Analysis of Risk Tolerance Test – FinaMetrica

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Table of Contents

Executive Summary

Background

The FinaMetrica Risk Profiling system is a tool used by financial advisors with their clients to determine clients' comfort levels with financial risk, investment risk in particular. The system is based on a psychometric test of personal financial risk tolerance. It has its beginnings in The Survey of Financial Risk Tolerance (SOFRT) authored by Dr Michael J. Roszkowski (Roszkowski, M. J., 1993-97), who was Associate Professor of Psychology at The American College, Bryn Mawr, Pennsylvania and is an acknowledged expert in the relationships between psychological and financial variables. The SOFRT used a 57-question questionnaire.

Chandler & Macleod Consultants conducted further research on the questionnaire with the aim:

a. to confirm that US research into the psychometric properties of the SOFRT was conducted along sound scientific principles,
b. to determine the useability of the SOFRT and to make revisions where necessary,
c. to establish the Australian database for the SOFRT,
d. to assess the adequacy of the SOFRT's psychometric properties in an Australian environment, and
e. to compare the performance of the SOFRT in an Australian environment to its performance in an American environment.

The initial Australian version has been through several development rounds before the first commercial release to:

a. develop a sophisticated scoring system,
b. maximise the usability of the instrument,
c. minimise the amount of time required to complete the scale, and
d. develop an acceptable norm group.

The current scale has 25 items. Decisions to alter the scale were based primarily on:

a. a lack of relevance to the Australian Financial system of some of the US items,
b. poor psychometric performance of an item (e.g. failure to discriminate, poor reliability),
c. lack of clarity as measured by user responses and feedback.

As this development work proceeded the successive alterations to each new version of the scale became more and more subtle, such that the only differences in the last few versions of the scale consisted of minor alterations to the wording of the questions or the categories.

The scale was further verified by the University of New South Wales Applied Psychology Unit confirming the psychometric qualities of the test and that it meets or exceeds the requirements for a test of this kind. A copy of the certification is available at http://www.riskprofiling.com/Downloads/UNSWFinaMetricaCertification.pdf.

As part of an ongoing quality assurance program, research is conducted regularly to refine the measure and test its psychometric properties. These include

a. an annual review of score distribution across time, country and demographic factors,
b. test-retest analysis every two to three years or when sufficient data is acquired, and
c. rescaling review every three to five years or when sufficient data is acquired.

This report outlines the most recent rescaling research conducted. Research was conducted in two parts. The first explored historical data from May 1999 to Jan 2011 and then a contemporary data set was selected from the historical set (Jan 2010 to July 2010 - which also includes new data from Feb 2011 to Jul 2011) for further analysis.

The FinaMetrica Risk Profiling System, and specifically the FinaMetrica Risk Tolerance Questionnaire (FRTQ), was developed in the late 1990s. The system was launched in October 1998, using a scoring algorithm based on a sample of 250 cases. Data collected in the first few months was used to adjust the scoring algorithm, such that the sample upon which the current test was developed was based on participants from Australia and New Zealand and consisted of approximately 4,000 cases. The revised algorithm was applied in May 1999. At present, the FRTQ has been administered in fourteen different countries, and the database currently consists of over 400,000 cases.

With a rapid increase in the number of cases added to the database, research was undertaken to, firstly, review existing data across time and countries to determine whether the test could be refined, secondly, if it could be refined, to make the necessary changes and, thirdly, to establish a base for sustainable future development of the test. While there was data from 14 countries in total, only five countries - Australia, New Zealand, the US, the UK and Canada, had sufficient data for analysis purposes.

The research was carried out by Dr Joanne Earl and her assistant Emily Chew, University of New South Wales (UNSW) and the report was second checked by Stuart Erskine MA, CompleteGenius and Myrisini Katsikatsou PhD London School of Economics.

The first part of the research reviewed the historical database from the first data collection in May 1999 through to data collected up until Jan 2011. The historical data was analysed to identify any changes in the data across time or by country (both of which were found) and to establish a base for analysis going forward.

While the differences found were statistically significant their magnitude was so small, the average difference was 3 points, as to have no practical impact. To put the differences in the context, the FRTQ measures risk tolerance on a scale of 0 to 100, mean 50 with a standard deviation of 10, so a 3 point difference is one third of a standard deviation.

The second part of the research focused on the contemporary data base, which comprises the data collected in 2010 and 2011. The contemporary database was identified as suitable for the purposes of developing new scoring algorithms and to be expanded to include smaller populations as data from other countries expands over time. We firstly determined the reliability of the measures using standardised scores and then proceeded to calculate new algorithms. The algorithm allows us to determine the value of scores controlling for any covariance resulting from differences in demographics (i.e. age, gender). Throughout the report we indicate which variables are used where. We explain in more detail how an algorithm is devised in Types of Score Used below.

Method of Analysis

The database was checked for anomalies and cleaned appropriately. This consisted of removing duplicate cases and unusual data.

Analyses were then performed using both the overall raw scores, z scores (at a question level) and algorithm-adjusted overall scores referred to as the Financial Risk Tolerance Score. The use of algorithm-adjusted question response scores allows for a standardised comparison of differences as the scores have been weighted and adjusted appropriately.

These analyses were:

a. An analysis of differences across time period and countries, controlling for age and gender.
b. Analysing the distribution of demographic variables across time and country, both for the total dataset and within specific countries and time periods.
c. A comparison of old and new scores, including reliability analyses, inter-correlation and principal component analysis.

d. Comparisons by country and risk group on each question, within the most recent time period of data.

Findings

There were some significant differences in Risk Tolerance Score between countries and across different time periods. There was no significant difference between Australia/New Zealand, Canada and the US but there was a significant difference between these countries and the UK. For some countries, there were differences between the more recent data and much earlier data. This is most likely a function of increased diversity in the sample over time. There were also significant differences in age and gender distributions across countries. We tested for other demographic differences (e.g. education, marital status, number of dependent, gross income, combined gross income and net assets) but none were identified. This is important as it is known (and also replicated in the current findings) that risk tolerance may be affected by age and gender.

The reliability (Cronbach Alpha) of the scale remains excellent. Generally accepted standards for test reliability are 0.80 and the FRTQ measure performs at 0.90 (see 4.3 below for further details). The results of the principal component analysis also indicate that the scale continues to assess one factor – risk tolerance.

The measure continues to distinguish between scores across the Risk Tolerance Groups. In a majority of cases the questions behave in the way they were designed and differentiate between groups of people on the basis of increasing risk tolerance.

Conclusion and Recommendations

Analysis of the historical data indicated that the test would benefit from rescaling and new scales were developed. Given that there are some significant differences between countries and also differences between time periods, updated algorithms reflect differences in the new contemporary data. The measure manages to maintain excellent reliability and to successfully differentiate between different risk groups ensuring that assessment is purposeful and worthwhile.

A Description of the Measure

Before we begin our description of the analysis and our findings it is firstly necessary to outline the measure and details of the risk groups.

The Financial Risk Tolerance measure consists of 25 multiple choice questions as outlined in the Table below. Later in the report we discuss the reliability of the measure (i.e. how likely the questions are all measuring the same thing consistently, in this case risk tolerance). A full list of the questions and rating scale used can be found in Appendix 1.

Table 1. Summary of Item Descriptions (Questions)

1	are you a risk taker
2	how do you adapt when things go wrong
3	what does risk mean
4	have you ever invested for the thrill
5	pay vs. job security
6	Interested in losses or gains
7	how do you feel after deciding
8	how would like to be paid
9	what risks have you taken in the past
10	what risk are you now prepared to take
11	ever borrowed to invest
12	confidence in decisions
13	buy into company after restructure
14	how much fall to make you uncomfortable
15	renovate, rent or sell
16	which portfolio
17	conditions to invest 25% of money
18	money value vs. purchasing power
19	how have your investments gone
20	how much in high risk returns
21	portfolio vs. term deposit
22	use government perks
23	fixed vs. variable interest
24	how much insurance cover
25	rate yourself 0-100

Types of Scores Used

Throughout the report different scores are used. In summary these are:

- Raw Scores – the number of the actual answer chosen
- Z Scores – a rescaled score that allows us to compare across questions
- Sum Z scores – a score that combines the Z scores but does not include the 'covariance factor.
- Algorithm based scores – a score that weights each question equally and includes the 'covariance factor'.

A z score is a way of making sure that you are comparing apples to apples. All of the questions in the test contribute equally to the overall score – i.e. there are no questions that count more in the overall score. Responses to questions are all rescaled to reflect how many standard deviations the response is from the mean response for that question. This is achieved by comparing each response to the mean responses to each question generated from our norm group (i.e. all the respondents included in the contemporary data set). This approach allows us to compare directly responses to questions that have different numbers of response options to see which response represents the riskier option compared to our norm group.

Suppose we have two questions, Q1 has 9 response alternatives, whereas Q2 has 5 response options. A response of 7 to Q1 can be compared to a response of 4 to Q2. If Q1 had a mean response in our norm group of 5 out of nine, and a standard deviation of 1, then the response of 7 would be 2 standard deviations away from the mean (and therefore such a response would be relatively rare). However if Q2 had a mean response of 3, and a standard deviation of 1, the response of 4 would only be 1 standard deviation away from the mean (a much more common event). Consequently, in this example, the response of 7 to Q1 would be rescaled to 2, and the response of 4 to Q2 would be rescaled to 1. Before this is done, all the raw scales are corrected so that they run in a consistent direction with higher numbered responses indicating the riskier option. Thus in this example the response to question 1 represents a much more risky option than the response to question 2.

When all the questions have been rescaled in this manner and z scores produced, the sum of z scores can be calculated.

The algorithm based score is the sum of z scores divided by the 'covariance factor'. The latter is the standard deviation of the sum of the z scores where the correlation among the z scores on the items is taken into account. This way, all 25 questions are weighted equally. The result is rescaled once more to produce a final score mapped onto a range of 0 – 100. The scale is designed so that our norm group would produce a mean risk score of 50, and a standard deviation of 10.

The fact that the scale is a norm-referenced scale means that the final score calculated provides a measure of risk tolerance relative to the other respondents of the questionnaire included in the contemporary data set. For example, scores below 50 represent below average risk tolerance, whereas scores above 50 represent above average risk tolerance. The relative interpretation of the scores is reasonable in the case of risk tolerance as there is no natural measurement unit for the risk tolerance (as it exists for example for height and weight).

As with any norm-referenced scale, the norm group is updated from time to time to reflect a more representative comparison group. When this occurs, all scores are adjusted so that 50/100 represents the median score. To make sure that the group is representative the demographics of the respondents are observed and included in the data set as well. Demographics that affect the risk tolerance should be definitely included (and sometimes are referred to as covariates). Also, as the norm sample becomes even larger it will be possible

to use the demographic data to produce differential norms for various sub-groups. This way, the reporting can be refined.

The 0 to 100 scale is distributed across seven risk groups of increasing risk tolerance. Later in the report we determine whether the measure allows us to differentiate between the seven risk groups, and whether there is variation between the groups on a question-by-question basis.

Table 2. Risk groups, risk score ranges and brief group description

Group	Risk Score Range	% in Group	Description
Group 1	0 – 24	1%	These people have extremely low risk tolerance.
Group 2	25 – 34	6%	These people have very low risk tolerance.
Group 3	35 – 44	24%	These people have low risk tolerance.
Group 4	45 – 54	38%	These people have average risk tolerance.
Group 5	55 – 64	24%	These people have high risk tolerance.
Group 6	65 – 74	6%	These people have very high risk tolerance.
Group 7	75 – 100	1%	These people have extremely high risk tolerance.

HISTORICAL DATA SET

The original database extending from May 1999 until January 2011 consisted of 404,571 cases.

1. Data Cleaning

1.1 Anomalous Data

Firstly, the data was checked for anomalies. This mainly consisted of screening the demographic variables (age, gender, educational status, personal before tax income, marital status, combined before tax income, dependents and net assets). Anomalous data was discovered in the age category, whereby it was indicated that some of the people who had taken the survey were either very young (e.g. aged 13 years) or very old (e.g. aged 110 years). Age was restricted to remove any outliers, identified as cases younger than 20 and older than 90, and the data was filtered accordingly. This resulted in the removal of 839 cases.

1.2 Duplicate Data

Secondly, it was identified that there was test-retest data present in the database. Using the TRT (test-retest) code provided for FinaMetrica's data, 9361 cases were removed, leaving 394,371 cases overall. Using the ClientCode variable, 16,331 potential duplicates were identified. This data is referred to as *potential* duplicate data as some of it could have been unique data entered by financial advisors using the same code, or the same code being used for couples. In the interests of maintaining purity of the data the second occurrence of these cases were deleted. This resulted in there being 378,040 cases overall.

DEMOGRAPHIC DATA SET

2. Demographic Data - Total Data Set

2.1 Description of the Data Set

Demographic data (both age and gender) for the total data set was available for 257,290 cases (thus reducing the total data set from 378,040 cases). There were fourteen original country categories, these were: Australia, Australia/New Zealand, Canada, China, Germany, Hong Kong, India, Malaysia, Kuwait, New Zealand, United Kingdom, United States, South Africa and Other/Unknown. Three of these categories (Australia, Australia/New Zealand, and New Zealand) were collapsed into one category, Australia/New Zealand, resulting in 12 country categories for the total data set. The range of time remained the same (years 1999 to 2011).

2.1.1 Distribution of Age and Gender

Table 3 shows the distribution of age and gender across the total data set. Table 4 shows the number of cases per country and year across the total data set. Tables 5 and 6 explore age differences while Table 7 and 8 compare gender.

Table 3. Number of cases and percentage by age and gender across the total dataset (N=257,290)

Demographic Variable	Category	Percentage
Sex	Male	59.1%
	Female	40.9%
Age	20-29	6%
	30-39	15.5%
	40-49	21.6%
	50-59	27.8%
	60-69	22%
	70-79	5.9%
	80+	1.2%

About 70% of the sample is comprised of participants in the age range 40-69.

2.1.2 Distribution Across Time by Country

Table 4. Number of cases and percentage distribution (per country by year) by country and year for the total dataset N=257,290

Year	AUS/NZ	Canada	UK	US	Other	Total
1999	1,147 (100%)	0	0	0	0	1,147 (0.45%)
2000	3,259 (99.54%)	0	0	7 (0.21%)	8 (0.24%)	3,274 (1.27%)
2001	4,365 (98.05%)	0	0	76 (1.71%)	11 (0.25%)	4,452 (1.73%)
2002	9,555 (82.90%)	3 (0.03%)	1	1,958 (16.99%)	9 (0.08%)	11,526 (4.48%)
2003	9,364 (69.39%)	33 (0.24%)	238 (1.76%)	3,628 (26.89%)	231 (1.71%)	13,494 (5.24%)
2004	9,778 (58.89%)	35 (0.21%)	1,071 (6.45%)	5,416 (32.62%)	305 (1.84%)	16,605 (6.45%)
2005	10,085 (52.83%)	51 (0.27%)	2,049 (10.73%)	6,676 (34.97%)	230 (1.20%)	19,091 (7.42%)
2006	12,937 (48.03%)	273 (1.01%)	2,751 (10.21%)	10,507 (39.01%)	467 (1.74%)	26,935 (10.47%)

2007	13,531 (45.48%)	524 (1.76%)	4,310 (14.49%)	10,983 (36.91%)	405 (1.36%)	29,753 (11.56%)
2008	12,462 (39.24%)	562 (1.77%)	7,970 (25.10%)	10,317 (32.49%)	448 (1.41%)	31,759 (12.34%)
2009	12,936 (24.57%)	892 (1.69%)	11,328 (21.51%)	27,128 (51.52%)	375 (0.71%)	52,659 (20.47%)
2010	12,662 (27.37%)	1,137 (2.46%)	13,076 (28.27%)	18,678 (40.38%)	701 (1.52%)	46,254 (17.98%)
2011	52 (15.25%)	10 (2.93%)	66 (19.35%)	208 (61.00%)	5 (1.47%)	341 (0.13%)
Total	112,133 (43.58%)	3,520 (1.37%)	42,860 (16.66%)	95,582 (37.15%)	3195 (1.24%)	257290

In the early years, most participants were from Australia. FinaMetrica enters the US market in 2002 formally and over the years it has grown to become our biggest market.

2.1.3 Distribution of Age Groups Across Country

Table 5. Number of cases and percentage distribution (by country) by age group and country across total sample (N=257,290)

Country	**20's**	**30's**	**40's**	**50's**	**60's**	**70's**	**80's +**	**Total**
AUS/NZ	7603 (6.8%)	19834 (17.7%)	24092 (21.5%)	30764 (27.4%)	23614 (21.1%)	5,376 -4.80%	850 (0.8%)	112133 (43.6%)
CAN	151 (4.3%)	442 (12.60%)	879 (25.00%	1087 (30.90%)	720 (20.50%)	198 (5.60%)	43 (1.20%)	3520 (1.40%)
US	4,952 (5.20%)	12283 (12.90%)	19735 (20.70%	27934 (29.20%)	22236 (23.30%)	6891 (7.20%)	1551 (1.60%)	95582 (37.20%)
UK	2131 (5.00%)	6337 (14.80%)	10049 (23.50%	11156 (26.00%)	9875 (23.00%)	2758 (6.40%)	554 (1.3%)	42860 (16.70%)
Other	516 (16.2%)	899 (28.20%)	909 (28.50%	599 (18.80%)	208 (6.50%)	43 (1.40%)	20 (0.60%)	3194 (1.20%)
Total	15353 (60.00%	39795 (15.50%)	55665 (21.60%	71540 (27.80%)	56653 (22.00%)	15266 (5.90%)	3018 (1.20%)	257,290

2.1.4 Distribution of Age Groups Across Time

Table 6. Number of cases and percentage distribution (by year) by age group and year across total sample (N=257,290)

	Age Groups							
Year	**20's**	**30's**	**40's**	**50's**	**60's**	**70's**	**80's +**	**Total**
1999	96 (8.4%)	292 (25.5%)	337 (29.4%)	292 (25.5%)	110 (9.6%)	19 (1.7%)	1 (0.1%)	1,147 (0.5%)
2000	272 (8.3%)	631 (19.3%)	782 (23.9%)	990 (30.3%)	516 (15.8%)	71 (2.2%)	12 (0.4%)	3,274 (1.3%)
2001	363 (8.2%)	916 (20.6%)	1,123 (25.2%)	1,213 (27.3%)	695 (15.6%)	127 (2.9%)	15 (0.3%)	4,452 (1.7%)
2002	738 (6.4%)	2,296 (19.9%)	2,746 (23.8%)	3,323 (28.8%)	1,883 (16.3%)	488 (4.2%)	52 (0.5%)	11,526 (4.5%)
2003	575 (4.3%)	2,181 (16.2%)	3,148 (23.3%)	4,086 (30.3%)	2,713 (20.1%)	692 (5.1%)	99 (0.7%)	13,494 (5.2%)
2004	598 (3.6%)	2,636 (15.9%)	3,915 (23.6%)	4,979 (30%)	3,499 (21.1%)	833 (5.0%)	145 (0.9%)	16,605 (6.5%)
2005	650 (3.4%)	3,265 (17.1%)	4,515 (23.7%)	5,619 (29.4%)	3,860 (20.2%)	994 (5.2%)	188 (1%)	19,091 (7.4%)

2006	1,483 (5.5%)	4,511 (16.8%)	6,336 (23.5%)	7,686 (28.5%)	5,285 (19.6%)	1,375 (5.1%)	259 (1%)	26,935 (10.5%)
2007	2,234 (7.5%)	5,003 (16.8%)	6,540 (22%)	8,097 (27.2%)	6,095 (20.5%)	1,476 (5%)	308 (1.%)	29,753 (11.6%)
2008	2,212 (7%)	4,671 (14.7%)	6,735 (21.2%)	8,457 (26.6%)	7,289 (23%)	2,006 (6.3%)	389 (1.2%)	31,759 (12.3%)
2009	3,543 (6.7%)	7,265 (13.8%)	10,207 (19.4%)	14,181 (27%)	12,932 (24.6%)	3,714 (7.1%)	817 (1.6%)	52,659 (20.5%)
2010	2,556 (5.5%)	6,077 (13.1%)	9,230 (20%)	12,529 (27.1%)	11,690 (25.3%)	3,443 (7.4%)	729 (1.6%)	46,254 (18%)
2011	33 (9.7%)	51 (15%)	51 (15%)	88 (25.9%)	86 (25.2%)	28 (8.2%)	4 (1.2%)	341 (0.1%)
Total	15,353 (6%)	39,795 (15.5%)	55,665 (21.6%)	71,540 (27.8%)	56,653 (22%)	15,266 (5.9%)	3,018 (1.2%)	257,290

2.1.5 Distribution Across Gender By Country

Table 7. Number of cases and percentage distribution (by country) by gender and country across total sample (N=257,290)

Country	**Male**	**%**	**Female**	**%**	**Total**	**%**
AUS/NZ	67,059	60%	45,074	40%	112,133	44%
Canada	1,901	54%	1,619	46%	3,520	1%
US	54,421	57%	41,161	43%	95,582	37%
UK	26,437	62%	16,423	38%	42,860	17%
Other	2172	70%	923	30%	3095	1%
Total	151,990	59%	105,300	41%	257,290	100%

There is a slightly highest proportion of male than female across all countries, more so in the UK.

2.1.6 Distribution Across Gender By Year

Table 8. Number of cases and percentage distribution (by year) by gender and year across total sample (N=257,290)

Year	**Male**	**%**	**Female**	**%**	**Total**	**%**
1999	855	75%	292	25%	1,147	0%
2000	2,238	68%	1,036	32%	3,274	1%
2001	2,946	66%	1,506	34%	4,452	2%
2002	7,582	66%	3,944	34%	11,526	4%
2003	8,529	63%	4,965	37%	13,494	5%
2004	10,204	61%	6,401	39%	16,605	6%
2005	11,450	60%	7,641	40%	19,091	7%
2006	15,426	57%	11,509	43%	26,935	10%
2007	16,365	55%	13,388	45%	29,753	12%
2008	17,629	56%	14,130	44%	31,759	12%
2009	32,130	61%	20,529	39%	52,659	20%
2010	26,458	57%	19,796	43%	46,254	18%
2011	178	52%	163	48%	341	0%
Total	151,990	59%	105,300	41%	257,290	100%

ANALYSIS OF HISTORICAL DATA SET

In the previous section we reported on the composition of the historical data set. In this section we report on analyses that were conducted to determine whether significant differences existed between countries and within countries (according to year). We then proceed to explore differences between the age groups and across gender. This analysis was conducted for the purpose of identifying the best dataset for developing any new metrics, including an algorithm or algorithms (depending on the extent of the differences between countries) used to score the measure. We selected the larger countries for this analysis and the cases were distributed as follows:

Table 9. Number of cases per country

Country	**No. of cases**
Australia/New Zealand	112,133
Canada	3,520
United States	95,582
United Kingdom	42,860

2.2 Differences Across Time Periods

A number of analyses were conducted to determine whether differences existed across time. Firstly a one-way Analysis of Variance (ANOVA) was conducted using year (Y) as the independent variable and Risk Tolerance Score (Score) as the dependent variable. The results of the ANOVA indicated that there were statistically significant (small) differences, mainly decreases, in the average risk tolerance score across time periods. We know from other analysis reported elsewhere that the test-retest reliability (the correlations of tests taken by the same set of subjects over a period of time) points to high stability of the FRTQ measure. In previous studies this has been reported as 0.74 (and well within acceptable limits; Rozkowski and Davey, 2010). Essentially it means that when a person completes the test once and then again the results are not significantly different (they score similarly on the first and second test). The time period between test and retest ranged from 9 months to 71 months. So, changes across time may partly be the result of a change in sample composition (see Appendix 2 for details of analysis).

2.3 Gender and Composition Differences

We also wanted to determine if significant differences existed between men and women. We did see some differences. Figure 1 shows the distribution of gender. Other researchers (see Gerrans, Faff and Hartnett, 2013, 2015) reported a greater gender difference in the UK than elsewhere and this may explain differences across countries.

" gender gap is wider in the U.K. with females having a 6.3 points lower FRT compared with AUS/NZ (4.0)" (p. 18).."

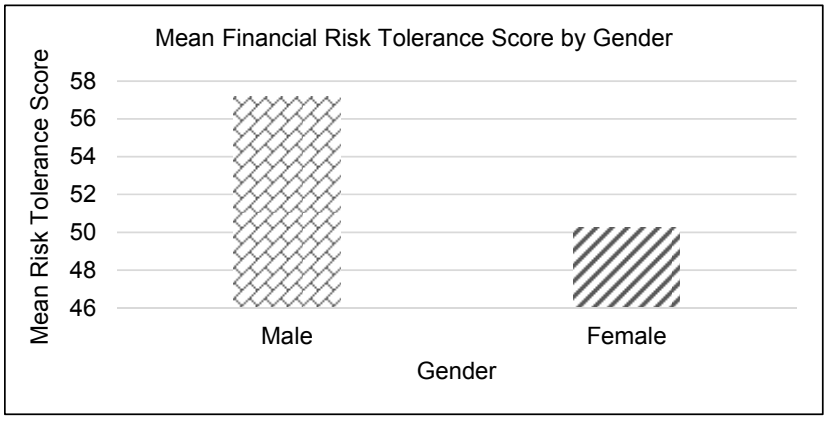


Figure 1. Mean risk tolerance score calculated using algorithm for historical data set by gender

Additionally, we conducted ANOVAs on Gender (see Appendix 3). Men and women were significantly different with men scoring higher than women in general.

2.4 Age and Composition Differences

Table 10 shows the distribution of age groups across the selected countries. Figure 2 demonstrates the percentage within each age group within each country, by age group (see Appendix 4 for chi-square results.) Reference to the bottom line in the table and to the graph demonstrates that a majority of the sample are in their 40's – 60's.

We wanted to determine whether significant differences existed across risk tolerance scores for the different age groupings. To do this we've conducted ANOVAs on Age Group (see Appendix 5) with post hoc comparisons. Age groups were also significantly different from each other except in the case of 20's vs 30's.

Table 10. Number of cases per age group by selected country

	Age Groups							
Country	**20's**	**30's**	**40's**	**50's**	**60's**	**70's**	**80's +**	**Total**
AUS/NZ	7,603	19,834	24,092	30,764	23,614	5,376	850	112,133
CAN	151	442	879	1,087	720	198	43	3,520
UK	2,131	6,337	10,049	11,156	9,875	2,758	554	42,860
US	4,952	12,283	19,735	27,934	22,236	6,891	1,551	95,582
TOTAL	14,837	38,896	54,755	70,941	56,445	15,123	2998	254,095

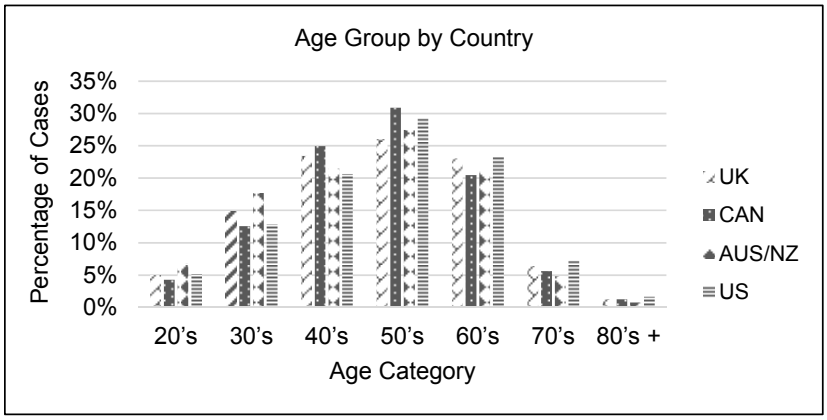


Figure 2. Percentage of cases per age group per country

2.5 Differences Within Gender across Age Groups

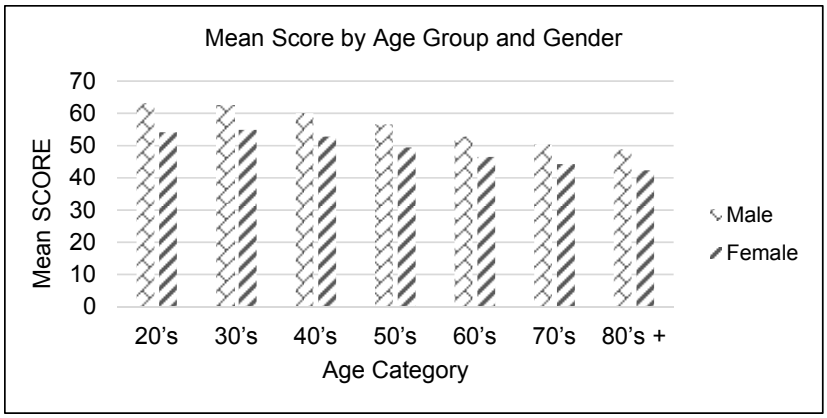


Figure 3. Mean risk tolerance score by age group and gender

As can be seen from the Figure above, males scored higher than females across each age group. A significant interaction effect exists F=39.293 (6,254081) p =.000. This means that as the age increases the difference between men and women becomes smaller.

2.6 Composition and Differences of Risk Groups

As can be seen from the graphs below women dominate the less financially risk tolerant groups when compared to men. Younger age groups are also associated with more risk tolerance.

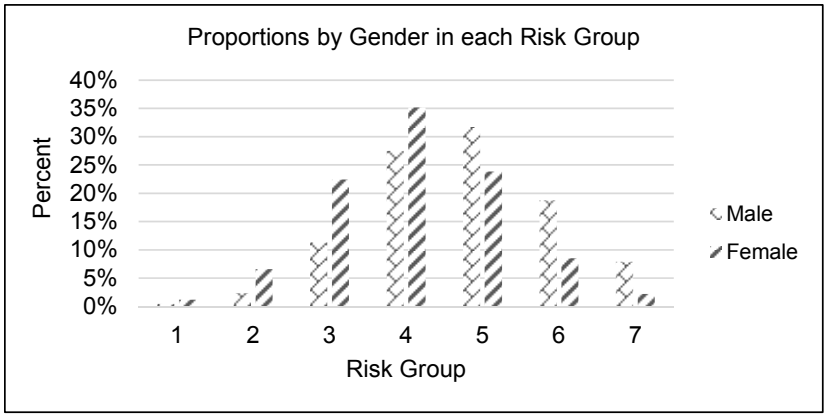


Figure 4. Percentage of males and females across risk group

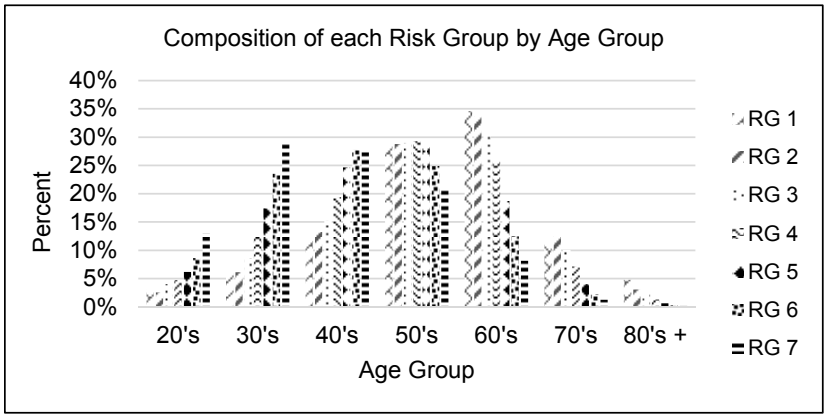


Figure 5. Percentage by age group across risk group

A Two-Way ANOVA was conducted to determine the significant of gender and risk groups. (See Appendix 6 and 7 for details).

CONTEMPORARY DATA SET

In determining the best contemporary data set to work with, differences were examined across time (see Appendix 2). Years 2010 and 2011 were identified as appropriate. For the analysis here data from February 2011 to July 2011 was added to the data set.

3. Describing the Contemporary Data Set

The 2010 and 2011 data consisted of 79,602 cases overall. Data was available from twelve different countries - Australia/New Zealand (AUS/NZ), Canada (CAN), China, Finland, Germany, Hong Kong, India, Malaysia, Kuwait, the United Kingdom (UK), the United States of America (US), and South Africa. See Table 11 for a comparison of cases per country.

Table 11. Number of cases per country across 2010 and 2011 data

Country	Frequency	Percent	Valid Percent	Cumulative Percent
Australia/New Zealand	21351	26.8	26.8	26.8
Canada	1671	2.1	2.1	28.9
China	5	0	0	28.9
Germany	862	1.1	1.1	30
Hong Kong	124	0.2	0.2	30.2
India	246	0.3	0.3	30.5
Malaysia	76	0.1	0.1	30.6
Kuwait	3	0	0	30.6
United Kingdom	23445	29.5	29.5	60
United States	30701	38.6	38.6	98.6
South Africa	1118	1.4	1.4	100
Total	79,602	100	100	

ANALYSING THE CONTEMPORARY DATA SET

4. Construct Validity and Reliability Analyses

Before undertaking any additional analysis it was essential to ensure that the FRTQ measure was reliable and measuring a single factor. Construct validity refers to the extent to which the items (questions) are all measuring the same thing. Reliability analysis determines whether a person gets the same score under the same circumstances (the questionnaire measures consistently risk tolerance). Scores closer to 1 indicate a reliable measure and the accepted psychometric standard is that the reliability of measures should be at least 0.80 (Cronbach Alpha). Cronbach's alpha and the Spearman-Brown test of scale reliability have been calculated using standardised scores (indicated by the prefix 'z').

4.1 Construct Validity – Principle Component Analysis

The construct validity of the scale can be measured using Principle Component Analysis. As the scale is designed to measure one underlying construct, Risk Tolerance, principal component analysis should not yield more than one significant factor. The presence of other significant factors would have implications for the scoring of the scale, suggesting that the various sub-components require separate scoring and reporting.

Principle Component Analyses were conducted for the complete 2010 and 2011 dataset (N=79,602). The results of these analyses all indicate that this scale measures one very dominant factor.

Specifically in regard to the total dataset, the solution suggests four other factors, but close inspection of these factors show that they consist of three to five items (questions) only. Most items load onto factor one. An inspection of the scree plot, which shows the fraction of total variance explained by each component, reveals a clear break after the first component.

Thus factor analysis, see Table 12 below, confirms that the scale does indeed appear to measure only one underlying factor – "Risk Tolerance".

Analysis number 1 Listwise deletion of cases with missing values

Extraction 1 for analysis 1, Principal Components Analysis (PC)

Initial Statistics:

Table 12: Principal Components Analysis using raw scores

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.92	31.67	31.67	7.92	31.67	31.67
2	1.32	5.29	36.96	1.32	5.29	36.96
3	1.22	4.86	41.82	1.22	4.86	41.82
4	1.03	4.12	45.94	1.03	4.12	45.94
5	1.01	4.04	49.98	1.01	4.04	49.98
6	0.95	3.78	53.76			
7	0.86	3.42	57.18			
8	0.81	3.24	60.42			
9	0.77	3.08	63.5			
10	0.76	3.03	66.53			
11	0.74	2.95	69.48			
12	0.73	2.93	72.41			
13	0.68	2.72	75.13			
14	0.67	2.67	77.81			
15	0.64	2.58	80.38			
16	0.64	2.56	82.94			
17	0.62	2.48	85.42			
18	0.6	2.41	87.83			
19	0.57	2.27	90.09			
20	0.54	2.15	92.24			
21	0.52	2.07	94.31			
22	0.43	1.73	96.03			
23	0.39	1.55	97.58			
24	0.33	1.31	98.89			
25	0.28	1.11	100			

4.2 Reliability Analysis

Reliability analyses were performed on the total data set of N=79,602, removing Q24 and the dichotomous variable Q11. Firstly, because Q24 is reverse scored, it appeared to be behaving inconsistently in the data. There are a number of possible alternatives as to why this occurs. Firstly, some people may not have noticed that the direction of the responses were in the opposite direction to other questions. Secondly, this question pertains to how much insurance a person has to cover a wide variety of life's major risks - theft, fire, accident, illness, death etc. It may be that what is being evaluated here is knowledge about own insurance rather than risk tolerance.

With reference to Q11 in order to conduct principal component analysis using dichotomous variables more than one item is needed and a different method is applied (i.e. tetrachoric correlations).

Cronbach's alpha and the Spearman-Brown test of scale reliability have been calculated below (Section 4.3) using standardised scores (indicated by the prefix 'z'). As such, all variables have a mean of 0 and a standard deviation of 1. In general the reliability of the measure remains excellent at 0.90 with recognised international benchmarks for reliability set at 0.80.

4.2.1 Descriptive Statistics for Two Subsets of the Questionnaire

The questionnaire has been split into two parts, Part 1 including questions Q1 to Q10, Q12, and Q13 (i.e. 12 variables) and Part 2 including questions Q14 to Q22 and Q25 (i.e. 11 variables). For each part the mean, variance, and standard deviation of the z scores are computed and presented in Table 13. This is done to check whether there is consistency among the questions with respect to the concept they measure. High level of consistency is reflected by similar means and variances of the sum of z scores between the two parts of the questionnaire which is the case here.

Table 13. Variance and Standard Deviations for Parts 1 (Q1 to Q10, Q12 – Q13) and Part 2 (Q14 to Q22, Q25) of Measure

N of statistics for	Mean	Variance	Std. Dev	Variables
PART 1	0	51.84	7.20	12
PART 2	0	44.66	6.68	11
SCALE	0	170.58	13.06	23

4.2.2 Split Reliability Analysis by Item (Question)

In split reliability analysis, the data of the questions 1-10, 12-23, and 25 are considered. At each step of the analysis the data of one of the above questions are omitted and the scale mean, scale variance, corrected item-total correlation, and Cronbach's alpha are computed. For example, at step one the data of question 1 are omitted, at step 2 the data of question 1 are added back into the data set to be analysed but the data of question 2 are omitted and so on. The results of the analysis are shown below. Similar values across the different analyses reflect high consistency among the questions.

Table 14. Split Reliability Analysis by Item Number (Z scores)

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q1 are you a risk taker	0	151.42	0.74	0.90
Q2 how do you adapt when things go wrong	0	157.24	0.49	0.90
Q3 what does risk mean	0	156.76	0.51	0.90
Q4 have you ever invested for the thrill	0	160.93	0.34	0.90
Q5 pay vs. job security	0	156.86	0.51	0.90
Q6 Interested in losses or gains	0	156.59	0.52	0.90
Q7 how do you feel after deciding	0	160.02	0.38	0.90
Q8 how would like to be paid	0	157.69	0.47	0.90
Q9 what risks have you taken in the past	0	155.73	0.56	0.90
Q10 what risk are you now prepared to take	0	151.74	0.72	0.90
Q12 confidence in decisions	0	158.80	0.43	0.90
Q13 buy into company after restructure	0	157.44	0.48	0.90
Q14 how much fall to make you uncomfortable	0	155.36	0.57	0.90
Q15 renovate, rent or sell	0	161.09	0.34	0.91
Q16 which portfolio	0	151.43	0.74	0.90
Q17 conditions to invest 25% of money	0	156.32	0.53	0.90
Q18 money value vs. purchasing power	0	157.76	0.47	0.90
Q19 how have your investments gone	0	156.62	0.52	0.90
Q20 how much in high risk returns	0	152.34	0.70	0.90

Q21 portfolio vs. term deposit	0	158.14	0.46	0.90
Q22 use government perks	0	157.30	0.49	0.90
Q23 fixed vs. variable interest(rev)	0	152.05	0.71	0.90
Q25 rate yourself 0-100	0	165.60	0.16	0.91

4.3 Reliability Coefficients

In this section the data set is split again into two subsets, Part 1 and Part 2, as defined in Section 4.2.1. Cronbach's alpha is computed for each part as well as for the complete data set. Spearman-Brown test is reported too. This provides further indication of the stability of the test by measuring the degree of correspondence between alternate items throughout the test. Like Cronbach's alpha, coefficients close to 1 indicate a high degree of correspondence between items and hence an internally consistent scale. Also, the correlation of the total scores derived by each part is given. All these tests and measures are used to assess the internal consistency of the questionnaire, i.e. that all parts of the questionnaire contribute equally to the measure of risk tolerance. The reported results indicate high level of consistency.

N of Cases = 79,602

N of items = 23

Correlation between forms (Part 1 and Part 2) = 0.77

Guttman Split-half = 0.87

Equal-length Spearman Brown = 0.87

Unequal-length Spearman Brown = 0.87

12 items in part 1 (Q1 to Q10, Q12 to Q13)

11 items in part 2 (Q14 to Q22, Q25)

Alpha for part 1 = 0.84

Alpha for part 2 = 0.83

Cronbach's Alpha = 0.90

The results of the reliability analyses indicate that the removal of Question 24 has slightly increased the reliability of the measure. The dichotomous variable, Question 11, was also not included in the reliability analyses.

The measure maintains excellent reliability (exceeding all benchmarks).

4.4 Inter-correlations

The following are the inter-correlations of all the items (questions) in the scale using Pearson's coefficient. Inter-correlations demonstrate the strength of the relationships between items in the scale. Each inter-correlation compares two items in the scale, showing the similarity between the two items. The higher the inter-correlation, the greater the similarity between the underlying construct measured by the items on the scale, and vice versa. However, note that Pearson correlation assumes interval/continuous variables while all the items in the questionnaire are ordinal. For this, the Pearson correlations presented in Table 15 should be interpreted with caution.

Table 15. Inter-item correlations between items 1-25

Mean = 0.24

Maximum = 0.71

Minimum = -0.17

Median = 0.26

ITEM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	1																								
2	0.43	1																							
3	0.45	0.31	1																						
4	0.29	0.14	0.23	1																					
5	0.40	0.26	0.28	0.21	1																				
6	0.43	0.31	0.34	0.19	0.32	1																			
7	0.29	0.29	0.22	0.09	0.19	0.28	1																		
8	0.36	0.23	0.27	0.22	0.45	0.27	0.20	1																	
9	0.55	0.28	0.31	0.31	0.30	0.32	0.23	0.32	1																
10	0.65	0.38	0.41	0.24	0.37	0.40	0.27	0.34	0.50	1															
11	0.18	0.09	0.12	0.16	0.16	0.13	0.09	0.18	0.25	0.14	1														
12	0.33	0.29	0.21	0.16	0.23	0.23	0.34	0.24	0.32	0.30	0.2	1													
13	0.37	0.28	0.28	0.16	0.27	0.28	0.21	0.26	0.26	0.37	0.10	0.23	1												
14	0.44	0.36	0.30	0.19	0.27	0.30	0.23	0.26	0.31	0.46	0.11	0.26	0.33	1											
15	0.23	0.17	0.19	0.14	0.25	0.19	0.11	0.21	0.14	0.25	0.12	0.14	0.22	0.21	1										
16	0.61	0.37	0.38	0.24	0.37	0.38	0.27	0.33	0.43	0.63	0.17	0.32	0.37	0.50	0.26	1									
17	0.41	0.27	0.29	0.18	0.26	0.29	0.19	0.25	0.28	0.45	0.09	0.19	0.30	0.39	0.21	0.45	1								
18	0.37	0.26	0.22	0.12	0.26	0.27	0.22	0.22	0.28	0.36	0.12	0.23	0.29	0.31	0.17	0.41	0.28	1							
19	0.42	0.26	0.27	0.18	0.27	0.28	0.17	0.21	0.27	0.47	0.12	0.20	0.27	0.35	0.21	0.49	0.32	0.29	1						
20	0.56	0.35	0.36	0.24	0.33	0.35	0.24	0.31	0.41	0.60	0.16	0.30	0.34	0.47	0.24	0.71	0.45	0.38	0.46	1					
21	0.38	0.23	0.24	0.16	0.24	0.24	0.22	0.23	0.32	0.37	0.04	0.25	0.26	0.30	0.12	0.42	0.26	0.30	0.26	0.40	1				
22	0.37	0.24	0.25	0.19	0.28	0.28	0.18	0.25	0.27	0.38	0.12	0.21	0.28	0.32	0.22	0.39	0.36	0.29	0.28	0.39	0.28	1			
23	-0.12	-0.07	-0.11	-0.08	-0.14	-0.12	-0.03	-0.11	-0.04	-0.13	-0.17	-0.04	-0.08	-0.09	-0.16	-0.14	-0.10	-0.08	-0.15	-0.13	0.10	-0.11	1		
24	0.04	0.04	0.02	0.00	-0.02	0.02	0.08	0.03	0.07	0.04	0.06	0.11	0.03	0.05	-0.02	0.07	0.03	0.05	0.02	0.07	0.09	0.03	0.08	1	
25	0.63	0.39	0.41	0.27	0.38	0.40	0.28	0.35	0.46	0.58	0.19	0.35	0.36	0.43	0.25	0.60	0.40	0.37	0.42	0.58	0.37	0.37	-0.15	0.06	1

5. Analysis of Differences Between Countries, Controlling for Demographic Differences

We wanted the contemporary data set to reflect a majority of cases and so we focused on Australia, New Zealand, Canada, United States (collectively ANZCUS) and United Kingdom (UK). This resulted in a database of 77,168 cases overall (for 2010 and 2011 data only). As more data is collected in other countries this can be included in the updated contemporary data set also. A number of new analyses were conducted exploring differences between countries in the areas identified above.

For these analyses we compute the algorithm based scores for three norm groups. One norm group is the one defined by the complete contemporary data set. The other norm groups include the contemporary data that refers to ANZCUS only and UK only and the derived scores will be referred to as new scores.

Multivariate Analysis of Variance (MANOVA) was conducted, investigating whether the differences between countries for the algorithm based scores existed when age and gender were controlled for as covariates in the 2010 & 2011 dataset. MANOVA is a general form of ANOVA that is used for samples with multiple dependent variables and allows investigators to determine whether changes in independent variables (covariates) have significant effects on dependent variables. Demographic data (both age and gender reported) were available for 77,168 cases when limited by the countries outlined above in 6.2. The results of the MANOVA analyses (see Appendix 8) indicated that when age and gender were controlled for, there were still significant differences in the algorithm based scores between countries $F(3,20053) = 241.89$ $p<0.001$.

An ANOVA was conducted, comparing the Risk Tolerance scores by country. This suggested that there were significant differences between the Risk Tolerance scores by country but such an analysis does not conclusively compare the Risk Tolerance scores of each country (see Appendix 9). Post-hoc tests were conducted in order to compare results from Australia, New Zealand, Canada and United States (ANZCUS) countries and the UK. Whilst there was no significant difference between ANZCUS, this group was significantly different to the UK.

Table 16. ANOVA results with post-hoc comparisons between countries

Country		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
AUS/NZ	Canada	0.08	0.34	1.00	-0.78	0.94
	UK	2.00*	0.12	0.00	1.68	2.33
	US	0.09	0.12	0.85	-0.21	0.40
Canada	AUS/NZ	-0.08	0.34	1.00	-0.94	0.78
	UK	1.93*	0.33	0.00	1.07	2.79
	US	0.02	0.33	1.00	-0.84	0.87
UK	AUS/NZ	-2.00*	0.12	0.00	-2.33	-1.68
	Canada	-1.93*	0.33	0.00	-2.79	-1.07
	US	-1.91*	0.11	0.00	-2.20	-1.62
US	AUS/NZ	-0.09	0.12	0.85	-0.40	0.21
	Canada	-0.02	0.33	1.00	-0.87	0.84
	UK	1.91*	0.11	0.00	1.62	2.20

*. The mean difference is significant at the 0.05 level.

6. Comparisons by Question by Country for the 2010-2011 Dataset

A question by question comparison was completed for the selected countries/regions from the contemporary dataset (with age and gender data complete). Higher scores indicate greater risk tolerance for Q1-22 and Q25. Q23 and Q24 are reverse scored, such that on these questions higher scores indicate lower risk tolerance.

6.1 Means by Question for Countries/Regions

Countries/regions were selected based on sample size and interest. Table 17 shows the standardised means and standard deviations for each question (Q1-25) across ANZCUS and UK using Z scores as the relevant metric. The data in Table 17 excludes OTHER and as a result the mean and standard deviation are not 0 and 1 respectively. The full data set is reported in Appendix 10.

Table 17. Question response standardised means and standard deviations across selected countries/regions (N= 77,168).

	ANZCUS (N=53723)		UK (N=23445)		Total (N=77168)	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Zscore: Q1	0.03	1	-0.1	0.99	-0.01	1
Zscore: Q2	0.02	1	-0.05	0.99	0	1
Zscore: Q3	0	0.98	-0.03	1.01	-0.01	0.99
Zscore: Q4	-0.03	0.96	0	1	-0.02	0.97
Zscore: Q5	-0.02	0.99	0.02	1.01	-0.01	1
Zscore: Q6	0	0.99	-0.02	1.01	-0.01	1
Zscore: Q7	0.06	1	-0.14	0.97	0	1
Zscore: Q8	0.01	1.01	-0.06	0.96	-0.01	1
Zscore: Q9	0.04	0.99	-0.12	1	-0.01	1
Zscore: Q10	0.03	0.99	-0.11	1	-0.01	1
Zscore: Q11	0.08	1.04	-0.19	0.87	0	1
Zscore: Q12	0.03	1	-0.11	0.99	-0.01	1
Zscore: Q13	0.02	0.98	-0.05	1.02	0	1
Zscore: Q14	0.06	0.99	-0.14	1	0	1
Zscore: Q15	-0.04	1	0.07	0.99	-0.01	1
Zscore: Q16	0.08	1	-0.21	0.97	-0.01	1
Zscore: Q17	0.04	0.99	-0.1	1	0	1
Zscore: Q18	0.02	1	-0.07	0.98	-0.01	1
Zscore: Q19	-0.01	1	-0.01	0.98	-0.01	0.99
Zscore: Q20	0.08	1.01	-0.2	0.95	0	1
Zscore: Q21	0.04	1.03	-0.08	0.94	0	1
Zscore: Q22	0.02	1	-0.07	0.99	-0.01	1
Zscore: Q23 reverse scored	-0.08	1.02	0.16	0.92	-0.01	1
Zscore: Q24 reverse scored	-0.09	1	0.22	0.96	0	1
Zscore: Q25	0.03	1	-0.1	0.97	-0.01	0.99

6.2 Determining Significant Differences Between Regions by Question

A multivariate analysis of variance (MANOVA) was conducted investigating between-region differences on each question. Multivariate outliers were removed, resulting in a sample of N =77,168. The p-value of Box's test is less than 0.001 which means that the hypothesis of equal covariance matrices across regions is rejected even at 1% significance level. For this to compare the means across regions we use Pillai's trace test. This is significant too, indicating there are differences in means across groups. The partial eta squared is 0.054 indicating that 5.4% of multivariate variance is associated with the covariate region.

In regard to ANZCUS, it was found that individuals from ANZCUS had significantly higher scores on all questions except Questions 4, 5 and 15, 23 and 24 than individuals from the UK. Analysis can be found in Appendix 11.

7. Risk Groups

Risk groups as outlined in the Introduction (see Description of the Measure) are spread across 7 groups of increasing risk tolerance. Our analysis of the risk groups included the total sample N = 79,602 (2010 and 2011 data for all countries with age and gender complete).

7.1 Distribution of Sample by Risk Group for Each Question

The figure below outlines the number of cases within each risk group.

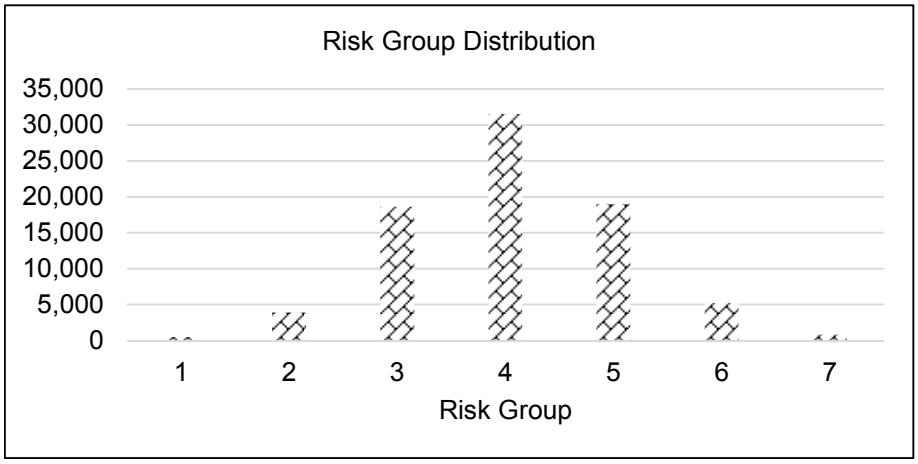


Figure 6. The number of cases across each risk group

A full description of the scores including the mean and standard deviation for each question can be found in Appendix 12.

7.2 Significant Differences across Risk Groups by Question

A multivariate analysis of variance (MANOVA) was conducted investigating between-Risk Group differences on each question. Multivariate outliers were removed, resulting in a sample of N =79,602. It was found that, controlling for age and gender, there was a significant difference between risk groups. Post hoc tests were then conducted using ANOVA to investigate where these differences were consistent across all risk groups.

A summary of the results appears below. Post hoc analysis can be found in Appendix 13.

Table 18: MANOVA results comparing risk groups and risk tolerance scores

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Sum of Z Scores	13226136.687[a]	8	1653267.09	154609.60	0	0.94
	Score_New_ALL	7478839.669[b]	8	934854.96	154609.60	0	0.94
Intercept	Sum of Z Scores	15310.63	1	15310.63	1431.81	0	0.02
	Score_New_ALL	8710577.84	1	8710577.84	1440586.02	0	0.95
D1	Sum of Z Scores	4248.71	1	4248.71	397.33	0	0.01
	Score_New_ALL	2402.47	1	2402.47	397.33	0	0.01
Age_YRS	Sum of Z Scores	6463.46	1	6463.46	604.45	0	0.01
	Score_New_ALL	3654.82	1	3654.82	604.45	0	0.01
RiskGroup	Sum of Z Scores	11036567.39	6	1839427.90	172018.92	0	0.93
	Score_New_ALL	6240727.73	6	1040121.29	172018.92	0	0.93
Error	Sum of Z Scores	851101.64	79593	10.69			
	Score_New_ALL	481263.19	79593	6.05			
Total	Sum of Z Scores	14077238.33	79602				
	Score_New_ALL	206965110.37	79602				
Corrected Total	Sum of Z Scores	14077238.33	79601				
	Score_New_ALL	7960102.86	79601				

a. R Squared = .940 (Adjusted R Squared = .940)

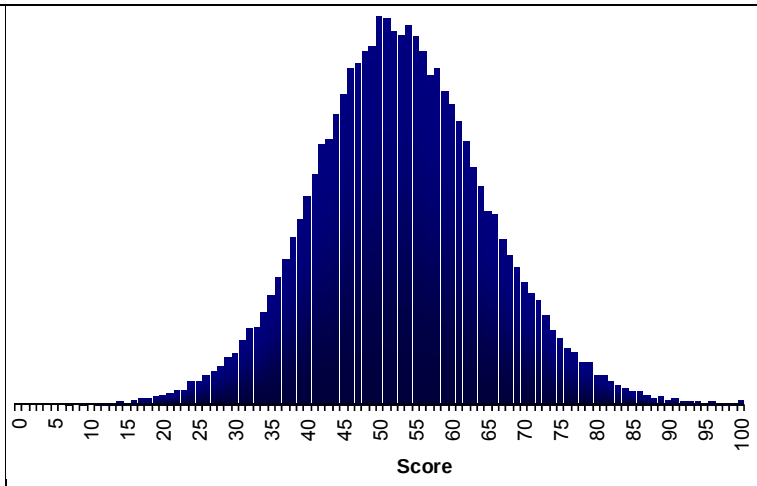
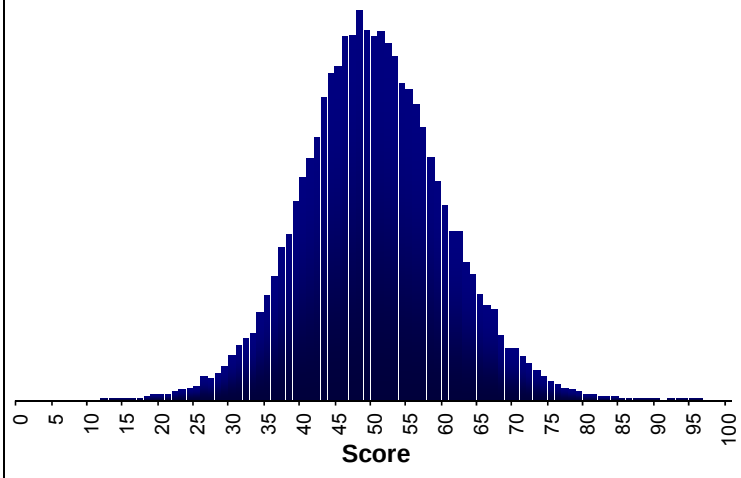
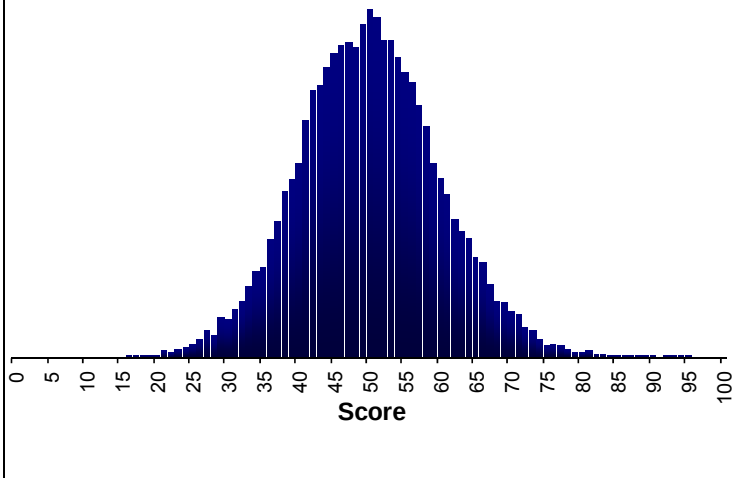
b. R Squared = .940 (Adjusted R Squared = .940)

8. New Scoring Algorithms and Application of Test

Three new scoring algorithms (based on the existing algorithm-based score methodology explained under Types of Scores) were developed from the contemporary data set: one for the dataset as a whole (which was used for the MANOVA in Appendix 8 and Table 18, and the Risk Group distribution and description in Appendix 12 and Figure 6), one for the ANZCUS data and one for the UK data. The distribution of scores for the respective datasets are as shown in Table 19.

The FinaMetrica methodology for comparing risk tolerance as assessed by the FRTQ to investment risk is detailed in the Asset Allocation Mappings Guide available at http://www.riskprofiling.com/Downloads/Asset_Allocation_Mappings_Guide_ALL_Plus.pdf.
In short, the FinaMetrica methodology is aimed at providing a link from the plain-English of the risk tolerance questionnaire, via a score, to a portfolio parameter indicative of risk that would be meaningful to both clients and advisors. Assuming that the portfolio is well diversified, then the percentage of growth assets is a suitable portfolio parameter. That is, for a given risk tolerance score, the system provides a suitable range of growth assets.

Table 19: New scoring Algorithms

ALL (n=79,602) SE_M = 4.05 Confidence Interval (95%) = ± 7.94	
ANZCUS (n=53,723) SEM = 4.06 Confidence Interval (95%) = ± 7.96	
UK (n=23,445) SEM = 3.90 Confidence Interval (95%) = ± 7.64	

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See Appendix 14 for a list of academic research ultising the FinaMetrica risk tolerance questionnaire.

Appendix 1

Financial Risk Tolerance Test

This is the Australian version of the questionnaire. Other versions are identical except for terminology differences, e.g. stocks vs shares

1. Compared to others, how do you rate your willingness to take financial risks?
   1 Extremely low risk taker.
   2 Very low risk taker.
   3 Low risk taker.
   4 Average risk taker.
   5 High risk taker.
   6 Very high risk taker.
   7 Extremely high risk taker.

2. How easily do you adapt when things go wrong financially?
   1 Very uneasily.
   2 Somewhat uneasily.
   3 Somewhat easily.
   4 Very easily.

3. When you think of the word "risk" in a financial context, which of the following words comes to mind first?
   1 Danger.
   2 Uncertainty.
   3 Opportunity.
   4 Thrill.

4. Have you ever invested a large sum in a risky investment mainly for the "thrill" of seeing whether it went up or down in value?
   1 No.
   2 Yes, very rarely.
   3 Yes, somewhat rarely.
   4 Yes, somewhat frequently.
   5 Yes, very frequently.

5. If you had to choose between more job security with a small pay increase and less job security with a big pay increase, which would you pick?
   1 Definitely more job security with a small pay increase.
   2 Probably more job security with a small pay increase.
   3 Not sure.
   4 Probably less job security with a big pay increase.
   5 Definitely less job security with a big pay increase.

6. When faced with a major financial decision, are you more concerned about the possible losses or the possible gains?
   1 Always the possible losses.
   2 Usually the possible losses.
   3 Usually the possible gains.
   4 Always the possible gains.

7. How do you usually feel about your major financial decisions after you make them?
   1 Very pessimistic.
   2 Somewhat pessimistic.
   3 Somewhat optimistic.
   4 Very optimistic.
8. Imagine you were in a job where you could choose to be paid salary, commission or a mix of both. Which would you pick?
   1 All salary.
   2 Mainly salary.

3 Equal mix of salary and commission.
4 Mainly commission.
5 All commission.

9. What degree of risk have you taken with your financial decisions in the past?
   1 Very small.
   2 Small.
   3 Medium.
   4 Large.
   5 Very large.

10. What degree of risk are you currently prepared to take with your financial decisions?
   1 Very small.
   2 Small.
   3 Medium.
   4 Large.
   5 Very large.

11. Have you ever borrowed money to make an investment (other than for your home)?
   1 No.
   2 Yes.

12. How much confidence do you have in your ability to make good financial decisions?
   1 None.
   2 A little.
   3 A reasonable amount.
   4 A great deal.
   5 Complete.

13. Suppose that 5 years ago you bought shares in a highly regarded company. That same year the company experienced a severe decline in sales due to poor management. The price of the shares dropped drastically and you sold at a substantial loss.

    The company has been restructured under new management and most experts now expect it to produce better than average returns. Given your bad past experience with this company, would you buy shares now?
   1 Definitely not.
   2 Probably not.
   3 Not sure.
   4 Probably.
   5 Definitely.

14. Investments can go up and down in value and experts often say you should be prepared to weather a downturn. By how much could the total value of all your investments go down before you would begin to feel uncomfortable?
   1 Any fall in value would make me feel uncomfortable.
   2 10%.
   3 20%.
   4 33%.
   5 50%.
   6 More than 50%.

15. Assume that a long-lost relative dies and leaves you a house which is in poor condition but is located in a suburb that's becoming popular.

    As is, the house would probably sell for $300,000, but if you were to spend about $100,000 on renovations, the selling price would be around $600,000.
    However, there is some talk of constructing a major highway next to the house, and this would lower its value considerably.

Which of the following options would you take?
1 Sell it as is.
2 Keep it as is, but rent it out.
3 Take out a $100,000 mortgage and do the renovations.

16. Most investment portfolios have a mix of investments - some of the investments may have high expected returns but with high risk, some may have medium expected returns and medium risk, and some may be low-risk/low-return. (For example, shares and property would be high-risk/high-return whereas cash and term deposits would be low-risk/low-return.)

    Which mix of investments do you find most appealing? Would you prefer all low-risk/low-return, all high-risk/high-return, or somewhere in between? Please select one of the seven portfolios listed below.

	Mix of Investment in Portfolio		
Portfolio	High Risk/Return	Medium Risk/Return	Low Risk/Return
1	0%	0%	100%
2	0%	30%	70%
3	10%	40%	50%
4	30%	40%	30%
5	50%	40%	10%
6	70%	30%	0%
7	100%	0%	0%

17. You are considering placing one-quarter of your investment funds into a single investment. This investment is expected to earn about twice the term deposit rate. However, unlike a term deposit, this investment is not protected against loss of the money invested.

    How low would the chance of a loss have to be for you to make the investment?
    1 Zero, i.e. no chance of loss.
    2 Very low chance of loss.
    3 Moderately low chance of loss.
    4 50% chance of loss.

18. With some types of investment, such as cash and term deposits, the value of the investment is fixed. However inflation will cause the purchasing power of this value to decrease.

    With other types of investment, such as shares and property, the value is not fixed. It will vary. In the short term it may even fall below the purchase price. However, over the long term, the value of shares and property should certainly increase by more than the rate of inflation.

    With this in mind, which is more important to you - that the value of your investments does not fall or that it retains its purchasing power?
    1 Much more important that the value does not fall.
    2 Somewhat more important that the value does not fall.
    3 Somewhat more important that the value retains its purchasing power.
    4 Much more important that the value retains its purchasing power.

19. In recent years, how have your personal investments changed?
    1 Always toward lower risk.
    2 Mostly toward lower risk.
    3 No changes or changes with no clear direction.
    4 Mostly toward higher risk.
    5 Always toward higher risk.

20. When making an investment, return and risk usually go hand-in-hand. Investments which produce above-average returns are usually of above-average risk.

With this in mind, how much of the funds you have available to invest would you be willing to place in investments where both returns and risks are expected to be above average?

1 None.
2 10%.
3 20%.
4 30%.
5 40%.
6 50%.
7 60%.
8 70%.
9 80%.
10 90%.
11 100%.

21. Think of the average rate of return you would expect to earn on an investment portfolio over the next ten years. How does this compare with what you think you would earn if you invested the money in term deposits?
    1 About the same rate as from term deposits.
    2 About one and a half times the rate from term deposits.
    3 About twice the rate from term deposits.
    4 About two and a half times the rate from term deposits.
    5 About three times the rate from term deposits.
    6 More than three times the rate from term deposits.

22. People often arrange their financial affairs to qualify for a government benefit or to obtain a tax advantage. However a change in legislation can leave them worse off than if they'd done nothing.

    With this in mind, would you take a risk in arranging your affairs to qualify for a government benefit or obtain a tax advantage?
    1 I would not take a risk if there was any chance I could finish up worse off.
    2 I would take a risk if there was only a small chance I could finish up worse off.
    3 I would take a risk as long as there was more than a 50% chance that I would finish up better off.

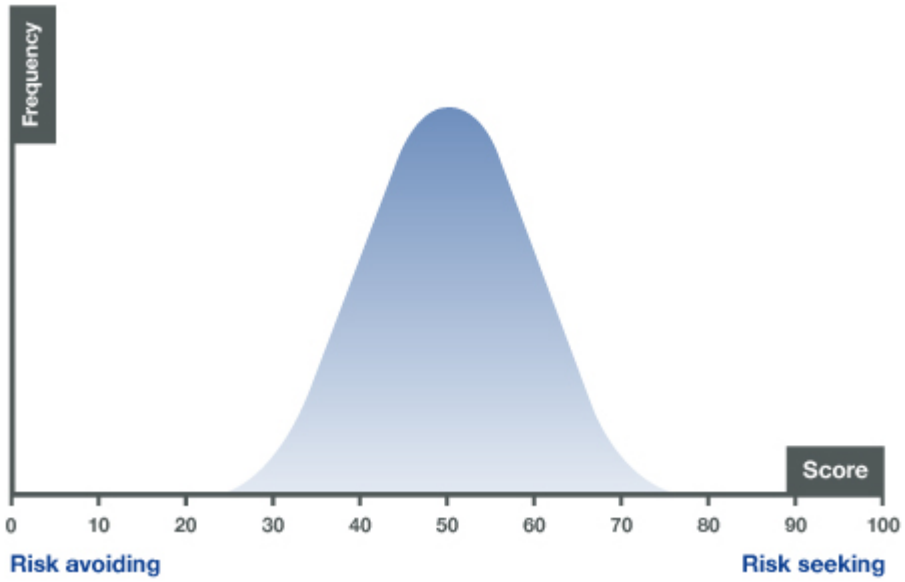
23. Imagine that you are borrowing a large sum of money at some time in the future. It's not clear which way interest rates are going to move - they might go up, they might go down, no one seems to know.

    You could take a variable interest rate that will rise and fall as the market rate changes. Or you could take a fixed interest rate which is 1% more than the current variable rate but which won't change as the market rate changes. Or you could take a mix of both.

    How would you prefer your loan to be made up?
    1 100% variable.
    2 75% variable, 25% fixed.
    3 50% variable, 50% fixed.
    4 25% variable, 75% fixed.
    5 100% fixed.

24. Insurance can cover a wide variety of life's major risks – theft, fire, accident, illness, death, etc. How much cover do you have?
    1 Very little.
    2 Some.
    3 Considerable.
    4 Complete.

25. This questionnaire is scored on a scale of 0 to 100. When the scores are graphed they follow the familiar bell-curve of the Normal distribution shown below. The average score is 50. Two-thirds of all scores are within 10 points of the average. Only 1 in 1000 is less than 20 or more than 80.



What do you think your score will be?

In addition to the 25 questions listed above, there are 8 standard demographic questions.

The demographic questions cover:

- Age
- Gender
- Education
- Marital status
- Number of dependents
- Gross income
- Combined gross income (if applicable)
- Net assets

Appendix 2

One-way Analysis of Variance, Risk Tolerance Score (Score) by Year (Year)

Score

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1999.00	2062	59.66	12.747	.281	59.11	60.22	15	100
2000.00	5176	58.49	13.104	.182	58.13	58.85	15	100
2001.00	7209	57.45	12.984	.153	57.15	57.75	13	100
2002.00	18005	56.69	13.094	.098	56.50	56.88	6	100
2003.00	21852	53.86	12.396	.084	53.70	54.02	8	100
2004.00	28166	53.96	12.341	.074	53.82	54.10	7	100
2005.00	33607	54.02	12.248	.067	53.89	54.15	6	100
2006.00	38537	54.71	12.206	.062	54.59	54.83	7	100
2007.00	43083	54.90	12.185	.059	54.79	55.02	8	100
2008.00	45190	52.98	12.355	.058	52.87	53.09	7	100
2009.00	65458	53.24	12.612	.049	53.14	53.33	7	100
2010.00	69291	52.40	12.210	.046	52.31	52.49	7	100
2011.00	404	52.77	12.058	.600	51.59	53.95	17	100
Total	378040	53.90	12.466	.020	53.86	53.94	6	100

Test of Homogeneity of Variance

Score

Levene Statistic	df1	df2	Sig.
25.945	12	378027	.000

ANOVA

Score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	701338.245	12	58444.854	380.600	.000
Within Groups	58049685.64	378027	153.560		
Total	58751023.88	378039			

While the differences in average risk tolerance score across time were statistically significant their magnitude was so small, the average difference was 3 points, as to have no practical impact. Note that the standard deviation of total score seem stable over time.

Post Hoc Tests

Multiple Comparisons

Score

Tukey HSD

(I) Year	(J) Year	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1999.00	2000.00	1.174*	.323	.017	.10	2.24
	2001.00	2.218*	.309	.000	1.19	3.24
	2002.00	2.977*	.288	.000	2.02	3.93
	2003.00	5.805*	.285	.000	4.86	6.75
	2004.00	5.706*	.283	.000	4.77	6.64
	2005.00	5.646*	.281	.000	4.71	6.58
	2006.00	4.953*	.280	.000	4.03	5.88
	2007.00	4.762*	.279	.000	3.84	5.69
	2008.00	6.685*	.279	.000	5.76	7.61
	2009.00	6.429*	.277	.000	5.51	7.35
	2010.00	7.266*	.277	.000	6.35	8.18
	2011.00	6.893*	.674	.000	4.66	9.13
2000.00	1999.00	-1.174*	.323	.017	-2.24	-.10
	2001.00	1.044*	.226	.000	.30	1.79
	2002.00	1.803*	.195	.000	1.16	2.45
	2003.00	4.631*	.192	.000	4.00	5.27
	2004.00	4.532*	.187	.000	3.91	5.15
	2005.00	4.472*	.185	.000	3.86	5.09
	2006.00	3.779*	.183	.000	3.17	4.39
	2007.00	3.588*	.182	.000	2.98	4.19
	2008.00	5.511*	.182	.000	4.91	6.11
	2009.00	5.255*	.179	.000	4.66	5.85
	2010.00	6.092*	.179	.000	5.50	6.68
	2011.00	5.719*	.640	.000	3.60	7.84
2001.00	1999.00	-2.218*	.309	.000	-3.24	-1.19
	2000.00	-1.044*	.226	.000	-1.79	-.30
	2002.00	.760*	.173	.001	.19	1.33
	2003.00	3.587*	.168	.000	3.03	4.14
	2004.00	3.488*	.164	.000	2.95	4.03
	2005.00	3.429*	.161	.000	2.90	3.96
	2006.00	2.736*	.159	.000	2.21	3.26
	2007.00	2.544*	.158	.000	2.02	3.07
	2008.00	4.468*	.157	.000	3.95	4.99
	2009.00	4.212*	.154	.000	3.70	4.72
	2010.00	5.048*	.153	.000	4.54	5.56
	2011.00	4.675*	.634	.000	2.58	6.77
2002.00	1999.00	-2.977*	.288	.000	-3.93	-2.02
	2000.00	-1.803*	.195	.000	-2.45	-1.16
	2001.00	-.760*	.173	.001	-1.33	-.19
	2003.00	2.828*	.125	.000	2.41	3.24
	2004.00	2.729*	.118	.000	2.34	3.12
	2005.00	2.669*	.114	.000	2.29	3.05
	2006.00	1.976*	.112	.000	1.61	2.35
	2007.00	1.785*	.110	.000	1.42	2.15
	2008.00	3.708*	.109	.000	3.35	4.07
	2009.00	3.452*	.104	.000	3.11	3.80
	2010.00	4.288*	.104	.000	3.95	4.63
	2011.00	3.916*	.623	.000	1.85	5.98
2003.00	1999.00	-5.805*	.285	.000	-6.75	-4.86
	2000.00	-4.631*	.192	.000	-5.27	-4.00
	2001.00	-3.587*	.168	.000	-4.14	-3.03

	2002.00	-2.828*	.125	.000	-3.24	-2.41
	2004.00	-.099	.112	1.000	-.47	.27
	2005.00	-.158	.108	.963	-.52	.20
	2006.00	-.851*	.105	.000	-1.20	-.50
	2007.00	-1.043*	.103	.000	-1.38	-.70
	2008.00	.881*	.102	.000	.54	1.22
	2009.00	.625*	.097	.000	.30	.95
	2010.00	1.461*	.096	.000	1.14	1.78
	2011.00	1.088	.622	.875	-.97	3.15
2004.00	1999.00	-5.706*	.283	.000	-6.64	-4.77
	2000.00	-4.532*	.187	.000	-5.15	-3.91
	2001.00	-3.488*	.164	.000	-4.03	-2.95
	2002.00	-2.729*	.118	.000	-3.12	-2.34
	2003.00	.099	.112	1.000	-.27	.47
	2005.00	-.059	.100	1.000	-.39	.27
	2006.00	-.752*	.097	.000	-1.07	-.43
	2007.00	-.944*	.095	.000	-1.26	-.63
	2008.00	.980*	.094	.000	.67	1.29
	2009.00	.724*	.088	.000	.43	1.02
	2010.00	1.560*	.088	.000	1.27	1.85
	2011.00	1.187	.621	.789	-.87	3.24
2005.00	1999.00	-5.646*	.281	.000	-6.58	-4.71
	2000.00	-4.472*	.185	.000	-5.09	-3.86
	2001.00	-3.429*	.161	.000	-3.96	-2.90
	2002.00	-2.669*	.114	.000	-3.05	-2.29
	2003.00	.158	.108	.963	-.20	.52
	2004.00	.059	.100	1.000	-.27	.39
	2006.00	-.693*	.092	.000	-1.00	-.39
	2007.00	-.885*	.090	.000	-1.18	-.59
	2008.00	1.039*	.089	.000	.74	1.33
	2009.00	.783*	.083	.000	.51	1.06
	2010.00	1.619*	.082	.000	1.35	1.89
	2011.00	1.246	.620	.727	-.81	3.30
2006.00	1999.00	-4.953*	.280	.000	-5.88	-4.03
	2000.00	-3.779*	.183	.000	-4.39	-3.17
	2001.00	-2.736*	.159	.000	-3.26	-2.21
	2002.00	-1.976*	.112	.000	-2.35	-1.61
	2003.00	.851*	.105	.000	.50	1.20
	2004.00	.752*	.097	.000	.43	1.07
	2005.00	.693*	.092	.000	.39	1.00
	2007.00	-.192	.087	.587	-.48	.10
	2008.00	1.732*	.086	.000	1.45	2.02
	2009.00	1.476*	.080	.000	1.21	1.74
	2010.00	2.312*	.079	.000	2.05	2.57
	2011.00	1.939	.620	.086	-.11	3.99
2007.00	1999.00	-4.762*	.279	.000	-5.69	-3.84
	2000.00	-3.588*	.182	.000	-4.19	-2.98
	2001.00	-2.544*	.158	.000	-3.07	-2.02
	2002.00	-1.785*	.110	.000	-2.15	-1.42
	2003.00	1.043*	.103	.000	.70	1.38
	2004.00	.944*	.095	.000	.63	1.26
	2005.00	.885*	.090	.000	.59	1.18
	2006.00	.192	.087	.587	-.10	.48
	2008.00	1.924*	.083	.000	1.65	2.20
	2009.00	1.668*	.077	.000	1.41	1.92
	2010.00	2.504*	.076	.000	2.25	2.76
	2011.00	2.131*	.619	.033	.08	4.18
2008.00	1999.00	-6.685*	.279	.000	-7.61	-5.76
	2000.00	-5.511*	.182	.000	-6.11	-4.91
	2001.00	-4.468*	.157	.000	-4.99	-3.95
	2002.00	-3.708*	.109	.000	-4.07	-3.35

	2003.00	-.881*	.102	.000	-1.22	-.54
	2004.00	-.980*	.094	.000	-1.29	-.67
	2005.00	-1.039*	.089	.000	-1.33	-.74
	2006.00	-1.732*	.086	.000	-2.02	-1.45
	2007.00	-1.924*	.083	.000	-2.20	-1.65
	2009.00	-.256*	.076	.041	-.51	-.01
	2010.00	.580*	.075	.000	.33	.83
	2011.00	.207	.619	1.000	-1.84	2.26
2009.00	1999.00	-6.429*	.277	.000	-7.35	-5.51
	2000.00	-5.255*	.179	.000	-5.85	-4.66
	2001.00	-4.212*	.154	.000	-4.72	-3.70
	2002.00	-3.452*	.104	.000	-3.80	-3.11
	2003.00	-.625*	.097	.000	-.95	-.30
	2004.00	-.724*	.088	.000	-1.02	-.43
	2005.00	-.783*	.083	.000	-1.06	-.51
	2006.00	-1.476*	.080	.000	-1.74	-1.21
	2007.00	-1.668*	.077	.000	-1.92	-1.41
	2008.00	.256*	.076	.041	.01	.51
	2010.00	.836*	.068	.000	.61	1.06
	2011.00	.463	.618	1.000	-1.59	2.51
2010.00	1999.00	-7.266*	.277	.000	-8.18	-6.35
	2000.00	-6.092*	.179	.000	-6.68	-5.50
	2001.00	-5.048*	.153	.000	-5.56	-4.54
	2002.00	-4.288*	.104	.000	-4.63	-3.95
	2003.00	-1.461*	.096	.000	-1.78	-1.14
	2004.00	-1.560*	.088	.000	-1.85	-1.27
	2005.00	-1.619*	.082	.000	-1.89	-1.35
	2006.00	-2.312*	.079	.000	-2.57	-2.05
	2007.00	-2.504*	.076	.000	-2.76	-2.25
	2008.00	-.580*	.075	.000	-.83	-.33
	2009.00	-.836*	.068	.000	-1.06	-.61
	2011.00	-.373	.618	1.000	-2.42	1.68
2011.00	1999.00	-6.893*	.674	.000	-9.13	-4.66
	2000.00	-5.719*	.640	.000	-7.84	-3.60
	2001.00	-4.675*	.634	.000	-6.77	-2.58
	2002.00	-3.916*	.623	.000	-5.98	-1.85
	2003.00	-1.088	.622	.875	-3.15	.97
	2004.00	-1.187	.621	.789	-3.24	.87
	2005.00	-1.246	.620	.727	-3.30	.81
	2006.00	-1.939	.620	.086	-3.99	.11
	2007.00	-2.131*	.619	.033	-4.18	-.08
	2008.00	-.207	.619	1.000	-2.26	1.84
	2009.00	-.463	.618	1.000	-2.51	1.59
	2010.00	.373	.618	1.000	-1.68	2.42

*. The mean difference is significant at the 0.05 level.

Homogenous Subsets

Score

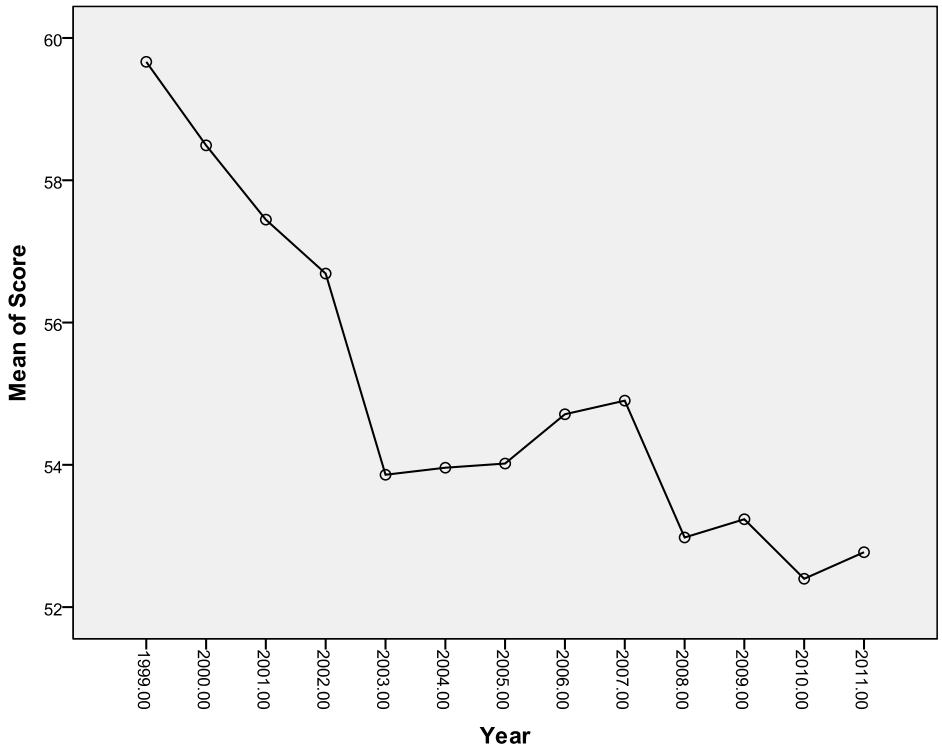
Tukey HSD[a,b]

Year	N	Subset for alpha = 0.05							
		1	2	3	4	5	6	7	8
2010.00	69291	52.40							
2011.00	404	52.77							
2008.00	45190	52.98	52.98						
2009.00	65458	53.24	53.24	53.24					
2003.00	21852		53.86	53.86	53.86				
2004.00	28166			53.96	53.96	53.96			
2005.00	33607			54.02	54.02	54.02			
2006.00	38537				54.71	54.71			
2007.00	43083					54.90			
2002.00	18005						56.69		
2001.00	7209						57.45		
2000.00	5176							58.49	
1999.00	2062								59.66
Sig.		.165	.111	.252	.145	.060	.298	1.000	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3652.005.
b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Means Plot



Appendix 3

ANOVA by Gender

Score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2902962.291	1	2902962.291	20559.359	.000
Within Groups	35877694.906	254093	141.199		
Total	38780657.197	254094			

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Male	149818	57.17	12.144	.031	57.10	57.23	6	100
Female	104277	50.29	11.497	.036	50.22	50.36	7	100
Total	254095	54.35	12.354	.025	54.30	54.39	6	100

Appendix 4

Chi-Square results: Gender by Country (N=254095)

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	361.658[a]	3	.000
Likelihood Ratio	361.556	3	.000
Linear-by-Linear Association	3.432	1	.064
N of Valid Cases	254095		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 1444.56.

*Country Code * DQ1-Gender Cross Tabulation*

			DQ1-Gender		Total
			Male	Female	
Country Code	AUS/NZ	Count	67059	45074	112133
		Expected Count	66115.2	46017.8	112133.0
		% within Country Code	59.8%	40.2%	100.0%
		% within DQ1-Gender	44.8%	43.2%	44.1%
		% of Total	26.4%	17.7%	44.1%
	Canada	Count	1901	1619	3520
		Expected Count	2075.4	1444.6	3520.0
		% within Country Code	54.0%	46.0%	100.0%
		% within DQ1-Gender	1.3%	1.6%	1.4%
		% of Total	0.7%	0.6%	1.4%
	US	Count	54421	41161	95582
		Expected Count	56356.5	39225.5	95582.0
		% within Country Code	56.9%	43.1%	100.0%
		% within DQ1-Gender	36.3%	39.5%	37.6%
		% of Total	21.4%	16.2%	37.6%
	UK	Count	26437	16423	42860
		Expected Count	25270.9	17589.1	42860.0
		% within Country Code	61.7%	38.3%	100.0%
		% within DQ1-Gender	17.6%	15.7%	16.9%
		% of Total	10.4%	6.5%	16.9%
Total		Count	149818	104277	254095
		Expected Count	149818.0	104277.0	254095.0
		% within Country Code	59.0%	41.0%	100.0%
		% within DQ1-Gender	100.0%	100.0%	100.0%
		% of Total	59.0%	41.0%	100.0%

Appendix 5

Two-Way ANOVA with post hoc test

Tests of Between-Subjects Effects

Dependent Variable: Score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	6519864.958[a]	13	501528.074	3949.957	.000	.168
Intercept	245608390.140	1	245608390.140	1934373.617	.000	.884
Age_brackets	3351169.628	6	558528.271	4398.882	.000	.094
Gender	1123180.399	1	1123180.399	8845.995	.000	.034
Age_brackets * Gender	29934.534	6	4989.089	39.293	.000	.001
Error	32260792.238	254081	126.971			
Total	789243437.000	254095				
Corrected Total	38780657.197	254094				

a. R Squared = .168 (Adjusted R Squared = .168)

Multiple Comparisons

Dependent Variable: Score

Tukey HSD

(I) Age_brackets	(J) Age_brackets	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Twenties	Thirties	-.15	.109	.790	-.48	.17
	Forties	2.07*	.104	.000	1.76	2.38
	Fifties	5.53*	.102	.000	5.23	5.83
	Sixties	8.70*	.104	.000	8.40	9.01
	Seventies	11.03*	.130	.000	10.65	11.42
	Eighties+	13.19*	.226	.000	12.53	13.86
Thirties	Twenties	.15	.109	.790	-.17	.48
	Forties	2.22*	.075	.000	2.00	2.44
	Fifties	5.68*	.071	.000	5.47	5.89
	Sixties	8.86*	.074	.000	8.64	9.08
	Seventies	11.19*	.108	.000	10.87	11.51
	Eighties+	13.35*	.214	.000	12.72	13.98
Forties	Twenties	-2.07*	.104	.000	-2.38	-1.76
	Thirties	-2.22*	.075	.000	-2.44	-2.00
	Fifties	3.46*	.064	.000	3.27	3.65
	Sixties	6.63*	.068	.000	6.43	6.83
	Seventies	8.96*	.103	.000	8.66	9.27
	Eighties+	11.12*	.211	.000	10.50	11.75
Fifties	Twenties	-5.53*	.102	.000	-5.83	-5.23
	Thirties	-5.68*	.071	.000	-5.89	-5.47
	Forties	-3.46*	.064	.000	-3.65	-3.27
	Sixties	3.18*	.064	.000	2.99	3.36
	Seventies	5.51*	.101	.000	5.21	5.80
	Eighties+	7.67*	.210	.000	7.05	8.29
Sixties	Twenties	-8.70*	.104	.000	-9.01	-8.40
	Thirties	-8.86*	.074	.000	-9.08	-8.64
	Forties	-6.63*	.068	.000	-6.83	-6.43
	Fifties	-3.18*	.064	.000	-3.36	-2.99
	Seventies	2.33*	.103	.000	2.03	2.63
	Eighties+	4.49*	.211	.000	3.87	5.11
Seventies	Twenties	-11.03*	.130	.000	-11.42	-10.65
	Thirties	-11.19*	.108	.000	-11.51	-10.87
	Forties	-8.96*	.103	.000	-9.27	-8.66
	Fifties	-5.51*	.101	.000	-5.80	-5.21
	Sixties	-2.33*	.103	.000	-2.63	-2.03
	Eighties+	2.16*	.225	.000	1.50	2.82
Eighties+	Twenties	-13.19*	.226	.000	-13.86	-12.53
	Thirties	-13.35*	.214	.000	-13.98	-12.72
	Forties	-11.12*	.211	.000	-11.75	-10.50
	Fifties	-7.67*	.210	.000	-8.29	-7.05
	Sixties	-4.49*	.211	.000	-5.11	-3.87
	Seventies	-2.16*	.225	.000	-2.82	-1.50

Based on observed means.

The error term is Mean Square(Error) = 126.971.

*. The mean difference is significant at the .05 level.

Appendix 6

Two-Way Anova Gender by Risk Group

Tests of Between-Subjects Effects

Dependent Variable: Score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	36508870.475[a]	13	2808374.652	314094.027	.000	.941
Intercept	138061120.144	1	138061120.144	15441021.437	.000	.984
Gender	550.419	1	550.419	61.560	.000	.000
RiskGroup	28318370.303	6	4719728.384	527863.508	.000	.926
Gender * RiskGroup	1104.730	6	184.122	20.593	.000	.000
Error	2271786.722	254081	8.941			
Total	789243437.000	254095				
Corrected Total	38780657.197	254094				

a. R Squared = .941 (Adjusted R Squared = .941)

Multiple Comparisons

Dependent Variable: Score

Tukey HSD

(I) Risk Group	(J) Risk Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	-10.84*	.073	.000	-11.06	-10.63
	3.00	-20.47*	.069	.000	-20.67	-20.26
	4.00	-29.80*	.068	.000	-30.00	-29.60
	5.00	-39.24*	.068	.000	-39.44	-39.04
	6.00	-48.82*	.069	.000	-49.02	-48.62
	7.00	-60.41*	.072	.000	-60.63	-60.20
2.00	1.00	10.84*	.073	.000	10.63	11.06
	3.00	-9.62*	.033	.000	-9.72	-9.53
	4.00	-18.96*	.031	.000	-19.05	-18.87
	5.00	-28.40*	.031	.000	-28.49	-28.31
	6.00	-37.98*	.033	.000	-38.07	-37.88
	7.00	-49.57*	.039	.000	-49.69	-49.46
3.00	1.00	20.47*	.069	.000	20.26	20.67
	2.00	9.62*	.033	.000	9.53	9.72
	4.00	-9.33*	.018	.000	-9.39	-9.28
	5.00	-18.77*	.019	.000	-18.83	-18.72
	6.00	-28.35*	.022	.000	-28.42	-28.29
	7.00	-39.95*	.029	.000	-40.03	-39.86
4.00	1.00	29.80*	.068	.000	29.60	30.00
	2.00	18.96*	.031	.000	18.87	19.05
	3.00	9.33*	.018	.000	9.28	9.39
	5.00	-9.44*	.015	.000	-9.48	-9.39
	6.00	-19.02*	.019	.000	-19.07	-18.96
	7.00	-30.61*	.027	.000	-30.69	-30.53
5.00	1.00	39.24*	.068	.000	39.04	39.44
	2.00	28.40*	.031	.000	28.31	28.49
	3.00	18.77*	.019	.000	18.72	18.83
	4.00	9.44*	.015	.000	9.39	9.48
	6.00	-9.58*	.019	.000	-9.64	-9.52
	7.00	-21.17*	.028	.000	-21.26	-21.09
6.00	1.00	48.82*	.069	.000	48.62	49.02
	2.00	37.98*	.033	.000	37.88	38.07
	3.00	28.35*	.022	.000	28.29	28.42
	4.00	19.02*	.019	.000	18.96	19.07
	5.00	9.58*	.019	.000	9.52	9.64
	7.00	-11.60*	.030	.000	-11.68	-11.51
7.00	1.00	60.41*	.072	.000	60.20	60.63
	2.00	49.57*	.039	.000	49.46	49.69
	3.00	39.95*	.029	.000	39.86	40.03
	4.00	30.61*	.027	.000	30.53	30.69
	5.00	21.17*	.028	.000	21.09	21.26
	6.00	11.60*	.030	.000	11.51	11.68

Based on observed means.

The error term is Mean Square(Error) = 8.941.

*. The mean difference is significant at the .05 level.

Appendix 7

Two Way ANOVA - Age Groups by Risk Groups

Tests of Between-Subjects Effects

Dependent Variable: Score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	36515058.581[a]	48	760730.387	85302.185	.000	.942
Intercept	50338078.148	1	50338078.148	5644507.070	.000	.957
RiskGroup	8365356.256	6	1394226.043	156337.291	.000	.787
Age_brackets	548.492	6	91.415	10.251	.000	.000
RiskGroup * Age_brackets	4102.295	36	113.953	12.778	.000	.002
Error	2265598.615	254046	8.918			
Total	789243437.000	254095				
Corrected Total	38780657.197	254094				

a. R Squared = .942 (Adjusted R Squared = .942)

*A*ppendix 8

MANOVA Analysis

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Score_New_ALL	1249350.013[a]	5	249870.003	3013.953	.000
	Score	1813717.934[b]	5	362743.587	3004.197	.000
Intercept	Score_New_ALL	15762098.007	1	15762098.007	190123.722	.000
	Score	18677250.903	1	18677250.903	154682.657	.000
Age_YRS	Score_New_ALL	588320.505	1	588320.505	7096.370	.000
	Score	842670.447	1	842670.447	6978.891	.000
D1	Score_New_ALL	643587.829	1	643587.829	7763.009	.000
	Score	951134.378	1	951134.378	7877.176	.000
COUNTRYCODE	Score_New_ALL	60160.215	3	20053.405	241.886	.000
	Score	80694.802	3	26898.267	222.768	.000
Error	Score_New_ALL	6397071.314	77162	82.904		
	Score	9316972.335	77162	120.746		
Total	Score_New_ALL	199634655.983	77168			
	Score	226168817.000	77168			
Corrected Total	Score_New_ALL	7646421.327	77167			
	Score	11130690.269	77167			

a. R Squared = .163 (Adjusted R Squared = .163)
b. R Squared = .163 (Adjusted R Squared = .163)

Appendix 9

One-way Analysis of Variance, Risk Tolerance Score by Country

Descriptive

ZSUM

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Aus/NZ	21351	.4874	13.39459	.09167	.3078	.6671	-45.01	59.54
Canada	1671	.4098	13.76024	.33662	-.2504	1.0701	-44.12	60.37
China	5	6.4934	12.03946	5.38421	-8.4555	21.4424	-12.89	20.06
Germany	862	4.1758	13.82159	.47077	3.2518	5.0998	-36.30	48.27
Hong Kong	124	6.8783	13.45605	1.20839	4.4863	9.2702	-24.61	44.99
India	246	7.6830	11.95624	.76230	6.1815	9.1845	-22.80	42.94
Malaysia	76	4.3435	12.17500	1.39657	1.5614	7.1256	-36.12	32.47
Kuwait	3	21.7027	3.93006	2.26902	11.9399	31.4655	18.33	26.02
UK	23445	-1.5165	13.64674	.08913	-1.6912	-1.3418	-46.70	59.47
US	30701	.3927	12.69501	.07245	.2507	.5347	-50.38	62.55
South Africa	1118	5.0411	15.03060	.44953	4.1591	5.9231	-40.27	58.37
Total	79,602	.0000	13.29840	.04713	-.0924	.0924	-50.38	62.55

ANOVA

ZSUM

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	130897.267	10	13089.727	74.702	.000
Within Groups	13946341.064	79591	175.225		
Total	14077238.330	79601			

Appendix 10

Descriptive - Items by Region

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Zscore: Q1-Compared to others, how do you rate your willingness to take financial risks?	ANZCUS	53723	0.03	1.00	0.00	0.02	0.04	-3.01	3.46
	UK	23445	-0.10	0.99	0.01	-0.11	-0.09	-3.01	3.46
	OTHER	2434	0.33	1.09	0.02	0.29	0.37	-3.01	3.46
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-3.01	3.46
Zscore: Q2-How easily do you adapt when things go wrong financially?	ANZCUS	53723	0.02	1.00	0.00	0.01	0.03	-2.09	2.16
	UK	23445	-0.05	0.99	0.01	-0.07	-0.04	-2.09	2.16
	OTHER	2434	0.14	0.97	0.02	0.10	0.18	-2.09	2.16
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-2.09	2.16
Zscore: Q3-When you think of the word 'risk' in a financial context, which of the following words comes to mind first?	ANZCUS	53723	0.00	0.98	0.00	0.00	0.01	-2.16	3.36
	UK	23445	-0.03	1.01	0.01	-0.05	-0.02	-2.16	3.36
	OTHER	2434	0.23	1.28	0.03	0.18	0.28	-2.16	3.36
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-2.16	3.36
Zscore: Q4-Have you ever invested a large sum in a risky investment mainly for the "thrill" of seeing whether it went up or down in value?	ANZCUS	53723	-0.03	0.96	0.00	-0.04	-0.02	-0.47	5.27
	UK	23445	0.00	1.00	0.01	-0.02	0.01	-0.47	5.27
	OTHER	2434	0.65	1.49	0.03	0.59	0.71	-0.47	5.27
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-0.47	5.27
Zscore: Q5-If you had to choose between more job security with a small pay rise and less job security with a big pay rise, which would you pick?	ANZCUS	53723	-0.02	0.99	0.00	-0.02	-0.01	-1.50	1.90
	UK	23445	0.02	1.01	0.01	0.00	0.03	-1.50	1.90
	OTHER	2434	0.18	1.08	0.02	0.14	0.23	-1.50	1.90
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-1.50	1.90
Zscore: Q6-When faced with a major financial decision, are you more concerned about the possible losses or the possible gains?	ANZCUS	53723	0.00	0.99	0.00	-0.01	0.01	-2.14	2.34
	UK	23445	-0.02	1.01	0.01	-0.03	-0.01	-2.14	2.34
	OTHER	2434	0.16	1.05	0.02	0.12	0.20	-2.14	2.34
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-2.14	2.34
Zscore: Q7-How do you usually feel about your	ANZCUS	53723	0.06	1.00	0.00	0.05	0.06	-3.77	1.97

major financial decisions after you make them?	UK	23445	-0.14	0.97	0.01	-0.15	-0.13	-3.77	1.97
	OTHER	2434	0.16	1.13	0.02	0.11	0.20	-3.77	1.97
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-3.77	1.97
Zscore: Q8-Imagine you were in a job where you could choose whether to be paid salary, commission or a mix of both. Which would you pick?	ANZCUS	53723	0.01	1.01	0.00	0.00	0.02	-1.51	3.03
	UK	23445	-0.06	0.96	0.01	-0.08	-0.05	-1.51	3.03
	OTHER	2434	0.34	1.00	0.02	0.31	0.38	-1.51	3.03
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-1.51	3.03
Zscore: Q9-What degree of risk have you taken with your financial decisions in the past?	ANZCUS	53723	0.04	0.99	0.00	0.03	0.05	-2.04	2.74
	UK	23445	-0.12	1.00	0.01	-0.14	-0.11	-2.04	2.74
	OTHER	2434	0.35	1.08	0.02	0.30	0.39	-2.04	2.74
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-2.04	2.74
Zscore: Q10-What degree of risk are you currently prepared to take with your financial decisions?	ANZCUS	53723	0.03	0.99	0.00	0.03	0.04	-2.34	3.16
	UK	23445	-0.11	1.00	0.01	-0.12	-0.10	-2.34	3.16
	OTHER	2434	0.27	1.10	0.02	0.23	0.32	-2.34	3.16
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-2.34	3.16
Zscore: Q11-Have you ever borrowed money to make an investment (other than for your home)?	ANZCUS	53723	0.08	1.04	0.00	0.08	0.09	-0.60	1.67
	UK	23445	-0.19	0.87	0.01	-0.20	-0.18	-0.60	1.67
	OTHER	2434	-0.01	0.99	0.02	-0.05	0.03	-0.60	1.67
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-0.60	1.67
Zscore: Q12-How much confidence do you have in your ability to make good financial decisions?	ANZCUS	53723	0.03	1.00	0.00	0.02	0.04	-2.74	2.54
	UK	23445	-0.11	0.99	0.01	-0.12	-0.10	-2.74	2.54
	OTHER	2434	0.34	1.07	0.02	0.29	0.38	-2.74	2.54
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-2.74	2.54
Zscore: Q13-Buy a stock after declining [shorten version of question, see full questionnaire for actual text]	ANZCUS	53723	0.02	0.98	0.00	0.01	0.03	-2.16	1.99
	UK	23445	-0.05	1.02	0.01	-0.06	-0.04	-2.16	1.99
	OTHER	2434	0.11	1.09	0.02	0.07	0.15	-2.16	1.99
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-2.16	1.99
Zscore: Q14-Loss before becoming uncomfortable [shorten version of question, see full questionnaire for actual text]	ANZCUS	53723	0.06	0.99	0.00	0.05	0.07	-1.90	2.55
	UK	23445	-0.14	1.00	0.01	-0.16	-0.13	-1.90	2.55
	OTHER	2434	0.07	1.10	0.02	0.03	0.12	-1.90	2.55
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-1.90	2.55
Zscore: Q15-Rent, sell or renovate inherited house [shorten version of question, see full questionnaire for actual	ANZCUS	53723	-0.04	1.00	0.00	-0.05	-0.03	-0.96	1.48
	UK	23445	0.07	0.99	0.01	0.06	0.08	-0.96	1.48
	OTHER	2434	0.26	1.04	0.02	0.22	0.30	-0.96	1.48

text]]	Total	79602	0.00	1.00	0.00	-0.01	0.01	-0.96	1.48
Zscore: Q16-% of Low-risk low-return, medium-risk medium-return, or high-risk high-eturn	ANZCUS	53723	0.08	1.00	0.00	0.07	0.09	-2.47	2.80
	UK	23445	-0.21	0.97	0.01	-0.23	-0.20	-2.47	2.80
	OTHER	2434	0.29	1.07	0.02	0.25	0.34	-2.47	2.80
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-2.47	2.80
Zscore: Q17-Chance of loss before investing [shorten version of question, see full questionnaire for actual text]	ANZCUS	53723	0.04	0.99	0.00	0.03	0.05	-2.13	2.23
	UK	23445	-0.10	1.00	0.01	-0.11	-0.09	-2.13	2.23
	OTHER	2434	0.04	1.07	0.02	0.00	0.08	-2.13	2.23
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-2.13	2.23
Zscore: Q18-Keep money value or purchase power [shorten version of question, see full questionnaire for actual text]	ANZCUS	53723	0.02	1.00	0.00	0.01	0.03	-2.46	1.27
	UK	23445	-0.07	0.98	0.01	-0.08	-0.06	-2.46	1.27
	OTHER	2434	0.22	1.08	0.02	0.17	0.26	-2.46	1.27
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-2.46	1.27
Zscore: Q19-In recent years, how have your personal investments changed?	ANZCUS	53723	-0.01	1.00	0.00	-0.02	0.00	-2.24	2.82
	UK	23445	-0.01	0.98	0.01	-0.02	0.01	-2.24	2.82
	OTHER	2434	0.26	1.12	0.02	0.22	0.31	-2.24	2.82
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-2.24	2.82
Zscore: Q20-Change in total value before becoming uncomfortable	ANZCUS	53723	0.08	1.01	0.00	0.07	0.09	-1.77	2.96
	UK	23445	-0.20	0.95	0.01	-0.21	-0.18	-1.77	2.96
	OTHER	2434	0.08	1.07	0.02	0.04	0.13	-1.77	2.96
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-1.77	2.96
Zscore: Q21-Average return over next ten years [shorten version of question, see full questionnaire for actual text]	ANZCUS	53723	0.04	1.03	0.00	0.03	0.05	-2.07	1.62
	UK	23445	-0.08	0.94	0.01	-0.09	-0.07	-2.07	1.62
	OTHER	2434	-0.04	0.96	0.02	-0.08	0.00	-2.07	1.62
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-2.07	1.62
Zscore: Q22-Government benefit or tax advantage [shorten version of question, see full questionnaire for actual text]	ANZCUS	53723	0.02	1.00	0.00	0.01	0.03	-1.56	1.53
	UK	23445	-0.07	0.99	0.01	-0.08	-0.05	-1.56	1.53
	OTHER	2434	0.21	1.07	0.02	0.17	0.25	-1.56	1.53
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-1.56	1.53
Zscore: Q23-Variable, market or mixed loan rate [shorten version of question, see full questionnaire for actual text]	ANZCUS	53723	-0.08	1.02	0.00	-0.09	-0.07	-1.27	2.02
	UK	23445	0.16	0.92	0.01	0.15	0.17	-1.27	2.02
	OTHER	2434	0.25	1.01	0.02	0.21	0.29	-1.27	2.02
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-1.27	2.02

Zscore: Q24-Insurance can cover a wide variety of life's major risks - theft, fire, accident, illness, death etc. How much cover do you have?	ANZCUS	53723	-0.09	1.00	0.00	-0.10	-0.08	-1.67	2.01
	UK	23445	0.22	0.96	0.01	0.21	0.23	-1.67	2.01
	OTHER	2434	-0.07	0.93	0.02	-0.11	-0.04	-1.67	2.01
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-1.67	2.01
Zscore: Q25-Percieved Score [shorten version of question, see full questionnaire for actual text]	ANZCUS	53723	0.03	1.00	0.00	0.02	0.04	-3.37	3.67
	UK	23445	-0.10	0.97	0.01	-0.12	-0.09	-3.37	3.67
	OTHER	2434	0.27	1.14	0.02	0.23	0.32	-3.37	3.39
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-3.37	3.67
Sum of Z Scores	ANZCUS	53723	0.43	13.01	0.06	0.32	0.54	-50.38	62.55
	UK	23445	-1.52	13.65	0.09	-1.69	-1.34	-46.70	59.47
	OTHER	2434	5.10	14.18	0.29	4.53	5.66	-40.27	58.37
	Total	79602	0.00	13.30	0.05	-0.09	0.09	-50.38	62.55
Q23 reverse scored	ANZCUS	53723	2.44	1.25	0.01	2.43	2.45	1.00	5.00
	UK	23445	2.74	1.11	0.01	2.72	2.75	1.00	5.00
	OTHER	2434	2.85	1.22	0.02	2.80	2.90	1.00	5.00
	Total	79602	2.54	1.22	0.00	2.53	2.55	1.00	5.00
Q24 reverse scored	ANZCUS	53723	2.29	0.82	0.00	2.28	2.29	1.00	4.00
	UK	23445	2.54	0.79	0.01	2.53	2.55	1.00	4.00
	OTHER	2434	2.30	0.76	0.02	2.27	2.33	1.00	4.00
	Total	79602	2.36	0.82	0.00	2.36	2.37	1.00	4.00
Zscore: Q23 reverse scored	ANZCUS	53723	-0.08	1.02	0.00	-0.09	-0.07	-1.27	2.02
	UK	23445	0.16	0.92	0.01	0.15	0.17	-1.27	2.02
	OTHER	2434	0.25	1.01	0.02	0.21	0.29	-1.27	2.02
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-1.27	2.02
Zscore: Q24 reverse scored	ANZCUS	53723	-0.09	1.00	0.00	-0.10	-0.08	-1.67	2.01
	UK	23445	0.22	0.96	0.01	0.21	0.23	-1.67	2.01
	OTHER	2434	-0.07	0.93	0.02	-0.11	-0.04	-1.67	2.01
	Total	79602	0.00	1.00	0.00	-0.01	0.01	-1.67	2.01

Appendix 11

ANOVA Region X Question

		Sum of Squares	df	Mean Square	F	Sig.
Zscore: Q1-Compared to others, how do you rate your willingness to take financial risks?	Between Groups	260.771	1	260.771	264.170	.000
	Within Groups	76173.192	77166	.987		
	Total	76433.964	77167			
Zscore: Q2-How easily do you adapt when things go wrong financially?	Between Groups	85.830	1	85.830	85.832	.000
	Within Groups	77164.667	77166	1.000		
	Total	77250.497	77167			
Zscore: Q3-When you think of the word 'risk' in a financial context, which of the following words comes to mind first?	Between Groups	24.322	1	24.322	24.867	.000
	Within Groups	75475.086	77166	.978		
	Total	75499.408	77167			
Zscore: Q4-Have you ever invested a large sum in a risky investment mainly for the "thrill" of seeing whether it went up or down in value?	Between Groups	9.937	1	9.937	10.482	.001
	Within Groups	73154.985	77166	.948		
	Total	73164.921	77167			
Zscore: Q5-If you had to choose between more job security with a small pay rise and less job security with a big pay rise, which would you pick?	Between Groups	15.436	1	15.436	15.536	.000
	Within Groups	76667.499	77166	.994		
	Total	76682.934	77167			
Zscore: Q6-When faced with a major financial decision, are you more concerned about the possible losses or the possible gains?	Between Groups	8.054	1	8.054	8.088	.004
	Within Groups	76842.521	77166	.996		
	Total	76850.574	77167			
Zscore: Q7-How do you usually feel about your major financial decisions after you make them?	Between Groups	638.484	1	638.484	649.879	.000
	Within Groups	75812.931	77166	.982		
	Total	76451.414	77167			
Zscore: Q8-Imagine you were in a job where you could choose whether to be paid salary, commission or a mix of both. Which would you pick?	Between Groups	97.732	1	97.732	98.231	.000
	Within Groups	76774.322	77166	.995		
	Total	76872.055	77167			
Zscore: Q9-What degree of risk have you taken with your financial decisions in the past?	Between Groups	431.568	1	431.568	437.906	.000
	Within Groups	76049.051	77166	.986		
	Total	76480.618	77167			
Zscore: Q10-What degree of risk are you currently prepared to take with your financial decisions?	Between Groups	333.269	1	333.269	337.732	.000
	Within Groups	76146.162	77166	.987		
	Total	76479.430	77167			
Zscore: Q11-Have you ever borrowed money to make an investment (other than for your home)?	Between Groups	1243.679	1	1243.679	1263.580	.000
	Within Groups	75950.639	77166	.984		
	Total	77194.318	77167			
Zscore: Q12-How much confidence do you have in your ability to make good financial decisions?	Between Groups	320.045	1	320.045	324.066	.000
	Within Groups	76208.713	77166	.988		
	Total	76528.758	77167			
Zscore: Q13-Buy a stock after declining [shorten version of question, see full questionnaire for actual text]	Between Groups	76.242	1	76.242	76.800	.000
	Within Groups	76605.380	77166	.993		
	Total	76681.622	77167			
Zscore: Q14-Loss before becoming uncomfortable [shorten version of question, see full questionnaire for actual text]	Between Groups	670.084	1	670.084	680.821	.000
	Within Groups	75949.115	77166	.984		
	Total	76619.199	77167			
Zscore: Q15-Rent, sell or renovate inherited house [shorten version of question, see full questionnaire for actual text]]	Between Groups	201.489	1	201.489	202.983	.000
	Within Groups	76597.967	77166	.993		
	Total	76799.455	77167			
Zscore: Q16-% of Low-risk low-return, medium-risk medium-return, or high-risk high -eturn	Between Groups	1417.421	1	1417.421	1454.742	.000
	Within Groups	75186.317	77166	.974		
	Total	76603.738	77167			
Zscore: Q17-Chance of loss before investing [shorten	Between Groups	318.352	1	318.352	321.076	.000
	Within Groups	76511.417	77166	.992		

version of question, see full questionnaire for actual text]	Total	76829.769	77167			
Zscore: Q18-Keep money value or purchase power [shorten version of question, see full questionnaire for actual text]	Between Groups	129.461	1	129.461	130.552	.000
	Within Groups	76521.285	77166	.992		
	Total	76650.747	77167			
Zscore: Q19-In recent years, how have your personal investments changed?	Between Groups	.087	1	.087	.088	.766
	Within Groups	76352.870	77166	.989		
	Total	76352.958	77167			
Zscore: Q20-Change in total value before becoming uncomfortable	Between Groups	1262.564	1	1262.564	1289.931	.000
	Within Groups	75528.858	77166	.979		
	Total	76791.422	77167			
Zscore: Q21-Average return over next ten years [shorten version of question, see full questionnaire for actual text]	Between Groups	224.413	1	224.413	224.549	.000
	Within Groups	77119.133	77166	.999		
	Total	77343.546	77167			
Zscore: Q22-Government benefit or tax advantage [shorten version of question, see full questionnaire for actual text]	Between Groups	124.712	1	124.712	125.693	.000
	Within Groups	76563.680	77166	.992		
	Total	76688.392	77167			
Zscore: Q25-Percieved Score [shorten version of question, see full questionnaire for actual text]	Between Groups	308.479	1	308.479	313.523	.000
	Within Groups	75924.496	77166	.984		
	Total	76232.975	77167			
Zscore: Q23 reverse scored	Between Groups	981.506	1	981.506	996.654	.000
	Within Groups	75993.186	77166	.985		
	Total	76974.692	77167			
Zscore: Q24 reverse scored	Between Groups	1564.389	1	1564.389	1590.309	.000
	Within Groups	75908.299	77166	.984		
	Total	77472.689	77167			

Appendix 12

Risk Group Descriptive for each question based on New Score ALL

Risk Group		N	Mean	Std. Deviation
Zscore: Q1	1	467	-2.5988185	.68239765
	2	3920	-1.6518149	.85730272
	3	18619	-.7188564	.75663437
	4	31555	.0198022	.59794497
	5	19009	.6133559	.62782003
	6	5210	1.3398285	.69241793
	7	822	2.2001232	.85994970
	Total	79,602	0	1
Zscore: Q2	1	467	-1.7655959	.70029119
	2	3920	-1.1455494	.95379647
	3	18619	-.5040161	.88563250
	4	31555	-.0136720	.85608874
	5	19009	.4825583	.80604153
	6	5210	.9152982	.80189518
	7	822	1.4466279	.80533800
	Total	79,602	0	1
Zscore: Q3	1	467	-1.69584232	.80063168
	2	3920	-.9753765	.89972916
	3	18619	-.4998224	.69568178
	4	31555	-.1035546	.79530144
	5	19009	.5369424	.99576776
	6	5210	1.0950965	.87791735
	7	822	1.5536519	.79898921
	Total	79,602	0	1
Zscore: Q4	1	467	-.4486146	.17449474
	2	3920	-.4133950	.32314994
	3	18619	-.3547793	.45906425
	4	31555	-.1425261	.77612255
	5	19009	.3134378	1.17375532
	6	5210	.9770659	1.54004804
	7	822	2.2924632	1.84526931
	Total	79,602	0	1
Zscore: Q5	1	467	-1.2645943	.52448944
	2	3920	-.9712094	.65982547
	3	18619	-.5686616	.75523344
	4	31555	-.0621310	.88078797
	5	19009	.5432067	.89882950
	6	5210	1.0388953	.80851726
	7	822	1.4692210	.61727156
	Total	79,602	0	1
Zscore: Q6	1	467	-1.9134485	.58340552
	2	3920	-1.2374749	.88169797
	3	18619	-.5406306	.84443234
	4	31555	.0097875	.85351526
	5	19009	.4990060	.79261687
	6	5210	.9099211	.80017737
	7	822	1.5515139	.90533468
	Total	79,602	0	1
Zscore: Q7	1	467	-2.0358919	1.45352157
	2	3920	-.9569532	1.20572992
	3	18619	-.3602290	.97538478
	4	31555	.0054955	.80612607
	5	19009	.3101253	.85735765
	6	5210	.7989290	1.00623536
	7	822	1.4332352	.90365023
	Total	79,602	0	1
Zscore: Q8	1	467	-1.2371055	.58030235
	2	3920	-.9223214	.72035464
	3	18619	-.5169676	.78391854
	4	31555	-.0546269	.83985213
	5	19009	.4639852	.92796851
	6	5210	1.0220177	1.01785143
	7	822	1.7004768	1.05677958
	Total	79,602	0	1
Zscore: Q9	1	467	-1.7198375	.68035766
	2	3920	-1.2034234	.87360583
	3	18619	-.5884531	.86985120
	4	31555	-.0079506	.79357242

	5	19009	.4828820	.75304529
	6	5210	1.1467040	.80998384
	7	822	1.9153810	.72606753
	Total	79,602	0	1
Zscore: Q10	1	467	-2.2062553	.41630753
	2	3920	-1.5929859	.74175774
	3	18619	-.7625578	.76361897
	4	31555	.0599457	.66990134
	5	19009	.5776429	.59153227
	6	5210	1.3094664	.75311533
	7	822	2.1637091	.74537886
	Total	79,602	0	1
Zscore: Q11	1	467	-.5438799	.34483276
	2	3920	-.4334038	.58791611
	3	18619	-.3046039	.76112174
	4	31555	-.0654467	.96191229
	5	19009	.2933978	1.10897898
	6	5210	.6267863	1.13232259
	7	822	1.0301333	1.02425780
	Total	79,602	0	1
Zscore: Q12	1	467	-1.3808952	1.24200902
	2	3920	-.9071952	1.09912473
	3	18619	-.4467460	.92646680
	4	31555	-.0485299	.83586970
	5	19009	.4098032	.84619627
	6	5210	.9558594	.88292852
	7	822	1.5577033	.85169807
	Total	79,602	0	1
Zscore: Q13	1	467	-1.6718668	.69914393
	2	3920	-1.1038264	.81712228
	3	18619	-.5431613	.86136631
	4	31555	.0073833	.89393712
	5	19009	.5013314	.81892065
	6	5210	.8504405	.76671815
	7	822	1.2497568	.78961131
	Total	79,602	0	1
Zscore: Q14	1	467	-1.7693656	.37606508
	2	3920	-1.3165612	.68289766
	3	18619	-.6061097	.82428451
	4	31555	.0157157	.80450497
	5	19009	.5311281	.80801443
	6	5210	1.0303291	.82635073
	7	822	1.5963903	.83708935
	Total	79,602	0	1
Zscore: Q15	1	467	-.8040818	.43546931
	2	3920	-.6214260	.64475807
	3	18619	-.4106133	.80138756
	4	31555	-.0627137	.95946934
	5	19009	.3978835	1.01430534
	6	5210	.7610741	.95293233
	7	822	1.1034922	.76897601
	Total	79,602	0	1
Zscore: Q16	1	467	-2.1198901	.57518992
	2	3920	-1.4718570	.68654014
	3	18619	-.7310040	.67908776
	4	31555	-.0415067	.64648095
	5	19009	.6511256	.71006607
	6	5210	1.4462008	.70401132
	7	822	2.1508780	.61201863
	Total	79,602	0	1
Zscore: Q17	1	467	-1.7956950	.61435234
	2	3920	-1.1906828	.77508655
	3	18619	-.6049646	.79593731
	4	31555	.0339437	.86094602
	5	19009	.5134534	.80432881
	6	5210	.9074742	.86838433
	7	822	1.4727901	.89877834
	Total	79,602	0	1
Zscore: Q18	1	467	-2.1042948	.79033053
	2	3920	-1.2028841	1.05221292
	3	18619	-.4807634	.92266057
	4	31555	.0160040	.84004921
	5	19009	.4598462	.82566354
	6	5210	.8599480	.72587424
	7	822	1.1226208	.48330391
	Total	79,602	0	1
Zscore: Q19	1	467	-1.8002453	.81377621
	2	3920	-1.0571523	.93463094
	3	18619	-.5100925	.81501224
	4	31555	-.0496853	.81166784

	5	19009	.4691841	.87221805
	6	5210	1.0791383	.85604083
	7	822	1.8357121	.85329464
	Total	79,602	0	1
Zscore: Q20	1	467	-1.5680292	.35373399
	2	3920	-1.1762433	.53159711
	3	18619	-.6956887	.59218045
	4	31555	-.1183480	.69041505
	5	19009	.6458741	.82315650
	6	5210	1.5125435	.81167916
	7	822	2.2784286	.70904842
	Total	79,602	0	1
Zscore: Q21	1	467	-1.4846748	.72946618
	2	3920	-.9828282	.79603027
	3	18619	-.4944898	.86572150
	4	31555	-.0229931	.90960947
	5	19009	.4662143	.87634294
	6	5210	.8867524	.76669874
	7	822	1.2119629	.63172946
	Total	79,602	0	1
Zscore: Q22	1	467	-1.4737317	.41398452
	2	3920	-1.1148274	.74683354
	3	18619	-.5438044	.87004302
	4	31555	-.0016327	.84115050
	5	19009	.4913724	.89076392
	6	5210	.9262241	.84264137
	7	822	1.3002957	.59863791
	Total	79,602	0	1
Zscore: Q25	1	467	-1.9634671	.92018072
	2	3920	-1.3518793	.74244084
	3	18619	-.7511585	.68523462
	4	31555	-.0500261	.71815198
	5	19009	.6995917	.66782903
	6	5210	1.3171732	.61781537
	7	822	1.9704223	.76590668
	Total	79,602	0	1
Zscore: Q23 reverse scored	1	467	-.6254701	1.06157665
	2	3920	-.4172060	.96313691
	3	18619	-.2110838	.91640407
	4	31555	-.0338971	.93646882
	5	19009	.1957089	1.02882740
	6	5210	.4810482	1.12556038
	7	822	.8527205	1.18448202
	Total	79,602	0	1
Zscore: Q24 reverse scored	1	467	.2902536	1.19627196
	2	3920	.1241634	1.05500040
	3	18619	.0685651	.99427818
	4	31555	.0026742	.97690705
	5	19009	-.0594125	.99593917
	6	5210	-.1241118	1.04880928
	7	822	-.2521476	1.14814093
	Total	79,602	0	1

Appendix 13

Post hoc analysis by risk group based on New Score ALL

(I) RG		Mean Difference (I-J)	Std. Error	Sig.
1	2	-8.44618*	0.09858	0
	3	-16.50469*	0.0924	0
	4	-24.25173*	0.09136	0
	5	-32.02530*	0.09162	0
	6	-39.92878*	0.09351	0
	7	-49.48664*	0.09981	0
2	1	8.44618*	0.09858	0
	3	-8.05851*	0.04507	0
	4	-15.80555*	0.0429	0
	5	-23.57912*	0.04344	0
	6	-31.48260*	0.04731	0
	7	-41.04046*	0.05879	0
3	1	16.50469*	0.0924	0
	2	8.05851*	0.04507	0
	4	-7.74704*	0.02571	0
	5	-15.52060*	0.0266	0
	6	-23.42409*	0.03254	0
	7	-32.98194*	0.04772	0
4	1	24.25173*	0.09136	0
	2	15.80555*	0.0429	0
	3	7.74704*	0.02571	0
	5	-7.77356*	0.02274	0
	6	-15.67705*	0.02946	0
	7	-25.23490*	0.04568	0
5	1	32.02530*	0.09162	0
	2	23.57912*	0.04344	0
	3	15.52060*	0.0266	0
	4	7.77356*	0.02274	0
	6	-7.90348*	0.03025	0
	7	-17.46134*	0.04618	0
6	1	39.92878*	0.09351	0
	2	31.48260*	0.04731	0
	3	23.42409*	0.03254	0
	4	15.67705*	0.02946	0
	5	7.90348*	0.03025	0
	7	-9.55786*	0.04984	0
7	1	49.48664*	0.09981	0
	2	41.04046*	0.05879	0
	3	32.98194*	0.04772	0
	4	25.23490*	0.04568	0
	5	17.46134*	0.04618	0
	6	9.55786*	0.04984	0

Appendix 14

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