Menkhoff, Schmidt, and Brozynski; 2005: 1768) .

3. DATA AND METHODOLOGY

3.1 Problem statement

The preceding discussion has highlighted the role of individual's risk tolerance in shaping investment behaviour. It was also, however, shown that the best approach for measuring an individual's subjective risk tolerance is not clear and that risk tolerance measurements may be subject to a framing bias. This study therefore seeks to address this problem by attempting to investigate the effects of framing, gender and prior experience for a typical subjective risk tolerance questionnaire.

3.2 Instrument

This study employed a subjective risk tolerance measurement technique developed by Hanna & Lindamood (2004). Their survey technique was based on a pension risk question created by Hanna, et al (2001) which was in turn a modified form of a job risk type question used by Barsky, et al (1997: 540). The first question out of a series of questions within the Barsky, et al (1997: 540) study read as follows; "Suppose that you are the only income earner in the family, and you have a good job guaranteed to give you your current (family) income every year for life. You are given the opportunity to take a new and equally good job, with a 50-50 chance it will double your (family) income and a 50-50 chance that it will cut your (family) income by a third. Would you take the new job?" Depending on the selection respondents are directed to follow-up questions in which the potential risky benefits are varied until the level of potential benefit sufficient to induce the respondent to select the risky alternative is identified.

Hanna, *et al* (2001) identified a concern that it was not clear to respondents in the Barsky *et al* study that income changes would be permanent and they therefore converted the Barsky *et al* question into a pension scenario in an attempt to reflect that losses in wealth would be permanent. Hanna and Lindamood (2004:1) then further refined the instrument by adding graphical illustrations to complement the pension scenario in order to reduce the need for respondent to hold and manipulate numbers in his/her head. The preliminary question in the Hanna and Lindamood subjective risk tolerance measure is thus:

> "Suppose that you are about to retire, and have two choice for a pension. Pension A gives you an income equal to your pre-retirement income. Pension B has a 50% chance your income will be double your Pre-retirement income and a 50% chance that your income will be 20% less than your pre-retirement income. You will have no other source of income during retirement, no chance of employment, and no other family income ever in the future. All incomes are after tax. Which pension would you choose?"

The wording of the Hanna and Lindamood scenario was then altered to create two new scenarios, an investment scenario and a gamble scenario. The alternative preliminary questions were:

Investment Scenario – "Suppose that you want to invest a set amount of money, and have two Investment choices. Investment A entails not investing your money (Ensuring, zero loss and zero gain, over the investment period). Investment B has a 50% chance your investment will be doubled and a 50% chance that your invested money will be 20% less than your initial investment, at the end of the investment period. Which investment would you choose?"

Gamble Scenario – "Suppose that you are considering taking a betting Gamble. You have a choice between two options. Option A, entails not making the bet (Ensure zero gain and zero loss). Option B has a 50% chance that your return (money received after betting) will be double your betted amount, and a 50% chance that your return will be 20% less than your betted amount. Which bet would you choose?"

For all three scenarios the relative rates of return for each alternative were identical. In line with Khuberger (1998:2) this represents a strict definition of framing in which identical outcomes are simply presented with different wording. In addition, the questionnaire required respondents to report their gender and asked them to indicate whether or not they had prior experience in the relevant scenario. The respective questions were thus:

"Have you ever spoken to someone who has a retirement plan about pension funds?"

"Have you ever purchased a share or ever invested your personal funds in any financial instrument (besides a bank account)"

"Have you ever gambled in a casino or any premise where gambling is legal (i.e. In a Casino, online betting or gambling, horse racing etc) ?"

3.4 Sample

The study was conducted amongst Economics 2 students on the Pietermaritzburg class of the University of KwaZulu-Natal. This meant that the sample group was relatively homogenous in terms of age, educational background and exposure to basic economic principles. The three scenarios were distributed randomly within the class. In total 233 responses were recorded.

Table 1: Risk Tolerance groupings

Risk Tolerance Categories	Questionnaires			Total
	Pension	Investment	Gamble	Risk Tolerance
Ext low	15	23	20	58
Very Low	4	5	3	12
Low	3	12	10	25
Moderate	7	17	6	30
High	6	12	11	29
Very High	7	12	18	37
Ext High	3	11	28	42
Total number of participants	45	92	96	233

3.5 Method of Analysis

Due to the fact that responses are captured within categories, nonparametric techniques were used to analyse the data (Roscoe; 1969: 7). Specifically, the Mann-Whitney U test and Kruskal-Wallis test (*k*), were employed to compare the mean ranks if respondents' risk tolerances. The Mann-Whitney U test is a nonparametric alternative to the t-test, without the limiting assumptions made by the t-test statistic (Zikmund; 2003:543). The test is used to evaluate ordinal data taken from two random samples but taken from the same parent population and compared on a single criterion to determine whether or not the two populations differ (Cooper and Schindler; 2001: 607)**.** The advantage of this test is that it can be used to test samples that are unequal in size (Cooper and Schindler; 2001: 670). The Kruskal-Wallis test can be used to test differences in mean ranks across more than two groups/samples. The test does, however, require that the data be ranked from lowest to highest or that the original data be converted so that a numerical rank may be consigned to every observation (Zikmund; 2003:544).

4 FINDINGS AND ANALYSIS

Framing

In order to test whether respondents to the different questionnaires have a tendency towards different risk tolerances, we performed a Kruskal Wallis to test whether there is a statistically significant difference in the ranking of risk tolerances for the different questionnaires. The results are presented in Tables 1.1 and 1.2.

Table 1.1 – Mean Rank across Questionnaires

Ranks

	Questionnaire	N	Mean Rank
RiskTolerance	Pension	45	98.03
	Investment	92	108.36
	Gamble	96	134.17
	Total	233	

Table 1.2 – Kruskal-Wallis Test Statistic

Test Statistics(a,b)

	RiskTolerance
Chi-Square	11.663
df	2
Asymp. Sig.	.003

a Kruskal Wallis Test

b Grouping Variable: Questionnaire

It is apparent that respondents to the Gamble questionnaire reported much higher risk tolerances than those who answered the Pension and Investment questionnaires, suggesting that the manner in which the scenario was framed encouraged risk seeking. Moreover, the difference in the risk tolerance rankings is statistically significant at the 1% level, offering compelling evidence of a framing effect.

The mean ranks suggest that the framing effect is strongest for the gambling questionnaire. To test this proposition we performed pairwise comparisons of the ranked risk tolerances using the Mann-Whitney test. The results are presented below in Tables 2.1, 2.2, 3.1, 3.2, 4.1, and 4.2.

Table 2.1 – Mean Rank across Questionnaires – Pension vs Investment

Ranks

	Questionnaire	N	Mean Rank	Sum of Ranks
RiskTolerance	Pension	45	64.74	2913.50
	Investment	92	71.08	6539.50
	Total	137		

Table 2.2 – Mann-Whitney test, Pension v Investment

Test Statistics(a)

	RiskTolerance
Mann-Whitney U	1878.500
Wilcoxon W	2913.500
Z	-.893
Asymp. Sig. (2-tailed)	.372

a Grouping Variable: Questionnaire

Table 3.1 – Mean Rank across Questionnaires – Pension vs Gamble

Ranks

	Questionnaire	N	Mean Rank	Sum of Ranks
RiskTolerance	Pension	45	56.29	2533.00
	Gamble	96	77.90	7478.00
	Total	141		

Table 3.2 – Mann-Whitney test, Pension v Gamble

Test Statistics(a)

	RiskTolerance
Mann-Whitney U	1498.000
Wilcoxon W	2533.000
Z	-2.980
Asymp. Sig. (2-tailed)	.003

a Grouping Variable: Questionnaire

Table 4.1 – Mean Rank across Questionnaires – Investment vs Gamble

Ranks

	Questionnaire	N	Mean Rank	Sum of Ranks
RiskTolerance	Investment	92	83.78	7707.50
	Gamble	96	104.78	10058.50
	Total	188		

Table 4.2 – Mann-Whitney test, Investment v Gamble

Test Statistics(a)

	RiskTolerance
Mann-Whitney U	3429.500
Wilcoxon W	7707.500
Z	-2.686
Asymp. Sig. (2-tailed)	.007

a Grouping Variable: Questionnaire

It is apparent that there is not a statistically significant difference in the risk tolerances reported for the Pension and Investment questionnaires, though respondents to the Investment questionnaire tended to report a higher risk tolerance, in view of the higher rank observed in Table 2.1. However, the risk tolerances obtained from the Gamble questionnaire were statistically significantly different from those obtained for both the Pension and Investment questionnaires at a 1% level of significance. It seems that presenting a scenario as a wager induced risk-seeking.

Sensitivity of Framing Effect to Gender and Experience

To investigate whether this framing effect is sensitive to the respondents' gender and experience, we repeated the Kruskal Wallis and Mann-Whitney tests for male and female sub-samples, and for sub-samples of respondents who reported experience of risk-taking ('experienced') and those who did not ('not experienced').

Gender

The results of the Kruskal-Wallis test for the male and female sub-samples are presented in Tables 5.1 and 5.2, and 6.1 and 6.2, respectively.

Table 5.1 – Mean Rank across Questionnaires, Male Sub-sample

Ranks

	Questionnaire	N	Mean Rank
RiskTolerance	Pension	15	41.63
	Investment	58	49.72
	Gamble	35	67.93
	Total	108	

Table 5.2 – Kruskal-Wallis Test Statistic, Male Sub-sample

Test Statistics(a,b)

	RiskTolerance
Chi-Square	10.587
df	2
Asymp. Sig.	.005

a Kruskal Wallis Test

b Grouping Variable: Questionnaire

Table 6.1 – Mean Rank across Questionnaires, Female Sub-sample

Ranks

	Questionnaire	N	Mean Rank
RiskTolerance	Pension	30	55.03
	Investment	34	59.50
	Gamble	61	68.87
	Total	125	

Table 6.2 – Kruskal-Wallis Test Statistic, Female Sub-sample

Test Statistics(a,b)

	RiskTolerance
Chi-Square	3.504
df	2
Asymp. Sig.	.173

a Kruskal Wallis Test

b Grouping Variable: Questionnaire

We find that while both males and females tend to be more risk tolerant depending on the framing of the scenario, with the mean rank for the Gamble questionnaire exceeding that for the Investment questionnaire, which in turn exceeds that for the Pension questionnaire, for both genders, this outcome is far less pronounced for the female sub-sample. In fact, the evidence of a framing effect is only statistically significant (again at the 1% level) for the male sub-sample. The chi-square statistic for the Kruskal-Wallis test on the female sub-sample, at 3.504, is well below the critical value for rejecting a null hypothesis that there is no framing effect, even at the borderline 10% level of significance. This finding is in direct contrast to the earlier study of Strydom *et al* (2009: 17) who found that women were more susceptible to framing. Their observation, however, was based on comparing the results between two completely different risk tolerance questions rather than the rewording of the same underlying question.

Further insight into the framing effect is obtained when pairwise comparisons of the Gamble questionnaire with the other two questionnaires are performed for the male and female sub-samples using the Mann-Whitney test.

Table 7.1 – Mean Rank across Questionnaires – Pension vs Gamble, Male Sub-sample

Ranks

	Questionnaire	N	Mean Rank	Sum of Ranks
RiskTolerance	Pension	15	17.20	258.00
	Gamble	35	29.06	1017.00
	Total	50		

Table 7.2 – Mann-Whitney test, Pension v Gamble, Male Sub-sample

Test Statistics(a)

	RiskTolerance
Mann-Whitney U	138.000
Wilcoxon W	258.000
Z	-2.679
Asymp. Sig. (2-tailed)	.007

a Grouping Variable: Questionnaire

Table 8.1 – Mean Rank across Questionnaires – Pension vs Gamble, Female Sub-sample

Ranks

	Questionnaire	N	Mean Rank	Sum of Ranks
RiskTolerance	Pension	30	39.22	1176.50
	Gamble	61	49.34	3009.50
	Total	91		

Table 8.2 – Mann-Whitney test, Pension v Gamble, Female Sub-sample

Test Statistics(a)

	RiskTolerance
Mann-Whitney U	711.500
Wilcoxon W	1176.500
Z	-1.754
Asymp. Sig. (2-tailed)	.079

a Grouping Variable: Questionnaire

Table 9.1 – Mean Rank across Questionnaires – Investment vs Gamble, Male Sub-sample

Ranks

	Questionnaire	N	Mean Rank	Sum of Ranks
RiskTolerance	Investment	58	41.04	2380.50
	Gamble	35	56.87	1990.50
	Total	93		

Table 9.2 – Mann-Whitney test, Investment v Gamble, Male Sub-sample

Test Statistics(a)

	RiskTolerance
Mann-Whitney U	669.500
Wilcoxon W	2380.500
Z	-2.776
Asymp. Sig. (2-tailed)	.006

a Grouping Variable: Questionnaire

These results are very interesting. In both cases, for the male-subsample, the reported U-statistics are statistically significant at the 1% level of significance (Tables 7.2 and 9.2), in keeping with the results for the sample as a whole. However, for the female sub-sample, there is far less evidence of a framing effect. While female risk tolerances

differed between the Pension and Gamble questionnaires, the difference in the mean ranks was only statistically significant at the 10% level (Table 8.2).

Table 10.1 – Mean Rank across Questionnaires – Investment vs Gamble, Female Sub-sample

Ranks

	Questionnaire	N	Mean Rank	Sum of Ranks
RiskTolerance	Investment	34	43.46	1477.50
	Gamble	61	50.53	3082.50
	Total	95		

Table 10.2 – Mann-Whitney test, Investment v Gamble, Female Sub-sample

Test Statistics(a)

	RiskTolerance
Mann-Whitney U	882.500
Wilcoxon W	1477.500
Z	-1.223
Asymp. Sig. (2-tailed)	.221

a Grouping Variable: Questionnaire

Moreover, based on the test results presented in Table 10.2, the null hypothesis that female respondents' risk tolerances were insensitive to the different framing of the Gamble and Investment scenarios cannot be rejected. Therefore, it seems that male respondents are far more susceptible to framing effects than female respondents, displaying a greater tendency to adjust their risk tolerance to the scenario presented to them. The same analysis was done comparing the Investment and Pension scenarios but no significant difference was found for either males or females.

The results of the Mann-Whitney test of the mean ranks of risk tolerance responses for the whole sample, as well as the separate questionnaires, are presented in Tables 11.1 and 11.2 below.

Table 11.1 Mean Ranks for Whole Sample and Separate Questionnaires, by Gender

Ranks

	Gender	N	Mean Rank	Sum of Ranks
RiskTolerance	Male	108	116.98	12633.50
	Female	125	117.02	14627.50
	Total	233		
RTGamble	Male	35	51.91	1817.00
	Female	61	46.54	2839.00
	Total	96		
RTPension	Male	15	22.03	330.50
	Female	30	23.48	704.50
	Total	45		
RTInvest	Male	58	47.19	2737.00
	Female	35	46.69	1634.00
	Total	93		

Table 11.2 Mann-Whitney Tests for Gender

Test Statistics(a)

	RiskTolerance	RTGamble	RTPension	RTInvest
Mann-Whitney U	6747.500	948.000	210.500	1004.000
Wilcoxon W	12633.500	2839.000	330.500	1634.000
Z	-.005	-.929	-.359	-.089
Asymp. Sig. (2-tailed)	.996	.353	.720	.929

a Grouping Variable: Gender

It is apparent that gender appears to have no explanatory power insofar as risk tolerance is concerned. It is only for the Gamble questionnaire that there is a noticeable difference in the mean rank of the risk tolerances, but even this difference is not even close to being statistically significant. These results are surprising in view of the earlier finding that gender appears to have a role in explaining sensitivity to framing. In particular, female respondents did not appear to noticeably distinguish between the Investment and Gamble Scenarios. This is borne out in Table 11.1 by the similar mean ranks for similar sized samples for the two questionnaires. In contrast the mean rank for male respondents increases noticeably for the Gamble questionnaire, and the Mann-Whitney test statistic for the difference in mean ranks across the Investment and Gamble questionnaires was statistically significant (Table 11.2).

Similarly, while male respondents displayed slightly lower risk tolerance than female respondents for the Pension questionnaire, the mean rank of their risk tolerances was higher than that of females for the Gamble questionnaire. The reader will recall that there was a highly statistically significant difference between the risk tolerances across the two questionnaires for the male sub-sample (Table 7.2). Therefore, we conclude that it is not so much a case of gender explaining risk tolerance in any given scenario, but of gender explaining the extent to which risk tolerances can shift across different scenarios.

Experience

As the experience question for each scenario was different the analysis of experience as a factor in determining risk tolerance is limited to within each scenario. The results of the Mann-Whitney test of the mean ranks of risk tolerance responses for the whole

sample, as well as the separate questionnaires, are presented in Tables 12.1 and 12.2 below.

Table 12.1 Mean Ranks for Whole Sample and Separate Questionnaires, by Experience

Ranks

	TotalExp	N	Mean Rank	Sum of Ranks
RiskTolerance	Experienced	85	122.78	10436.50
	Not Experienced	148	113.68	16824.50
	Total	233		
RTGamble	Experienced	34	53.01	1802.50
	Not Experienced	62	46.02	2853.50
	Total	96		
RTPension	Experienced	25	21.80	545.00
	Not Experienced	20	24.50	490.00
	Total	45		
RTInvest	Experienced	26	51.46	1338.00
	Not Experienced	67	45.27	3033.00
	Total	93		

Table 12.2 Mann-Whitney Tests for Experience

Test Statistics(a)

	RiskTolerance	RTGamble	RTPension	RTInvest
Mann-Whitney U	5798.500	900.500	220.000	755.000
Wilcoxon W	16824.500	2853.500	545.000	3033.000
Z	-1.008	-1.201	-.705	-1.008
Asymp. Sig. (2-tailed)	.313	.230	.481	.314

a Grouping Variable: TotalExp

As with gender, prior experience of risk-taking does not appear to be a statistically significant determinant of risk tolerance. However, as we pointed out above, the experience indicator relates only to the particular scenario in question. The difference in mean ranks is, however, suggestive. Across all three scenarios, respondents indicating experience had a higher mean rank suggesting greater risk tolerance which is in keeping with the argument of Menkhoff, Schmidt, and Brozynski (2005: 15) that experienced individuals display greater risk tolerance. Within scenarios, experienced respondents in the Gamble and Investment scenarios also exhibited a higher mean rank suggesting that more experienced individuals displayed greater risk tolerance. Interestingly, for the Pension scenario experienced individuals displayed a lower mean rank. This could be as a result of the difficulty in measuring experience of pensions for a sample of University students or could indicate that those with no

experience of pensions assume that they are less risky than experienced respondents and so make more aggressive selections. The fact that these differences in mean ranks is not significant unfortunately means that meaningful conclusions can not be reached but the differences observed suggest that further research using a more sophisticated measure of experience is required.

5 CONCLUSION

The results of this study provide support for the hypothesis that subjective risk tolerance questionnaires may be subject to framing bias. Interestingly, the evidence appears to indicate that males are more sensitive to framing than females (at least for this instrument). Males were especially found to increase their risk tolerance when the scenario was framed as a gamble. This effect was also found for females but to a much smaller extent. However, within a given scenario, it was found that gender did not significantly affect risk tolerance. Prior experience relating to a given scenario was also not a statistically significantly determinant of risk tolerance, though for the Gamble and Investment scenarios, experienced participants appeared to be more risk tolerant.

Investigating the effect that actual amounts would have, rather than returns, would be an obvious extension of this study. In addition, the simple approach to measuring experience employed in this study is a major limitation. Further research which seeks to more accurately assess prior experience would also be a fruitful avenue for further research.

References

Arrow, K.J. (1971). Essays in the Theory of Risk Bearing. Chicago Markham Publishing Company.

Barsky,R.B, Thomas,F.T, Kimball, M.S. and Shapiro, M.D, (1997). "Preference Parameters and Behavioural Heterogeneity: An Experimental Approach in the Health and Retirement Study." Quarterly Journal of Economics, 112 (2), pg. 537-79.

Bodie.Z, Kane. A, Marcus .A.J(2007), Essentials of investments, McGraw-Hill Publishers, Chicago

Droms. W. G. (1987). Investment asset allocation for PFP clients. Journal of Accountancy. 163. 114-1

Frisch, D. (1993). "Reasons for framing effects". Organizational Behavior and Human Decision Processes. No. 54, pg. 399–429.

Grable, J.E. (2000). "Financial Risk Tolerance and Additional Factors That Affect Risk Taking in Everyday Money Matters" Journal of Business and Psychology, Vol. 14, No. 4; Jun.; pg. 625-630.

Grable, J. E. and Lytton, R. H. (1999). Financial risk tolerance revisited: The development of a risk assessment instrument. Financial Services Review. Vol. 8 pg. 163-181.

Gron and Winton. (2001). "Risk Overhang and Market Behavior". The Journal of Business, Vol. 74, No. 4; Oct.., pg. 591-612

Hallahan, T.A.; Faff, R.W. and McKenzie, M.D. (2004). "An empirical investigation of personal financial risk tolerance". Financial Services Review. Vol: 13 (1) ; pg:57-78.

Hanna, S. D., Gutter, M. S., & Fan, J. X. (2001). A measure of risk tolerance based on economic theory. Financial Counseling and Planning,Vol. 12 pg 53-60.

Hanna, S.D. and Lindamood, S. (2004). An Improved Measure of Risk Aversion Financial Counseling and Planning Education, Vol. 15(2), pp.27-38.

Kahneman,D and Tversky,A .(1986)."Rational Choice and the Framing of Decisions", Journal of Business, vol.59, no.4, pt.2.

Kahneman,D and Tversky, A, (1979) "A, Prospect theory: An analysis of decision under risk". Econometrica; Vol 47, pg263–291.

Kahneman, D and Tversky, A, (1992). "Advances in Prospect Theory: Cumulative Representation of Uncertainty". Journal of Risk and Uncertainty, 5(4), pp297–323.

Kuhberger; A. (1998). "The Influence of Framing on Risky Decisions: A Meta-analysis". Organizational Behavior and Human Decision Processes. Vol. 75, Issue 1, July, pg. 23-55.

Levin, I.P.; Schneider, S.L. and Gaeth, G.J. (1998). “All Frames Are Not Created Equal: A Typology and Critical Analysis of Framing Effects” Organizational Behavior and Human Decision Processes. Vol. 76, No. 2, November, pp. 149–188.

Markowitz, H 1952, ‘Portfolio selection’, The journal of finance, vol. 7, no. 1.

Pratt, J. (1964) Risk aversion in the Small and Large. Econometrica. 32, p122-136.

Menkhoff, L.; Schmidt, U. and Brozynski, T. (2006). “The impact of experience on risk taking, overconfidence, and herding of fund managers: Complementary survey evidence.” European Economic Review. Vol. 50, Issue 7, October , Pg. 1753-1766.

Powell, D. and Ansic, D. (1997). “Gender differences in risk behaviour in financial decision-making: An experimental analysis”. Journal of Economic Psychology. Vol.18 pg. 605-628.

Schooley, D.K. and Worden, D.D. (1996). “Risk Aversion Measures: Comparing Attitudes and Asset Allocation”. Financial Services Review. 5(2); pg, 87-99.

Schubert, R.; Brown, M.; Gysler, M. and Brachinger, H.W. (1999). “Financial decision-making: are women really more risk-averse?” American Economic Review. Vol: 89 (2); pg. 381-385.

Strydom, B.; Gokul, A. & Christison, A. (2009). “Financial Risk Tolerance: A South African Perspective”. Paper delivered at the 18th Annual Conference of the Southern African Finance Association. 14-16 January 2009.

Subedar, Z. McCrae, M. and Gerace, D. (2006). The Validity of Financial Advisor’s Heuristic Risk Tolerance Categorisation: Evidence from a Risk Tolerance Assessment Tool. Australia, University of Wollongong.

Tversky,A. and Kahneman, D (1981). "The Framing of Decisions and the Psychology of Choice." Journal of Experimental Psychology, pg 453-458.

Walls, M.R. and Dyer, J.S. (1996). “Risk Propensity and Firm Performance: A Study of the Petroleum Exploration Industry.” Management Science, Vol. 42, No. 7 (Jul.), pg. 1004-1021.

Yao. R, Gutter. M. S, and Hanna S.D. (2005). The Financial Risk Tolerance of Blacks, Hispanics and Whites - Financial Counselling and Planning Vol. 16 (1).

Yook, C.K and Everett, R.(2003). Assessing Risk Tolerance: Questioning the Questionnaire Method. FPA Journal.