Rational Lifetime Investment Strategies: Gender Differences in the Allocation of Assets in Retirement Savings Plans

Chase Lancaster*

Anubhav Raj**

Marjorie McElroy, Faculty Advisor

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*Chase Lancaster is an investment banking analyst for Jefferies & Co. in New York. He can be reached at crl8@duke.edu for any questions/comments.

**Anubhav Raj is a consulting analyst for Deloitte in Atlanta. He can be reached at anubhav.raj@duke.edu for any questions/comments.

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Abstract

Previous research has demonstrated that women have greater risk aversion than men. Controlling for age, education, family size, income, self-reported financial risk tolerance, and occupation, this study examines the impact of gender on asset allocation decisions in retirement accounts. Our findings suggests that after accounting for a large number of factors, single women tend to choose more conservative investment allocations in their retirement accounts than do single men. However, within married households, no significant gender differences in asset allocation were found. Spousal influence within married couples was examined and seemed to explain away gender differences for married households.

I. Introduction

In light of the recent trend towards self-directed pension accounts, individuals and households are becoming increasingly responsible for their own financial well-being. As a growing number of companies switch from employer-managed to employee-managed retirement plans, workers are often faced with crucial investment allocation decisions that play a significant role in determining the size of their pension accounts. Exacerbated by time, certain investment choices such as the appropriate allocation of stocks and bonds can be essential to financial security in retirement.

A growing number of financial studies highlight the gender disparity in investment allocation. Numerous papers find that women invest their assets more conservatively than men do. In particular, a large body of literature shows that women tend to pursue a less risky investment strategy in their retirement asset accounts. After controlling for psychological, financial, and demographic factors that may influence risk, we aim to assess the residual impact of gender on asset allocation decisions within retirement accounts. In light of the recent trend towards self-directed pension accounts, the existence of a gender difference in financial risk tolerance provokes significant questions for public policy. Beyond the obvious concern of the overall financial well-being of women in retirement, government policies can be more effectively developed with a better understanding of the underlying causes of these gender differences in asset allocation.

Each year, a growing number of companies are beginning to replace employer-managed pensions with employee-managed retirement plans, more commonly known as defined contribution (DC) retirement plans. In 2006, about half of Americans' retirement savings were held in DC plans and IRA's. The combined assets in DC plans and IRA's represented 51 percent of retirement assets in 2006, up from 39 percent in 1990 (Investment Company Institute 2007). As more firms opt for DC retirement plans, great demand is being placed on individuals to make sound investment decisions for their retirement.[1]

In general, previous research and conventional wisdom suggests that many workers are inadequately prepared for such responsibility (Borstorff, Thomas & Hearn, 2007). Many individuals tend to invest their retirement accounts too conservatively, and fail to capitalize on the higher returns that riskier assets can provide over an average retirement planning lifecycle. As previously mentioned, research suggests that women are less likely than men to allocate their assets towards "riskier" investments like stocks, as opposed to bonds.

In theory, women's greater life expectancy should dictate a less conservative approach to retirement investing. Given stock premiums observed throughout history, the low propensity of women to invest in these riskier assets could translate into substantial differences in wealth accumulation for retirement. Reduced retirement account values coupled with a longer period of retirement are a big cause for concern for women.

A large number of studies have been dedicated to exploring gender differences in asset allocation. Many papers have addressed the psychological, financial, and demographic factors that seem to influence risk and account for gender differences in investment behavior, but fail to include a large number of these variables in unison. That being said, our study aims to contribute to the existing literature in two ways. First, we seek to give a more timely description and analysis of gender differences in asset allocation in retirement accounts. Secondly, this study takes a more comprehensive approach in its investigation of

[1] In general, there are two different types of pension plans. Defined-benefit plan is employer-managed, while defined-contribution plan is employee-managed. The DC plan allows workers to make self-directed investment decisions.

gender differences in the allocation of assets in retirement savings plans than most past studies have attempted. By including a myriad of predictor variables in our model and separately examining spousal influence at the household level, we intend on addressing multiple factors affecting gender differences in investment allocation simultaneously.

Aims of the Current Research

The purpose of our paper is to examine gender differences in asset allocation after controlling for an unprecedented number of psychological, financial, and demographic variables through the utilization of the 2004 dataset from the Survey of Consumer Finances (SCF). The dataset enables us to undertake a detailed analysis of investment choices in DC plans and relate it to individual and household characteristics. A majority of the information is collected at the household level; however, data on pension coverage, employment, and other demographic characteristics are available for both household head and the spouse/partner, giving us measures of his and her "power."

In our paper, we will begin with an exploration of prior research that consistently indicates gender disparity in investment allocation decisions and risk tolerance. Next, we will address relevant economic theory with a particular emphasis on the life-cycle model of consumption coupled with labor supply flexibility. We will then use descriptive and quantitative statistics to give a better understanding of the dynamics of our sample. Next, we will explain our model in detail. We will then present the results of our empirical analysis. Finally, we will give some concluding remarks on our findings, along with commentary on the potential significance of our results in the broader debate of optimal retirement savings plans.

II. Review of Literature

Several attempts have been made to address the issue of gender differences in asset allocation. In general, the literature we found to be appropriate and relevant to our study includes studies of whether differences in risk tolerance of males and females exist in investment decisions, psychological studies that focus on the risk tolerance of men and women, and other studies that have addressed the various factors that influence risk.

One of the biggest difficulties in examining gender differences in investment allocation is the limited number of gender-specific and comparable data with the necessary control variables. Ideally, this type of study demands detailed demographic information for each individual in the sample, data on non-pension wealth and income, as well as pension asset allocation information. Moreover, the sample set should be representative of the entire population. While current data sets lack all these criteria, several attempts have been made to address the issue of gender differences in asset allocation.

That women are more risk averse than men in making financial choices is fairly common. Perhaps to no surprise, this widespread belief has been repeatedly confirmed by numerous past studies. In one study, Jianakoplos and Bernasek (1998) use data from the 1989 SCF data set to analyze the risk tolerance disparity between males and females. Examination of their empirical results finds that single women are relatively more risk averse in investing than single men or married couples. Furthermore, the study also shows that women perceive themselves to be less willing to take risks. While 63% of single women and 57% of married women indicated that they are not willing to accept financial risk at all, only 43% of single men and 41% of married men reported this level of risk aversion. In another study that addresses the gender differences in risk tolerance in investment behavior, Bajtelsmit and VanDerhei (1997) discover significant gender differences in the investments of pension assets. They use pension plan allocation data from 1993 provided by a large plan sponsor. Given a choice of five separate investment alternatives and their estimated risk, employers were asked to self-allocate their pension contributions. These authors find that women are significantly less likely to invest in the riskiest alternative.

The apparent risk difference between men and women has been attributed to many factors. Some psychologists argue that biological differences might be a possible explanation (Felton, Gibson, & Sanbonmatsu, 2003). Others have invoked evolution and suggested that women have adapted toward lower levels of risk because they have greater responsibilities than men, in terms reproduction and childcare (LaBorde Witt, 1994). To be sure, while a plethora of explanations have been put forth, there is no single explanation that can explain why women are less risky than men.

A previous study done by Annika Sunden and Brian Surette (1998) also succinctly captures the gender differences in asset allocation of pension plans. The authors utilize data from the 1992 and 1995 Survey of Consumer Finances (SCF) to conclude that gender and marital status significantly affect how individuals allocate assets in DC plans. In their analysis, they control for a large range of demographic, financial, and attitudinal characteristics that help to explain differences in asset allocation. Their results indicate that such controls are important, but do not explain away gender and marital effects.

Additionally, Lusardi and Mitchell, in a study that focused on education, a factor widely believed to influence risk in investment decisions, found that many households are unfamiliar with even the most simple economic concepts that are required to make investment decisions and that financial illiteracy is widespread and a big cause of concern (Lusardi & Mitchell., 2007). In particular, research indicates that risk aversion is more prominent in female investors because of their limited financial knowledge. Also, another factor that might influence risk tolerance is income. According to Bajtelsmit and Vanderhei, lower levels of income leads to lower levels of risk. In their study, they suggest that a wealthy individual should be able to sustain more financial losses relative to the less wealthy individual (1997).

Finally, another factor that may influence risk behavior is marital status. The idea that women have a greater responsibility than men seems to be extremely relevant in predicting the effect of marital status on risk. In one study, Daly and Wilson (2001) assert that the amount of responsibilities after marriage dramatically increases, and this should make people less tolerant of risk. Sunden and Surrette (1998) provide empirical evidence for this argument in showing that people who are married exhibit less risky behavior in their investment decisions than single people. Additionally, Arditti examines the relationship between divorce and income among males and females (1997). The author finds that while females experience a 73% decrease in income in the first year after divorce, males actually incur a 42% rise. So it may be the case that females simply cannot afford to take on as much financial risk as their male counterparts because of these relatively elevated levels of post-divorce income risks.

Furthermore, many studies show that married individuals do not typically make investment decisions on their own. These papers find that spousal influence plays a significant role in many investment choices within a married household. The view seems to be that couples tend to make joint financial decisions, and what one spouse decides to invest in affects what the other spouse invests in. Jianakoplos, Bajtelsmit, and Bernasek (2003) found that married couples' investment choices within their own defined-contribution plans were very similar. This seems to support the notion that spouses make joint financial decisions, or that married couples have similar risk tolerance levels.

III. Economic Theory for Consumption Smoothing and Portfolio Choice

Why people save is the first step in this process of understanding and exploring differences in asset allocation. There are several popular theories on the consumption and savings trends of individuals over the course of a lifetime. One of the most comprehensive studies was done by Milton Friedman (1957), who developed what has become to be known as the life-cycle model of consumption**.** This theory predicts that people prefer to have fairly smooth consumption patterns over their lives. Since income changes significantly over the course of one's life, savings that transfer consumption over time periods are of paramount importance in understanding the dynamics of a family's consumption and preparedness for retirement. People will borrow against future earnings when they are young and their income is low. They are predicted to increase savings as their income rises in order to prepare for retirement, and then consume these saved assets after retirement. The basic life-cycle model has not stood up well against empirical analysis; however, it has done much better when factors such as bequest motives and capital market constraints are taken into consideration (Cocco, Gomes & Maenhout 2005).

It has been even further expanded to divide assets into current income, current assets and future income, with there being a different marginal propensity to consume out of each of these mental accounts (Shefrin, 1988). The basic life-cycle model does not directly predict how different variables will affect savings behavior and investment decisions.

However, it is relevant to our study by laying a precedent of the importance of savings in regards to future consumption.

Zvi Bodie, Robert Merton and William Samuelson enriched the basic life-cycle model of consumption through the inclusion of labor supply flexibility (1992). These authors realized that it was far too unrealistic to assume that individuals do not have flexibility to vary their work effort over different stages in their life. Past labor literature separately focused on participation decisions and consumption behavior and rarely simultaneously included both in a model. Additionally, labor supply was seldom used as an endogenous variable in financial literature. The connection between labor supply flexibility and asset allocation, developed by Bodie, Merton and Samuelson, is crucial to the understanding of the dynamics of consumption and saving over an individual's life-cycle. They show that an individual (regardless of gender) is able to invest in a riskier investment portfolio ex-ante due to the individual's labor supply flexibility ex-post. In other words, an individual with labor supply flexibility can insure against unfavorable investment outcomes by increasing his labor supply and reducing leisure.

A further analysis of the work done by Bodie, Merton, and Samuelson can be very beneficial in furthering our understanding of the relationship between labor supply flexibility and optimal asset allocation. Let us start by examining the authors' continuous-time life-cycle model. Individuals live from time 0 to time T, and begin with financial wealth F(0). Their current wealth, F(t), is determined by past investment and saving decisions. The individual also possesses additional wealth in the form of human capital, H(t), which is the present value of all future streams of labor income. It is important to remember that an individual is partly in control of their human capital due to labor supply flexibility, yet there is also a stochastic component of human capital since future wages are uncertain. In this model, individuals have the choice to invest in both a risk-free asset that offers a known return of r and a risky asset that offers an expected return of α. Individuals can decide at any point of time their optimal levels of consumption, labor supply (leisure), and asset allocation within their portfolio.

Individuals maximize the discounted lifetime expected utility function, which is given by:

$$E_0[\int \exp^{-\delta s} u(C(s),L(s))ds].$$

Where E is the expectation operator at time t and δ is the individual's rate of time preference. Both the price of the risky asset and the wage paid to labor follow Itô processes. The authors assume that either wages are perfectly correlated with the risky asset or that they are non-stochastic, so that human capital can be treated as a tradable asset.

The inclusion of human capital is needed to adequately explain investment, labor and consumption behaviors. An example presented by the authors can help illustrate the importance of human capital in optimal asset allocation. Their example examines a person who has accumulated $300,000 in financial wealth. In addition, he has human capital with the present value of future earnings, worth $500,000. Furthermore, we can assume that his future wages have relatively modest risk and they are equivalent to holding $400,000 in the riskless asset and $100,000 in the risky asset. If his optimal asset allocation is 60% in the risk-free asset and 40% in the risky asset, an outside observer who only included financial wealth would think that he should invest $180,000 in the riskless asset and $120,000 in the risky asset. However, this is not the case when we take human capital into consideration and examine total wealth. The individual has $800,000 in total wealth, so he should invest

$320,000 in the risky asset. Since, he already has $100,000 invested in the risky asset in the form of human capital, he should invest an additional $220,000. This case shows that people with high amounts of human capital, such as young workers, who have modest to little risk positions, should invest a greater proportion of their financial wealth in risky assets.

The authors reach several important conclusions that are crucial to understanding investment behaviors of people in a life-cycle model. The first finding is that, other things equal, people with labor flexibility will uniformly invest a greater portion of their total financial wealth in riskier assets than someone whose labor supply cannot be changed. The authors believe that some measures of labor flexibility are occupational category and family status, since certain occupations and households with two income earners have greater labor flexibility. They also find that individuals will exhibit more conservative behaviors as they near retirement. This is due to the fact that as an individual moves through his working life, his human capital depreciates and thus he cannot use it to rebalance his financial investments. It is also due to the fact that the degree of labor flexibility one can use to boost human capital reserves diminishes over the life-cycle.

We can now see that increased labor flexibility allows an individual to hold aggressive asset allocation positions. Labor flexibility can be obtained by investments in education and technical training. However, it is quite possible that females will not be able to achieve the same amount of labor flexibility as their male counterparts. Wives may have less labor flexibility than their husbands because of obligations to children and greater income risk in the case of a divorce.

We can further examine savings pattern by studying retirement plans, since they are one of the largest investment vehicles that individuals use to save for the future. Defined-contribution retirement plans are especially significant to empirical analysis because they allow us to see the individual's preference regarding asset allocation (equities vs. bonds) within the portfolio. As discussed, previous research has shown that there is considerable variation in the asset allocation of individuals due to differences in age, gender, marital status, tolerance to risk, investment knowledge, income, and work experience.

It is an obvious fact that returns on retirement plans can significantly impact the utility for retirees. How much money one has during retirement plays a significant role in one's ability to maximize utility. Oftentimes, people underestimate the amount of money they will require after retirement. Studies have shown that people need about 80% of their pre-retirement salary to maintain the same standard of living, but over 42% of the people surveyed by the Employee Benefits Institute felt that they can get by on less than 60% of their previous salary (Singletary, 2002). While women have made considerable advancements in regards to pay equity, positions, and power, there is still a considerable disparity between men and women when it comes to their preparedness for retirement (Borstorff, Thomas & Hearn, 2007). Women are more likely to cash out of their 401(k)'s prematurely, leaving them more susceptible to outliving their wealth (Shaw & Hill, 2002). This is part of an incredibly disturbing, larger trend that only 33% of all employees with just a defined contribution plan are on pace to meet their retirement goals (Borstorff, Thomas & Hearn, 2007).

Improper asset allocation is one of the main reasons why so many people are not financially prepared for retirement. Gutner (1999) observed that nearly 90% of women with household incomes of at least $30,000 owned overly conservative certificates of deposit in their retirement accounts when they should have had riskier stocks for long-term growth. Jeremy Siegel (2002) has done a considerable amount of research on the equity risk premium, the fact that stocks tend to give better returns over the long run than bonds. For the period between 1871 and 2001, stocks have given a 6.8% real return while gold and bonds have a -0.4% and 1.7% real return, respectively. Stocks have also considerably outperformed bonds during any 20 year period over the past 60 years. An illustrative example used by Siegel is that if someone in 1802 had invested one dollar in bonds, then in 1999 that investment would be worth $792. However, if that same person had invested that dollar in stocks, then by 1999 his investment would have been worth over $790,000. We do have to be careful not to excessively rely on past results to predict future trends; however, there is strong evidence that a long-term investor will be able to achieve a 3-5% higher return from stocks as opposed to bonds.

Women may not be adequately prepared for retirement due to overly conservative asset allocations in their retirement accounts. According to the National Center for Health Statistics, women tend to outlive men by approximately 5.3 years. Its puzzling that women tend to be more conservative than men in the asset allocation of their retirement plans even though they can ride out market fluctuations better than their male counterparts due to their longer expected lifespan. How does this affect future utility and consumption for women?

In this paper, we want to understand what drives the difference between males and females in their asset allocation decisions. Past studies have shown that there are a myriad of variables that affect asset allocation within retirement plans. These variables include age, marital status, education, family size, income, self-reported risk tolerance and occupation.

Our hypotheses concerning the relationship of these variables with the riskiness of a portfolio is largely rooted in prior research, the life-cycle model of consumption with the inclusion of labor supply flexibility, and the investment theories of Siegel. Using these tools, we aim to estimate the various effects of certain psychological, demographic, and financial variables on investment allocation in retirement savings plans, and show that gender disparities in asset allocation cannot be explained away.

IV. Model for Application

First, we hypothesize the risk level of a retirement portfolio to have a negative relationship with age. This can be attributed to the fact that an individual expends human capital and also has a lesser degree of labor supply flexibility as he ages and can no longer use the relatively risk-free human capital to rebalance financial investments (Bodie, Merton & Samuelson, 1991). Furthermore, as Siegel mentions, the expected higher returns for investments in stocks can only be realized for long-term investors. As investors approach old age their investment horizons shorten and they are more concerned with receiving a steady paycheck as opposed to achieving the highest return 25 or 30 years down the road. There is greater variance for stocks in shorter investment periods than bonds (see Figure 1, page 40).

Furthermore, we anticipate there to be a negative relationship between the riskiness of a portfolio and marital status. Someone who is married has more responsibilities and we would expect them to exhibit safer investment preferences (Daly & Wilson, 2001). This theme of responsibility would also lead us to expect a negative relationship between portfolio risk level and family size, holding income or wealth constant, since a larger primary economic unit would imply greater responsibility. However, there is a chance that the additional labor supply flexibility of households with two income earners can override the greater responsibility and lead to a positive relationship between portfolio risk level and family size and marital status.

Additionally, we understand that financial knowledge is an important indicator of how comfortable a person is with making investment decisions. More astute investors will recognize the ability to maximize returns by investing in riskier assets in a well diversified long-term portfolio (Siegel, 2002). We will use education levels and occupational technicality as proxies for investment knowledge. Although these proxies are not perfect, we believe education level and occupational technicality are acceptable substitutes for investment knowledge. While we admit that may not hold true in every instance, it is our belief that someone with higher levels of education and occupational technicality levels will possess greater investment knowledge. For these reasons, holding age and permanent income constant, we expect to find a positive relationship between risk level of a retirement portfolio and financial knowledge. Higher levels of education and more technical occupations can lead to greater labor supply flexibility and higher human capital reserves. This also leads us to hypothesize that education and more technical occupations will have a positive relationship with portfolio risk level.

We hypothesize a positive relationship between income and a portfolio's riskiness, due to the fact that higher income should increase the risk tolerance of an investor. The idea is that a wealthy investor can better sustain losses than an investor with a lower level of income. The last variable we will be accounting for is self-reported risk tolerance. As people indicate that they are more willing to take risk, we expect their investment portfolio to be riskier. Assuming that people can accurately gauge their risk tolerance then this relationship is self-explanatory. We hypothesize that even after controlling for these variables, there will remain some unexplained difference in asset allocation that can be contributed to gender. We expect, on average, for men to engage in riskier asset allocations than women, a hypothesis that is consistent with previous research and theory.

Ideally, we would hope to examine a family's entire asset portfolio in order to thoroughly scrutinize all investment allocations. It is important to recognize that retirement accounts are not the only means through which one can invest in risky assets (i.e. stocks). There are other investment vehicles through which an individual's financial riskiness can be assessed. However, given the longevity of a 401(k) and similar retirement accounts, employees might be more likely to allocate a greater portion of these investment vehicles to stock.

V. 2004 Survey of Consumer Finances and Summary Statistics for Sample Dataset

The dataset for this study is the 2004 Survey of Consumer Finances (SCF). The SCF is a triennial survey sponsored by the Federal Reserve Board in cooperation with the Statistics of Income. The SCF collects comprehensive and detailed information on households' balance sheet and demographic characteristics, as well as on pension coverage, pension plan characteristics and the allocation of assets within these DC plans. The 2004 SCF data was collected using the computer-assisted interviewing technique (CAPI). This technique is very similar to computer-assisted telephone interviewing, except in this case, interviews took place in person and not over the phone. In this type of interview, the respondent sits in front of a computer terminal and inputs his/her answers into the computer. Thus, there is no questionnaire in the usual sense.

Selection of respondents was based on a variety of information, including the distribution of the population across the country in the 2000 Census. The households and others were randomly selected using a scientific procedure designed to produce an accurate representation of the average U.S. household. It was created to portray similar financial characteristics of a subset of the household unit, referred to as the “primary economic unit” (PEU). Simply put, the PEU constitutes the economically dominant individual or couple in a household and all other individuals in the household who are financially interdependent with that individual or couple. For example, in the case of a household of a married couple with two children and one financially independent parent, the PEU would consist of the couple and their two children.While most variables collected in the interview were at the household level, there were some collected separately for both the respondent and the spouse/partner of the respondent. These variables were employment, pension, and demographic characteristics, such as age, education, family size, marital status, sex, income, wage, and occupation. This method of collecting identical data at the individual level for both the respondent and the spouse/partner helped us create a more comprehensive dataset because it allowed us to separate and include both the respondent from his/her spouse/partner and still maintain the same degree of explanatory power in the model.

The sample for this study that aims to estimate gender effects on investment decisions consists of 5,765 working males and females. These individuals are between the age of 21 and 75 and make self-directed investment decisions for their retirement accounts. In this analysis, only those who have control over investment decisions in their retirement portfolios are included because this study focuses on allocation within defined-contribution plans.

This subsample of 5,765 is not representative of the 2004 SCF sample of 21,356 working males and females. As one might anticipate, our subsample (people who make self-directed investment decisions for their pension plans) is, on average, more educated, wealthier, (a bit) older, and employed in more technical occupations than the entire sample (see Table 1, page 41). One would expect those with defined-contribution retirement plans to be characteristically different than, say, individuals with defined-benefit accounts. Table 1 shows means for the entire SCF 2004 sample and our subsample of workers.

In terms of education, while the average years of completed education for an individual in the entire SCF 2004 sample is 14.1 years, the average for an individual from the subsample is 15.0 years. Furthermore, a bigger disparity is seen in income, defined as one's salary per year (before taxes, from one's primary job). The average income for the subsample is $105,156. The average individual salary for the entire sample is $62,468. Finally, in terms of age, there was not a significant difference as individuals in the entire SCF sample had an average age of almost 45.2 years and individuals in the subsample had an average age of almost 46.6 years.

Within the subsample of 5,765 observations, the discrepancy between males and females is notable in terms of self-reported risk tolerance and occupational technicality. For self-reported risk tolerance, we compared single females to single males. Because this variable is measured at the household level, and not the individual level, it was appropriate to make this comparison using solely individuals who are single, given the fact that we treated respondents and their spouses/partners as separate individuals. Otherwise, we would have observed identical responses for these variables for both married females and married males. In terms of comparing risk tolerance for these groups, the analysis indicates that males have much higher self-reported risk tolerance levels (see Table 2 and Figure 2, page 43). Particularly convincing is that 42.93% of males reported a willingness to take above average risks, while only 19.18% of women did the same.

Furthermore, in terms of occupation, there does not appear to be any significant differences between males and females with regards to the technical level of the job (see Table 3 and Figure 3, page 44). While a higher percentage of men work at jobs at the "least technical" level, there are a higher percentage of males working at the "most technical" level as well.

Also, the descriptive statistics show that for the subsample, men invest more heavily in stocks than and women (see Table 4 and Figures 4-5, page 45). In particular, males, on average, allocate 63.2% of their portfolio to stocks, while females invest just under 59%. This observation is consistent with the hypothesis that females are more conservative with their investment allocation decisions.

Stratified by gender, Table 5 (page 46) further characterizes the subsample dataset. In terms of education for the subsample, males are more educated than females by more than half a year. For income, males make a significantly greater amount in salary per year than females; however, descriptive statistics indicate that females have significantly higher wages. Table 5 (page 46) also shows that males from the subsample earn an average salary per year of $141,127.8, while females earn only $55,316.9. This is a huge discrepancy in earnings by gender. Finally, the age distribution reflected in the statistics suggests that males and females tend to be of similar ages, males being older by just over 2 years.

In order to better understand gender differences in asset allocation, we also utilize a Three Stage Least Squares simultaneous equations analysis to capture spousal influence within households. Particularly, we want to know how much a husband's (wife's) percentage allocation to stocks is influenced by his (her) spouse's level of investment in stocks. In order to properly examine this issue, we narrowed the previous sub-sample to include only married couple households where both the husband and wife have control over their investment decisions because this part of the study mainly focuses on the spousal effect to invest retirement funds in stocks. Furthermore, we also only include couples in which both spouses have a greater than zero percent allocation to stocks. The 3SLS analysis is an attempt to capture spousal influence with respect to percent investment in stocks so it is appropriate to include only married couples in which each spouse has some retirement funds allocated to stocks. After these restrictions, the sample size is reduced to 658 married couples (658 spousal pairs).

Descriptive statistics for these 658 married couples, differentiated by gender, can be found in Table 10 (page 51). The table shows that, within these married households, husbands have more assets allocated to stocks than their spouses with 70.8% and 67.1% invested in stock, respectively. Also, in terms of annual income, husbands earn $111,426, while their spouses earn a significantly less value of $61,466 per year. Furthermore, both spouses have similar occupational technicality levels. In particular, 71% of female spouses and 72% of male spouses have jobs at the most technical level. For risk tolerance, a variable collected at the household level (thus, identical values for both the husband and the wife), only 5.6% indicated a willingness to take zero risk; whereas, 27% indicated a willingness to take above average risks. It is important to note that the risk tolerance distribution for these married couple households is very similar to the tobit sub-sample of 5,765 observations.

VI. Empirical Specifications

Tobit Model for Gender Differences in Asset Allocation

We aim to test the null hypothesis that even after controlling for a large number of psychological, financial, and demographic variables, gender differences in the asset allocation of retirement accounts cannot be completely explained away. If we reject the hypothesis for our highly selected subsample, this provides more evidence that simple finance models leave out important factors in determining the gender gap. A tobit model is appropriate for testing this hypothesis, as our dependent variable, percent invested in stock, is a left-censored variable that is censored from below. Approximately 11.71% of the observations in the sample have no assets allocated to stocks.

To explain each individual's percentage investment in stock, we employ demographic, attitudinal, occupational, and financial characteristics. Some variables are collected at the individual level, while others are common to both the respondent and spouse of the same household. Those variables that are unique to each individual in the sample include, age, gender, education, occupational technicality, income, and wage. Those variables found at the household level include risk tolerance, family size, and marital status.

The empirical model of each individual's percentage investment in stock has the form:

$$Y^*_i = \alpha + \beta_1 X_i + \varepsilon.$$

We observe $Y_i = Y^*_i$ only if $Y^*_i > 0$, where

Y_i is the percentage invested in stock and is the dependent variable,

Y^*_i is an index of how strongly individual i wants to invest in stocks,

α and β are parameters to be estimated,

X_i are explanatory variables such as age, gender, marital status, income, etc…, and

ε is the error term which is assumed to be distributed independently and identically across all investors in stock and non-investors.

Dependent Variable

Percentage invested in stock: The SCF collects data for every individual on the percentage of assets for the DC plans which are allocated to stocks. The data ranges from 0 to 100, with a value of 0 being the least risky and a value of 100 being the most risky. Individuals holding a portfolio consisting entirely of bonds would be recorded as a 0, individuals holding portfolios that are either all stocks or all alternative assets such as hedge funds would be recorded as 100.

Predictor Variables (see Table 1, page 41, for sample statistics for all predictor variables):

Age is a continuous variable and is used to estimate the effect of age and investment decisions. *AgeSq* is a continuous variable generated by squaring the *Age* variable in order to determine the convexity of the relationship between age and an investment portfolio's risk level. *Married* is an indicator variable in which Married=0, if not married, and Married=1, if married, and is used to estimate the effect of marital status in asset allocation. We reclassified all people who reported being separated, divorced, widowed, and never married as single. We also combined individuals who were married or living with a partner to form the married group. The rationale behind this was to separate individuals who lived with either a partner or spouse from the rest of the sample. *Male* is an indicator variable in which female=0 and male=1 and is used to estimate the effect of gender differences in asset allocation. *Education* is a continuous variable and is used to estimate the effect of education, a proxy for financial knowledge, on investment decisions. A value of 0 signifies no completed grades, while values from 1-16 correspond with the number of grades completed and a value of 17 indicates a graduate school degree. For instance, a value of 12 would indicate high school completion and a value of 15 would specify the completion of 3 years of college. *Income,* in the unedited dataset, is a continuous variable from -1 to 50 million, indicating the pre-tax income of each individual in the sample. With a value of -1 representing an individual who is self-employed and not receiving a salary and a value of 0 for individuals not doing work for pay. In our sample we threw out people who were either self-employed or not working, as well as those with incomes of over $10 million in order to eliminate outliers and get an accurate representation of the effect of income on asset allocation. Furthermore, we divided the income by 100,000 in our regressions in order to achieve a meaningful coefficient. *Wage* was indirectly computed from variables: income (I), hours worked per week (H), and weeks worked per year (W). For each individual, wage was calculated using the equation:

$$wage = I / (H*W).$$

We divided by the *wage* variable by 10,000 in our regressions to achieve a meaningful coefficient. For the variable, *Family Size,* respondents were asked to give the number of people in the primary economic unit (PEU). As previously mentioned, the PEU constitutes the economically dominant individual or couple in a household and all other individuals in the household who are financially interdependent with that individual or couple. For example, in the case of a household of a married couple with two children and one financially independent parent, the PEU would consist of the couple and their two children. For the variable, *Risk Tolerance,* respondents were asked to accurately record the risk tolerance of their primary economic unit (household) with regards to asset allocation decisions. The choices were willing to take 1) no financial risks (FinRisk1) 2) average financial risks (FinRisk2) 3) above average financial risks (FinRisk3), and 4) substantial financial risks (FinRisk4). We left FinRisk1 out of the regression in order to compare the effects of higher levels of financial risk tolerance to asset allocation. In the original data set, respondents were classified into 6 groups based on the varying amounts of technical and quantitative skills needed to enter that occupation. We use *Occupational Technicality*, in addition to education, to proxy for financial knowledge. Since our subsample consists mostly of individuals in the top 2 levels of technicality, we combined the 4 occupation groups associated with the lowest amount of technical skills required, in order to achieve a large enough sample and also due to the fact that these groups required similar levels of technical skills. Occupation1 is associated with the least technical and quantitative occupations. Occupation2 is associated with higher levels of technical occupations in comparison to Occupation1, and Occupation3 is the group of occupations with the highest level of technical and quantitative skills. We have left Occupation1 out of the regression in order to compare the effects of more technical and quantitative occupations on the riskiness of asset allocation in retirement plans. *Occ2edu* and *Occ3edu* are interaction variables between occupational technicality and education. Both occupational technicality and education can be used as proxies for financial knowledge. Thus, an interaction variable between the two is useful.

Three Stage Least Squared Regression (3SLS) for Spousal Influence within a Household

By using a tobit model to estimate gender differences in the allocation of assets, it has been assumed that individuals make financial decisions independent of their spouses –

an assumption that has perhaps become less tenable given recent empirical studies that have shown spouses to make joint investment decisions (Jianakoplos Bajtelsmit & Bernasek, 2003). In an effort to further examine spousal influence within a household, we have employed a three stage least squared regression.

As a preliminary step to the 3SLS analysis, we generated variables (p-hat(male), p-hat(female), p-hat(malesq), p-hat(femalesq)) that represented the predicted probability of being invested in any stocks at all. This step was required since 3SLS could not accommodate the significant number of observations that we had at our left hand limit of zero. These predicted probability variables allowed us to remove the individuals that did not invest in any stock while still accounting for their effect.

Structural Equations:

$$Y_m = \alpha + \gamma Y_f + \beta_1 X_{i,h} + \beta_2 X_{i,m} + \beta_3 X_{i,mf} + \varepsilon_m \quad (1)$$

$$Y_f = \alpha + \gamma Y_m + \beta_1 X_{i,h} + \beta_2 X_{i,f} + \beta_3 X_{i,mf} + \varepsilon_f \quad (2)$$

Y_m is the percentage invested in stock by males and is the dependent variable in equation (1),

Y_f is the percentage invested in stock by females and is the dependent variable in equation (2),

α and β are parameters to be estimated,

$X_{i,h}$ are explanatory household variables such as family size and financial risk tolerance,

$X_{i,m}$ are explanatory variables that are unique to males such as the male's income, wage, age, education, and occupation,

$X_{i,f}$ are explanatory variables that are unique to females such as the female's income, wage, age, education, and occupation,

$X_{i,mf}$ are explanatory variables that are used to explain both Y_m and Y_f such as the age differential between spouses, and the predicted probability variables that were generated in the preliminary step,

ε_m is the error term in equation (1) which is assumed to be distributed normally, and

ε_f is the error term in equation (2) which is assumed to be distributed normally.

Additional predictor variables not previously discussed:

Male Older is a continuous variable, from 0 to 16, and is used to estimate the effect of a husband being older than his wife on investment decisions. For example, a value of 0 signifies that either of the spouses is of the same age or the wife is older. Also, a value of 5 represents a husband who is 5 years older than his wife. *Female Older* is a continuous variable, from 0 to 10, and is used to estimate the effect of a wife being older than her husband on investment decisions. For example, a value of 0 signifies that either the spouses are of the same age or the husband is older. Also, a value of 5 represents a wife who is 5 years older than her husband. *P-hat(male)* is a variable, ranging from 0 to 1, that captures the predicted probability of a male being invested in any stock at all. *P-hat(malesq)* is a variable that is generated by squaring the *P-hat(male)* variable. *P-hat(female)* is a variable, ranging from 0 to 1, that captures the predicted probability of a female being invested in any stock at all. *P-hat(femalesq)* is a variable that is generated by squaring the *P-hat(female)* variable.

VII. Evidence on Gender Differences in Asset Allocation

After running the pooled tobit regression of our entire subsample, many of our preliminary hypotheses were confirmed (see Table 6, page 47). Age, sex, education, family size, tolerance to financial risk and occupation reflected the anticipated results. Our findings also confirm the hypothesis that women are more risk averse as shown by the positive sex coefficient that is significant at the 5% level. Marital status had a positive relationship to percent invested in stock that was significant at the 0.1% level. This is anticipated under the labor supply flexibility model; however, it is contrary to psychological theory under which the increased responsibility associated with marriage would result in less risk tolerance. It appears that the increased labor supply flexibility in a married household outweighs the increased responsibility. Marriage could also lead to investors being more concerned about the future welfare of their family and influence more long-term retirement planning. If married investors believed that they would need greater savings for retirement then they could potentially be motivated to allocate their investments in riskier assets that have a larger expected return. We experienced similar results when we included the interaction variables (see Table 6, page 47). Education was no longer significant by itself; however, the interaction between education and the most technical occupation group was significant at the 1% level.

We also ran the tobit regressions separately for single and married individuals (see Table 7, page 48). One of the most intriguing findings was that age had a positive relationship with the risk level of a portfolio for single individuals and a negative relationship for married people; both were significant at the .1% level. The negative relationship for married people is what we had previously expected. However, the positive relationship for single individuals is unexpected. A potential reason for this is that single individuals tend to be younger and do not have the necessary resources to take advantage of investing in the stock market up until a certain age where they can enter the stock market and take advantage of the greater expected returns. Furthermore, although females were more risk averse in the singles group, they were not more risk averse in the married group. There was no significant gender difference in asset allocation within the married households. This could lead us to believe that single females are more willing to take financial risks than married females because of less responsibility. Also, this may be a result of spousal influence. It could be that a spouse is simply following his/her spouse and making similar investment decisions. The issue of spousal influence will be examined further in our simultaneous equations analysis (3SLS). Family size has a negative relationship with a portfolio's risk level for single individuals, which is significant at the .1% level. This can be expected since a greater burden of responsibility is placed on single individuals that must support a larger family. Financial risk tolerance once again has a positive relationship to percent invested in stock that is significant at the .1% level. Occupation has a positive relationship when the interaction variables are not included, however the results are not as robust. Education is only positive and significant for the married group when the interaction variables are not included. Some reasons for education not being significant across the board are that single individuals may not have completed their education and that the interaction variables between occupation and education absorb some of education's influence on the risk level of a portfolio.

We also experienced similar results when we ran the regressions separately for males and females (see Table 8, page 49), except the results were not as robust. One potential reason for this is the reduced sample size in the separate regressions in comparison with the pooled one. It is interesting to note that income and wage were both insignificant for females. However, wage was negatively correlated with percent invested in stock while income exhibited a positive relationship for males. Both wage and income were significant at the .1% level. A potential reason for these seemingly inconsistent results is that some errors may arise when indirectly computing wage, since it is dependent on a respondent correctly recording the amount of hours they work per week, number of weeks worked per year, etc... Small errors in a respondent's answer can greatly affect the indirectly computed wage rate.

We then ran four separate regressions separated by marital status and gender (see Table 9, page 50). Results on the effects of financial risk tolerance and occupation were along the lines of what we had previously predicted. However, some of our other findings were inconsistent with previous assumptions and might lead one to believe that for our sample the explanatory variables exhibited unique effects on asset allocation for these four distinct groups. One of the most intriguing findings was a positive relationship between age and risk level of an investment portfolio for single females that was significant at the 0.1% level, unexpected and contrary to prior research. This relationship returned to the anticipated negative coefficient for married females. The relationship for the single female subgroup could be explained by an unknown variable that was not included in our regression. It is also interesting to note that family size exhibited a negative relationship with risk level of an investment portfolio for single females that we had initially hypothesized using the responsibility theory but a positive relationship for married females. This could be due to the idea that the increased responsibility that is placed on single mothers can result in less risky asset allocation. However, married females that have time to prepare for increases in family size may not exhibit the same behavior. It is also important to note that many of our explanatory variables were not as robust in the four separate regressions compared to the pooled regression. This once again could be caused by the reduced sample size.

The 3SLS regression results give evidence for spousal influence within married couples households (see Table 11, page 52). The positive coefficient values for the spouse's percent investment in stock seem to illustrate that the level of investment in stock by a spouse subsequently influences the corresponding spouse's level of investment in stock. In equation (1), the endogenous variable, percent invested in stock by females (or wives) was significant at the 5% level. In equation (2), percent invested in stock by males (or husbands) was significant at the 1% level. The evidence for spousal influence within these married couples is very useful in analyzing gender differences in asset allocation. For example, in our previous tobit regression that focused on non-married individuals vs. married individuals, we found that gender differences in the married sample were not significant. This might be best explained by the observed 3SLS estimates that give evidence for spousal influence within married households. Within married couples, the husband and wife seem to influence each other's investment decision, which reduces any observed gender differences in asset allocation. Another possibility to the notion that spouses make joint financial decisions is that married couples have similar risk tolerance levels. So instead of observing spousal influence, we might be observing similar risk tolerance levels with regards to investment decisions.[2]

Furthermore, some other estimates in our 3SLS analysis for our predictor variables turned out as expected. In equation (1), there was a positive coefficient for Occ3, an indicator variable for the highest occupational technicality level, and this was significant at the 5% level. Also in equation (1), there was a positive coefficient for education that was significant at the 1% level. Additionally, the age coefficient was negative in both equations, although not significant in either one. In equation (2), Finrisk4, the indicator variable for a willingness to take substantial risk, was positive and significant at the 5% level. This was consistent with previous regressions.

Other estimates for predictor variables within the simultaneous regressions analysis were not as initially expected. For example, in equation (1), the coefficient values on the risk tolerance variable were all negative, although none of significance. This could be a result of the way in which this variable was defined into its specific sub-groups. Because this sub-sample was only 658 observations, the control group for this set of indicator variables was only 6% of the total observations. Any slight irregularities within this sub-group could have produced skewed results. Also, there was a negative coefficient value on education in equation (2), which was not consistent with prior analysis or hypotheses. This was also true of the coefficient value of wage in equation (1). That the estimates in this simultaneous regression analysis were not consistent with prior tests could be a result of our

[2] Because risk tolerance level is a variable at the household level, we are unable to properly examine whether these spouses have similar or different risk preferences.

model specification. It may be that a variable like male's income could not only affect percent invested in stock for the male, but also percent invested in stock for the female.

VIII. Concluding Remarks and Implications

Our tobit results verified the majority of our a priori hypotheses; however, after stratifying by gender and marital status our results were not as consistent. A myriad of explanations can be attributed to these findings. Certainly, the size of our sample, particularly for single individuals, could be increased. Also, our 3SLS regression verified that there is a great deal of spousal influence in asset allocation. Spouses tend to mirror the decisions of the each other in regards to portfolio risk levels. However, many of our explanatory variables that were significant in our tobit analysis became insignificant in the 3SLS. A more comprehensive data set could result in more consistent findings. Although we included a plethora of explanatory variables, it is quite possible that there are several unknown variables that may have a large effect on risk tolerance. After accounting for our explanatory variables, gender seemed to play a significant factor in the riskiness of a single individual's retirement portfolio. Single women, on average, tend to hold more conservative asset allocations than single men in their retirement accounts. This gender gap in asset allocation could be attributed to past research that has identified psychological and biological differences between males and females. However, our 3SLS regression results and our tobit results when we stratified by marital status show that spousal influence may help explain away the gender gap in asset allocation with married households.

Further research should be conducted to see if explanatory variables have different effects on asset allocation behavior for subgroups that are stratified by gender and marital status. This research should pay particular attention to finding if unmarried females are truly different from married females when it comes to age affecting the riskiness of their portfolios, or if our data set is an anomaly. Also, further research needs to study whether spousal influence can truly explain away the gender gap in asset allocation, or if there are other factors contributing to our findings.

In light of the recent trend in employers switching over to employee controlled defined-contribution retirement plans, it is essential to educate employees on investment strategies. We used education and occupation as proxies for investment knowledge; however, this is far from ideal. The best way to ensure that employees are properly prepared for retirement is to increase their financial and investment acumen. Employees that are comfortable with financial lexicon and investment strategies will be more likely to make sound financial planning decisions.

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Figure 1:

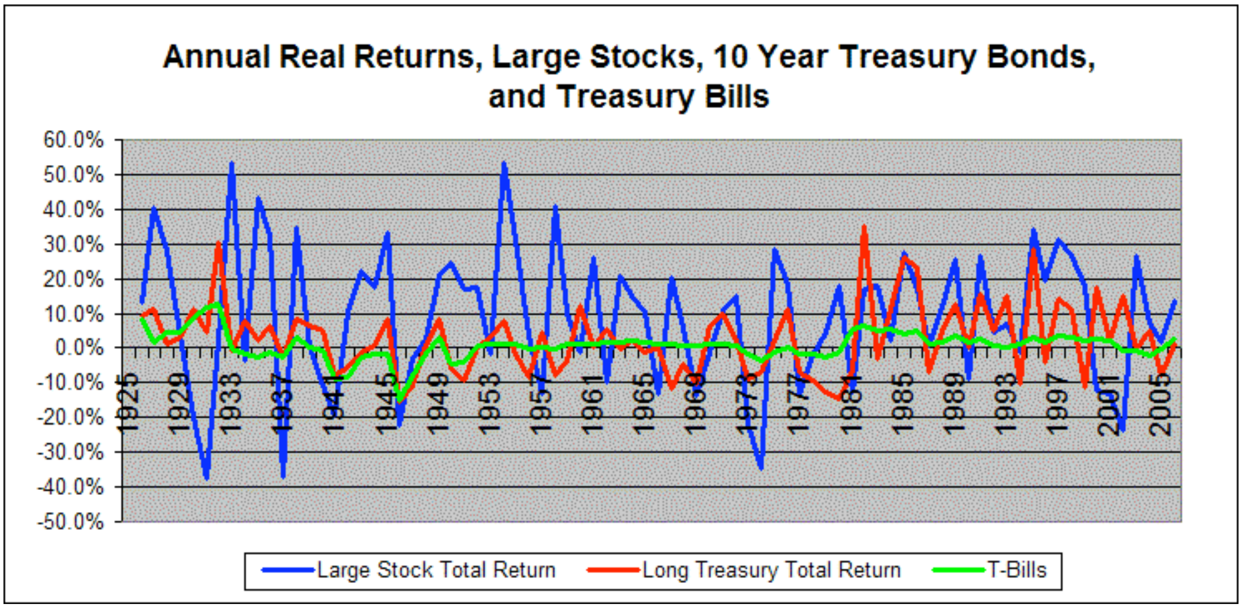
Annual Real Returns, Large Stocks, 10 Year Treasury Bonds, and Treasury Bills
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
-30.0%
-40.0%
-50.0%
1925
1929
1933
1937
1941
1945
1949
1953
1957
1961
1965
1969
1973
1977
1981
1985
1989
1993
1997
2001
2005
Large Stock Total Return
Long Treasury Total Return
T-Bills

Table 1:
Descriptive Statistics Tobit sample (n = 5,765) vs. 2004 SCF Sample (n = 21,356)

Predictor Variable	*M*	*n*	%	*sd*	range
Gender		5,765			
Female		2,415	41.9%		
Male		3,350	58.1%		
Gender		21,356			
Female		9,927	46.5%		
Male		11,429	53.5%		
Age (years)	46.6			10.923	21-75
Age (years)	45.2			12.750	18-90
Marital Status		5,765			
Not Married		980	17%		
Married		4,785	83%		
Marital Status		21,356			
Not Married		4,565	21.4%		
Married		16,791	78.6%		
Education (years)	15.0			2.035	2-17
Education (years)	14.1			14.138	0-17
Income ($)	105,156.6			148,212.5	6.4-1M
Income ($)	62,468.5			914,301.3	1.8-1M
Wage ($/hr)	46.96			70.235	.003-913
Wage ($/hr)	35.11			593.628	.001-1,000
Hours Worked/Week	44.6			.160	1-100
Hours Worked/Week	41.0			.093	1-120
Family Size	2.9			1.320	1-10
Family Size	2.8			1.362	1-10
Risk Tolerance (%)		5,765			
Taking no risks		692	12%		
Taking average risks		2,873	49.8%		
Taking above average risks		1,848	32.1%		
Taking substantial risks		352	6.1%		
Risk Tolerance (%)		21,356			
Taking no risks		6,030	28.2%		
Taking average risks		9,426	44.1%		
Taking above average risks		4,880	22.9%		
Taking substantial risks		1,020	4.8%		

Predictor Variable	*M*	*n*	%	*sd*	range
Occupational Technicality		5,765			
Least Technical		891	15.5%		
Average Technicality		1,120	19.4%		
Most Technical		3,754	65.1%		
Occupational Technicality		21,356			
Least Technical		6,089	28.5%		
Average Technicality		4,541	21.3%		
Most Technical		10,726	50.2%		

Table 2:

Risk Tolerance (NOT MARRIED individuals only, n=980)

Gender	No Risk	Average Risk	Above Average Risk	Substantial Risk	Total	
Female	163	274	112	35	584	n
	(27.91)	(46.92)	(19.18)	(5.99)	100	%
Male	32	154	170	40	396	n
	(8.08)	(38.89)	(42.93)	(10.10)	100	%
Total	195	428	282	75	980	n
	(19.90)	(43.67)	(28.78)	(7.65)	100	%

Figure 2:

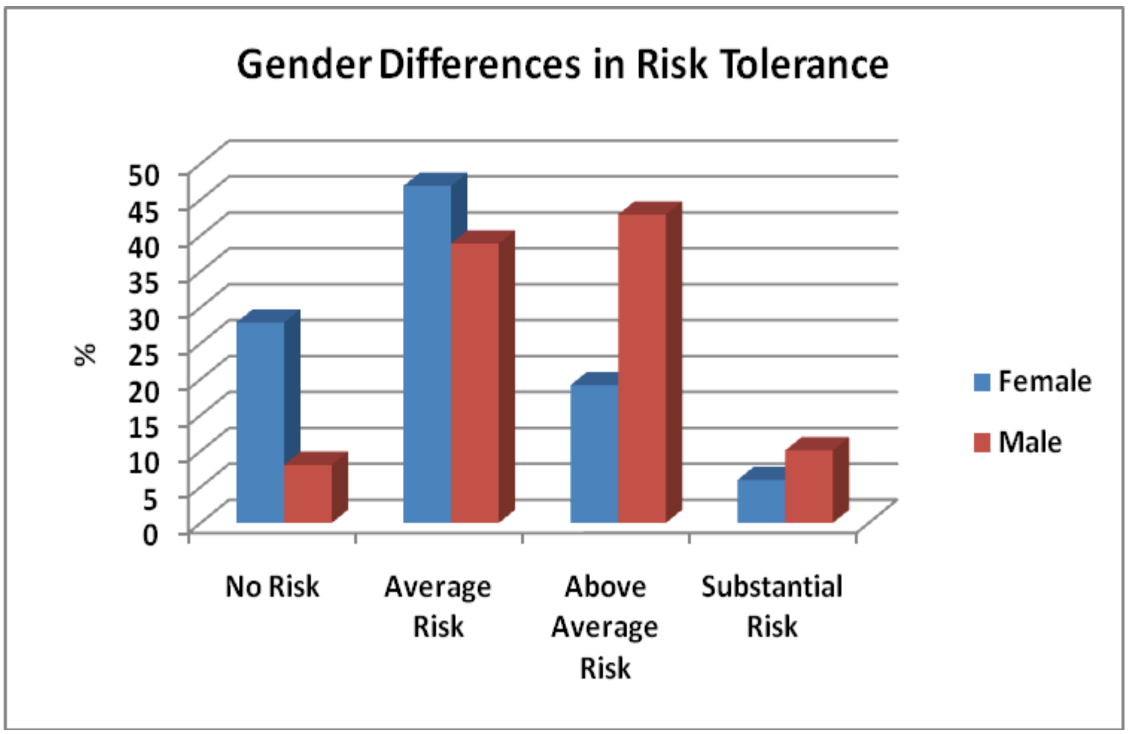

Table 3:

	Occupational Technicality (n=5,765)				
Gender	**Least Technical**	**Average Technicality**	**Most Technical**	**Total**	
Female	217	716	1,482	2,415	n
	(8.99)	(29.65)	(61.37)	100	%
Male	674	404	2,272	3,350	n
	(20.12)	(12.06)	(67.82)	100	%
Total	891	1,120	3,754	5,765	n
	(15.46)	(19.43)	(65.12)	100	%

Figure 3:

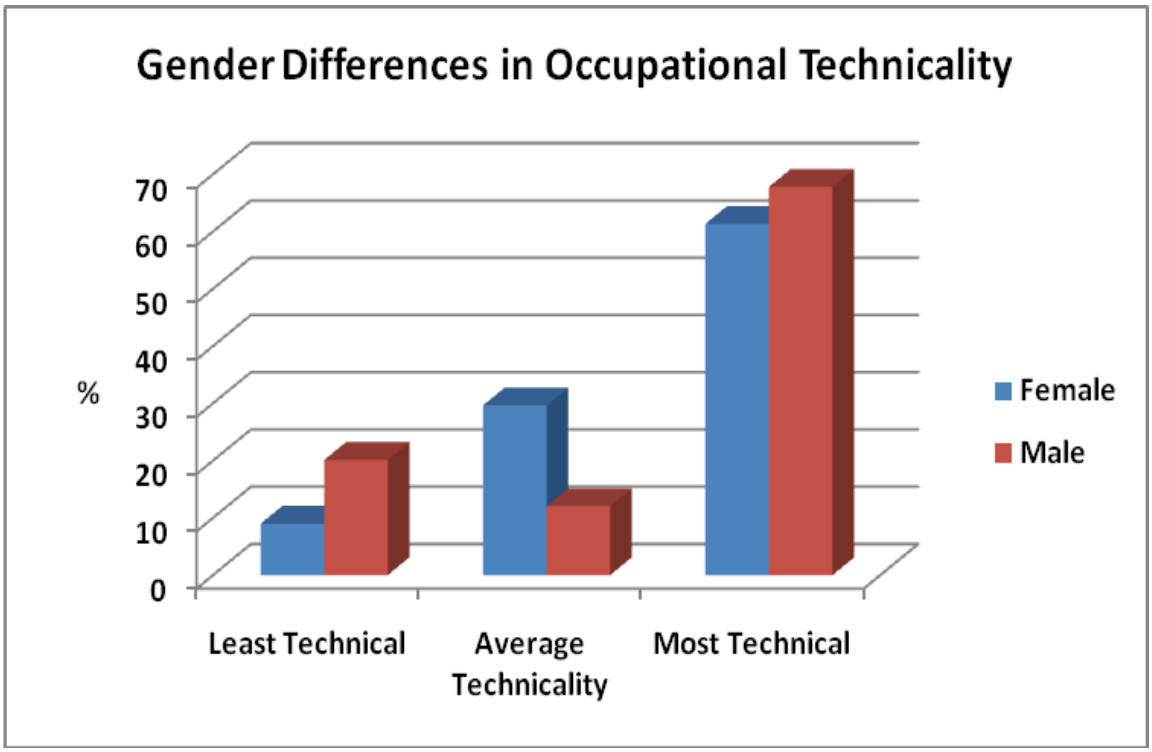

Table 4:

Percent Stock Allocation

	N	Mean	Median	SD	Min	Max
Males & Females	5,765	61.426	60	34.822	0	100
Females only	2,415	58.919	50	34.812	0	100
Males only	3,350	63.233	70	34.722	0	100

Figure 4:

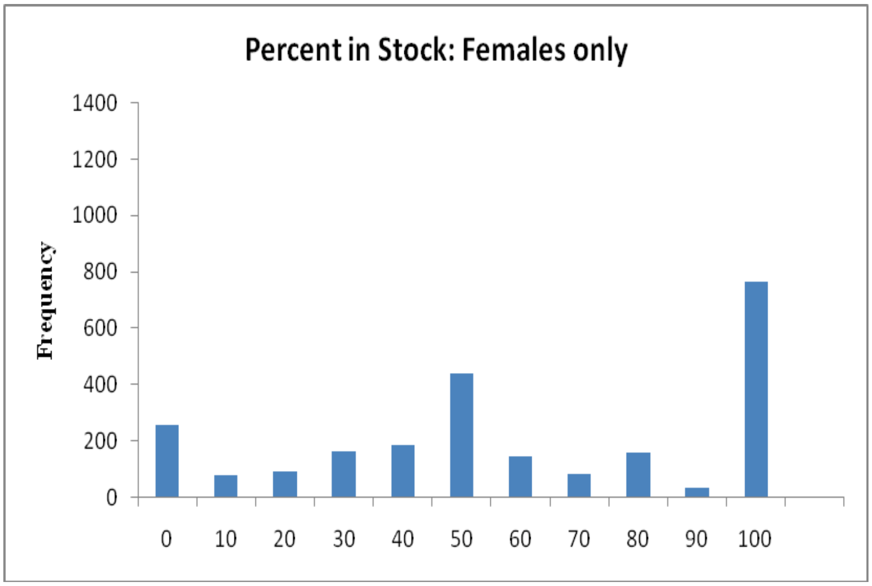

Figure 5:

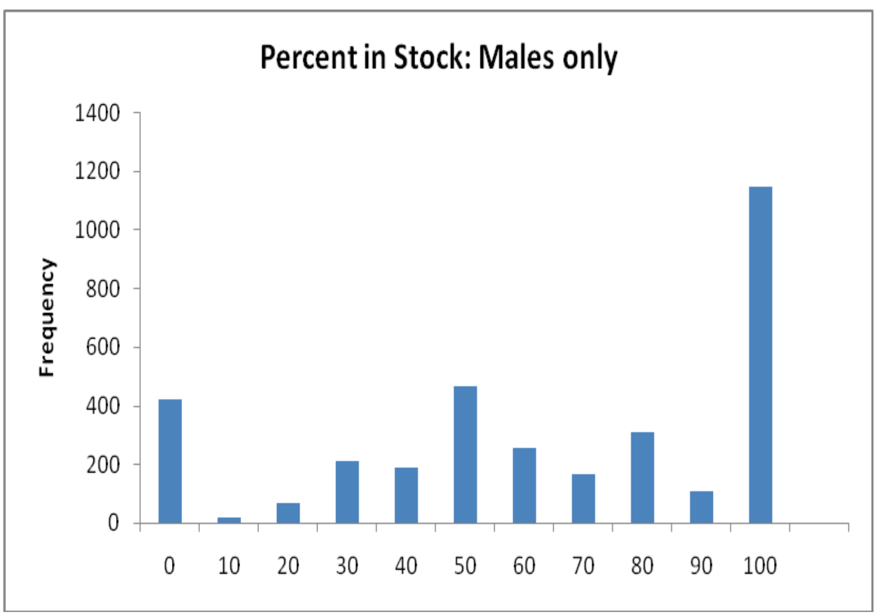

Table 5:

Descriptive Statistics for Tobit Sample Females (n=2,415) vs. Males (n=3,350)

Predictor Variable	*M*	*n*	%	*sd*	range
Age (years)	45.2			10.221	22-75
Age (years)	47.5			11.308	21-74
Marital Status		2,415			
Not Married		584	24.2%		
Married		1,831	75.8%		
Marital Status		3,350			
Not Married		396	11.8%		
Married		2,954	88.2%		
Education (years)	14.7			2.077	2-17
Education (years)	15.3			1.973	6-17
Income ($/year)	55,316.9			74,515.3	6.5-.9M
Income ($/year)	141,127.8			175,210.9	6.4-1M
Wage ($/hr)	27.6			38.405	.004-494
Wage ($/hr)	60.9			83.420	.003-913
Family Size	2.7			1,259	1-6
Family Size	3.0			1.348	1-10
Risk Tolerance (%)		2,415			
Taking no risks		372	15.4%		
Taking average risks		1,264	52.3%		
Taking above average risks		641	26.6%		
Taking substantial risks		138	5.7%		
Risk Tolerance (%)		3,350			
Taking no risks		320	9.6%		
Taking average risks		1,609	48.0%		
Taking above average risks		1,207	36.0%		
Taking substantial risks		214	6.4%		
Occupational Technicality		2,415			
Least Technical		217	9.0%		
Average Technicality		716	29.6%		
Most Technical		1,482	61.4%		
Occupational Technicality		3,350			
Least Technical		674	20.1%		
Average Technicality		404	12.1%		
Most Technical		2,272	67.8%		

Table 6:

Pooled Tobit Regression Results
Females & Males (n=5,765)

	Coefficient (SE)	Coefficient (SE)
Age	-.829 (.356)*	-.920 (.357)*
Agesq	.008 (.004)	.008 (.004)*
Married	5.350 (1.625)**	5.129 (1.625)**
Male	2.340 (1.137)*	2.312 (1.136)*
Educ	1.407 (.320)***	.280 (.617)
Income	.054 (.393)	-.001 (.393)
Wage	-.518 (.625)	-.559 (.624)
Famsize	-1.315 (.497)**	-1.356 (.497)**
Finrisk2	11.239 (1.692)***	11.869 (1.700)***
Finrisk3	17.130 (1.805)***	17.817 (1.814)***
Finrisk4	25.637 (2.541)***	25.862 (2.540)***
Occ2	4.845 (1.839)**	6.702 (12.059)
Occ3	4.833 (1.758)**	-25.462 (10.411)*
Occ2*Edu	------ -------	-.033 (.883)
Occ3*Edu	------ -------	2.129 (.744)**
Constant	40.986	57.511
Prob>Chi^2	0.0000****	0.0000****

******p<0.0001 ***p<0.001, **p<0.01, *p<0.05.**

Table 7:

Tobit Regression Results
Stratified by Marital Status

	NOT MARRIED ONLY (n=980)		MARRIED ONLY (n=4,785)	
	Coefficients (SE)	**Coefficients (SE)**	**Coefficients (SE)**	**Coefficients (SE)**
Age	3.628 (.795)***	3.667 (.802)***	-2.061 (.401)***	-2.133 (.402)***
Agesq	-.041 (.009)***	-.042 (.009)***	.021 (.004)***	.021 (.004)***
Married	------- --------	-------- --------	------- --------	------ -------
Male	7.183 (3.011)*	7.151 (3.012)**	.352 (1.239)	.360 (1.238)
Educ	-.119 (.701)	-.736 (1.103)	1.918 (.358)***	1.044 (.740)
Income	-4.495 (4.715)	-4.719 (4.720)	.145 (.416)	.120 (.417)
Wage	.064 (.114)	.069 (.114)	-5.689 (6.202)***	-6.032 (6.198)
Famsize	-6.651 (1.774)***	-6.646 (1.775)***	-.337 (.523)	-.393 (.523)
Finrisk2	19.574 (3.461)***	19.341 (3.492)***	7.578 (1.945)***	8.174 (1.957)***
Finrisk3	27.336 (3.948)***	27.056 (3.981)***	12.943 (2.052)***	13.620 (2.063)***
Finrisk4	50.430 (5.290)***	50.036 (5.314)***	17.033 (2.901)***	17.506 (2.903)***
Occ2	5.791 (3.865)**	-14.314 (23.992)	5.225 (2.078)**	15.921 (13.954)
Occ3	6.413 (3.820)*	-3.138 (22.319)	5.085 (1.969)**	-20.526 (11.959)
Occ2*Edu	------ ------	1.464 (1.717)	------ ------	-..687 (1.030)
Occ3*Edu	------ ------	.717 (1.537)	------ ------	1.781 (.864)
Constant	-35.152	-27.704	67.174	79.890
Prob>Chi^2	0.0000****	0.0000****	0.0000****	0.0000****

******p<0.0001 ***p<0.001, **p<0.01, *p<0.05**

Table 8:

Tobit Regression Results
Stratified by Gender

	FEMALES ONLY (n=2,415)		**MALES ONLY (n=3,350)**	
	Coefficients (SE)	**Coefficients (SE)**	**Coefficients (SE)**	**Coefficients (SE)**
Age	-.896 (.570)	-.943 (.573)	-1.314 (.470)**	-1.404 (.470)**
Agesq	.009 (.006)	.010 (.006)	.013 (.005)*	.014 (.005)**
Married	6.979 (2.154)**	6.762 (2.164)**	1.417 2.503	1.444 (2.499)
Male	------- -------	------- -------	------- -------	------- -------
Educ	1.233 (.462)**	.524 (1.008)	1.538 (.447)**	.038 (.796)
Income	1.422 (1.111)	1.369 (1.113)	3.963 (.813)***	3.843 (.813)***
Wage	-.445 (.616)	-.468 (.617)	-100.310 (17.226)***	-98.388 (17.202)***
Famsize	-.186 (.780)	-.151 (.781)	-1.379 (.653)*	-1.558 (.655)*
Finrisk2	13.968 (2.334)***	14.189 (2.344)***	7.031 (2.452)**	8.165 (2.473)**
Finrisk3	13.991 (2.618)***	14.240 (2.630)***	16.587 (2.536)***	17.717 (2.555)***
Finrisk4	29.367 (3.792)***	29.070 (3.813)***	21.110 (3.454)***	22.115 (3.462)***
Occ2	8.496 (3.026)**	6.160 17.342	2.439 (2.518)	5.906 (17.693)
Occ3	6.796 (3.122)*	-8.847 (15.560)	4.685 (2.170)*	-37.839 (14.325)**
Occ2*Edu	------ ------	.252 (1.324)	------ ------	-.081 (1.256)
Occ3*Edu	------ ------	1.161 (1.167)	------ ------	2.933 (1.001)**
Constant **Prob>Chi^2**	34.645 0.0000****	37.212 0.0000****	37.996 0.0000****	37.939 0.0000****

******p<0.0001 ***p<0.001, **p<0.01, *p<0.05**

Table 9:

Tobit Regression Results
Stratified by Gender and Marital Status

	FEMALES		MALES	
	NOT MARRIED	**MARRIED**	**NOT MARRIED**	**MARRIED**
	(n=584) Coefficients (SE)	**(n=1,831) Coefficients (SE)**	**(n=396) Coefficients (SE)**	**(n=2,954) Coefficients (SE)**
Age	5.481 (1.108)***	-3.723 (.671)***	.880 (1.158)	-1.682 (.515)**
Agesq	-.062 (.013)***	.040 (.007)***	-.011 (.013)	.017 (.006)**
Married	------ -------	----- ------	----- ------	----- ------
Male	------- -------	------ ------	------ -------	------ -------
Educ	-.090 (.904)**	2.269 (.541)***	-.382 (1.231)	1.666 (.481)**
Income	-14.972 (12.638)	1.599 (1.229)	-.653 5.032	4.255 (.837)***
Wage	423.959 (328.594)	-.461 (.599)	-27.532 (118.718)	-102.641 (17.530)***
Famsize	-9.575 (2.229)***	1.694 (.817)*	1.023 (3.153)	-1.250 (.677)
Finrisk2	22.715 (4.044)***	6.278 (2.913)*	2.221 (7.335)	7.761 (2.606)**
Finrisk3	18.607 (5.260)***	7.253 (3.135)*	22.201 (7.391)**	16.007 (2.703)***
Finrisk4	57.700 (7.315)***	14.135 (4.500)**	35.689 (8.929)***	18.526 (3.774)***
Occ2	10.971 (5.340)**	8.205 (3.634)*	1.671 (6.205)	3.794 (2.757)
Occ3	13.562 (5.600)**	5.500 (3.750)	2.646 (5.519)	5.863 (2.364)*
Constant **Prob>Chi^2**	-77.697 0.0000****	36.107 0.0000****	35.224 0.0000****	38.194 0.0000****

******p<0.0001 ***p<0.001, **p<0.01, *p<0.05**

Table 10:

Descriptive Statistics for 3SLS Sample Females (n=658) vs. Males (n=658)

Predictor Variable	*M*	*n*	%	*sd*	range
Percent invested in stock	67.1			26.794	5-100
Percent invested in stock	70.8			29.079	5-100
Age (years)	46.2			10.095	22-70
Age (years)	48.6			10.241	26-71
Education (years)	15.1			1.961	8-17
Education (years)	15.2			2.049	6-17
Income ($)	61,466.9			59,447.67	6.5-.375M
Income ($)	111,426.8			136,906	9.1-.95M
Wage ($/hr)	34.5			42.452	.005-384
Wage ($/hr)	48.6			61.107	.004-633
Hours Worked/Week	38.2			13.015	1-80
Hours Worked/Week	46.0			11.037	8-100
P-hat(female)	.924			.082	.67-.99
P-hat(male)	.877			.071	.56-.99
Age_{female}-Age_{male}	-2.35			4.408	-16-10
Age_{male}-Age_{female}	2.35			4.408	-10-16
Occupational Technicality		658			
Least Technical		42	6.4%		
Average Technicality		148	22.5%		
Most Technical		468	71.1%		
Occupational Technicality		658			
Least Technical		123	18.7%		
Average Technicality		60	9.1%		
Most Technical		475	72.2%		
Family Size (HH level)	3.12			1.176	2-6
Risk Tolerance (%) (HH level)		658			
Taking no risks		37	5.6%		
Taking average risks		402	61.1%		
Taking above average risks		177	26.9%		
Taking substantial risks		42	6.4%		

Table 11:

3SLS Regression Results

Equation	Observations	"R-Sq"	Prob>Chi2
Percent Invested in Stock$_M$	**658**	**.360**	**0.0000******
Percent Invested in Stock$_F$	**658**	**.231**	**0.0000******

Equation (1)		**Equation (2)**	
Percent Invested in Stock$_M$	------ ------	**Percent Invested in Stock$_F$**	----- -----
Percent Invested in Stock$_F$	.455 (.153)**	**Percent Invested in Stock$_M$**	.966 (.179)***
Income$_M$	.038 (1.750)	**Income$_F$**	.631 (1.726)
Education$_M$	-.683 (.590)	**Education$_F$**	2.082 (.667)**
FamSize	.329 (1.175)	**FamSize**	-1.484 (1.291)
Age$_M$	-2.491 (1.279)	**Age$_F$**	-.521 (1.425)
AgeSq$_M$	.026 (.013)	**AgeSq$_F$**	.005 (.016)
Wage$_M$	-.002 (.037)	**Wage$_F$**	.025 (.022)
Finrisk2	-15.304 (8.645)	**Finrisk2**	13.619 (8.630)
Finrisk3	-.186 (7.074)	**Finrisk3**	-4.686 (7.072)
Finrisk4	-13.846 (13.865)	**Finrisk4**	25.145 (11.333)**
Occ2$_M$	-1.217 (2.869)	**Occ2$_F$**	8.118 (4.257)
Occ3$_M$	7.658 (3.298)*	**Occ3$_F$**	3.221 (3.795)
P-hat$_M$	462.698 (290.110)	**P-hat$_F$**	-211.792 (265.894)
P-hatsq$_M$	-259.436 (186.210)	**P-hatsq$_F$**	98.523 (157.233)
P-hat$_F$	-82.922 (223.877)	**P-hat$_M$**	360.232 (274.354)
P-hatSq$_F$	72.937 (130.738)	**P-hatSq$_M$**	-277.540 (162.436)
MaleOlder	-.118 (.276)	**MaleOlder**	.303 (.299)
FemaleOlder	.255 (.612)	**FemaleOlder**	-.859 (.678)
Constant	-79.124	**Constant**	-19.907

******p<0.0001 ***p<0.001, **p<0.01, *p<0.05**