FINANCIAL RISK TOLERANCE: DIFFERENCES BETWEEN WOMEN AND MEN.
Preface

We would like to thank all the respondents of the questionnaire, as well as, those people who helped us edit and modify the questionnaire. We would also like to thank our supervisor, Anders Isaksson, who helped and guided us, at times even sacrificing his summer vacation. Without them this paper would not be possible.

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Abstract

The statistics has shown that men and women have different investing strategies, where men tend to choose riskier investments and women lean towards less risky investments. The financial theory states that individuals are risk averse in general, and some prior studies have shown that women are more so than men. Moreover, financial knowledge and experience have been pointed out to be one of the factors affecting one’s financial risk tolerance. This paper researches these issues by addressing the following to questions: Are there any gender differences in Financial Risk Tolerance? Does knowledge and experience have impact on Financial Risk Tolerance? A literature search has been done and relevant theory has been gathered and review, which served as a base and a framework for conducting this study. A quantitative methodological study has been carried out by handing out questionnaires, based on a 13-item Financial Risk Tolerance scale developed by Grabble & Lytton (1999). The target population was the Umeå University students. The size of the sample was 139. The findings of this paper confirm prior studies which state that women, in general, are less risk tolerant than men – female students scored lower on the Financial Risk Tolerance Score than male students. Furthermore, this study also shows that one’s Financial Risk Tolerance is affected by experience and knowledge in the field of finance – students that are studying economics had higher Financial Risk Tolerance score than students that were studying other subjects.
1 INTRODUCTION

In this chapter we intend to show and get the readers interest as to why we chose to investigate whether there are any gender differences when it comes to financial risk tolerance. This chapter consists of problem background, problem specification, the research question followed by the purpose of the research.

1.1 Problem background and problem formulation

Sweden is considered one of the most gender equal countries in the world. The Swedish parliament has 47.3% of its members that are women and 52.7% members that are men according to the statistics on the Swedish Parliament’s homepage (2006). There have been some discussions in the Swedish Parliament about increasing the amount of female members in the board of directors. A parliamentary bill was proposed by Schyman G. in 2000 suggesting a mandatory 40% representation of both genders in the Board of Directors of publicly listed companies, as well as, state and municipality owned companies (G. Schyman 2000). The development in this area has been positive. To be precise, the percentage of females in managerial positions has gone from 26% in 2002 up to 32% in 2004. However, the figure declined in 2005 and 2006, being 26% and 25% each year respectively (Renstig 2006). However, the aforementioned Bill has never been passed, which means there is no law making companies in Sweden to have an equally represented Board of Directors. Whereas, in other countries there has been some progress in this issue, for instance in Norway the Government has passed a law, according to which at least 40% of both genders have to be represented in the board of directors of private owned public limited companies, as well as, state owned public limited companies (Public Limited Companies Act 2003).

Out of all new businesses started in 2005 and 2006, 34% and 35% respectively were started by women. The amount of new businesswomen has increased from 2005 to 2006 by 5%, while that of businessmen has decreased by 2% (ITPS 2007)

When it comes to financing their businesses, women make different financial choices from men; they tend to search for external financing to a lesser degree compared to men. According to Powell and Ansic (1997), individuals’ risk preferences are related to their financial decision-making. In 2005 only 35% of businesswomen in Sweden have applied
for loans or credits, as opposed to that, the portion of businessmen that have applied for loans or credits was 46% (NUTEK 2007)

Concerning the private investments that men and women make, the differences are noticeable. According to Mia Halleröd (2008) a portfolio of an average man most likely consists of high risk companies, such as IT-companies, gaming, natural resources companies and so on. According to the statistics from NCSD (2008), men prefer shares of companies such as, 24HPoker Holding, Switch Core and Pricer. Whereas, women invest their money in more historically secure and rather big companies, for instance, SEB, H&M and Swedbank (NCSD 2008).

Women, in general, invest in stocks less than men. According to SCB (2007) the size of a median portfolio of stocks that women owned was worth 18 000 SEK, as for men, the figure was 22 000 SEK. Moreover, 15.6 percent of women and 21.6 percent of men were stockowners (SCB 2007).

According to a Swedish study, done by Sjögren and Säve-Söderbergh (2004), which explored gender differences in financial decision-making by examining betting decisions of the contestants of TV-show Jeopardy before the final question, women choose financial strategies with possible outcomes that have less variety, whereas men have the highest possible outcome in mind. This is in line with the aforementioned statistics from SCB (2007) that there are fewer women than men investing in stocks and that women’s stock portfolio is worth less.

There has been done a substantial amount of research in the past investigating differences in individual financial risk tolerance. Rui Yao et al. (2004) have investigated the correlation between the stock market performance and financial risk tolerance. They came to a conclusion in their research that “risk tolerance level is affected by recent events” (Yao et al. 2004). Apart from financial characteristics, the effects of demographic characteristics on financial risk tolerance have also been widely researched. Gender was found to be one of the factors that affect a person’s financial risk tolerance among other factors such as, income, wealth, age, ethnicity, education level and marital status (Hallahan, Faff, McKenzie 2004; Meier-Pesti & Penz 2007; Powell & Ansic 1997; Jianakoplos & Bernasek 1998; Grable & Lytton 2001). These researchers have found that women have a propensity to be more risk averse when investing or making a financial-
decision as opposed to men (see also Weber, Blais & Betz 2002). Conversely, Daruvala (2007) found that, even though both women and men perceived women to be more risk averse, according to his research, there was “no significant relationship between gender and risk preferences”. Likewise, the results of Kruse & Thompson’s (2001) research are in contradiction with the perception that women are less tolerant towards financial risk. They find that gender differences in risk taking disperse when there is money involved, even though they find that there are differences between men and women in non-financial domain (Kruse & Thompson 2001). Holt & Laury (2002) have similar findings to the latter research.

It is apparent that the issue of gender differences in risk tolerance is not exceedingly clear and uncut. Pesti and Penz (2008) elaborate on the notion of differentiating between sex and gender and argue that effects of masculinity and femininity on financial risk taking have to be considered, and not only the effects of biological sex. They, based on their study, come to a conclusion that being masculine coincided with having high risk tolerance. However, their study has not shown that there is a relationship between femininity and being reluctant to financial risk.

1.2 Research Question

According to the aforementioned facts, our own interest and curiosity we form our research question as stated below:

Are there any gender differences in Financial Risk Tolerance?

Furthermore, we want to address the following question:

Does financial knowledge and experience have impact on Financial Risk Tolerance?

1.3 Research purpose

Our aim with this thesis is to examine whether or not gender can be attributed to the differences in financial risk tolerance. The vast amount of studies around this subject has taken place in the US; however there is little research done in Sweden and our essay will
be a contribution to this field. What's more, we want to investigate the relationship between gender and financial risk tolerance, along with relationship between knowledge and experience and financial risk tolerance. We will fulfill our purpose by conducting a survey among the students at Umeå University.

### 1.4 Disposition

Our thesis will contain the following chapters:

1. **Introduction** - *In this chapter we intend to show and get the readers interest as to why we chose to investigate whether there are any gender differences when it comes to financial risk tolerance. This chapter consists of problem background, problem specification, the research question followed by the purpose of the research.*

2. **Theoretical Framework** - *The following part of the thesis will present the relevant theoretical framework, which will later be used to analyse the empirical data.*

3. **Method** - *This chapter introduces the way the study has been done. The choice of the subject, research approach and applied method. It also takes up reliability and validity.*

4. **Result and Analysis** - *This chapter will present the empirical findings of our research as well as the analysis of those findings. It consists of descriptive statistics, t-tests and one-way and two-way ANOVA tests.*

5. **Conclusion** - *In this chapter we will answer our research questions, make conclusions from the analysis and authors’ personal reflections will be presented.*

6. **Theoretical and Practical Contributions** – *This chapter contains the theoretical and practical contributions of our research*

7. **Further Research** – *The thesis concludes with this chapter discussing the further possible studies that can be done in this field.*
2 THEORETICAL FRAMEWORK

The following part of the thesis will present the relevant theoretical framework, which will later be used to analyse the empirical data.

2.1 Risk

As defined by Oxford English Dictionary (1989) risk is a “hazard, danger; exposure to mischance or peril”. According to this definition, risk is a rather negative perception. This is true when speaking of the word “risk” in general and daily use. As Hamberg (2004) explains, managers often associate “risk” with “uncertainty”; however, “risk” in financial theory does not necessarily relate to uncertainty, neither does it have a negative implication. As per Investopedia’s® Dictionary (2008), risk is:

“the chance that an investment's actual return will be different than expected.”

Here, the difference between the actual return and the expected return can either be negative or positive. The magnitude of risk is measured as variance in expected returns. A risk, unlike uncertainty, as first established by Frank Knight (1921), entails known possible outcomes, as well as known probabilities of those outcomes.

2.2 Risk Aversion and Risk Tolerance

When talking about attitudes towards risk, there are different approaches to it. Terms like “risk aversion” and “risk tolerance” are widely used in previous research papers. These two terms have a tendency to be used interchangeably. However, they do not have the same meaning, but rather express a different viewpoint on the same notion, that is risk attitude. A person with a high risk tolerance can be said to have a low risk aversion. A study made by Faff, Mulino and Chai (2008) concludes that financial risk tolerance and risk aversion are highly correlated, and even though they are potentially distinguishable, financial risk tolerance and risk aversion “study similar ... aspects of decision making under uncertainty”. This essay will not differentiate between risk tolerance and risk aversion, but it will rather purport them as representing two opposite ends of one continuum of financial risk attitude.
MacCrimmon & Wehrung (1986 cited in Grable & Lytton 1999, p.167) state that

“assessment items used within an instrument must ... cover a variety of risky financial situations in a multidimensional manner including standard versus natural occurring risks, behaviors, attitudes, threats, opportunities, and simple versus complex situations”

The 13-item scale, developed by Grable & Lytton (1999), measures different dimensions of Financial Risk Tolerance. The dimensions are as following:

1. Guaranteed vs. probable gambles
2. Choice between sure loss and sure gain
3. Risk as experience and knowledge
4. Risk as a level of comfort
5. Speculative risk
6. Prospect theory
7. Investment risk

The 7 dimensions above together measure a person’s financial risk tolerance.

2.3 Financial Risk Tolerance and Gender

Jianakoplos and Bernasek (1998) argue that, when women are asked to point out the degree of financial risk they are willing to take when saving or making investments, they “indicate greater risk aversion than men”. The article “Are Women More Risk Averse” (Jianakoplos & Bernasek, 1998) sought to explore whether women’s perceived greater risk aversion was in line with their financial decision-making. Single men, as well as, single women display relative risk aversion which decreases as the wealth increases, however, women show a decrease in risk aversion to a lesser degree:

...where wealth equals $20,000, single women are predicted to hold 43% of their wealth in risky assets, compared to 51% by single men. If wealth increases to $100,000 [...] the share held in risky assets is predicted to increase for both single women and men; however, the share increases by 19 percentage points for women, compared to 28 percentage points for men. (Jianakoplos & Bernasek, 1998).
Jianakoplos & Bernasek (1998) also note that women’s portfolios have a smaller proportion of risky assets than men over most age ranges: women in only 3 age groups out of 10 hold slightly higher proportion of risky assets.

Powell & Ansic (1997) investigate whether females have a lower risk tolerance in comparison to males when the decisions to be made are concerned with losses rather than gains, i.e. tasks, such as insurance decisions, that are framed in terms of losses; and when the tasks are familiar. Their research proves that females are less risk tolerant than males, regardless of whether decisions are being made in the domain of losses or gains and regardless of whether the subjects are familiar to the tasks or not. When it comes to strategies in financial decision-making women and men tend to implement different ways: since women are less risk tolerant they have a propensity to adopt strategies that best avoid loss and gain security, whereas, men focus on achieving best possible gain (Powell & Ansic, 1997). However, Powell & Ansic (1997), note that even though there were differences in risk tolerance and strategies among the subjects of their research experiment, there were no significant differences between women and men in performance ability in financial decision-making.

Eckel and Grossman (2002) have also detected that females are more averse to financial risk, on average, than men. The study Eckel and Grossman (2002) have done involved an experiment with gambles, and it has been observed that women were four times as likely as men to go for the risk-free gamble and only one-third to pick a gamble with the highest risk.

Byrnes, Miller & Schafer (1999) argue that the differences in risk-taking between women and men are, among other things, specific from context to context. Women might feel more confident in certain contexts, situations or environments than men, and be willing to take the risks involved. In domains that are considered rather masculine, as Beyer & Bowden (1997) note, women tend to be more averse to the risks and less confident. However, Beyer & Bowden (1997) find that the aforementioned observation does not affect the ability to perform – the same conclusion that Powell & Ansic (1997) came to.

2.4 Financial Risk Tolerance and Experience and Knowledge
Prior experience and the degree of knowledge of the subject in hand reduce the differences in risk taking according to Byrnes, Miller & Schafer (1999). Dwyer et al (2002) also found evidence, through a survey of 2000 mutual fund investors, the risk taking differences between both genders soothe significantly when knowledge of financial markets and investments is considered. Dwyer et al (2002, p.151) argues that:

*the greater level of risk aversion among women that is frequently documented in the literature can be substantially, but not completely, explained by knowledge disparities.*

There are more previous studies that presented the impact of experience and knowledge on financial risk taking. Menkhoff, Schmidt and Brozynski (2006) found that the more experience one has the less risk he/she is willing to take. They also state that:

*Experience gained from a learning process [...] may lead to a comparatively more risk averse behavior.* (Menkhoff et al. 2006, p. 1764)

Robert Masters (1989) examined whether people with knowledge of investments have different risk taking preferences than those without any investment knowledge. He found that knowledge of investment is positively correlated to an individual’s financial risk tolerance.

Grable (2000), as well, identified financial risk tolerance levels to increase when financial knowledge increases.

### 2.5 Four decision situations in risk taking

There are differences in how people react and make decisions when it comes to decisions that relate to different situations. Different situations can be met different ways, and that depends on whether the situations we are facing on is new or not. Blombäck (2000) presents four decision situations in risk taking in her book. These four situations have different possibilities and controlled differently depending on the situation when they occur. Blombäck (2000) shows these four situations when it comes to risk taking in the figure below.
Figure 1. The risk involved in four different situations based on the perceived control over outcomes and the possibility of quantification. (adapted from Blombäck, 2000)

- **Risk 1:** *Repeated behavior relates to the probability of a risk and involves everyday or “not-first-time decisions”* (Blombäck, 2000, p.32) here depends on earlier experience, if the decision maker has previously encountered similar risk then the decision will be based on the knowledge of that outcome.

- **Risk 2:** *Unique internal projects are genuine uncertainty decisions.* (Blombäck, 2000, p.32) These are non-quantifiable because of lack of experience. Here there is a chance that the decisions maker can see if he/she can do something about the outcome and according to Blombäck (2000) there is no right way to succeed.

- **Risk 3:** *Gambling decisions are theoretically quantifiable* (Blombäck, 2000, p.32); here the outcome cannot be explained by earlier experiences. The outcome cannot be controlled by former experiences in that reason the outcome of gambling cannot be predicted.

- **Risk 4:** *Unique external projects are non-quantifiable due to lack of perceived control* (Blombäck, 2000, p.32). The decision makers have not control of the outcome and that depends on the lack of information which effects their decision.
2.6 Prospect Theory

The Prospect Theory has been developed by Kahneman and Tversky in 1976, it is an alternative to the Expected Utility Theory. Prospect Theory takes a descriptive approach by describing how the financial decisions are made in reality, unlike the Expected Utility theory, which is concerned with how the decisions should be made. Daniel Kahneman has received the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel for his contribution in behavioral finance with the Cumulative Prospect Theory, which is a revised version of the original Prospect Theory. Prospect Theory and the Cumulative Prospect Theory as well, suggest that people are risk averse in positive prospects and risk seeking in negative prospects (Kahneman & Tversky 1979). In Kahneman’s and Tversky’s study the subjects were asked to answer the two following questions:

1. In addition to whatever you own, you have been given $1 000. You are now asked to choose between:
   a. A 50% chance to gain $1000 and a 50% chance to gain nothing
   b. A sure gain of $500

2. In addition to whatever you own, you have been given $2 000. You are now asked to choose between:
   c. A 50% chance to lose $1000 and a 50% chance to lose nothing
   d. A sure loss of $500

(the two questions above have been included in the questionnaire that we have used as questions # 9 and 10 respectively, however the order of responses are reversed in both questions.)

Majority (84%) of the respondents in Kahneman’s and Tversky’s (1979) study chose b in the first question and in the question 2 the majority (69%) chose option c. Note, however, that the final states of the options in both questions are identical:

option a => 1000 + 0.5*1000 + 0.5*0 = 1500 = option c => 2000 – 0.5*1000 – 0.5*0 = 1500
option b => 1000 + 500 = 1500 = option d => 2000 – 500 = 1500
As mentioned earlier this theory is a descriptive theory, that is, it only tries to describe how people make financial decisions in life when faced with risky choices. Hence, according to it, people tend to be rather risk averse when gains are concerned, but risk seeking with losses, even if the expected returns in both risky and riskless options are equal.

Figure 2. Hypothetical Value Function (Kahneman & Tversky 1979, p. 279)

The value function embodying the Prospect Theory is $S$-shaped as seen above. The origin on the graph represents the reference point where the initial investments are considered. On the x-axis are the monetary amounts – losses to the left of the origin and gains to the right of the origin. On the y-axis is the value of a certain gain or loss.

The value function in the domain of gains (upper right part of the graph) is concave, implying that sure expected values of a gamble (option $b$ in question 1) are preferred to the gamble (option $a$ in question 2). In contrast, in the domain of losses (lower left part of the graph) it is convex, which entails that a gamble (option $e$ in question 2) is preferred to the sure expected value of that gamble (option $d$ in question 2). Kahneman and Tversky(1979) refer to this as the reflection effect of Prospect Theory – people are averse to risk for positive prospects and risk seeking for negative prospects.

Moreover, the slope of the losses curve is steeper than the slope of the gains curve. A loss of an X amount of money is more dissatisfactory than a gain of a same amount is satisfactory. In other words, losses hurt more than gains satisfy.
3 METHOD

This chapter introduces the way the study has been done. The choice of the subject, research approach and applied method. It also takes up reliability and validity

3.1 Choice of subject

It was not easy to decide what subject to write about. It took us a while before we could come to a decision for this subject, which is gender differences in financial risk tolerance among the students at Umeå University. The financial situation in the world, i.e. the subprime mortgage crisis in the US and its effects on world economy, at the time of writing led the authors to settle upon this subject and see if individuals make differing financial decisions depending on what gender they belong to.

3.2 Method choice

When a researcher wants to find out the factors that lie behind individuals risk taking she can go in two different ways. One, where the researcher starts from theory and tests her hypothesis by an observation or experiment, the other is inductive approach where, according to Wallén (1996), one goes from data gathering and makes theoretical conclusions from the material gathered.

We are aiming to investigate whether gender has an effect on financial risk tolerance and our choice when it comes to approach will be deductive. The reason to why we have chosen deductive is we wanted to test if the theory holds, in our case the preconception about women being risk averse and less risk tolerant than men. We wanted to do questionnaires and test them statistically, which we could not do if we have chosen inductive as a method.

3.3 Scientific approach

There are two different kinds of methods that researchers use, one which is a quantitative method and the other is a qualitative method. According to Walliman (2005, p.246), the two researchers in those two methods

“they differ not only in the nature of the data sought and the subsequent methods of data analysis, but also in their philological rationale”.
Both qualitative and quantitative methods have one thing in common according to Holme and Solvang (1997, p. 76), they are both

“aimed to give a better understanding of the society we are living in and how individuals, groups and institutions trade and influence each other”.

Moreover, Holm and Solvang explained the differences between the two methods which they said quantitative method is about making information into numbers and quantity. Whereas, the qualitative method depends on the interpretation of the researcher. According to Walliman (2005) the qualitative researcher tries to get inside view of the phenomenon, whereas the quantitative researcher remains outside.

Quantitative method was chosen due to the topic. We wanted to do survey questioners so that we can generalize the study. We wanted to minimize the effect of the researcher and individual differences. One other reason to why quantitative method was chosen and survey questions is that we are doing study on gender differences. We did not want our preconception affect the result of our study.

A survey with closed questions has been chosen for this study. Using a questionnaire enables the researcher to organize the questions and receive answers without talking to everybody who is participating in the study (Walliman, 2005). Due to our study being about the differences between the two genders we did not want to influence the study. People can participate and finish the study as they wish. We wanted to make the study impersonal so that we could get the best result. Closed questionnaires are appropriate to the study because of the structure and impersonality that they have. The researcher affect on respondents are minimum and they do not have to be at the same place. That gives respondents the chance to be unidentified which allows the researcher get fair and true replies (Walliman, 2005).

Even though we have chosen to use questionnaires as the source of data gathering and deliver them personally, we knew that it had advantages and limitations. The advantage of delivering the questionnaires personally is; that one can persuade more people to participate by asking them personally and remind them to complete the questions. This way we managed to minimize the missing cases rate. The limitation is the geographical
location, which we did not have in our research due to target population that we have chosen in our research.

3.4 Literature search

The search of relevant literature has been done through the Umeå University Library System – ALBUM. The articles were found through the databases, such as, Affärsdata, Business Source Premier (EBSCO), Emerald Fulltext, Helecon (SCIMA), LIBRIS (websök).

Keywords the authors have used included the following words:

Financial risk, financial risk attitude, financial risk tolerance, financial risk aversion, gender and risk, gender differences in financial risk, sex differences in financial risk, jämställdhet

Further relevant articles were obtained by searching through the references of initially found literature and scientific articles.

Some of the main articles that we used were:


3.5 Choice of questionnaire

In order to assess the Financial Risk attitudes there had to be a scale that would measure the subject in hand. In search of existing scales we found a previous study, done by Grable & Lytton (1999) in the US, which has developed a scale measuring Financial Risk Tolerance. The scale has been tested by the developers on several occasions and has been modified and perfected. The scale consisted of 13 items, which were selected down from 100 items.

One item from the 13-item scale has been taken away after the pilot study due to complexity of the item and potential misunderstanding of the Swedish interpretation by
the respondents. Item number 4 in the original 13-item scale has 3 answer options; however, we found the number of answer options to be limited – there was a lack of a higher risk option. We have added a 4th option providing for a riskier weight. The 12 items in our questionnaire each represent one or more of the 7 dimensions of Financial Risk Tolerance as shown in Table 1.

Table 1. Dimensions of FRT and items in the Questionnaire That measure each dimension.

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Items in the Questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guaranteed vs. Probable Gambles</td>
<td>Questions 2, 8 and 13</td>
</tr>
<tr>
<td>Choice between sure loss and sure gain</td>
<td>Question 8</td>
</tr>
<tr>
<td>Risk as experience and knowledge</td>
<td>Questions 1, 4, 6, 7 and 11</td>
</tr>
<tr>
<td>Risk as a level of comfort</td>
<td>Questions 1, 3, 6, 7 and 12</td>
</tr>
<tr>
<td>Speculative Risk</td>
<td>Questions 2, 8 and 13</td>
</tr>
<tr>
<td>Prospect Theory</td>
<td>Questions 9, 10 and 12</td>
</tr>
<tr>
<td>Investment Risk</td>
<td>Questions 4, 6 and 11</td>
</tr>
</tbody>
</table>

As it can be seen from Table 1 all the questions in our questionnaire are meant to measure different dimensions, which together make up one whole measurement of Financial Risk Tolerance. All 13 questions are presented in Table 2 on the following page. The explanations for each dimension and the questions making up each respective dimension as to what they are measuring are given after the Table 2. The proportion of answers to each option for questions 1 to 13 is given as a percentage in the Appendix next to each answer option in the questionnaire.
Table 2. Financial Risk Tolerance Assessment Items

<table>
<thead>
<tr>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In general, how would your best friend describe you as a risk taker?</td>
</tr>
<tr>
<td>a. A real gambler</td>
</tr>
<tr>
<td>b. Willing to take risks after completing adequate research</td>
</tr>
<tr>
<td>c. Cautious</td>
</tr>
<tr>
<td>d. A real risk avoider</td>
</tr>
<tr>
<td>2. You are on a TV game show and can choose one of the following. Which would you take?</td>
</tr>
<tr>
<td>a. 6000 SEK in cash</td>
</tr>
<tr>
<td>b. A 50% chance at winning 30 000 SEK</td>
</tr>
<tr>
<td>c. A 25% chance at winning 60 000 SEK</td>
</tr>
<tr>
<td>d. A 5% chance at winning 600 000 SEK</td>
</tr>
<tr>
<td>3. You have just finished saving for a &quot;once-in-a-lifetime&quot; vacation. Three weeks before you plan to leave, you lose your job. You would:</td>
</tr>
<tr>
<td>a. Cancel the vacation</td>
</tr>
<tr>
<td>b. Take a much more modest vacation</td>
</tr>
<tr>
<td>c. Go as scheduled, reasoning that you need the time to prepare for a job search</td>
</tr>
<tr>
<td>d. Extend your vacation, because this might be your last chance to go first-class</td>
</tr>
<tr>
<td>4. If you unexpectedly received 120 000 SEK to invest, what would you do?</td>
</tr>
<tr>
<td>a. Deposit it in a bank account, money market account, or an insured Certificate of Deposit</td>
</tr>
<tr>
<td>b. Invest it in safe high quality bonds or bond mutual funds</td>
</tr>
<tr>
<td>c. Invest it in stocks or stock mutual funds</td>
</tr>
<tr>
<td>d. Speculate in high risk securities market (options, warrants, swaps, etc.)</td>
</tr>
<tr>
<td>5. Have you ever invested in stocks?</td>
</tr>
<tr>
<td>a. Yes.</td>
</tr>
<tr>
<td>b. No.</td>
</tr>
<tr>
<td>6. In terms of experience, how comfortable are you investing in stocks or stock mutual funds?</td>
</tr>
<tr>
<td>a. Not at all comfortable</td>
</tr>
<tr>
<td>b. Somewhat comfortable</td>
</tr>
<tr>
<td>c. Very comfortable</td>
</tr>
<tr>
<td>7. When you think of the word &quot;risk&quot; which of the following words comes to mind first?</td>
</tr>
<tr>
<td>a. Loss</td>
</tr>
<tr>
<td>b. Uncertainty</td>
</tr>
<tr>
<td>c. Opportunity</td>
</tr>
<tr>
<td>d. Thrill</td>
</tr>
</tbody>
</table>
8. Given the best and worst case returns of the four investment choices below, which would you prefer?
   a. 1200 SEK gain best case; 0 SEK gain/loss worst case
   b. 4800 SEK gain best case; 1200 SEK loss worst case
   c. 15600 SEK gain best case; 4800 SEK loss worst case
   d. 28800 SEK gain best case; 14400 SEK loss worst case

9. In addition to whatever you own, you have been given 6000 SEK. You are now asked to choose between:
   a. A sure gain of 3000 SEK
   b. A 50% chance to gain 6000 SEK and a 50% chance to gain nothing

10. In addition to whatever you own, you have been given 12000 SEK. You are now asked to choose between:
    a. A sure loss of 3000 SEK
    b. A 50% chance to lose 6000 and a 50% chance to lose nothing

11. Suppose a relative left you an inheritance of 600000 SEK stipulating in the will that you invest ALL the money in ONE of the following choices. Which one would you select?
    a. A savings account or money market mutual fund
    b. A mutual fund that owns stocks and bonds
    c. A portfolio of 15 common bonds
    d. Commodities like gold, silver and oil

12. If you had to invest 120000 SEK, which of the following investment choices would you find most appealing?
    a. 60% in low-risk investment, 30% in medium-risk investment, 10% in high-risk investments
    b. 30% in low-risk investment, 40% in medium-risk investment, 30% in high-risk investments
    c. 10% in low-risk investment, 40% in medium-risk investment, 50% in high-risk investment

13. Your trusted friend and neighbor, an experienced geologist, is putting together a group of investors to fund an exploratory gold mining venture. The venture could pay back 50 to 100 times the investment if successful. If the mine is a bust, the entire investment is worthless. Your friend estimates the chance of success is only 20%. If you had the money, how much would you invest?
    a. Nothing
    b. One month's salary
    c. Three month's salary
    d. Six month's salary
Questions that make up the “Guaranteed vs. Probable Gambles” dimension, give the respondent an option to choose between a guaranteed safe alternative and a gamble. A person who chooses a guaranteed safe option would be considered more risk averse than someone who chooses a gamble. For instance, in question 2, the respondents are asked to choose between a guaranteed 6000 SEK option and several risky choices with corresponding probable gains.

Note that, some questions can measure one or several dimensions of financial risk tolerance. For instance, Question 8 by itself measures financial risk tolerance as a choice between a sure loss and a sure gain by requiring the respondents to make a decision with incomplete information. Here, the respondents are asked to choose between various cases of sure gain along with a sure loss.

Questions assessing the “Risk as Experience and Knowledge” dimension require some financial knowledge or experience such as, investing, saving and stocks and so forth. These questions assess whether experienced people or people with prior financial knowledge are more risk tolerant than others, as theory states.

The dimension of “Risk as a Level of Comfort” is related to respondents experience and knowledge. The questions that make up this dimension assess respondents’ attitude towards risky choices. A respondent that is comfortable or confident in making risky choices will choose a riskier option, thus exhibiting more risk tolerance than others. For instance, in question 7, a person who associates the word “risk” with opportunity is more risk tolerant than a person who associates risk with loss.

Questions assessing Speculative Risk assume that a risk tolerant person would tend to speculate more than a risk averse person. Here, a respondent has to choose either a safe option or speculate on the extent of probable return.

Questions 9 and 10 are from the Prospect Theory, according to which people make decisions in terms of potential gains and losses relative to a reference point. Prospect Theory states that in general, people choose sure gain in Question 9 and chance in Question 10, which points to an average risk tolerance. A risk averse respondent would choose sure gain and sure loss in the respective questions; however a more risk tolerant respondent would go for chance options in both questions.

Questions 4, 6 and 11 measure a respondent’s tendency to take investment risk. This dimension combines knowledge and attitude of the respondent in making risky choices. If
the respondent is willing to make riskier investments instead of choosing investments with less variance, he or she is more risk tolerant than others.

Each answer to questions numbered 1-4 and 6-13 is given a weight, where a higher weight means high risk and a lower weight means less risk. The table below summarizes the scoring system of the Financial Risk Tolerance scale.

<table>
<thead>
<tr>
<th>Item #</th>
<th>Weights for each answer option</th>
<th>Item #</th>
<th>Weights for each answer option</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(a = 4; \ b = 3; \ c = 2; \ d = 1)</td>
<td>8</td>
<td>(a = 1; \ b = 2; \ c = 3; \ d = 4)</td>
</tr>
<tr>
<td>2</td>
<td>(a = 1; \ b = 2; \ c = 3; \ d = 4)</td>
<td>9</td>
<td>(a = 1; \ b = 3)</td>
</tr>
<tr>
<td>3</td>
<td>(a = 1; \ b = 2; \ c = 3; \ d = 4)</td>
<td>10</td>
<td>(a = 1; \ b = 3)</td>
</tr>
<tr>
<td>4</td>
<td>(a = 1; \ b = 2; \ c = 3; \ d = 4)</td>
<td>11</td>
<td>(a = 1; \ b = 2; \ c = 3; \ d = 4)</td>
</tr>
<tr>
<td>6</td>
<td>(a = 1; \ b = 2; \ c = 3)</td>
<td>12</td>
<td>(a = 1; \ b = 2; \ c = 3)</td>
</tr>
<tr>
<td>7</td>
<td>(a = 1; \ b = 2; \ c = 3; \ d = 4)</td>
<td>13</td>
<td>(a = 1; \ b = 2; \ c = 3; \ d = 4)</td>
</tr>
</tbody>
</table>

The Financial Risk Tolerance (FRT) score is calculated by adding up all the weights of corresponding answers. The maximum score that a person can get is 44 indicating a very high financial risk tolerance. A score of 12, on the other hand, indicates the opposite extreme, that is, having a very low risk tolerance.

### 3.6 Pilot study

The original questions have been translated from English to Swedish. Pilot and pre-testing questions has been done before sending out the questionnaire. Six persons have been tested to see if the questionnaire and the items in the questionnaire are comprehensible. The test respondents were observed during the time they answered the questions to see their reaction to the items in the questionnaire and were asked to give feedback. The tests were done with the help of 6 respondents and revisions and modifications were done after every second respondent. An English language teacher at the Language department was asked to help translate the questions from English to Swedish. The initial translation of the questions was presented to our supervisor Anders Isaksson, who gave us some ideas on adjusting the questionnaire to Swedish respondents. The first two pilot respondents received initially the Swedish version of the questionnaire and the English version afterwards. They gave comments on the translation of the
questions and some suggestions for more suitable words. After modifying the questionnaire the rest of the pilot respondents gave feedback and suggestions on the second Swedish version of the questionnaire. The last modified version of the Swedish questionnaire was submitted to the supervisor, who gave us the green light.

### 3.7 Target population

Our researches population is students at Umeå University. We have chosen students in different departments at University in order to get good response. We wanted to know if one could get differences according to program/courses they are taking. We have chosen to give the survey out in two different ways: one, where we handed the questionnaires out during lectures and later collected them; and the other, where we randomly handed the questionnaires out to students around the university. The sampling method used was cluster sampling.

We have chosen to hand out the questionnaires during lectures in order to get back the answers as quick as possible and do it cheap. There was a possibility of some members of the class missing the days we did the research and that is the reason we handed the questionnaires out randomly to students around the campus area in different days so that we could capture different students. We handed out 171 questionnaires and our mission was to get back as many as possible and maximize the response rate. We have decided to hand out the questionnaires on different occasions: from Monday May 5th, 2008 to Thursday May 8th, 2008, from 8:00 in the morning to 16:00 in the afternoon and the reason was to capture different groups. At the end there were 32 missing questionnaires out of the 171 that were handed out. Our goal was to have as minimum missing data as possible; however, it is impossible to avoid missing values totally. The response rate for our questionnaires was 81.3%.

The percentage of women and men in our study is 55.4% and 44.6% respectively, whereas, the proportion of women and men in Umeå University is 62% and 38% respectively. The total amount of students studying at Umeå University is 27 228 (Umeå University 2008). The ratio of women to men in our sample is not a perfect match with that of the whole population; however, the sample proportions are close to those of the population, and we believe our sample is representative of the population.

Total number of respondents is 139, out of which, 77 are female (42 economists and 35 non-economists) and 62 are male (43 economists and 19 non-economists). 85 respondents
are economists and 54 are non-economist students. Table 4 exhibits the proportions for some demographic characteristics of the sample.

<table>
<thead>
<tr>
<th>Sample size</th>
<th>Gender</th>
<th>Age</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 139</td>
<td>Female</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>20</td>
<td>24</td>
</tr>
</tbody>
</table>

**Percentage of respondents**

<table>
<thead>
<tr>
<th>17 -</th>
<th>21 -</th>
<th>25 -</th>
<th>29 -</th>
<th>≤</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>55%</td>
<td>14%</td>
<td>58%</td>
<td>19%</td>
</tr>
<tr>
<td>Male</td>
<td>45%</td>
<td>58%</td>
<td>19%</td>
<td>3%</td>
</tr>
</tbody>
</table>

| Amount of respondents | 77 | 62 | 20 | 80 | 27 | 4 | 8 | 85 | 54 |

**3.8 Statistical Method**

The collected data has been analyzed using SPSS, a computer program for statistical analysis, and Microsoft Excell. After checking for normality and conducting a Levene’s test for homogeneity of variances, which are necessary for further analysis of the data, we carried out statistical analyses using such parametric statistical techniques as independent samples t-test, one-way and two-way between groups ANOVA (Analysis of Variance) a Binomial test and a Chi-Square test.

Kolmogorov-Smirnov and Shapiro-Wilk tests were conducted to confirm normality of the distribution. To confirm normal distribution p-value (Sig.) for the Kolmogorov-Smirnov test has to be greater than 0.05, the same applies to the Shapiro-Wilk test.

The Significance value (Sig.) for Levene’s test should be greater than 0.05, which means the variance of data is homogeneous. Homogeneity of variances and normal distribution of data are the underlying assumptions for conducting Analysis of Variance and t-test.

To find out whether there were significant differences in mean scores between groups One-way ANOVA test was conducted.

To find out whether there is an interaction effect between the independent variables and to simultaneously test for the effect of each of the independent variables on the dependent
variable Two-Way Between Groups ANOVA has to be conducted (Pallant 2007, p. 258).

Binomial Test:

A binomial test was used to test the significance of deviations from an expected distribution of observations in Questions 9 and 10 (See Table 2 for the questions).

Independent-Samples t-Test:

An independent-samples t-test is used when you want to compare the mean score, on some continuous variable, for two different groups of subjects. (Pallant 2007, p. 232)

To calculate the magnitude of the differences between groups the effect size statistics such as eta squared and Cohen’s d have been used.

The formula for eta squared is as following:

\[ \eta^2 = \frac{t^2}{t^2 + df} \]

The formula for calculating Cohen’s d is shown below:

\[ d = \frac{\mu_1 - \mu_2}{\sqrt{\sigma_1^2 + \sigma_2^2}} \]

The effect size for Cohen’s d value of 0.02 is small, 0.05 is medium and 0.08 is large. For eta squared value of 0.01 the effect size is small, for 0.06 it is moderate and for 0.14 it is large effect size.

3.9 Reliability and Validity

Reliability is a term used to see whether the study can be repeated by others at a different point in time (Bryman 2003). Validity is the concern of whether one is measuring what it supposed to (Bryman 2003). The search of existing scales we found a previous study. The questionnaire used in this thesis has been adopted from Grable & Lytton (1999), who developed, tested and re-tested it by means of a longitudinal study. We have no doubts in
the reliability of the original scale, since it has been peer reviewed and cited numerous times in other researches, such as “Development and Validation of a Model and Measure of Financial Risk-Taking” by Lampenius & Zickar (2005); however, since the original scale is constructed in English, we translated it into Swedish. Moreover, the questions were created by American researchers and their study has been conducted in the US, thus the questions might not be understood in the same way by students at Umeå University because of cultural differences. In order to achieve reliability of the Swedish version of the questionnaire we had to make sure that the respondents understood the questionnaire properly the way it is supposed to be understood. Thus, a pilot study has been conducted as mentioned earlier in this chapter.
4 RESULT AND ANALYSIS

This chapter will present the empirical findings of our research as well as the analysis of those findings. It consists of descriptive statistics, t-tests and one-way and two-way ANOVA tests.

The mean FRT score for the whole sample of 139 cases is 26 points, which is below the midpoint (28) of the scale; a score of 28 being an average risk taker.

The 7 dimensions of financial risk tolerance in the questionnaire are covered by different items in it as shown below. Two separate tables for each group of questions comparing females and males. The tables show means of scores of each question in the group for females and males in their respective tables. Group means are shown in the bottom of the tables. The scores for each question are calculated using a scale where 0 indicates the lowest risk tolerance and 3, or 2 in some items, indicate highest risk tolerance.

There were significant differences in means between males and females in 5 of the dimensions with \( p < 0.01 \) (2-tailed) (See Table 5). In all 5 of those dimensions of FRT males have scored higher than females, indicating higher risk tolerance. In two dimensions, namely, “Choices between sure loss and sure gain” and “Prospect theory” the differences are not statistically significant, even though the scores are higher for males in both these dimensions as well.

Table 5. Mean Scores for Financial Risk Tolerance dimensions by gender

<table>
<thead>
<tr>
<th>Guaranteed vs. Probable Gambles</th>
<th>Choice between sure loss and sure gain</th>
<th>Risk as experience and knowledge</th>
<th>Risk as a level of comfort</th>
<th>Speculative Risk</th>
<th>Prospect Theory</th>
<th>Investment Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>7.18*</td>
<td>2.51</td>
<td>11.46*</td>
<td>11.34*</td>
<td>7.18*</td>
<td>6.03</td>
</tr>
<tr>
<td>Females</td>
<td>6.18*</td>
<td>2.34</td>
<td>10.12*</td>
<td>10.25*</td>
<td>6.18*</td>
<td>5.75</td>
</tr>
<tr>
<td>Min</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Max</td>
<td>12</td>
<td>4</td>
<td>18</td>
<td>18</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Midpoint</td>
<td>7.5</td>
<td>2.5</td>
<td>11.5</td>
<td>11.5</td>
<td>7.5</td>
<td>6</td>
</tr>
</tbody>
</table>

* mean differences are statistically significant at (Sig. value) \( p < 0.01 \)
4.1 Prospect Theory

Questions 9 and 10 are intended to capture the part of the theoretical framework which concerns the Prospect Theory.

The proportion of responses to questions 9 and 10 (see Table 2 on page 18 for the questions) on the questionnaire are as shown in Table 6.

The majority (55.4%) of the respondents have chosen a sure gain of 3000 SEK in Question 9. Whereas, in Question 10, where the losses are concerned, the majority of the respondents (69.1%) have chosen option b, which is 50% chance to lose 6000 SEK or to lose nothing.

The Prospect Theory says that people, in general, are less risk taking (Kahneman & Tversky 1979) when they are faced with decisions associated with financial gains. However, when losses enter in the picture instead of gains, people tend to be more risk taking, even if the expected returns in all cases are identical (Kahneman & Tversky 1979). In order to test the significance of our results, we conducted a Binomial test.

The null hypothesis was formed to state that there is no preference between choosing sure gain or chance when answering Question 9, the probability of choosing sure gain is 0.50: $H_0 = 0.50$

The alternative hypothesis states that sure gain is preferred to chance: $H_1 > 0.50$

Although more people chose sure gain in Question 9, a Binomial test failed to reject the null hypothesis, with a (Sig. value) $p > 0.05$ (exact $p = 0.1175$). This means, according to the responses to Question 9, people are risk neutral, that is, there is no preference for sure gain or chance. This finding is not in line with the conclusions Kahneman & Tversky (1979) made, that in the domain of gains people, in general, prefer sure gains to chance.

Table 6. Proportion of responses to Questions 9 and 10

<table>
<thead>
<tr>
<th></th>
<th>Question 9/gains</th>
<th>Question 10/losses</th>
</tr>
</thead>
<tbody>
<tr>
<td>sure gain/loss</td>
<td>55.4% &gt;50%</td>
<td>30.9%* &lt;50%</td>
</tr>
<tr>
<td>Chance</td>
<td>44.6% &lt;50%</td>
<td>69.1%* &gt;50%</td>
</tr>
</tbody>
</table>

*statistically significant at $p < 0.01$ (exact $p = 0.000$)
According to Kahneman & Tversky (1979) people are risk seeking in the domain of losses, and a bigger proportion of respondents should choose the *chance* option in Question 10. From Table 6 one can observe that 69,1% of our respondents have chosen *chance*, as theory predicts.

The null hypothesis was formed to state that there is a 0,50 probability that a person will choose a sure loss:

\[ H_0 = 0,50 \]

The alternative hypothesis states that there is less than 0,5 probability that a person will choose a sure loss:

\[ H_1 < 0,50 \]

The results of a Binomial test have confirmed the alternative hypothesis, with a Sig. value \( p < 0,01 \) (exact \( p = 0.000 \)).

Tables 7 and 8 exhibit the results broken down by gender and department separately for both question 9 and 10. The same steps as on the previous page have been taken in testing the alternative hypothesis for the results shown on Table 7 & 8. (See Appendix for detailed tables from SPSS)

The responses to Question 9 have been tested with a Chi-square test of independence and this test indicates no significant association between gender and risk preferences \( \chi^2(1, n = 139) = 0.95, p = 0.33, \phi = -0.097 \), as well as, department and risk preferences in the domain of gains, \( \chi^2(1, n = 139) = 0.31, p = 0.58, \phi = -0.06 \).

The responses to Question 10 have also been tested with a Chi-square test of independence and the results indicate that, there is no significant association between gender and risk preferences \( \chi^2(1, n = 139) = 1.5, p = 0.22, \phi = 0.12 \), as well as, department and risk preferences in the domain of losses, \( \chi^2(1, n = 139) = 0.46, p = 0.5, \phi = -0.07 \).

| Table 7. Proportion of responses to Question 9 broken down by gender and faculty |
|---------------------------------|--------|----------------|-----------------|----------------|
|                                 | Male   | Female         | Non-Economists  | Economists     |
| Sure Gain                       | 50%    | 59.7%          | 59.3%           | 52.9%          |
| Chance                          | 50%    | 40.3%          | 40.7%           | 47.1%          |

| Table 8. Proportion of responses to Question 10 broken down by gender and faculty |
|---------------------------------|--------|----------------|-----------------|----------------|
|                                 | Male   | Female         | Non-Economists  | Economists     |
| Sure Loss                       | 37.1%  | 26%            | 35.2%           | 28.2%          |
| Chance                          | 62.9%  | 74%            | 64.8%           | 71.8%          |
4.2 FRT, Experience and Knowledge

Those respondents that have indicated a prior experience of stock trading scored slightly higher (by 2 points) than those who had no prior experience of trading stocks.

Figure 3. Mean FRT scores of respondents with stock trading experience and without stock trading experience

An independent samples t-test was conducted to compare the FRT scores for those who have experience in stock trading and those who don’t (see Table 9 & 10). There was a significant difference in scores for those with stock trading experience (M = 27.1, SD = 3.9) and for those with no stock trading experience (M = 24, SD.9 = 5.3), t (139) = 2.8, p = 0.006 (two-tailed). The magnitude of the differences in the means (mean difference = 2.2, 97% Confidence Interval: 0.5 to 4) was moderate (eta squared = 0.055).

<table>
<thead>
<tr>
<th>Stock Trading Experience</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRT Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>68</td>
<td>27.1</td>
<td>3.9</td>
<td>0.47</td>
</tr>
<tr>
<td>No</td>
<td>71</td>
<td>24.9</td>
<td>5.3</td>
<td>0.63</td>
</tr>
</tbody>
</table>
Table 10. Results of the Independent Samples t-Test for stock trading experience

<table>
<thead>
<tr>
<th>Levene's Test for Equality of Variances</th>
<th>97% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sig.</td>
<td>t</td>
</tr>
<tr>
<td>------</td>
<td>---</td>
</tr>
<tr>
<td>FRT Score</td>
<td>0.052</td>
</tr>
</tbody>
</table>

From Figure 4 it is obvious that there is a difference in the FRT score of students studying Economics and those who are non-Economics students. The mean scores are 27.1 for Economics students and 24.3 for non-Economics students.

An independent – samples t-test was conducted to compare the Financial Risk Tolerance scores for students studying Economics and other non-Economics students. There was a significant difference in scores for Economics students and non-Economics students. The mean FRT score for Economics students is $M=27.08$, as shown in Table 11 & 12, and the standard deviation is $SD=4.8$. For non-Economics students these values are $M=24.3$ and $SD=4.2$, $t (137) =3.51$, $p=0.001$ (two-tailed). The magnitude of the differences in the means (mean difference $= 2.8$, 97% Confidence Interval: 1.05 to 4.56) was higher than medium (eta squared $= 0.082$; Cohen’s $d = 0.65$).

Figure 4. Mean FRT scores for Economics and non-Economics students
Table 11. Means and Standard Deviations of FRT scores of two department groups

<table>
<thead>
<tr>
<th>Department</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRT Score</td>
<td>85</td>
<td>27.1</td>
<td>48</td>
<td>0.52</td>
</tr>
<tr>
<td>Non-Economics</td>
<td>54</td>
<td>24.3</td>
<td>4.2</td>
<td>0.57</td>
</tr>
</tbody>
</table>

Table 12. Results of the Independent Samples t-Test for FRT scores of two department groups

<table>
<thead>
<tr>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>97% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sig.</td>
<td>t</td>
<td>df</td>
</tr>
<tr>
<td>FRT Score</td>
<td>0.681</td>
<td>3.51</td>
</tr>
</tbody>
</table>

Menkhoff, Schmidt and Brozynski (2006) came to a conclusion that risk taking decreases with experience. Further, they state that experience which is gained through learning may cause one’s risk tolerance to decrease comparatively more. Our results, however, indicate the opposite. On Figure 3 one can see that those who have experience in stock trading score higher than those who have no prior experience with stocks. People with stock trading experience demonstrate higher financial risk tolerance than people with no prior experience. A study conducted by Masters (1989) also found that knowledge of investments has impact on individuals risk tolerance. Those with prior knowledge tend to be more risk tolerant than those with little or no knowledge in investment (Masters 1989). As Blombäck (2000) stated in her “four-decision-making-situations-in-risk-taking” model, if a person is familiar with, has an experience or knowledge of a situation, his/her decision will be based on the outcome of previous encounter with that situation. Thus, an experienced person’s financial risk tolerance is higher than that of an inexperienced person when faced with a financial decision making situation. Hence, prior experience has an impact on financial risk tolerance, as the results of our study are evidence for. Moreover, students at Economics department, as our results have shown; have higher financial risk tolerance compared to non- Economics students. This proves that, higher levels of financial knowledge lead to a higher level of financial risk tolerance, the same finding that Grable (2000) came to in his research.
4.3 Comparison of FRT Scores by Gender

Figure 5 exhibits the average FRT scores for both genders separately; according to it female respondents have a lower mean FRT score compared to male respondents.

An independent – samples t-test was conducted to compare the Financial Risk Tolerance scores for males and females. There was a significant difference in scores for males and females (see Table 13 & 14). The mean FRT score for males is M=27.6, as shown on the graph below, and the standard deviation is SD=5.3. For females the values are M=24.7 and SD=3.9, t (137) =3.67 p=0.000(two-tailed). The magnitude of the differences in the means (mean difference = 2.9, 97% Confidence Interval: 1.15 to 4.58) was higher than moderate (eta squared = 0.089; Cohen’s d = 0.6)

Our findings are in line with what Eckel and Grossman (2002), Jianakoplos and Bernasek (1998) and Powell and Ansic (1997) have found in their study, namely, that females are less risk tolerant than men in general.

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRT Score</td>
<td>Male</td>
<td>62</td>
<td>27.6</td>
<td>5.3</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>77</td>
<td>24.7</td>
<td>3.9</td>
</tr>
</tbody>
</table>
Table 14. Results of the Independent Samples t-Test for FRT scores by Gender

<table>
<thead>
<tr>
<th>Levene's Test for</th>
<th>97% Confidence Interval</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Equality of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variances</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sig.</th>
<th>t</th>
<th>Df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.158</td>
<td>3.67</td>
<td>137</td>
<td>0.000</td>
<td>2.9</td>
<td>1.15</td>
<td>4.58</td>
</tr>
</tbody>
</table>

4.4 Interaction Effect of Department and Gender on FRT

A two-way between-groups analysis of variance was conducted to explore the impact of gender and department on levels of Financial Risk Tolerance. Subjects were divided into two groups according to the department they study in (Group 1: Economists, Group 2: Non-economists) The interaction effect between department and gender was not statistically significant, F(1, 135) = 1.50 p = 0.222. There was statistically significant main effect for gender, F (1, 135) = 8.04 p = 0.005; and for department, F(1, 135) = 10.71 p = 0.001. The effect size was higher than medium for both variables (partial eta squared for gender = 0.056; partial eta squared for department = 0.73).

Table 15. Tests of Interaction Effect Between Department and Gender on FRT scores

<table>
<thead>
<tr>
<th>Source</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>157.8</td>
<td>8.04</td>
<td>0.005</td>
<td>0.056</td>
</tr>
<tr>
<td>department</td>
<td>210.2</td>
<td>10.71</td>
<td>0.001</td>
<td>0.073</td>
</tr>
<tr>
<td>Gender * department</td>
<td>29.5</td>
<td>1.50</td>
<td>0.222</td>
<td>0.011</td>
</tr>
<tr>
<td>Error</td>
<td>19.6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. R Squared = 0.159 (Adjusted R Squared = 0.140)
5 Conclusion and discussion

In this chapter we will answer our research questions, make conclusions from the analysis and authors’ personal reflections will be presented.

This is the place where it would be proper to mention our main research question again:

**Are there any gender differences in Financial Risk Tolerance?**

The empirical findings have been analyzed and compared to theories from previous researches in the field. We found from our data that female students in general have a lower FRT score than male students, which indicates that female students are less risk tolerant than their male counterparts (See Table 5). However, not all of the Financial Risk Tolerance dimensions have displayed a significant difference between female students and male students. The test of the Prospect Theory dimension on risk taking differences between female and male students did not show any significance.

Our findings are in line with the fact that women’s average portfolio consists of safer stocks, whereas that of men’s consists of high risk stocks, as the statistics from NCSD (2008) show. Thus, being less tolerant to financial risks influences women’s choice of investment strategy, how they construct their portfolio. However, their lower financial risk tolerance gives an advantage when the times are rough and most of the stock is performing poorly, especially high risk stocks; thus women lose less because of the safer investment. On the other hand, when things are going good and company stocks are performing well, women might lose out on potential high gains.

This thesis had also a secondary research question, which is stated below:

**Does financial knowledge and experience have impact on Financial Risk Tolerance?**

We have tested for the impact of prior financial experience and knowledge on Financial Risk Tolerance to find out whether our data confirms previous studies which state, that prior knowledge in the financial field and prior financial experience are factors affecting financial risk tolerance.
What we found from the data obtained was that experience and knowledge do affect one’s financial risk tolerance. The respondents to the questionnaire that have prior stock trading experience and that study Economics exhibit a comparatively higher FRT score. There was no association between knowledge and financial risk taking when testing the prospect theory.

We have carried out our research in order to find whether female students differed from male students in their financial risk taking decisions. This study is one of few which were done in Sweden. It is tempting to interpret the results of this study to be universal; however the respondents were all students studying at the Umeå University, Sweden. Thus, one should not rush to make groundbreaking conclusions based on this research. Though, the results obtained cannot be totally ignored either.

6 Theoretical and Practical Contributions

The results of this thesis contribute to a small pool of similar researches conducted in Sweden which address the differences in financial risk taking between men and women, as well as, the effect of financial knowledge on financial risk taking. This study was conducted among students at the university level, which could serve as a comparison for future studies among other social groups with different income.

7 Further research

During the early times of our work we spend some time to see whether there were previous theses written on financial risk tolerance differences between the two genders and we found it difficult to come across any of those. We had some difficulties finding relevant books, most of the information that we used came from resources, such as, previous scientific articles. We wanted to compare students and workers in order to see whether income had any effects, however, due to the amount of time and costs that kind of research would bear, we could not have managed to carry it out. Further research in this subject could be performed outside the university involving participants other than just students. Students in general do not have as high income as employed people. A comparison of these two groups could be done and see whether income and age has an effect on financial risk tolerance. A further study testing for other possible factors, such as, masculinity/femininity and overconfidence would help provide more insight into financial risk tolerance.
Reference List

Articles


**Books**


**Internet Sources**

Available at: http://www dn se/DNet/jsp/polopoly.jsp?aa=733845
[Accessed 25 April 2008]

Available at:
[Accessed 27 April 2008]

Available at: http://www.ncsd eu/967_SVE_ST.htm
[Accessed 25 April 2008]


Appendices

Questionnaire (Swedish version)

Kön:
   a. Man
   b. Kvinna

Ålder?
   a. 17 – 20  b. 21 – 24  c. 25 – 28  d. 29 – 32  e. 33 ≤

Vilken av följande alternativ passar dig bäst?

Vilken är den högsta examen som du har?
   a. Ej avslutad kandidat  d. Magister/Master
   b. Kandidat  e. Licentiat/Doktor

Ungefär vilken disponibel inkomst (inräknat CSN + lön) har du i år?
   a. Mindre än 50 000  d. 200 000 < 300 000
   b. 50 000 < 100 000  e. 300 000 < 400 000
   c. 100 000 < 200 000  f. Mer än 400 000

Tänk på vad du kommer att göra när du är färdig med universitet.
Vilka av följande påståenden passar dig bäst?
   a. Det är troligt att jag kommer att starta mitt eget företag
   b. Det är troligt att jag kommer att jobba för någon annan/jobba i något företag
**Din attityd till Finansiella risker:**

1. Välj ett alternativ som bäst skulle passa in på hur din närmsta vän skulle beskriva dig som en risktagare?
   a. En riktig gambler – 3,6%
   b. Villig att ta övervägda risker – 48,2%
   c. Försiktig – 44,6%
   d. En riktig riskundvikare – 3,6%

2. Du är med på ett TV underhållningsprogram och har chans att välja en av följande. Vilken skulle du välja?
   a. 6000 SEK kontant – 11,5%
   b. 50 % chans att vinna 30 000 SEK – 59%
   c. 25 % chans att vinna 60 000 SEK – 17,3%
   d. 5 % chans att vinna 600 000 SEK – 12,2%

3. Du har just sparat färdigt för en ”once-in-a-life-time” semester. En månad före din avresa förlorar du ditt jobb. Du skulle:
   a. Ställa in semestern – 12,9%
   b. Ta en mycket mer anspråkslös semester – 19,4%
   Åka som planerat, med hänsyn till att du behöver tid för att förbereda till
   c. jobsökandet – 56,1%
   Förlänga semestern, för den kan bli din sista chans för att semestra förstklassigt –
   d. 11,5%

4. Om du oväntad får 120 000 SEK att investera, vad skulle du göra?
   a. Spara i ett vanligt bankkonto, sparkonto eller fasträntekonto – 18%
      Investera pengarna i säkra hög kvalitets obligationer eller obligationsfonder –
   b. 37,4%
   c. Investera pengarna i aktier eller aktiefonder – 43,9%
   d. Spekulera på högriskmarknader (optioner, warranter, etc.) – 0,7%

5. Har du någonsin investerat i aktier?
   a. Ja. – 48,9%
   b. Nej. – 51,1%

6. När det gäller erfarenhet, hur bekväm är du med att investera i aktier eller aktiefonder?
   a. Inte alls bekväm – 45,3%
   b. En aning bekväm – 42,4%
   c. Mycket bekväm – 12,2%

7. När du tänker på ordet ”risk”, vilket av följande ord tänker du på först?
   a. Förlust – 2,9%
   b. Osäkerhet – 71,2%
   c. Möjligheter – 18%
   d. Spänning – 7,9%
8. Vilka av följande investeringsalternativ skulle du föredra i dag? (sannolikheter för vinst och förlust är lika i alla alternativ)
   a. 1 200 SEK vinst bästa fall; 0 SEK vinst/förlust värsta fall – 21,6%
   b. 4 800 SEK vinst bästa fall; 1 200 SEK förlust värsta fall – 25,2%
   c. 15 600 SEK vinst bästa fall; 4 800 SEK förlust värsta fall – 42,4%
   d. 28 800 SEK vinst bästa fall; 14 400 SEK förlust värsta fall – 10,8%

9. Oavsett vad du äger, du har fått 6 000 SEK. Nu frågas du att välja mellan:
   a. En säker vinst på 3 000 SEK 55,4%
      50 % möjlighet att vinna 6000 SEK och 50 % möjlighet att inte vinna någonting – 44,6%

10. Oavsett vad du äger, du har fått 12 000 SEK. Nu frågas du att välja mellan:
    a. En säker förlust på 3 000 SEK – 30,9%
       50% möjlighet att förlora 6 000 SEK och 50% möjlighet att inte förlora
    b. någonting – 69,1%

11. Anta att din släkting har efterlämnat ett arv på 600 000 SEK till dig, med förutsättning att du ska investera HELA summan i EN av följande alternativen. Vilken skulle du välja?
    a. Ett sparkonto – 25,2%
    b. En fond som består av aktier och obligationer – 57,6%
    c. En portfölj av 15 obligationer – 9,4%
    d. Varor som guld, silver och olja – 7,9%

12. Om du ska investera 120 000 SEK, vilken av de följande investeringsalternativen skulle du se som mest lockande?
    a. 60% i lågrisk investering, 30% i mediumrisk investering, 10% högrisk investering – 46,8%
    b. 30% i lågrisk investering, 40% i mediumrisk investering, 30% högrisk investering – 43,9%
    c. 10% i lågrisk investering, 40% i mediumrisk investering, 50% högrisk investering – 9,4%

13. Din förtrogna vän och granne, en erfaren geolog, samlar ihop en grupp av investerare för att finansiera en guldprospekteringsföretag. Företaget kan ge utdelning på 50 till 100 gånger av investeringarna om det lyckas. Om företaget misslyckas, hela investeringen är värdelös. Din vän bedömer att chansen att lyckas bara är 20 %. Om du hade pengarna, hur mycket skulle du investera?
   a. Ingenting – 29,5%
   b. En månadslön – 51,8%
   c. Tre månadslön – 14,4%
   d. Sex månadslöner – 4,3%
### Output Tables from SPSS

#### Binomial Test

<table>
<thead>
<tr>
<th>Category</th>
<th>N</th>
<th>Observed Prop.</th>
<th>Test Prop.</th>
<th>Asymp. Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
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<td><strong>TOTAL</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q 9 recoded 1-4</td>
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</tr>
<tr>
<td>Group 1</td>
<td>62</td>
<td>.45</td>
<td>.50</td>
<td>.235*</td>
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<td>.50</td>
<td>.000*</td>
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<td>43</td>
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<td>Total</td>
<td>139</td>
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</table>

*Based on Z Approximation.*

#### Binomial Test

<table>
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<tr>
<th>Category</th>
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<th>Test Prop.</th>
<th>Asymp. Sig. (2-tailed)</th>
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<td><strong>MALES</strong></td>
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<td></td>
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<td>q9</td>
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<tr>
<td>Group 1</td>
<td>31</td>
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<tr>
<td>Total</td>
<td>62</td>
<td>1.00</td>
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<td>q10</td>
<td></td>
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</table>

*Based on Z Approximation.*
### Binomial Test

#### FEMALES

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<thead>
<tr>
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<th>N</th>
<th>Observed Prop.</th>
<th>Test Prop.</th>
<th>Asymp. Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>q9 Group 1</td>
<td>sure gain</td>
<td>46</td>
<td>.60</td>
<td>.50</td>
<td>.110a</td>
</tr>
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<td>Group 2</td>
<td>50%-6000</td>
<td>31</td>
<td>.40</td>
<td></td>
<td></td>
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<td>Total</td>
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<td>77</td>
<td>1.00</td>
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</tr>
<tr>
<td>q10 Group 1</td>
<td>sure loss</td>
<td>20</td>
<td>.26</td>
<td>.50</td>
<td>.000a</td>
</tr>
<tr>
<td>Group 2</td>
<td>50%-6000</td>
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<td>.74</td>
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a. Based on Z Approximation.

#### NON-ECON

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<th>Category</th>
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<th>Observed Prop.</th>
<th>Test Prop.</th>
<th>Asymp. Sig. (2-tailed)</th>
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<td>.59</td>
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<td>.220a</td>
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<td>q10 Group 1</td>
<td>sure loss</td>
<td>19</td>
<td>.35</td>
<td>.50</td>
<td>.040a</td>
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<td>35</td>
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<td></td>
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<tr>
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<td>54</td>
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a. Based on Z Approximation.

#### ECON

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<tr>
<th></th>
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<td>50%-6000</td>
<td>40</td>
<td>.47</td>
<td>.50</td>
<td>.665a</td>
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<td>sure gain</td>
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<td>50%-6000</td>
<td>61</td>
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a. Based on Z Approximation.
### Chi-Square Tests

#### Gender/Risk taking (Question 9)

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<tr>
<th>Test</th>
<th>Value</th>
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<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>1,319(b)</td>
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<td>.251</td>
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<td>Continuity Correction(a)</td>
<td>.954</td>
<td>1</td>
<td>.329</td>
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<tr>
<td>Likelihood Ratio</td>
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<td>1</td>
<td>.251</td>
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<tr>
<td>Fisher's Exact Test</td>
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<td>Linear-by-Linear Association</td>
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<td>.253</td>
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a  Computed only for a 2x2 table  
b  0 cells (.0%) have expected count less than 5. The minimum expected count is 27.65.

#### Chi-Square Tests

#### Department/Risk taking (Question 9)

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<th>Test</th>
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<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
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</tr>
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<tr>
<td>Linear-by-Linear Association</td>
<td>.530</td>
<td>1</td>
<td>.467</td>
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<tr>
<td>N of Valid Cases</td>
<td>139</td>
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</tr>
</tbody>
</table>

a  Computed only for a 2x2 table  
b  0 cells (.0%) have expected count less than 5. The minimum expected count is 24.09.

#### Chi-Square Tests

#### Gender/Risk taking (Question 10)

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>1,989(b)</td>
<td>1</td>
<td>.158</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correction(a)</td>
<td>1,502</td>
<td>1</td>
<td>.220</td>
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</tr>
<tr>
<td>Likelihood Ratio</td>
<td>1,983</td>
<td>1</td>
<td>.159</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>1,974</td>
<td>1</td>
<td>.160</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
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</tbody>
</table>

a  Computed only for a 2x2 table  
b  0 cells (.0%) have expected count less than 5. The minimum expected count is 19.18.

#### Chi-Square Tests

#### Department/Risk taking (Question 10)

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<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
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<td>.388</td>
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<tr>
<td>Continuity Correction(a)</td>
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<tr>
<td>Likelihood Ratio</td>
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<tr>
<td>Fisher's Exact Test</td>
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<tr>
<td>Linear-by-Linear Association</td>
<td>.741</td>
<td>1</td>
<td>.389</td>
<td></td>
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</tr>
<tr>
<td>N of Valid Cases</td>
<td>139</td>
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<td></td>
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</tr>
</tbody>
</table>

a  Computed only for a 2x2 table  
b  0 cells (.0%) have expected count less than 5. The minimum expected count is 16.71.