

**Gender Effects on Employee Participation and Investment Behavior with 401(k)
Retirement Plans**

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Abstract

This study uses the economic theory of asset allocations and the life-cycle theory of savings and investment to examine the gender effects on employee investment and savings behavior with defined contribution retirement plans. Data on retirement plans were collected from surveys administered to employees in a private-sector publishing firm (171 respondents) and a non-profit hospital (184 respondents). The data indicate that women are more risk averse than men in making asset allocations with their retirement plans, which is consistent with economic theory predictions. Males were observed to make larger savings contributions to their retirement plans than females, counter to the predictions of life-cycle theory. No gender differences were observed in levels of employee participation to the defined contribution retirement plans.

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During the past decade both private and public sector firms in the U.S. have favored the adoption of defined contribution (DC) retirement plans as an employee benefit over the more traditional defined benefit (DB) plans. Defined contribution plans are a form of employee savings plan which allows an employee to set aside tax deferred funds in investments for retirement along with tax deferred accumulations of the investments. The majority of DC plans have provisions for the employer to match partially or fully the amount the employee contributes to the plan up to a specific percentage of the base salary. This is particularly the case with respect to the 401(k) plan, the fastest growing type of DC plan and one which is used in the private sector (Porterba, Venti & Wise, 1998).

With a DC plan the employee assumes the responsibility for asset allocations of the retirement funds between equities and bonds of varying levels of risk and potential investment return that will determine the final amount of the retirement income. On the other hand, the DB plan, places greater responsibility on management of a firm to provide a retirement income that is determined according to a formula that typically is a function of the employee's pre-retirement income and the number of years of company service (Dulebohn, Murray & Sun, 2000).

The trend whereby the DC plan has become a major component of retirement benefits for US employers provides significant challenges to employees to assume responsibility to produce a satisfactory retirement income for themselves. While previous generations of employees enjoyed paternalistic DB plans that provided a known retirement income based on a formula, these DB plans or pensions are becoming increasingly unavailable to

new entrants to the labor force. Employees whose primary source of retirement funds is a DC plan will need to take risks with their retirement funds in order to have their investments appreciate enough over the length of their work life to meet their retirement goals. It is important to understand how employees use their DC plans, since DC plans require that employees behave proactively with their retirement benefits in order to achieve their financial goals (Even & Macpherson, 2000). Employees who act passively and neglect either participating in the DC plan or making effective asset allocations to the plan could anticipate a less than desirable retirement income which eventually could affect the timing of their decision to retire. Moreover, evidence exists to show that there is currently a "retirement gap" between men and women due to differences in the labor market, retirement plan coverage, household responsibilities, and in investment decision making (Bajtelsmit & Bernasek, 1999; Even & Macpherson, 1994).

This study is concerned about comparing gender differences in employee behavior under DC plans. In particular, this study examines the differences between men and women with respect to (1) their propensity to take risks with their retirement fund allocations, (2) their saving behavior as measured by the size of their allocations for retirement, and (3) the decision to voluntarily participate with the DC plan after controlling for other factors. The findings will examine whether in the presence of the retirement gap men and women behave differently or similarly with respect to dealing with DC plans. The findings should also reveal whether DC plans exacerbate, or have a neutral or ameliorating effect on the retirement gap.

The data for this study were collected from employees who revealed their experiences with DC plans in two different organizations and involved administering a survey to the

respondents in each firm to learn how they used their retirement plans. One organization that was surveyed was a private firm that provided a 401(k) plan to its employees, and the other organization surveyed was a non-profit sector organization that provided a 403(b) plan. A separate analysis was performed on each of the two research sites to understand the gender differences and similarities with employees' use of their specific type of DC plan. Next, the findings of both organizations were compared to learn what, if any, results could be generalized across different types of DC plans and firms.

BACKGROUND, THEORETICAL DEVELOPMENT AND HYPOTHESES

The gender retirement gap literature reports that men have fared better than women in the rate of retirement plan coverage and the amount of retirement plan benefits provided to the retiree. In 1995 40 percent of working men and 32 percent of working women were covered by a defined contribution (DC) plan (Sunden & Surette, 1998). Further, in 1993 62 percent of working men and 56 percent of working women were reported as having some form of retirement plan coverage, either a DC or DB plan (Even & Turner, 1993). Even and Macpherson (1994) reported in a study based upon data collected from the Newly Entitled Beneficiary Survey that female retirees' received 55 percent of male retirees' pension benefits.

Factors in the literature that explain the presence of the gender retirement gap include (1) the gender pay gap; (2) women's greater likelihood to have discontinuous work histories; and (3) women's lower propensity to be represented by unions. First, the gap in pay between men and women has long been observed in the U.S. and other countries and has been well documented (Stanley & Jarrell, 1998; Currie, 1997). A significant amount

of this gap has been explained by the fact that a majority of working women have trained to work in female dominated occupations (such as nurse, teacher, clerical workers or librarian) leading to an over supply of labor available to these occupations. This "crowding effect" of females into a limited number of occupations has resulted in lower rates of pay than comparable males who tend to be more dispersed in their occupational choices (Carrington & Troske, 1995; Bielby & Baron, 1984). Retirement benefit allocations to retirees in the U.S. directly correspond to the level of income that is earned by an employee prior to retirement (Milkovich & Newman, 1999). Because women on average have smaller incomes than men from which to contribute to a DC plan, or apply to the formula that governs benefits for a DB plan, the presence of the pay gap means that women are likely to have more modest retirement incomes than men. Further, since women have longer life expectancies than men, by an average of six years according to the National Center for Health Statistics, women's retirement incomes also need to be distributed over a longer period of time on average than that of men. Therefore women must deal with more uncertainty in planning how to deploy their retirement resources over a greater span of time than men.

A second factor that contributes to the retirement gap affecting women's retirement prospects is due to the fact that women often have discontinuous work histories as a result of the choice to focus on home responsibilities such as child-rearing (Talaga & Beehr, 1995). While the differences between men and women's labor force participation rates have been declining, studies of the division of labor in households indicate that men's share of the family responsibilities has been slow to increase (Blau, Ferber, & Winkler, 1997). Consequently women continue to assume the preponderance of

household responsibilities even while engaging in labor market activities. The difficulty of trying to balance work and family responsibilities motivates many women to reduce their hours of paid work or take unpaid leaves while their children are young. For example, the U.S. Census Bureau reported in 1998 that 41 percent of women with infants younger than one year of age did not participate in the labor force, while only 27 percent of women remained at home when their children were more than one year old (Lewin, 2000). Women who take breaks from their labor market activities to care for their children lose the opportunity to take advantage of employer sponsored retirement plans for the amount of time that their labor market activity has been put on hold. Further, under DC plans, women who leave the labor market for several years in their 20s and 30s lose valuable opportunities during those years to take advantage of the compound interest accumulations of retirement fund contributions over the time that remains until retirement. Aggressive saving later in one's life may not make up for the lost opportunities to save and accumulate compound interest during the critical period early in one's career. Males, on the other hand, are more likely to experience continuous labor market activities and are thus able to capture larger amounts of retirement earnings from retirement contributions made without interruptions early in the career that have lengthy time periods to be compounded into a sizeable amount of retirement wealth, further increasing the retirement gap between men and women.

Finally, a lower percentage of women are represented by unions than men due to the fact that many women work in occupations that have been more difficult to organize into unions than men (Bajtelsmit & Bernasek, 1999; Freeman & Medhoff, 1984). Since unions through their collective bargaining strength have been able to capture a wage

advantage that averages about 9 to 12 percent above the wage of comparable nonunion firms, men have been more likely to experience this union wage advantage than women (Jarrel & Stanley, 1990). The outcome of the male propensity to experience higher earnings from union coverage compared to females can translate directly, through larger contributions, into higher retirement income for males at the end of the career.

Gender Effects on Risk Taking and Asset Allocations

Individual differences in attitudes toward risk affect the choices made in allocating funds to DC retirement plans. Highly risk-averse individuals are likely to find their retirement funds do not perform as well as those who have less aversion to taking risks. This is so because over the long-run, equities, which are investments that bear greater risk, have outperformed fixed-return investments such as bonds, which are likely to be preferred by individuals who have a strong aversion to risk taking (Vora & McGinnis, 2000).

Studies that have examined individual differences in risk taking have reported that men tend to be more risk tolerant than women (Barsky, Juster, Kimball & Shapiro, 1997; Jianakopulos & Bernasek, 1998). For example in a 1989 Survey of Consumer Finances sponsored by the Federal Reserve System, 60 percent of women and 40 percent of men said they were unwilling to take any financial risks with their retirement investments.

Sitkin and Pablo (1992) suggest that a key factor that explains an individual's risk aversion attitude is the past experience in a problem domain that involves the risk. A decision-maker with more experience in the problem domain becomes familiar with the decision choices and outcomes and develops a more tolerant attitude toward risk in the context of the problem (Slovic, 1972). In the context of financial risk taking, males are

expected to have more experience making decisions that involves risk. First, males have a greater likelihood during their work history of having participated in an employer-sponsored DC plan than females (Sunden & Surette, 1998). Second, females may not have access to the same quality and amount of investment information than males. This is so because often investment information is shared in discussions over drinks after work or at the golf course in informal networks to which women may not be included (Bajtelsmit & Bernaskek, 1999). This lack of information is likely to alter women's decision choices and familiarity with risk which leads to the following hypothesis.

Hypothesis 1: In the context of retirement investment decisions, women will have a greater aversion to risk than men, after controlling for other factors.

The economic model that applies to investor asset allocations asserts that the longer the time horizon before retirement, the greater the opportunity an individual investor has to take risks with equities (Siegel, 1994; Ibbotson & Sinquefeld, 1989). While equities have greater risk-return variability, they also have produced higher rates of return over the long run. A long time horizon also permits the investor ample opportunity to recover from stock picking mistakes by selecting better alternatives. Thus it follows that investors with long investment time horizons should have a smaller portion of their investment allocated in fixed income assets such as bonds, which over the long run have produced smaller returns than equities (Siegel, 1994). Further, the economic asset allocation model suggests that as the investor approaches retirement age, the asset mix between equities and bonds should be re-allocated so that higher proportions of bonds and smaller proportions of equities are in the portfolio as the time horizon before retirement decreases.

Research based on historical returns of differing asset classes provides evidence that as investment horizon lengthens, investors should allocate higher levels of their funds to equities in their portfolios (Bierman, 1997; Butler & Domian, 1991). These findings agree with practitioner advice given to employees who allocate their assets in large retirement funds such as Vanguard or TIAA-CREF and the oft-cited rule of allocating 100 minus the individual's age to equity (Waggle & Englis, 2000; Bogle, 1994). Applying this rule, a 30 year old individual would have 70 percent of retirement assets in equities, while a 65 year old person would have 35 percent in equities. Thus it is not surprising that age has been found to influence the decision to allocate assets to equities (Jagannathan & Kocherlakota, 1996; Barsky et al., 1997).

Besides age, other individual differences also influence the asset allocation decision between equities and other investments. Level of wealth (MacCrimmon & Wehrung, 1990; Waggle & Englis, 2000), and level of education (Bodie & Crane, 1997; Waggle & Englis, 2000) have been reported to be positively related to allocations in equities while female gender (Sunden & Surette, 1998; Bajtelsmit & Bernasek, 1996) and married marital status (Sunden & Surette, 1998) have been reported to be negatively related to equities in an investment portfolio.

Women are expected to allocate a smaller portion of their retirement funds to equities than men for two reasons. First, it has already been asserted that women on average are likely to have a greater aversion to risk than men. Since equities are riskier investments than bonds or other alternatives, women are expected to have a greater aversion to allocating their retirement assets to equities than men. Second, women are likely to have less access to useful investment information than men. As pointed out previously, a great

deal of investment information is exchanged in informal networks that may not be as available to women as to men. Formal channels of communication that explain tactics for making asset allocations for defined contribution retirement benefits are not always available in many organizations and if they are available they are often poorly designed so that employees may not understand how to use their benefits (Wilson, Northcraft & Neale, 1985). In addition, regulations that govern retirement benefits place restrictions on employers from giving specific investment advice to employees or else face a liability (Faller, 1999). As a result employees are being asked to assume responsibility to make their own asset allocations for their retirement. With less access to information on making investment choices, women are expected to display a greater aversion to allocating their retirement funds in equities. This leads to the next hypothesis:

Hypothesis 2: Women are expected to allocate a smaller portion of their retirement funds to equities than men, after controlling for other factors.

Gender Effects on Savings Behavior

The life-cycle theory of savings and consumption has been used to explain the decision to save (Hurd, 1990; Lazear, 1994; Elder & Rudolph, 2000). According to this theory individuals make economic decisions to maximize lifetime utility. This means that while individuals are working they save a portion of their income in order to consume at levels after retirement that are similar to consumption levels prior to retirement. This implies that income should be an important factor that affects the level of saving. Individuals with higher incomes will need more savings to maintain their standard of living compared to those who are accustomed to living at lower incomes. The empirical literature provides substantial evidence that wealthier individuals indeed do

save more for their retirement (Engen, Gale & Uccello, 1999; Mitchell & Moore, 1998). It also indicates that as incomes rise, individuals devote smaller proportions of their income to consumption and larger portions of their income to saving.

Life cycle theory suggests that individuals try to gauge the amount they need to save and put into their retirement plan based on their anticipated life span as well as their financial goals of accumulating enough wealth from their retirement plan to support their consumption needs. Since women should have a longer anticipated span of life than men on average, women can be expected to save more aggressively than men in order to sustain their consumption at retirement over a longer period of time. Thus, we would expect women to be making larger contributions to a defined contribution plan than comparable men, after controlling for income and other factors that affect saving.

Hypothesis 3: Women are expected to make larger contributions to their defined contribution retirement plans than men, after controlling for other factors.

Other factors that have been reported to influence an employee's defined contribution plan retirement saving include age, education level, marital status, and number of children at home (Elder & Randolph, 2000; Mitchell & Moore, 1998; Bajtelsmit & Bernasek, 1999; Engen, Gale & Uccello, 1999).

Gender Effects on DC Plan Participation

The decision to participate in a defined contribution plan (by making pre-tax payroll contributions to it) can be viewed as a special case of the decision to save by allocating funds to a tax deferred savings plan. Recent surveys have indicated 20 to 25 percent of employees who are eligible to enroll in employer-sponsored 401(k) plans, select not to participate in the savings plan (Wang, 1999). In making the decision to

participate, the employee must not only take into consideration one's propensity to save or consume but also consider his or her preference for saving in a tax sheltered or a non-tax sheltered savings plan. Non-tax sheltered savings plans allow an individual greater flexibility to withdraw savings and use them for consumption. Tax sheltered savings plans, on the other hand, provide less liquidity of savings for an individual and require substantial tax penalties for taking distributions made before the age of 59 1/2. But in return for less flexibility in savings withdrawals, tax sheltered savings plans defer taxes on contributions as well as to the accumulated interest on the invested funds (Butler, 1995). Thus one can generate greater retirement wealth in a specific investment within a tax sheltered savings plan than the same investment situated in a non-tax sheltered savings account. Therefore, it is expected that tax sheltered savings plans, such as 401(k) plans, to be particularly attractive to women who are affected by the retirement gap as a way to accelerate the build up of their retirement savings.

The application of life-cycle theory of savings and consumption allows us to make some predictions of an individual's decision to participate and save in a DC plan. Other things being equal, women's longer life span and need for retirement income over a greater duration of time is likely to influence women to have stronger preferences for saving over consumption, and have a greater propensity to allocate funds to tax sheltered savings plans compared to men. Thus if both men and women are presented with similar opportunities to participate in a DC retirement plan, women would be expected to display a stronger propensity to participate in the DC plan.

Hypothesis 4: Women are expected to show a greater propensity to participate in a DC plan than men, after controlling for other factors

These 4 hypotheses were tested using data collected at two research sites.

METHODS

Research Sites and Data Collection Procedures

For the purpose of testing the four hypotheses, two research sites were selected to administer a survey that contained measures designed to test the hypotheses of gender effects on employee investment and savings behavior with defined contribution retirement benefits. The organizations had to fulfill the following three criteria to be considered as appropriate research sites: (1) the organization offered a defined contribution (DC) retirement plan to employees for a minimum of three years which was deemed sufficient time for the employees to understand the features of the DC plan in order to answer the survey questions; (2) the workforce in the organization did not contain more than 75 percent of either men or women so that a sufficient number of respondents from each gender could be obtained for the analysis; and (3) the organization needed to have been in existence for a minimum of 10 years so that the age demographics of the workforce would more likely be representative of the general population rather than skewed towards younger employees which would be more likely to happen in recently established organizations.

The data were collected via a survey instrument administered to full-time employees during the February-April, 2000 period. Employees at both sites were informed that their responses would be kept confidential by the researchers and they were promised to receive a report that summarized their aggregate responses in exchange for their

participation on the survey. Only full-time employees who were eligible to receive their employer's full benefits package were asked to participate in the survey.

Research site one. The first research site was a private sector textbook publisher with over a billion dollars in annual revenues and located in the Middle Atlantic region of the United States. The DC plan consisted of a 401(k) plan that provided a 100 percent employer matching contribution up to three percent of an employee's annual salary. The organization also provided a traditional defined benefit plan in addition to the DC plan for its retirement benefits. A total of 171 surveys were returned from a mail-out sample of 500 employees for a 34 percent response rate. The sample of respondents was compared to the overall company employee population across the gender (male or female) and DC plan participation (yes or no) variables and no significant differences ($p < .05$) were observed. The gender distribution of the survey respondents was 56 percent women and 44 percent men. The average respondent was between 30 and 39 years of age, with a 4-year college degree, and between 4 and 6 years of company experience.

Research site two. The second research site was a non-profit hospital with approximately 500 million dollars of annual revenues located in the Western United States. The DC plan at this research site consisted of a 403(b) plan that did not have any provisions for employer matching contributions to those made by employees. A 403(b) plan is the non-profit sector equivalent of a 401(k) plan and both have very similar provisions for employee eligibility, types of asset allocation choices, and maximum amount of funds that can be contributed by the employee to the plan. The organization also provided a traditional defined benefit plan in addition to the defined contribution plan for its retirement benefits. Surveys were completed on a voluntary basis by

employees as part of a wider scope data gathering activity that was administered at the same time at the organization facilities. A total of 184 employees volunteered to complete the research survey out of 500 employees involved in the larger on going data gathering task for a 37 percent response rate. The sample of respondents was compared to the overall employee population in the organization across the gender (male or female) and DC plan participation (yes or no) variables and no significant differences ($p < .05$) were observed. The gender distribution of the survey respondents was 73 percent women and 27 percent men. The average respondent was between 30 and 39 years of age, with a high school degree, and between 4 and 6 years of experience at the hospital. The sample characteristics of the two research sites are summarized in Table 1.

Measures

Asset allocation. The asset allocation variable measured the percentage of an employee's retirement funds allocated to equities as a percentage of total retirement funds. Each respondent was asked in a question on the survey to report the percentage of their retirement contributions that most closely represented the percentage of their retirement funds that are currently allocated to equities.

Risk taking. The measure of risk taking used in this study is an adaptation of the risk aversion scale developed by Barsky et al. (1997) to examine individuals' propensity to take risks with household wealth for retirement and other financial goals. The risk aversion scale asks two questions about one's willingness to make gambles over one's lifetime income based on a hypothetical set of circumstances. The hypothetical situation is the following:

Suppose that you are the only income earner in the family, and you have a good job

guaranteed to give you your current (family) income every year for life. You are given the opportunity to take a new and equally good job, with a 50-50 chance it will double your (family) income and a 50-50 chance that it will cut your (family) income by a third. Would you take the new job?

If the answer to the first question is "yes", the respondent is given directions to answer the following question:

Suppose the chances were 50-50 that it would double your (family) income, and 50-50 that it would cut it in half. Would you still take the new job?

If the answer to the first question is "no", the respondent is given directions to answer the following question:

Suppose the chances were 50-50 that it would double your (family) income and 50-50 that it would cut it by 20 percent. Would you then take the new job?

The answers to the two questions separate the respondents into four specific risk preference levels. The responses to the questions can be ranked according to the degree of risk aversion with the highest level of risk aversion (with "no" answers to both questions) assigned a "1" and the least amount of risk aversion (with "yes" answers to both questions) assigned a "4". Thus, the risk aversion scale consists of an interval scale with a range of responses from one to four. Individuals who respond to the scale with the least amount of risk aversion (which corresponds to a 4 on the scale) are expected to be more willing to allocate a larger portion of their retirement funds in equities than individuals who generate a lower response on the risk aversion scale. Individuals with the strongest aversion to risk (which corresponds to a 1 on the scale) are expected to allocate smaller portions of their retirement funds to equities, and relatively larger

portions of their funds to fixed investments such as bonds, which represent lower investment risks.

Size of annual contribution to DC plan. The size of the respondent's annual contribution to the defined contribution retirement plan consisted of a 6-point interval scale that ranged from 1, "less than one thousand dollars" to 6, "nine to ten thousand dollars". Ten thousand dollars per year is the maximum size annual employee contribution to the 401(k) or 403(b) DC retirement plans examined in this study that were permitted under the law in 1999. The year 1999 was the year that respondents were asked to report on for assessing the size of their DC plan contributions.

Participation in employer's DC plan. Respondents were asked if they currently participate in their employer's DC retirement plan with a choice of a yes or no response. A dummy variable was developed from these responses with a "yes" coded as one, and a "no" coded as zero.

Gender. Respondents were asked to self report their gender on the survey. Gender was operationalized as a dummy variable with males coded as one and females coded as zero.

Control variables. Household income was used as the measure of the income control variable because retirement decisions are made within the context of the resources of the household (Even & Turner, 1999). Household income was self reported and represented annual household income in 1999. Household income was operationalized as a 9-point scale, ranging from 1, "less than \$30 thousand," 2, "\$30 to \$39 thousand," to 9, "\$100 thousand or over."

The measure for education consisted of a dummy variable that indicated whether the respondent attained a 4-year college degree (coded as one) or not (coded as zero). Company experience consisted of a 5-point scale that represented the number of years of experience in the company. Age consisted of a 5-point scale that represented the respondent's age in years. Data on marital status and number of children were collected for the study but could not be used in the analysis due to a low response rate to provide answers to these questions by the respondents. Additional details on the codes applied to all the variables used in this study are provided in Table one.

[Insert Table 1 about here]

Analysis

Separate regression analyses were performed on data collected from each of the two research sites. Research site one used a 401(k) DC plan and is so identified, while research site two used a 403(b) DC plan and is identified as such in the analysis. Only responses from respondents who indicated that they participate in the DC plan in their company were used in the regressions for hypotheses 1-3, which examined employees' behavior with respect to dealing with DC retirement plans. All respondents, participants and non-participants, were used in the test of hypothesis 4, which examined gender effects on participation in the retirement plan.

In order to test hypothesis 1, which examines the gender effect on risk taking, an ordinary least squares (OLS) regression analysis was performed on the gender and control variables, which were entered as a block into the regression. Next, hypothesis 2, which examines the gender effect on asset allocations, was tested with a hierarchical OLS regression analysis performed on the gender and control variables entered in the first step

(model 1), and with a gender by age interaction variable entered separately in the second step (model 2). An additional control variable to control for risk taking (the risk aversion scale) was added in the analysis of asset allocation. A gender by age interaction variable was added to the asset allocation regression to reveal information on whether men or women re-allocate their assets by having fewer equities and more bonds as they get older and approach retirement age. Hypothesis 3, which examines the gender effect on the size of the annual contributions to the DC retirement plan, is tested with an OLS regression analysis performed on the gender and control variables which were entered together as a block into the regression. Finally, to test hypothesis 4, which examines the gender effect on the propensity to participate in the DC retirement plan, a logistic regression analysis was performed on the gender and control variables, which were entered as a block into the regression. It is appropriate to use logistic regression when the dependent variable, participation, consists of a dummy variable which is how participation was coded. The sign and level of statistical significance of the main effects of the gender variable in all the regressions are examined to test each of the 4 hypotheses.

RESULTS

Only the respondents who indicated in the survey that they participated in their company-sponsored DC retirement plan were used in the regressions that examined the gender effects on risk taking, asset allocation and size of employee annual contributions to the DC plan (hypotheses 1-3). At research site one, which used a 401(k) DC retirement plan, 164 out of 171 respondents indicated that they currently participate in their employer-sponsored DC, which resulted in a 96 percent participation rate. At research

site two, which used a 403(b) DC retirement plan, 99 out of 184 respondents indicated that they currently participate in their employer-sponsored DC plan, which worked out to be a 54 percent participation rate. The disparity in the two employee participation rates at the research sites can be explained in part by the employers' policy on matching contributions. At research site one the employer matched 100 percent of an employee's contribution up to 3 percent of the base salary, whereas at research site two the employer did not provide any matching contribution to what an employee contributes to the plan. Thus, the employer provided some attractive economic incentives for employees to participate in the 401(k) plan at research site one in addition to the tax deferred benefits provided by the plan.

Table 2 summarizes the results of the regression analysis on risk taking for the samples of employees at both research sites. For the employees that used the 401(k) plan, the gender variable was significant ($p < .05$) and positive, which indicates that men have less aversion to risk than women. This finding agrees with the prediction of hypothesis 1. The age control variable was significant and negative ($p < .05$) at this research site, suggesting that older respondents had a greater aversion to risk than younger ones. Neither the gender variable nor any of the control variables reached statistical significance in the regression at the second research site where employees used the 403(b) plan. Thus, the analysis provided evidence in support of hypothesis 1, which predicted that women would have a greater aversion to risk than men.

[Insert Table 2 About Here]

Table 3 summarizes the results of the regression analysis on asset allocations made to DC plans by the employees who completed the survey. Referring to model 1 at research

site one, where employees used a 401(k) plan, there was a positive and significant ($p < .05$) gender effect on asset allocations, which measured the percentage of stock in an employee's retirement investment portfolio. This finding indicates that men allocated a larger percentage of their retirement contributions to equities than women, as was predicted in hypothesis 2. The data also revealed that the risk taking control variable was significant ($p < .05$) and positive suggesting that employees that are less averse to risk are more likely to allocate retirement funds to equities than those who are more risk averse. The regression in model 2 for employees who use the 401(k) plan revealed a gender by age interaction effect that was significant ($p < .05$) and negative. The negative sign of the gender by age interaction variable suggests that older men allocated fewer of their funds to equities and more of their funds to bonds compared to younger men. The older women on the other hand, made similar allocations to equities as the younger women. This finding suggested that as respondents got older and approached their retirement age, men were more likely to change the composition of their retirement portfolios than women. For the sample of respondents that used the 403(b) plan, neither the gender main effect (model 1) nor the gender by age interaction effect (model 2) reached statistical significance. Interestingly, the education control variable was significant ($p < .01$) and positive for these respondents, showing a positive relationship between college-educated respondents and making allocations of equities into their retirement portfolios. To conclude, the results provided evidence in support of hypothesis 2, which predicted that women would allocate smaller portions of their retirement funds to equities than men.

[Insert Table 3 About Here]

Table 4 summarizes the results of the regression analysis on the size of annual contributions made to the DC plans by the respondents. With respect to the respondents using the 401(k) plan at research site one, there was a statistically significant ($p < .05$) and positive gender effect on the size of the annual employee contributions to the DC plan. This finding of the gender effect suggested that men make larger contributions to their employer-sponsored DC plan than women and is not in agreement with hypothesis 3 which predicted that women would make larger contributions than men to their retirement plan. Other significant control variables were the attainment of a 4-year college degree ($p < .01$) and household income ($p < .01$) which were both positively related to the size of the annual employee contribution to the retirement plan. The gender variable did not attain statistical significance for the employees who used the 403(b) plan at research site two. The control variables in the regression analysis of the users of the 403(b) plan that attained statistical significance were employee age ($p < .01$) and household income ($p < .01$) which were both positively related to the size of the annual employee contribution to the retirement plan. Therefore, hypothesis 3 is rejected, which predicted that women would make larger contributions to their DC plans than men after controlling for other factors. However, the data revealed that a gender effect was present in the analysis of employee contributions to the retirement plan, but not in the predicted direction. Thus, the results found an inverse relationship compared to the one predicted by hypothesis 3.

[Insert Table 4 About Here]

Table 5 summarizes the results of the logistic regression analysis on employee participation with the DC plan at both research sites. The gender effect was not

statistically significant at either the site that used the 401(k) plan (research site one) or at the one that used the 403(b) plan (research site two). Company experience was statistically significant ($p < .01$) and negatively related to participation with the DC plan at both research sites. In addition, the attainment of a 4-year college degree was statistically significant ($p < .01$) and positive for employees using the 403(b) plan at research site two. However, since the gender variable did not attain significance in its relationship with employee participation for the logistic regression at either of the research sites, it is concluded that hypothesis 4 is rejected.

[Insert Table 5 About Here]

To draw some conclusions from the results, the data in the analysis supported two of the four research hypotheses. There was evidence to support the prediction that women who participate in DC retirement plans are more risk averse than men (hypothesis 1), and that women allocate proportionally fewer of their retirement funds to equities in their DC retirement plans than men (hypothesis 2). The data also revealed a gender effect that showed that men made larger contributions to their DC retirement plans than women which was opposite the predictions of male and female savings behavior as it relates to retirement (hypothesis 3). In addition, there were no gender effects observed that differentiated the participation of men and women with respect to being involved with an employer-sponsored DC retirement plan (hypothesis 4). So the data did not support hypotheses 3 and 4. Finally, the source of the significant findings came primarily from the research site that used the 401(k) plan which is representative of private sector firms. The non-profit sector research site, which applied the 403(b) plan, did not reveal meaningful gender differences. Therefore the findings are more likely to generalize to

private sector employees and less likely to generalize to employees working in the non-profit sector.

DISCUSSION AND CONCLUSIONS

This study provided empirical evidence that agrees with experimental findings from the literature on gender differences in risk taking (Barsky et al., 1997). It shows that within the context of making asset allocations for defined contribution retirement plans, women on average are more risk averse with their asset allocations than men. It also found that men displayed attitudes with less aversion to risk taking with respect to retirement funds than that of women. The findings suggest that the risk-taking behavior of men and women as related to making asset allocations with their retirement funds are consistent with their expressed attitudes toward taking risks.

An interesting finding that was observed in this study came from the gender by age interaction variable in the regression analysis of gender effects on retirement asset allocations. The data showed that as men approach retirement age they allocated their assets more conservatively, placing less emphasis on stocks, compared to the younger men. However, as women approached retirement age they maintained similar asset allocations between equities and bonds as the younger women. One possible interpretation of this finding is that women may have less knowledge about making asset allocations with their DC retirement plans and may not be aware that it is advisable to re-allocate their funds more conservatively as they approach retirement age. A second possible explanation is that women rationally decide to keep their retirement asset portfolios fixed with the same proportion of equities and bonds as they approach retirement age because they hope to compensate for their longer life span and relatively

smaller retirement funds compared to men. This second explanation suggests that older women anticipate having greater returns on their investments by maintaining their investments in equities, which can produce higher returns, than if they re-allocated their retirement assets and placed a greater emphasis on bonds. A test of these two possible explanations of women's retirement asset allocation decisions would best be undertaken with a longitudinal research design in future research that tracks a cohort of women over an extended period of time.

The research findings did not support the empirical test of life cycle theory of savings (Hurd, 1990; Lazear, 1994), which predicted that women should make larger contributions to their DC plan and have higher levels of participation in the plan than comparable men. The basis for this prediction was due to women's expectations of living longer than men, which would require more retirement savings to maintain the same level of consumption over a longer period. Indeed, the findings showed that men made larger contributions to their defined contribution plan than comparable women, which is opposite the prediction. A possible explanation for this unexpected finding is that women may still save more for retirement than men, consistent with life cycle theory, but may keep a relatively greater portion of their retirement savings in a non-tax deferred savings account (for example, a money market fund offered by a bank) in order to have greater access to their funds. This may explain why women made relatively smaller DC plan contributions than men. Since women are more likely than men to take unpaid leaves from full-time employment to care for newborn infants or other dependents, they may have a preference to place more of their savings into accounts that give them greater access to the funds to use for consumption needs. Tax-deferred savings plans such as DC

retirement plans have many more restrictions on taking money out for paying bills and other needs for cash.

The research findings from this study on gender effects on DC retirement plans suggests that women may not be taking full advantage of the opportunities presented by tax deferred retirement plans. While the data show that women are just as likely as men to participate in the retirement plan, the size of their annual contribution is likely to be smaller and their asset allocations are likely to be more risk averse than those of comparable men. Thus the overall effect of DC retirement plans on the gender retirement gap is likely to range from neutral to slightly negative. Some approaches to remedy the retirement gap, based on the findings, would be to (1) develop company policies that encourage women to make larger contributions of their income to the DC plan; and (2) find ways to change women's aversion to risk which prevents them from investing optimal portions of their retirement funds in equities to take advantage of the long-term potential of equities to produce more income for retirement.

A limitation of the findings of this study is that the significant findings of gender effects on retirement asset allocations, risk taking and annual employee contributions came only from the private sector research site that used the 401(k) plan. Significant gender differences were not observed in the non-profit research site that used the 403(b) plan. The differences in gender effects observed between these two sites suggest that the findings are most likely to generalize to private sector settings rather than public or non-profit sector settings. The lack of agreement between the private sector and non-profit sector research sites does not appear to be a serious limitation, since the private sector contains over 80 percent of the U.S. labor force. Moreover the 401(k) plan is the most

popular form of employer-sponsored DC plan. Therefore, the findings should generalize to employer-sponsored 401(k) DC plans which should be of significant interest to scholars who examine gender effects on retirement plans.

Implications for the Management of Retirement Funds

An important implication for the management of retirement funds that is suggested by this research is that the education of women about retirement investing should be given a high priority by firms that provide retirement benefits. The results of this study indicate that women are more conservative than men when it comes to allocating their DC contributions in equities. Therefore, employer provided investment education may reduce women's tendency to be more averse than men to investment risk. Rather than providing generic retirement benefits seminars offered to both of the genders, it could be beneficial to develop a tailor-made version of the benefits seminar to the specific needs of women. Some key elements of the female-targeted retirement education would be teaching women to be more comfortable with taking risks with their retirement assets and stressing the importance of taking full advantage of the power of compound interest by making sizeable contributions to a tax deferred defined contribution retirement plan.

It has been observed that some of the larger brokerage firms have recently begun to design different investment seminars just for women. For example Charles Schwab, the discount brokerage firm, offers investment seminars to groups of women that takes a different tack than that of its other seminars given to men. The seminar for women provides time for the attendees to socialize and get to know each other over coffee and snacks. The seminars avoid technical financial jargon and relate financial planning to real-life situations, such as getting divorced, having a child or becoming a widow (Lee,

2000). While the results of Schwab's efforts at tailoring investment education to women are not yet available, at the Morgan Stanley Dean Witter investment firm, two thirds of the participants at its women's seminars make appointments with advisers after a session, compared to about one fifth of attendees at its other seminars.

As employers in the U.S. place greater emphasis on the defined contribution plan as the key component of their employees' retirement benefits, the teaching to employees of how to invest their retirement benefits must assume a greater emphasis as well. With DC plans being emphasized, employees will need to feel comfortable taking risks with their retirement assets so that they can take full advantage of accumulating retirement income in a tax-deferred plan. Employers that make the effort to teach their employees how to manage their retirement contributions, perhaps teaching men and women separately by recognizing their different styles of learning about investments, are likely to have more committed employees who fully value their employer-sponsored retirement benefits.

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Table 1. Variable Means and Definitions

Variable	Definition	401(k) Retirement Plan (N=171)	403(b) Retirement Plan (N=184)
Gender	Males=1 and Females=0	.44 (.49)	.27 (.44)
4 year Degree	4 year degree=1, 0=otherwise	.70 (.46)	.39 (.49)
Company Experience	1=less than 1 yr., 2=1-3 yrs, 3=4-6, 4=7-9, 5= 10 or more	3.33 (1.34)	3.45 (1.44)
Employee Age	1=Less than 30 yrs., 2=30-39 3=40-49, 4=50-59, 5=60 +	2.68 (1.03)	2.66 (1.04)
Household Income	1=<\$30K, 2=\$30-\$39K, ..., 8=\$90-\$99K, 9=\$100+K	6.53 (2.66)	4.23 (2.52)
Risk Taking Scale	1=averse to risk taking, 4=attracted to risk taking	1.97 (1.00)	1.98 (1.11)
Participate in DC plan	1=participator, 0=non-participator	.94 (.25)	.54 (.50)
Size of DC Contribution	1=<\$1K, 2=1-\$2.9K, 3=3-4.9K, 4=5-\$6.9K, 5=7-\$8.9K, 6=9-\$10K	3.82 (1.64)	3.01 (1.58)
Allocation of Funds to Stock	Portion of funds allocated to stock as a percentage	57.86 (20.04)	53.52 (22.20)

Note: Standard deviations are in parentheses

Table 2 **Results of Regression Analysis of Risk Taking Scale for Defined Contribution Plans for Participating Employees**

Variable	401(k) Plan (N=164)	403(b) Plan (N=99)
Gender	.36* (.15)	1.01 (.84)
4 year Degree	.33 (.18)	-.13 (.24)
Company Experience	.03 (.06)	.01 (.11)
Employee Age	-.18* (.08)	-.13 (.14)
Household Income	.02 (.03)	.07 (.05)
R Square	.10	.07

* p<.05; ** p<.01

Note: Unstandardized Regression coefficients with standard errors in parentheses

Table 3 **Results of Regression Analysis of Allocations of Stock to Defined Contribution Plans for Participating Employees**

Variable	401(k) Plan (N=164)		403(b) Plan (N=99)	
	Model 1	Model 2	Model 1	Model 2
Gender	7.54* (4.41)	21.19** (8.45)	-3.81 (5.43)	12.84 (18.35)
4 year Degree	3.43 (3.84)	8.81** (3.01)	14.83** (5.02)	14.69** (5.03)
Company Experience	-.76 (1.19)	-.76 (1.03)	-2.19 (2.44)	-1.97 (2.45)
Employee Age	-.62 (1.74)	3.03 (1.77)	3.15 (2.80)	4.37 (3.08)
Risk Taking	3.14* (1.67)	2.96* (1.32)	3.34 (2.28)	3.10 (2.29)
Household Income	.33 (.68)	1.02* (.54)	1.97 (1.04)	2.20* (1.06)
Gender by Age Interaction		-6.33* (2.95)		-5.57 (5.86)
R Square	.10	.11	.26	.27

* p<.05; ** p<.01

Note: Unstandardized Regression coefficients with standard errors in parentheses

Table 4 **Results of Regression Analysis of Annual Contributions to Defined Contribution Plans for Participating Employees**

Variable	401(k) Plan (N=164)	403(b) Plan (N=99)
Gender	.45* (.21)	-.17 (.33)
4 year Degree	.80** (.25)	.53 (.31)
Company Experience	.16 (.08)	-.06 (.15)
Employee Age	.03 (.11)	.55** (.17)
Household Income	.32** (.05)	.28** (.07)
R Square	.40	.35

* p<.05; ** p<.01

Note: Unstandardized Regression coefficients with standard errors in parentheses

Table 5 **Results of Logistic Regressions on Employee Participation with Defined Contribution Plans**

Variable	401(k) Plan (N=171)	403(b) Plan (N=184)
Gender	-.11 (.75)	.63 (.42)
4 year Degree	.02 (.92)	1.14** (.41)
Company Experience	-.85** (.34)	-.68** (.15)
Employee Age	.03 (.36)	-.36 (.19)
Household Income	.04 (.13)	-.06 (.08)
Chi Square	13.68*	56.86**

* p<.05; ** p<.01

Note: Logit coefficients with standard errors in parentheses