The Journal of Psychology and Financial Markets
2001, Vol. 2, No. 1, 29–36

The Influence of Gender on the Perception and Response to Investment Risk: The Case of Professional Investors

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In a previous issue of this journal, O'Barr and Conley, noted that cultural differences caused public pension fund managers to invest differently and more conservatively than their private fund counterparts. An additional insight to is that cultural factors have a non-trivial affect on how assets are managed. This article continues with this theme and suggests that, even with equivalent training, experience and information, investment managers make different decisions based on identifiable cultural differences. This study focuses on professional men and women investment managers who perceive and respond to risk differently. This supports O'Barr and Conley, suggesting cultural factors may be responsible for this risk related gender effect.

There is extensive evidence that when faced with social and technological hazards, women are more risk averse than men. This appears to be so even when decision-makers of both genders have the same level of expertise and experience. In the investment realm, non-professional women investors also appear to accept less risk than their male counterparts, after controlling for factors such as age, education, wealth and experience. Although the precise reason for this gender difference in risk taking is unknown, it appears to be related to evolutionary and social factors.

This paper is unique in that it investigates the risk/gender difference for professionally trained investors. It is found that women investors weight risk attributes, such as possibility of loss and ambiguity, more heavily than their male colleagues. In addition, women tend to emphasize risk reduction more than men in portfolio construction. While gender differences appear to influence perceptions of risk and recommendations to clients, these differences tend to be the most significant for assets and portfolios at risk extremes.

The objective of this research was to determine whether women professional investors conceptualize and respond to investment risk differently than their male colleagues. Differential perceptions and response to investment risk increase the possibility of miscommunication and misunderstanding between advisors and clients of different gender. That gender based miscues might be important is suggested by the following facts. The Institute of Certified Financial Planners and the Association for Investment Management and Research estimate that about 20% of Certified Financial Planners (CFP) and Chartered Financial Analysts (CFA) are women. In addition, the Investment Company Institute estimates that about 75% of investors seek the advice of an investment professional and that 32% of women are partially, if not fully responsible for household investment decisions. Similarly, the Federal Reserve estimates that approximately 30% of working women are now covered by the rapidly expanding number of defined contribution retirement plans, wherein the employee is required to choose appropriate investment vehicles.

The following two sections of this paper briefly review the extensive evidence that in non-investment domains, gender based differences in risk perception and behavior exist, and that risk is a multi-attribute phenomenon. The third section presents new empirical evidence of gender-based differences in risk perception among professional investors. The final section contains conclusions and implications.

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Risk Taking and Gender: A Brief Review

Non-Financial Hazards

Risk taking involves the selection of options that might results in negative outcomes. Thus, risk taking

involves decisions about a wide range of activities such as smoking, driving above the speed limit, getting a suntan, changing jobs, etc. The relationship between gender and risk taking has been investigated for an extensive and diverse set of activities with the following general conclusions (see Byrnes, 1999).

- First, women tend to take less risk, in general, than do men.
- Second, risk-taking differences are somewhat context specific. For example, women take much less risk than men in physical activities, especially those involving spatial skills, such as stunt aircraft flying.
- Third, experience and level of expertise reduce, but usually do not eliminate risk-taking differences by gender.

In general, experts tend to perceive of risk in more concise and abstract terms, such as through the use of statistics, while non-experts tend to be more "intuitive" and characterize risk more broadly such as by feelings of dread, unknowing, and degree of trust (Slovic, 1987, 1993, 1997).

Two classes of theories have been advanced to explain women's generally greater perceptions of risk and their more conservative response to potentially hazardous situations. Once class of theories focuses on biological and evolutionary factors. The other set of theories emphasizes social and cultural influences. In general, there is evidence to support elements of both theories.

The biologically based evolutionary theories suggest that women's greater conservatism is adaptionist in that it increased the chances of survival for the human species. Specifically, women's unique role as child bearers and mothers and greater physical vulnerability to violence has led to physiological adaptations making women less sensation seeking and more averse to ambiguous situations. In contrast, for men, given a mating system of some historic degree of polygamy, natural selection would favor more risk taking to gain a mate and the resources necessary to support offspring. Evidence for this biological argument has been presented by Zuckerman (1994) who notes that women have higher levels of the enzyme monoamine oxidase, which retards sensation seeking. Kimura (1999) reviews extensive evidence that women tend to be more sensitive to external stimuli in all modalities, except vision, and appear to be especially gifted at identifying ambiguities and changes in physical and social situations. Such skills would have been very helpful for the care of children in a male dominated world, where women have always been the primary child caregivers. A more complete discussion of these and other biological/evolutionary arguments is presented by Buss (1999).

Slovic (1966) presented some of the earliest evidence for social/cultural argument for gender differences in risk taking. He noted that gender related risk-taking differences in childhood games developed only after an age when peer pressure and social expectancies became strong. Consistent with this evidence, Deaux and Ennsuiller (1994) and Beyer and Bowden (1997) have noted that women become less confident and more risk averse in domains considered to be masculine, in spite of equal ability to perform. Dake (1991) has suggested that the "World View" of women tends to be such that greater fatalism, and perceived lack of control over their lives leads to a magnification of risk potential and thus more conservative behavior. Also see Barke (1997), Slovic (1997) and Finucane (1999) for more development of the social/cultural explanations of gender differences in risk taking.

Financial Hazards

Although this paper appears to be the first to present information-detailing differences in risk behavior by professional investors, there is evidence that gender is related to risk taking difference among non-professional investors. Consistent with the evidence for non-financial domains, non-professional women investors tend to appear to be more conservative and more risk averse than their male counterparts after controlling for factors such as age, education, wealth, race, etc. Portfolio composition studies of Lewellen (1975), Chow (1992), Jianakoplos and Bernasek (1998), Sunden and Surette (1998) and Heinz (1997) found that women held larger proportions of wealth in financial assets with lower volatility of return.

Large-scale one-on-one attitude surveys by the Investment Company Institute (1996) and S.R.I. International (1997) also found that women tended to prefer lower risk assets than men.

Consistent with these aforementioned results, Brown and Harlow (1990) found that women preferred lower risk bets when asked to make choices in an experimental markets environment involving auctions and lotteries.

Explanations for the more conservative investment behavior of non-professional women investors have developed along the same biological/evolutionary, social/cultural lines as for non-financial risky decision-making. For example, Brown and Harlow (1990) found higher levels of the enzyme monoamine oxidase in women investors, suggesting a biological reason for greater risk aversion. On the other hand, studies of Estes and Hossenie (1988), Stinerock (1990), Wong and Carducci (1991), Prince (1993), Powell and Ansic (1997) and O'Dean (1998) suggest a social answer based on a perceived lower level of confidence due to the masculine nature of the investment domain.

Attributes of Investment Risk: A Brief Review

Modern finance still emphasizes measures of variability in asset return, such as variance or Beta, as proxies for perceived risk. These measures have their genesis in the Subjective Expected Utility Model (SEU) which postulates that "risk aversion" arises from diminishing marginal utility of wealth. The SEU model is a psychophysical model because it hypothesizes how people experience changes in quantity. However, it does not deal with risk as a perceived feeling or emotion. Behavioralists see emotion as essential for evaluation and action (Johnston, 1999; Damasio, 1999, 1994). In addition, current SEU risk measures are deficient because they usually assume away ambiguity and the effect of differing degrees of confidence in forecasts on investment decisions. That is, they usually assume the distribution of future outcomes is known with certainty. Finally, current SEU risk measures assume a common reference point used by all decision makers for accessing risk potential.

By itself, variability of outcomes is neutral with regard to emotion. That is, it does not possess an innate hedonistic tone (good or bad), which leads to action. Sometimes variability can be seen as positive, as when going to a new restaurant with a new cuisine, or negative, as when going for dental check-up. When it is said that investors dislike uncertain returns, what it appears that they dislike and what motivates them is the basic of emotion of fear, which is associated with incurring a loss, however measured. It is not variability itself that is the motivating force. Thus, risk aversion is really loss aversion from a behavioral point of view.

Having said this, variability or uncertainty of outcome does have a role to play in the feeling of risk in that it can serve as an amplifying factor in potential loss situations. In this respect, uncertainty or variability is similar to the basic emotion known as "surprise." By itself surprise has no inherent hedonistic tone but it can amplify. For example, the feeling of distress felt at the unexpected appearance of a tax bill is greater than the distress felt at the receipt of an anticipated tax bill. Likewise, in most circumstances, the greater the ambiguity (lack of certainty) one experiences in incurring a loss of known size, the more negative the feeling and the more reluctant one becomes to make choices that might result in a loss outcome. Beginning with Knight (1921), decision researchers have developed many alternative models tracing the negative impact of ambiguity on risk perception and risk taking. (See Keynes, 1936; Ellsberg, 1961; Shackle, 1952; Tversky and Koehler, 1994; Hastie and Pennington, 1995; Lopes, 1997; Jungermann, 1997; Einhorn and Hogarth, 1986; Heath, 1991; Huber, 1995; Camerer, 1992).

Last but not least, from a macroeconomic point of view, modern finance conceptualizes risk as an internal attribute of an asset rather than as an emergent phenomenon, which arises from the confluence of the attributes of an asset and the special circumstances of the investor. However, in actual practice an asset that "feels" risky to one investor may not feel so to another given differences in life experiences and current social, cultural and economic circumstances. In this respect, it is a tribute to the robustness of the Capital Asset Pricing Model that it does as well as it does explaining stock risk/return relationships.

A large number of empirical studies now document the importance of loss aversion, ambiguity and personal reference points in perceptions of and responses to risky or uncertain gambles. Slovic and others have noted that a wide range of social and technological risks such as nuclear power, sun tanning, pesticide use, etc. can be represented by a two factor model (Slovic, 1987; Goszczynska, 1991). One factor called "Dread" risk appears to be a proxy for loss size, while the second factor, called "Unknown" risk, appears to be a proxy for lack of knowledge and ambiguity. The impact of loss aversion, ambiguity and personal reference points on general managerial and financial decision has been documented by Payne, 1973; Laughhunn, 1980; March, 1992; Shapira, 1995; Kahneman, 1992; Kunreuther, 1995; Ghosh, 1997; Lopes, 1987; Sarin, 1993. Similarly, the effect of loss aversion, ambiguity and personal reference points have been identified in the investment arena by Harlow, 1989; Olsen, 1997, 2000; Farrelly and Reichenstein, 1984; Thaler, 1997; and the Investment Company Institute, 1996.

Data: Source and Method

Data was gathered in survey form from two groups of professional investors. The first group consisted of 209 anonymous Chartered Financial Analysts (CFA) of whom 42 or 20% were women. The second group consisted of 274 Certified Financial Planners (CFP) of whom 99 or 36% were women. For both groups the average length of work experience was between 13 to 15 years with between 90% to 94% having six or more years of experience. Of the CFAs, 84% listed their primary duties as institutional portfolio manager or analyst while 16% listed their occupation as investment counselor. All CFP's listed their occupation as investment counselor. The CFA data were collected at two educational meetings. The CFP data was collected from an anonymous mail survey of a random sample of 997 CFPs. The 27% response rate obtained from the CFP group was typical for this type of survey. Also, a five percent (50) call back to CFP questionnaire recipients did not suggest any relevant non-response bias.

All survey questionnaires were pre-tested and structured to avoid response bias. Because statistical tests did not reveal significant response differences between CFAs and CFPs, the data for these groups have been

Table 1. *Risk Attribute Ratings*

Attribute	Mean Rating	
	Men	Women
Chance of incurring a large loss relative to expectations	1.7*	1.2*
Chance of asset earning less than target (aspiration level)	2.7*	2.3*
Degree of ambiguity (uncertainty) about future distribution of possible returns	3.2*	2.6*
Overall variability in return over time	3.1	3.1
Chance of realizing a large gain relative to expectations	4.2	4.4
N	298	141

Note: 1 = Very Important to 5 = Very Unimportant. *Significant difference between men and women at 5% or better level.

pooled. The professional expertise of all respondents is likely to be high in that virtually all had at least one academic degree in a relevant discipline and both certification programs require completion of a rigorous program of study. Also, as just mentioned, the majority of the respondents had significant practical experience.

Tables 1 and 2 present information specific to the question as to whether women and men give equal emphasis to the various investment risk attributes. Table 1 presents summarized responses to an exercise wherein subjects were asked to rate, on a Likert type scale, from 1 (Very Important) to 5 (Very Unimportant), the investment importance of a pre-selected set of risk attributes. These attributes were chosen from those identified as widely used in a previous study of investment professionals (Olsen, 1997).

Consistent with the results of the prior study of professional investors (Olsen, 1997) measures of downside variation (risk of loss) are shown to be more important risk attributes than variability in asset return or the chance of large gain. The responses also indicate that ambiguity tends to be more important than variability of return, especially for women. However, what is unique in Table 1 is that women place greater emphasis on downside measures of risk and ambiguity than do men. As confirmation of the ambiguity effect, when the respondents were asked directly whether greater ambiguity, defined as uncertainty about the exact nature of the range of possible future states, reduced their level of confidence and increased perceived risk to a significant degree, 92% of the women, as compared with only 69% of the men, said yes.

Table 2 presents a second set of empirical results confirming the findings of Table 1. Behind these results was an exercise wherein respondents were asked to rate by risk level, using a seven point Likert type scale, ten actual but unnamed company stocks. Each stock was only identified by its Beta, Value Line Safety Ranking and an Index of Analyst Forecast Disagreement. Beta is a measure of return variability while the Value Line Safety Ranking is a measure of downside risk. The Index of Analyst Forecasting Disagreement was computed by rating stocks on a scale from 1 to 5 by the variance in predicted earnings across analysts, using data from the Institutional Brokers Estimate System. The number 1 indicated least disagreement and 5, most disagreement.

Respondents were advised that this index should be viewed as a proxy for the degree to which knowledgeable analysts disagreed about the future behavior of the stock in the next year or so. In this sense the index is a measure of ambiguity or uncertainty due to disagreement among information sources.

The statistically significant regression coefficients in Table 2 show that downside risk (S) and ambiguity (U), as well as variability or return (B), have an impact on perceived risk. In addition, the signs of the regression coefficients on the dummy variables for women (DB), (DS), (DU) indicate that women give lesser weight to variability of return and greater weight to downside risk and ambiguity than do men. These results thus confirm the findings in Table 1.

Even though the correlation between the explanatory risk variables in the regression was low, and a stepwise regression did not show significant changes in coefficients as variables were added to or removed from

Table 2. *Stock Risk as a Function of Quantitative Risk Attributes*

Regression:

$R = -.185 + 2.201(B) + .297(S) + .352(U)$
$\quad (.51) \quad (7.03)^{**} \quad (3.13)^{**} \quad (3.69)^{**}$

$-1.031(DB) + .442(DS) + .154(DU) \qquad R^2 = .41$
$\quad (2.56)^{**} \quad (3.46)^{**} \quad (2.42)^{*} \qquad N = 360$

Where:

B	= Beta of stock
S	= Safety Index (1 = best; 5 = worst)
U	= Diversity of Opinion Index (1 = least; 5 = most)
DB, DS, DU	= Dummy Variables (1 = women; 0 = men)
R	= level of risk (1 = very low; 7 = very high)
( )	= *t* values (**significant at 1%; *significant at 5%)

Standardized Regression Coefficients:

Coefficient	Value
B	.40
S	.21
U	.24
DB	–.32
DS	.42
DU	.05

the equation, a second exercise was conducted to confirm the findings of Table 2. In particular, a set of "artificial" stocks was created where by design the correlation between explanatory variables was constrained to approximate zero. The respondents were then asked to rate these "stocks." The results were virtually indistinguishable from those reported in Table 2. (These are available upon request.)

The R^2 less than 1.0 in the regression in Table 2 suggests that investors may conceptualize risk in broader terms than those just examined. This is confirmed by the fact that 65% of the respondents disagreed with the statement that "two securities with equal quantitative measures of risk are equally risky." In addition, in a similar study of professional investors, Olsen (1999) found that when company names were disclosed, the influence of the name itself accounted for an average 16% of the variability in perceived risk. Finally, when the respondents to this study were asked if the ability to construct a coherent and complete "story" with the facts of a situation was a very important element in appraising risk, 86% of the men and 100% of the women strongly agreed.

To investigate the impact of gender on perceptions of financial risk for asset classes, respondents were asked to rate by risk level, on a five point Likert type scale, seven different classes of financial assets, Zero indicated no risk and four indicated very high risk. The results of this exercise are presented in Table 3.

As can be seen, the rank order of the asset classes is identical for men and women. In addition, the average risk ratings are virtually identical by gender *except* for the lowest risk assets, Savings Accounts and Long Term Treasury Bonds, and the highest risk assets, IPOs of new firms. Women tend to see Savings Accounts, Long Term Treasury Bonds and IPOs as more risky than their male colleagues.

The most likely explanation for this result is that Savings Accounts, and Long Tern Treasury Bonds, possess significant downside risk due to interest rate risk and inflation. If women are more concerned with downside potential, as the previous exercises suggest, then these "low risk" assets might be seen as relatively more risky by women since these assets have less offsetting upside potential than do other assets, such as common stock.

Table 3. *Perceived Risk by Asset Type*

	Mean Rating	
Attribute	**Men**	**Women**
Insured Savings Account	0.5*	0.9*
Long Term Treasury Bonds	1.4*	1.8*
Income Mutual Fund	1.8	1.8
Large Cap/Blue Chip	2.0	1.9
Growth Mutual Fund	2.2	2.4
Small Cap Stocks	3.1	3.2
IPO's New Firms	3.3*	3.8*
N	170	96

Note: 0 = No Risk to 4 = High Risk. *Significant difference between men and women at 5% or better level.

Table 4. *Opinions About Investment Risk*

1. What general approach to investment selection (portfolio building) do you prefer to take?
   A. Select a return target and next consider alternative to risk.
      67% Women 33% Men
   B. Select a risk level target and next consider alternative to increase return.
      30% Women 70% Men
2. I find that women investors seem to focus more on risk reduction while men focus more on return.
   72% Agree 28% Disagree
3. Women investors tend to feel less confident than men even when they have equivalent experience and knowledge.
   70% Agree 30% Disagree

In the case of IPOs of new firms, empirical studies reveal that unless one is fortunate enough to buy in before the first couple of trades on the first day of trading, the distribution of returns is skewed toward poor performance, at least over the next three to five years (Loughran, 1995; Barry, 1993). In view of this "downward" return exposure, and the high degree of uncertainty about the future performance of the new company in general, the greater perceived risk of IPOs on the part of women investors is consistent with women's heavier focus on loss and ambiguity.

The empirical evidence presented thus far demonstrates that women investors are more heavily influenced by the chance of loss and the ambiguity surrounding such possibilities than are men. This suggests that women investors may resemble what Lopes (1987) has called security prone decision-makers. More specifically, Lopes has developed a theory of risky decision-making wherein decision makers are seen to trade off security potential against aspiration. Her theory, called SPA theory, appears to have great explanatory power for both decisions made in experimental and real market situations. In this regard, recently Cliff (1998) found that women entrepreneurs exhibited greater security prone behavior than men. Specifically, she found that female entrepreneurs were more likely to establish a moderate maximum business size objective and then adopt policies to reduce risk and assure steady slow growth. Men however focused on high initial growth rates, risking increased chance of failure.

Table 4 contains responses to questions intended to discover whether women investors exhibit the same security prone tendencies as women entrepreneurs, vis a vis men.

The results seem to suggest that indeed women investors as a group show a greater emphasis on security potential than do men. In particular, women exhibit a greater tendency to select a return target and then work to reduce risk, while men focus more on increasing return. Both men and women professional investors also believe that other women professional investors focus more on risk reduction than do men. Finally, men and women professional investors tend to believe that women are less confident than men even when all have similar experience and knowledge.

Summary and Implications

The unique findings of this paper suggest that women financial professionals place greater weight on downside or loss potential than men in an investment setting. Also, women investors appear to be more sensitive to the ambiguity or uncertainty associated with investment in financial assets. Thus, women show evidence of giving greater weight to security, as opposed to gain, considerations when making investment decisions.

These results raise the question of when and where gender difference in risk perceptions might cause significant problems in risk communication and management, especially between advisors and clients. Table 3 indicated that men and women differed significantly with regard to their risk perceptions of assets at the risk extremes. In particular, women saw fixed income high quality securities and IPOs of new firms as more risky than men. Thus, it appears reasonable to hypothesize that client situations that might traditionally give rise to significant emphasis on these assets might result in significantly different recommended portfolio mixes by men and women advisors. To test this hypothesis all respondents who listed their occupation as Investment Advisor were asked to allocate funds for two hypothetical clients. The client scenarios were modeled after those used in the formal training of Certified Financial Planners and were pre-tested to insure that each scenario was informative and realistic. Because few clients usually invest significant amounts of funds in high risk IPOs, the scenarios focused on the allocation of funds in low and medium risk assets. The scenarios and results are presented in Tables 5 and 6.

Table 5 shows that in the instance where traditionally a lower percentage of wealth would be invested in low risk assets, there is no statistically significant difference between the portfolios recommended by men and women. However, in Table 6, where traditionally it would be expected that a more conservative portfolio would be more appropriate, women advisors placed a larger portion of wealth in growth stocks rather than lower return, income based assets. At first glance this result seems paradoxical. However, given women's greater concern for loss, the result is consistent with the evidence of Table 3 showing that women tend to view high quality, low return income based assets as more risky than do men. Thus, a principal implication of this study is that gender based differences might arise only where the portfolios involved greater emphasis on traditionally low or very high-risk financial assets.

A second implication of this research is that since previous empirical evidence demonstrates that women clients are also more likely to be focused on security rather than return, they might feel more comfortable dealing with women advisors, who tend to frame the portfolio allocation task in the same fashion. Some evidence to support this hypothesis comes from advisors'

Table 5. *Upscale Suburban Household*

The Ramirez family lives in an upscale suburb of Atlanta. Bill Ramirez is 45, in good health and a successful engineer with a computer firm. Connie, his wife, age 42, has a degree in library science and works part-time at a local junior college. The Ramirez children, ages 16 and 12, attend local schools.

The Ramirezes are hardworking and thrifty. At this point they have a $108,000 mortgage on their $230,000 home and have set aside adequate college funds for the first child. Investable savings total $248,000 in money market type accounts. Out of a combined income $116,000 per year, the Ramirezes save about $32,000 per year.

Bill plans on retiring at 65 with a pension equal to about 45% of his salary. He currently carries life insurance of $325,000 on himself and $20,000 on his wife.

	Recommended Percentage	
Asset Class	**Men**	**Women**
Money Market	8.5%	8.9%
Income Assets (High dividend yield stocks and high grade bonds)	13.8%	13.7%
Growth Assets (Large and small cap stocks)	77.7%	77.4%

Note: N = 128 men; 96 women.

Table 6. *Disabled Client*

Jim Peake has to retire because of an accident that left him partially paralyzed on his left side. Apart from his condition, which does not necessitate significant cost for treatment or living expenses, Jim is in good health. Since Jim is 56 and does not have much formal education, it is doubtful that he will be able to earn much work-related income in the future.

Jim is divorced with no dependents or large debts. He lives in an apartment and owns a truck camper, which he uses for transportation. Jim's minimum annual financial needs, in excess of his pension and disability payments approximate $15,000 per year. Jim has liquid assets of about $295,000 and adequate health insurance. Jim likes to garden and travel domestically. He is a friendly but private person.

	Recommended Percentage	
Asset Class	**Men**	**Women**
Money Market	11.1%	10.3%
Income Assets	47.1%*	40.6%*
Growth Assets	42.6%*	48.3%*

Note: N = 128 men; 96 women. *Significant difference between men and women at 5% or better level.

response to two other survey questions. First, 72% of the advisors said that women depended more on advisor advice than do men clients. Second, 71% of advisors said that women, more than men, were concerned how their investments fit into the bigger picture of their economics and social lives. However only 63% of men advisors, compared to 82% of women advisors, were willing to look at portfolio decisions from this larger perspective.

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