



1996

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Hinz, Richard P.; McCarthy, David D.; and Turner, John A., "Are Women Conservative Investors? Gender Differences in Participant-Directed Pension Investments" (1996). *Wharton Pension Research Council Working Papers*. 578.

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Positioning Pensions for the Twenty-First Century

Edited by Michael S. Gordon,
Olivia S. Mitchell, and Marc M. Twinney

Published by

The Pension Research Council

The Wharton School of the University of Pennsylvania

and

University of Pennsylvania Press

Philadelphia

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Printed in the United States of America on acid-free paper

10 9 8 7 6 5 4 3 2 1

Published by

University of Pennsylvania Press

Philadelphia, Pennsylvania 19104-6097

Library of Congress Cataloging-in-Publication Data

Positioning pensions for the twenty-first century / edited by Michael S. Gordon, Olivia S.
Mitchell and Marc M. Twinney.

p. cm.

Includes bibliographical references and index.

ISBN 0-8122-3391-3 (acid-free paper)

1. Pensions—United States. I. Gordon, Michael S. II. Mitchell, Olivia S.

III. Twinney, Marc M.

HD7125.P67 1997

331.25'2'0973—dc21

96-53837

CIP

Chapter 6

Are Women Conservative Investors? Gender Differences in Participant- Directed Pension Investments

Richard P. Hinz, David D. McCarthy, and
John A. Turner

The rise in United States private-sector pension coverage during the 1980s and early 1990s was primarily attributable to the growth of 401(k) plans. In 1983, 401(k) plans covered 6 percent of participants in private pension plans; ten years later they covered 46 percent (USDOL 1994). Participation declined in both defined benefit plans and non-401(k) defined contribution plans during this period.

A common feature of 401(k) plans, and increasingly of other defined contribution plans, is that participants may direct the investment of some portion of their account.¹ In 1991, medium and large firms reported that 91 percent of participants in savings and thrift plans could direct the investment of participant contributions and 62 percent could direct the investment of employer contributions.²

Investment funds managed by individual pension participants allow participants to consider a range of investment strategies, selecting portfolios suited to their time horizon and risk tolerance. The shift toward individual management may, however, have adverse effects. Individuals may be too conservative, allocating to short-term, fixed-income assets a share of their portfolio inconsistent with specialists' views as to the optimal mix for a pension portfolio (EBPR 1993). In a survey, 69 percent of working Americans said that if they had to choose how to invest their pension money knowing that their benefits would go up with investment gains and down with investment losses, they would prefer low-risk, low-return investments (EBRI 1993). An increasingly prominent interpreta-

tion is that this preference results from financial naiveté. This study uses a new data set on the federal Thrift Savings Plan (TSP) to explore these and other hypotheses.

Prior Studies on Gender Differences in Investments

Investment decisions may differ by sex for several reasons. One possibility is that women know less and are less confident about their knowledge of investments as compared to men (New York Life Insurance Company 1993). Other surveys suggest that women are also more conservative investors than men. One study of business students found females less likely to take business risks than males (Zinkhan and Karande 1991). Using the 1989 Survey of Consumer Finances, a different team reported that 57 percent of women said they were unwilling to take any financial risks, compared to 41 percent of men (Jianakopulos and Bernasek 1994). That study found no significant gender differences, however, after controlling for savings, home ownership, and other assets. A different analysis of investor styles based on a questionnaire sent to clients of a large brokerage firm concluded that investor age, income, and sex in descending order were the primary determinants of investor style, with women being more conservative (Lewellen, Lease, and Schlarbaum 1977). Finally, a recent nationally representative survey concerning willingness to take a job with the potential for higher earnings but the risk of lower earnings found that women were more risk averse (Barsky, Juster, Kimball, and Shapiro 1995).

One caveat to these conclusions is that individuals' responses to questionnaires may differ from their actual behavior, with men and women being distinguished by what they consider a "socially acceptable" response. Nevertheless, a recent exploration of individual asset allocation and risk aversion patterns concluded that women are overall slightly more risk averse than men (Riley and Chow 1992). That report speculated that this could be due to differences in age, income, and wealth rather than gender, but they did not test that hypothesis in a multivariate framework. In a companion piece to the present one, VanDerhei and Bajtelsmit (this volume) found that women were more likely to invest in fixed-income securities and less likely to invest in employer stock than men.

If women invest in lower-risk pension portfolios than men, growing reliance on participant-directed individual account plans could worsen existing retirement income disparities by gender. For new pensioners in 1993 to 1994 the median of women's benefits was 50 percent less than men's (USDOL 1995:20).

Explanations for Gender Differences in Risk Preferences

To explore further possible explanations for why women and men differ in the amount of financial risk they hold, we consider a range of arguments. First, women and men may differ in their underlying attitudes or utility functions for risk. For example, cultural factors may cause men to bear more risk than women. Second, gender differences in risk bearing might be due to differences in economic status. For example, women often have lower earnings than men. If higher income workers were more willing to bear risk, a gender difference in risk bearing could be due to a difference in income. A third hypothesis is that differences in risk bearing could be due to gender differences in information. To the extent that males are better informed about investments, this might explain their willingness to bear more risk. Fourth, women's longer life expectancy and greater probability of outliving their spouses could affect their willingness to accept financial risk. If individuals with a longer time horizon have a greater ability to bear risk, women would be expected to hold riskier portfolios than men.

Testing the Hypotheses

To pursue these hypotheses in an empirical setting, we use data from a 1990 survey of participants in the federal government's Thrift Savings Plan (TSP) for federal employees. This plan had assets of approximately US \$27 billion as of January 1995, making it one of the 20 largest pension funds in the nation after less than ten years' existence (USGAO 1995, *Pensions and Investments* 1995). With 2 million participants, the TSP is projected to become the largest pension fund in the United States (Chernoff 1990).

Created during the 1986 reform of the federal retirement system, the TSP covers most federal employees hired after January 1, 1984. Participants in the preexisting Civil Service Retirement System were also given the option of joining the new system. Workers covered under the new TSP system also participate in the Federal Employees Retirement System (FERS), which is a defined benefit pension plan, and in the national Social Security system.

The federal government automatically contributes 1 percent of salary to the Thrift Savings Plan for all FERS employees. For workers who also contribute additional pre-tax amounts from their salary, the federal government matches these contributions up to 5 percent of pay—dollar for dollar for the first 3 percent and 50 cents per dollar for the next 2 percent, for a maximum government contribution of 5 percent. In 1990,

three quarters of male and 62 percent of female FERS employees contributed part of their salary to the Thrift Savings Plan.³

The TSP has three funds in which participants may invest. First, the G fund holds short-term nonmarketable United States Treasury securities specially issued to the plan. By law, the interest rate on these investments equals the average of market rates of return on United States Treasury marketable securities outstanding with four or more years to maturity. Because of the longer maturity and greater interest rate risk than on Treasury bills, the G fund earns a higher rate of return than Treasury bills.

The second fund available to TSP participants is the F fund, a fixed-income index fund of government and corporate bonds. Over the period of 1988 to 1990 this fund invested primarily in a commingled Shearson Lehman Hutton Government/Corporate bond index fund. In dollar terms, the United States Government sector comprised 74 percent of the index and corporate bonds the remaining 26 percent. This fixed-income fund has greater risk than the government securities G fund because of its longer maturity (and thus greater interest rate risk) and because it includes corporate bonds with default risk.

The third option open to TSP participants is the C fund that invests in common stocks in the form of a Standard & Poor's (S&P) 500 index fund. The C fund invests passively, closely matching the performance of the S&P 500 index. Over the period of 1980 to 1989, rates of return were 11 percent for the government bond fund, 12.2 percent for the fixed-income fund, and 17.4 percent for the stock fund.

The agency managing the TSP, known as the Thrift Savings Board, conducted a survey in 1990 to learn more about the effectiveness of the Board's publications informing employees about the plan. This survey was also matched with administrative records on covered employees.⁴ These data have not been used previously to analyze differences across workers in risk bearing. Because the data on the investment of pension contributions and worker earnings are based on administrative records, they are highly reliable. Unfortunately, the survey lacks information on worker educational attainment and family asset holdings.

Turning to the evidence, we note that FERS employees could allocate a maximum of 60 percent of their own contributions to the common stock and fixed-income funds in 1990.⁵ Our tabulations (see Table 1) indicate that women and men differed greatly in the probability of investing in common stock during that year. Only 28 percent of women, compared to 45 percent of men, participated in the common stock fund under the TSP. Of those respondents participating in that fund, the gender difference in the percentage of contributions allocated to common

TABLE 1 Descriptive Statistics on TSP Participants

<i>Description</i>	<i>Women</i>	<i>Men</i>	<i>Total</i>
Percent Contributing to:			
C or F	33%	48%	44%
C but not F	28	45	40
F but not C	12	20	18
Fraction of Funds in C Fund			
All Participants	8.9%	15.3%	13.4%
	(16.7)	(21.2)	(20.2)
Contributors Only	31.2	34.4	33.7%
	(16.8)	(18.9)	(18.5)
Fraction of Funds in F Fund			
All Participants	2.6%	8.8%	3.4%
	(7.7)	(8.8)	(8.5)
Contributors Only	21.1	18.5	19.0
	(10.2)	(10.6)	(10.5)
Fraction of Funds in G Fund	88.6%	81.0%	83.2%
	(19.8)	(23.3)	(22.6)
Average Salary (US \$)	\$35,614	\$46,706	\$43,410
	(19,681)	(19,995)	(20,520)
Other Income	\$19,582	\$14,768	\$16,198
	(19,222)	(13,383)	(15,489)
Married (%)	0.58	0.81	0.74
Average Age (years)	38.9	40.9	40.3
	(10.2)	(11.1)	(10.8)
Sample Size	148	350	498

Notes: Statistics given for the regression sample (unweighted); they do not represent population statistics. All participants required to contribute to the G fund, so statistics on the percentage contributing to that fund not presented. Standard deviations in parentheses.

stock was slight—on average 31 percent for women and 34 percent for men. All agency automatic and matching contributions were restricted to the government bond fund.

It is next of interest to ask whether the observed gender difference in portfolio allocations persists after controlling for economic and demographic variables available in the survey. That is, one might hypothesize no pure gender difference in risk bearing—the observed differences are due to differences in economic and demographic characteristics. The particular controls available here are salary, other family income, age, gender, and marital status (married/not married).⁶ However our analysis decisively rejects the hypothesis. That is, holding constant the worker's salary and other family income, men are still more likely to invest in the common stock and fixed-income funds than women. The analysis also shows that rising salary and other family income increases

the likelihood that a worker invests in the common stock or fixed-income funds. However, the effect of own salary is 10 times greater than other family income. This result is similar to results reported by Bernheim and Garrett (1995) concerning participation in 401(k) plans. They found that spouse's earnings had little effect on the respondent's own participation, and that the respondent's earnings had little effect on the spouse's participation.

Because Social Security replaces a higher percentage of earnings for low-paid workers than for high earners and because Social Security presumably is viewed as low risk, it might be thought that low earners would be more willing than high earners to accept risk. In fact, the reverse was found among TSP participants. Higher earners were significantly more likely to contribute to the common stock fund than lower earners. Our survey did not supply information on the workers' entire portfolios, but most Americans hold no financial assets outside their pension plans, so we believe that we have not omitted important controls from the analysis. Even among households with income of US \$50,000 or more, only 49 percent owned stocks (Kennickell and Shack-Marquez 1992).

Because marriage provides insurance through income pooling, with the employment possibilities of husbands and wives generally subject to different risks, married couples might be thought willing to take greater risk even after holding constant family income. Complicating factors are that married people have longer life expectancies than do nonmarried people and are more likely to have child dependents, but the direction of these effects is unclear.⁷

When we use the TSP sample to compare investment decisions by marital status, we compare people who are currently married to people who are single for whatever reason (divorced, never married, widowed). The results clearly show that marriage has a significantly negative effect; that is, married people were much less likely to invest either in stock or the fixed-income portfolio. The effect of marriage on differing individual risk bearing for men and women was also investigated, on the view that perhaps marriage might reduce gender differences in risk bearing, oppositely affecting the risk bearing of men and women. This investigation, however, shows that married men and unmarried women take similar investment risks. Married women are the most conservative, and unmarried men are the least conservative. In other words marriage appears not to reduce the gender gap in risk bearing. An alternative interpretation would view the married couple as a unit, finding that the combined husband-wife portfolio is intermediate in risk between the portfolios of the two people acting as single individuals. Thus by this interpretation, marriage bridges the gender gap in financial risk bearing.⁸

The estimated effect of marriage on risk bearing may shed light on the gender gap in risk bearing. The gender gap in risk bearing that remains after holding constant demographic and economic variables is unexplained in our data; however, a major gender difference that has not been measured directly is the gender difference in mortality risk. The gender difference in mortality risk is roughly equal to the marital status difference in mortality risk, and both gender and marital status have roughly the same magnitude of effect on risk bearing. This pattern suggests the interpretation that the gender difference in risk bearing is caused by the gender difference in mortality risk, with people that have lower mortality risk taking less financial risk.

Age differences could also affect willingness to bear financial risk. One argument is that those nearing retirement should place more retirement in fixed income. However Bodie (1995) argues that young workers with a long time horizon should not invest a large share of their portfolio in stocks. Another issue is that financial sophistication may increase with age and experience. In our analysis of the survey (see Table 3 below), we find that age generally is not a good predictor of asset allocation preferences except in investment in fixed-income securities where its effect is negative.⁹

One interesting fact discerned in the TSP survey is that a large percentage of the sample, 65 percent of women and 52 percent of men, invested only in the government bond fund. Several factors may explain this investment behavior. First, the Thrift Savings Plan statute required that all employee contributions had to be invested in the G fund in 1987. This requirement decreased each year by 20 percent through 1990 and was eliminated in 1991. Some employees who were invested entirely in the G fund may have not taken advantage of the opportunity to move out of the bond fund merely due to inertia. For other employees, the initial restrictions may have had a chilling effect on their willingness to invest in other funds. Second, by 1990, workers who had been in the Thrift Savings Plan only a short time may have invested in the least risky portfolio, preferring a conservative approach initially. As they learned more about the different funds through information provided them by the Thrift Savings Board, they would have had the chance to move to riskier investments. Nevertheless, when we investigated these hypotheses, none of them were borne out.¹⁰

An alternative explanation for why many participants invested in the minimum-risk portfolio is that some would have preferred a fund with even lower risk, for example, a fund with no real interest rate risk. This possibility is explored using a statistical technique known as a Tobit estimation procedure, and we posit that some workers fully invested in the government bond fund might have preferred an even more conservative

fund had one been available. In results not explored in detail here, this appears to be true for women in that more women than men would appear to prefer even less risky assets.¹¹ On the whole, we find that women would be predicted to have held 15 percent less in stock funds than men using this Tobit approach, double the estimate using simpler statistical techniques.

It should be noted that some TSP participants bunch at the opposite extreme, selecting the most risky portfolio available. Specifically 11 percent of men and 5 percent of women invested the maximum percentage in common stock, suggesting that some would have preferred an even riskier portfolio had that been available.¹² For workers having the maximum or minimum risk portfolio within the plan and for whom their pension portfolio is their entire financial investment portfolio, the restrictions on risk bearing within the plan are therefore likely to be binding. By contrast, workers who also had financial investments outside their pension portfolio could adjust the risk of their overall portfolio by offsetting outside investments.

In order to decide whether "right censoring" of this sort affects our results, we reestimated a Tobit model allowing for both left and right censoring. This analysis suggests an even larger estimate of the gender effect—a 19 percentage point differential.¹³ This effect is large, equaling in magnitude that of a woman having 48 percent less salary than an otherwise comparable man!

This finding is probably too large to be credible, based on additional evidence supplied by the survey. In particular, workers were asked whether they would prefer another investment option. Overall, about a quarter of all participants said "yes" with the same fraction of "yes" responses for those contributing only to the least risky fund, while 32 percent of workers contributing to the most risky portfolio said "yes." A better question for our purposes would have been, "Would you have invested in a less (more) risky option had that been available?" Nonetheless, the relatively low percentages of positive responses suggest few workers at the extremes were truly constrained in their investment portfolio options.

The economic importance of our findings is ascertainable using the data in Table 2. We calculate how much larger would be a man's pension account at retirement than a woman's, assuming equality of all relevant factors except the percentage of their two pensions held in stock. Among women who invested part of their pension portfolio in stock, the modal percentage of their contributions invested in stock was 20 percent. We use the estimated difference in the percentage of contributions invested in stock for men and women of 14 percentage points. We assume

TABLE 2 Pension Assets at Retirement Resulting from Gender Differences in the Percentage of Pension Contributions Allocated to Stock

<i>Years in the Plan</i>	<i>Male/Female Portfolio Size</i>
10	1.04
20	1.08
30	1.13
35	1.16

Source: Authors' calculations.

a 5 percent nominal wage growth over the career, no portfolio rebalancing, and that each year the stock and bond portions of the portfolio earned the average rate of return received over the period 1926 to 1994 on large company stocks (10.4 percent) or on long-term corporate bonds (5.4 percent) (Ibbotson 1995).

The effect on the plan's account balance of the gender difference in portfolio allocation increases with the number of years in the plan as shown in Table 2. With 20 years' participation in such a plan, the pension accumulation is about 8 percent larger for men; after 35 years of plan participation, the man's plan would be 16 percent larger.

Conclusions

Using a survey of TSP participants, we confirm that women appear to invest their pension assets more conservatively than men. A large percentage of women invested in the minimum-risk portfolio available to them. A portion of the pattern is explained by women's lower incomes, but the result persists after controlling for economic and demographic variables. Nonetheless, married women also invest less in common stock than married men, holding constant age and income. Because lower risk portfolios have lower expected return, the findings imply that women's pension accumulations will exacerbate the gender gap in retirement income over time.

Although examining evidence from a single pension plan somewhat limits the generality of our findings, we believe that data from a single plan avoids the possibility that unobserved plan or firm characteristics are confounding our interpretation of individual behavior.¹⁴ Also, by using data on a single plan we can incorporate the plan rules in our analysis. Nevertheless, it is possible that federal workers are more conservative in their investments than private-sector workers would be. On the other

hand, federal workers face less risk of layoff, and hence might be more willing to accept financial risks. In either case, as long as government employment affects risk taking similarly for both males and females, the gender comparisons found in our study remain unaffected.

The authors gratefully acknowledge comments from Vickie Bajtelsmit, Veda Charro, Marcia Goldstein, Olivia Mitchell, Mark Warshawsky, and Paul Yakoboski. The views expressed here are solely the responsibility of the authors and do not represent the position of the United States Department of Labor or of the above acknowledged persons.

Notes

1. A 1992 Department of Labor regulation relieves employers sponsoring participant-directed plans from fiduciary liability related to selection of investments when specific conditions are met.

2. There is a large overlap between 401(k) plans and savings and thrift plans. In 1991, 98 percent of participants in savings or thrift plans in medium and large firms were in 401(k) plans, and 64 percent of participants in 401(k) plans were in savings or thrift plans (USDOL 1993).

3. The information reported in this section is taken from Federal Retirement Thrift Investment Board (1991: B-69). Even and Macpherson (1993) also found lower participation rates for women than men in 401(k) plans in the private sector.

4. The full survey included part-time workers, postal service workers, and federal workers in the Civil Service Retirement System, but we restrict the analyses below to full-time federal workers in the FERS who contributed part of their salary to the Thrift Savings Plan.

5. The ceiling has since been lifted and FERS employees can now direct 100 percent of their contributions to any of the funds.

6. A Chow test on OLS regressions indicated it is appropriate to pool the male and female samples.

7. The association between mortality risk and marital status is particularly strong. For ages 20 to 49, the unmarried/married mortality factor exceeds the male/female factor, indicating that the death rate for unmarried women exceeds that for married men (Trowbridge 1995).

8. There may also be assortative mating if people seek spouses with opposite risk preferences. In this event, husbands and wives would specialize within the marriage, with women selecting conservative aspects of the family portfolio and men selecting more risky assets. A full understanding of gender differences in risk bearing within the family clearly requires data with information on the characteristics of spouses and on other family investments. Because of the complicating factor of marriage in interpreting gender differences in risk bearing, it might be thought that gender differences would best be estimated for a sample of unmarried workers. However, such a sample would likely be subject to selectivity bias, with single men and single women differing from married men and married

women in their attitudes toward risk. To evaluate this possibility, we also interacted gender with marital status in a multivariate model, but that variable was not statistically different from zero.

9. Other variables were entered in regressions (see Table 3) but were insignificant, including age at hire, tenure with the government, years to eligibility for retirement, years to eligibility for a retirement supplement (generally requiring more years of service), and dummy variables for being within five or ten years of eligibility for either type of retirement benefit.

10. We investigated the effect of short tenure in the plan by entering dummy variables for one or two years of tenure. We also interacted the tenure term with gender under the hypothesis that women might be more likely to enter the plan lacking knowledge, but then would increase their risk bearing as they became more knowledgeable. In a separate regression, we entered a variable for participation in the plan in 1987, and thus having faced the requirement that all contributions be invested in the G fund. None of these variables was statistically significant.

11. The Tobit estimation procedure assumes that some of the women's zero allocations to the stock fund would have been negative, if this were possible (see Table 4).

12. An additional constraint is that no more than 60 percent of the portfolio can be invested in the C or F funds. In the analysis sample, 14 percent of the men and 7 percent of the women were affected by this constraint.

13. See Table 4. The Tobit procedure assumes that errors are normally distributed. We relaxed this assumption by reestimating the model assuming first a Weibull then a Gamma distribution. The parameter estimates proved insensitive to the distributional assumption and are presented only for the familiar Tobit model.

14. This point was made for age differences in the analysis of single-plan data by Kusko, Poterba, and Wilcox (1994).

TABLE 3 Estimates of the Effect of Gender on Portfolio Investment Decisions

<i>Variable</i>	<i>Stock or Fixed Income</i>	<i>Stock Only</i>	<i>Fixed Income</i>
Male	.411 (.19)	.584 (.23)	.616 (.30)
Ln (Salary)	.584 (.18)	.931 (.21)	.252 (.27)
Ln (Other Income)	.060 (.02)	.057 (.03)	.054 (.03)
Age	.002 (.01)	-.011 (.01)	-.030 (.01)
Married	-.544 (.21)	-.520 (.24)	-.237 (.30)
-2 Log Likelihood	850.07	669.33	450.81
N	617	498	498

Note: Asymptotic standard errors in parentheses for Logit models, standard errors for OLS.

TABLE 4 Multivariate Estimates of TSP Participants

Variable	Dependent Variable: % of Contributions to Stock Fund		
	OLS	Tobit, Left Censored	Tobit, Left and Right Censored
Male	4.659 (2.03)	14.855 (4.99)	19.424 (6.51)
Ln (Salary)	8.928 (1.85)	22.769 (4.61)	29.718 (6.08)
Ln (Other Income)	.553 (.23)	1.438 (.55)	1.764 (.72)
Age	-.071 (.08)	-.281 (.20)	-.368 (.26)
Married	-4.847 (2.19)	-13.276 (5.24)	-18.493 (6.89)
-2 Log Likelihood		2349.00	2068.34
R ²	.08		
F	8.12		
N	498	486	486

Note: Asymptotic standard errors in parentheses for Tobit, standard errors for OLS. The sample size in the second and third regression is reduced because participants who do not invest in the C fund but do invest in the F fund were excluded from those regressions.

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