# Retirement Plan Participation in the United States: Do Public Sector Employees Save More?

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## Abstract

This study examines retirement plan participation and savings behavior for American public and private sector employees using the Panel Study of Income Dynamics (PSID) data set. This paper also examines the determinants of preference for a diversified portfolio within the retirement plans. The findings of this study indicate that the population's plan participation increases with age, income, and education level. The public sector employees are more likely than others to participate in defined benefits plans. Conversely, they are less likely to participate in the defined contribution plans. Also, the public sector employees who participate in defined contribution plans hold lower amounts within their retirement accounts. The public sector employees are more likely to diversify their retirement portfolios or allocate them in bonds or annuities and are less likely to hold all or most of their wealth in stocks. Preference for diversification also increases with age, income and educational attainment.

## 1. Introduction

The basic premise of every public policy decision that encourages saving and employee pension participation is to help individuals accumulate adequate wealth for their retirement. According to the permanent income hypothesis (Friedman, 1957), individuals maximize their utility through planned savings and expenditure decisions across time based on their lifetime income expectations. Currently the two most popular methods of saving for retirement are employment-based contribution plans and Individual Retirement Accounts (IRAs). Extant research shows that participants in these plans comprise a disproportionately higher number of males, high-income earners, and full-time employees (Springstead and Wilson, 2000).

Nearly 12 million people work for the federal government (Siegel and Rees, 1992; Light, 1999). Government employees, therefore, make up a substantial portion of the currently employed workforce. However, there is limited previous research directed toward studying government employees' retirement preparation, plan participation, and wealth accumulation. This paper examines the determinants of retirement plan participation and savings within the retirement accounts of the participants. This study also examines the determinants of asset allocation preferences of government

employees and other participants within their retirement accounts, controlling for various demographic and socioeconomic factors, using the PSID.

## 2. Literature Review

### 2.1 Investment and Wealth
In early research on the income and savings of government employees, Quinn (1982) found that the public employees on average received better benefits than employees in the private sector at the same level. This finding validated some of the past research that preceded this paper on government employees (Quinn, 1979; Smith, 1977). Previous studies on individual wealth accumulation have shown that a large number of households did not save enough for retirement to maintain their pre-retirement level of consumption (Moore and Mitchell, 1997; Yuh, Montalto and Hanna, 1998). Investment assets within the household portfolios were more for those with higher income, with higher educational attainment, and who were Caucasian (Zhong and Xiao, 1995). Also, older individuals (Ameriks and Zeldes, 2000; Poterba and Samwick, 1997) who had higher marginal tax rates (Mitrusi and Poterba, 2000) and had accumulated greater human capital (Campbell and Viceira, 2002; Klos and Weber, 2006) were likely to invest in financial assets. Guiso, Haliassos, and Jappelli (2002) found that, in the United States, the proportion of investors with direct or indirect stockholdings varied from 4.4% in the lowest quartile of wealth to 86.7 % in the highest quartile of wealth.

### 2.2 Participation in Retirement Plans
Munnell and Connolly (1979) found that public sector employees had superior tax savings retirement options than the private sector employees. Quinn (1979) found that a much larger proportion of government employees participated in pension plans than the private sector employees did. More recent studies on pension plan coverage have revealed that, in spite of the growth of defined contribution plans over the last 20 years or so, pension coverage has gradually declined (Bloom and Freeman, 1992; Papke, 1996). In a recent study, researchers found that nearly 65% of eligible workers participated in 401(k) plans. This paper also found that a smaller number of lower income employees participated in the 401(k) plan to save for their retirement (Bassett and Rodrigues, 1998). Bassett and Rodrigues (1998) also found that number of defined contribution plans offered to employees increased steadily across time, and that most of these plans substituted the previously existing defined benefit plans. The primary reason for increased acceptance of defined contribution plans was that these plans brought in greater cost savings to the employers than the earlier defined benefit plans had (Clark and McDermed, 1990; Ippolito and Thomson, 2000; Papke, 1995). Using the health and retirement survey (HRS), Engelhardt (2003) found that nearly 33% of participants with pension plans and 45% of all active pension participants had 401(k) plans. Poterba, Venti, and Wise (1998) also found that younger employees were more likely to participate in the 401 (k) plans.

The study by Bassett and Rodrigues (1998), revealed that higher participant income, age, job tenure, homeownership, and education as well as employer match rates increased the likelihood of employee participation in 401(k) plans. These findings were also consistent with those of the Andrews (1992) study. Yuh and DeVaney (1996) found that couples with higher incomes and who possessed lower levels of non-financial assets actually made larger contributions to their 401(k) plans. Munnell, Sunden, and Taylor (2000) found from their study using the Survey of Consumer Finances that the probability of 401(k) participation increased with age, job tenure, and income. Net worth also had a small but significant effect on participation. Poterba, Venti, and Wise (1996) and Engelhardt (2003) found that retirement savings plans such as the 401(k) increased savings among middle income households. Earlier studies by Venti and Wise (1997; 1990) discovered that tax advantaged savings accounts increased the savings of lower to middle income participants. Another research on 401(k) plans showed that participation increased with age and income in men. Participation was lower for African-American households as compared to White households (Gutter, Hayhoe and Wang, 2007;

Springstead and Wilson, 2000). Only about 50% of employees earning lower wages participated in voluntary contribution plans. Participation rates in IRAs were even lower. Even among those households with lower incomes that participated in their 401(k) plans, only about five percent of the participants actually maximized their contribution (Gale, Iwry and Orszag, 2004).

To summarize the findings of past studies, individuals level out their consumption over their lifetimes and save for retirement. Public sector employees have greater access to defined benefits plans than private sector employees do, and the public sector employees received better retirement savings incentives and employee benefits than the private sector employees. While participation in voluntary retirement savings plans such as the 401(k) and the IRA have increased among the middle class, the number of employers offering defined benefits plans to employees have reduced. Hence, based on existing literature and past studies, the following hypotheses have been developed:

**Hypothesis 1**: Public sector employees are more likely than private sector employees to participate in defined benefits plans, after controlling for other socioeconomic and demographic factors.

**Hypothesis 2**: Preference for a diversified portfolio increases with age and educational attainment, after controlling for other socioeconomic and demographic factors.

## 3. Methodology

### 3.1 Data and Sample
For the empirical analysis in this study, data from the PSID is used. The PSID is an ongoing nationally representative longitudinal study of approximately 8000 families living in the United States. The survey focuses on household socioeconomic, demographic, and behavioral characteristics. The survey first began in 1968 and is managed by the Survey Research Center of the University of Michigan (Brown, Duncan and Stafford, 1996). The most recent survey was conducted in 2005, and this study uses the data from that year. For the purpose of this study, employed individuals under the age of 65 who are the heads of households are considered.

### 3.2 Dependent Variable
Employee participation in retirement accounts is the dependent variable for the first part of this study. Using variables from the 2005 PSID data, three separate analyses are performed to investigate employee participation in IRAs, defined benefit plans, and defined contribution plans. All three of these variables are coded in this study as '1' for participation and as '0' if otherwise. The next part of this study examines the determining factors that affect the amount of retirement savings held within defined contribution plans and IRAs.

The third part of this study examines the determinants of asset allocation within the retirement plans. The dependent variable is based on the following question, which is asked to retirement plan participants in the PSID 2005 survey: "How are the funds invested?"

Respondents are given four options. Participants indicated '1' if most of their investments are in stocks; '2' if investments are diversified or balanced between stocks, bonds, or annuities; '3' if investments are mostly in bonds and annuities; and '0' if participants do not have a defined contribution plan.

### 3.3 Independent Variables
The independent variable of interest in this study is employment in a public sector job. This is coded as '1' for individuals employed with a federal, state, or local government or agency and '0' if employed in the private sector. The self employed are dropped from this analysis. Other control variables include

demographic, financial, and socioeconomic characteristics. Among the control variables, age is included because of its association with financial asset holdings in previous literature (Ameriks and Zeldes, 2000; Bassett and Rodrigues, 1998; Haurin, Wachter, and Hendershott, 1996; Poterba and Samwick, 1997). For this study, the population has been grouped into five age cohorts based on their quintile distribution. Respondents who were between the ages of 58 and 65 are used as the reference group (ages 65 or above are not considered for this study), and other age cohorts are compared to them. Prior research has shown that White employees were more likely than minorities to hold high-risk and high-return assets (Keister, 2000; Zhong and Xiao, 1995). Hence, in order to compensate for this demographic difference, race is included as a control variable. Education is included in the model since past research shows that educational attainment is positively correlated with investment in 401(k) plans (Bassett et al., 1998). Marital status and gender are also included because of their association with wealth and retirement plan participation in prior literature (Springstead and Wilson, 2000; Yuh and DeVaney, 1996; Zagorsky, 2007). The number of children is included as well. Keister (2003) found that having greater number of children negatively affected ownership of financial assets. Previous studies have found that income had a positive effect on the amount invested in defined contribution plans (Poterba et al., 1996). To control for this, log values of the total family income is also included in the model.

### 3.4. Analysis

A descriptive statistical analysis is initially performed for examining the demographic composition, educational attainment, income, and investment characteristics of those who work for the government compared to those who don't. The first part of this study examines the determinants of retirement savings participation and whether public sector employees differ significantly from others in their preference for tax advantaged retirement accounts when controlling for income, educational attainment, demographic differences, and other socioeconomic factors. The three dependent variables for participation in defined benefits plans, defined contribution plans, and IRAs are coded as binary categorical variables. Probit estimation technique is used to estimate the coefficients of the hypothesized variables. These estimates are then applied to calculate the predicted probabilities or the marginal effects for the variables. The probit model is expressed as follows:

$$P_i^* = X_i`\beta_1 + u_i,$$
where $P_i = 1$ if $P_i^* > 0$
and $P_i = 0$ if otherwise for $i = \{1, 2, \ldots, I\}$ (1)

In this study, $P_i$ is a discrete dependent variable, which is equal to 1 for participation in a retirement plan for the $i^{th}$ participant and 0 if otherwise. Pi is determined in this case by $P_i^*$, which is a latent continuous variable indicating whether the marginal benefit of participating in a retirement savings plan is greater than the marginal cost of having one. The error term ($u_i$) is distributed normally with mean 0 and variance 1. $X_i`$ is the vector of all the control variables including whether the respondent is a government employee.

The next part of this study investigates the factors that determine the amount of retirement savings held within the defined contribution plans and IRAs. Tobit analysis is performed for this portion of the study. Since participation rates within these savings plans are low, the use of Ordinary Least Squares (OLS) regression may lead to a biased estimation of the censored dependent variables. Hence the coefficients are estimated using the Tobit procedure with robust standard errors (Wooldridge, 2006). The Tobit model can be expressed as follows:

$$A_i^* = X_{2i}` \alpha_1 + z_i$$
where $A_i = A_i^*$ if $A_i^* > 0$
and $A_i = 0$ if otherwise (2)

In this model, $A_i$ is the dependent variable which is equal to $A_i^*$, the amount held within the savings plan or account, if $A_i^*$ is greater than 0. The value of $A_i$ is 0 otherwise. $X_{2i}$` is the vector of the control variables that determine $A_i^*$ and hence $A_i$.

The final part of this study examines a limited dependent variable for the type of asset allocation within the retirement plan. Hence, to determine plan participants' preferences for investing mostly in stocks, mostly in bonds, or in diversified investments within their retirement fund portfolios, a multinomial Probit analysis is performed. The multinomial Probit model for this analysis can be expressed as follows:

$M_i^* = S_i` \gamma_1 + v_i$

where $M_{ij}=1$ if $M_{ij}^* \geq Max|M_i|$

and $M_i=0$ if otherwise (3)

In this case, for each preference 'j' (mostly stocks, mostly bonds, or diversified investments) made, latent vector $M_i^*$ is present. Therefore, every time that choice 'j' is observed, the jth choice component of $M_i$ is larger than other choice components. In this model, $S_i$` is the vector of the control variables used in the model.

## 4. Results

### 4.1 Descriptive Statistics
Table 1 shows the demographic and socioeconomic composition as well as investment participation rates of public and private sector employees. The median wealth for public sector employees in 2005 ($53,000) is higher than the median wealth of the general population ($43,450). However, the average wealth of public sector employees is less than the average wealth of the general population. Also, the median family income for public sector employees ($57,292) is higher than that of the general population ($44,690). Public sector employees have higher instances of homeownership but lower instances of financial asset ownership such as stocks, bonds, and mutual funds. The descriptive analyses of the data also reveal that public sector employees carry greater debt on average. The mean mortgage debt for public sector employees is $480,770 as compared to $396,333 for the general population. Additionally, public sector employees have a higher car loan balance on average than others. The average credit card debt for public sector employees is $9,229, as compared to $7,960 for the general population. Besides, while nearly 53% of the population surveyed has a credit card, this percentage (62%) is higher for the public sector employees.

**Table 1**: Descriptive Statistics

| Variables (N=5535) | All | Public sector Employee | Private sector. employee |
|---|---|---|---|
| Age | 45 | 43 | 45 |
| %Male | 70 | 68 | 70 |
| %Married | 51 | 55 | 53 |
| Children | 0.85 | 0.89 | 0.84 |
| Race | | | |
| %White | 60 | 55 | 61 |
| %Black | 31 | 38 | 29 |
| %Hispanic | 6 | 5 | 6 |
| %Asian | 3 | 2 | 4 |
| Education | | | |
| %Less than High School | 27 | 12 | 27 |

| | | | |
|---|---|---|---|
| %High School Grad | 30 | 27 | 30 |
| %Some College | 22 | 25 | 22 |
| %College Graduate | 13 | 22 | 13 |
| %Graduate Education | 8 | 14 | 8 |
| | | | |
| Mean Family Income (Annual) | $62,176 | $67,109 | $61,416 |
| Median Family Income (Annual) | $44,690 | $57,292 | $42,038 |
| Mean Wealth04 | $229,130 | $178,959 | $236,857 |
| Median Wealth04 | $43,450 | $53,000 | $41,100 |
| | | | |
| Investment Participation | | | |
| %Homeowner | 68 | 69 | 68 |
| %Have Checking/ Savings Accounts | 74 | 78 | 74 |
| %Have Other Savings (Bonds, ins) | 16 | 14 | 16 |
| %Have Stocks/ Mutual Funds | 17 | 13 | 18 |
| | | | |
| Debt | | | |
| Mortgage Debt | $396,333 | $480,770 | $383,328 |
| Car Loan | $30,120 | $37,103 | $29,044 |
| Debt other than Mortgage or Car | $7960 | $9229 | $7765 |
| % Have Credit Card Debt | 53 | 62 | 52 |

## 4.2 Determinants of participation in retirement plans

Results of the Probit analysis from Table 2 reveal that public sector employees are more likely than others to participate in defined benefit plans and less likely to participate in defined contribution plans. Among demographic variables, all participants between 31 and 58 years of age have a higher likelihood of participating in the defined benefits and defined contribution plans when compared with the reference age group of 58 or older. African-Americans are significantly less likely to participate in IRAs, whereas Hispanics are less likely to participate in defined benefits plans, defined contribution plans, and IRAs.

**Table 2**: Probit estimation of retirement plan participation

| Variables | Participation in Defined Contribution Plans | | | Participation in Defined Benefit Plans | | | Participation in Individual Retirement Accounts | | |
|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | Marginal Effects | Sig | Coeff. | Marginal Effects | Sig | Coeff. | Marginal Effects | Sig |
| Gov Employee | -0.293 | -5.53% | *** | 1.246 | 43.82% | *** | 0.029 | 1.01% | |
| Log Income | 0.400 | 6.80% | *** | 0.402 | 12.51% | *** | 0.222 | 7.03% | *** |
| Age <31 | 0.161 | 1.93% | | 0.053 | 1.07% | | -0.009 | -0.03% | |
| Age3140 | 0.192 | 4.02% | * | 0.341 | 10.66% | *** | -0.036 | -1.12% | |
| Age4148 | 0.241 | 5.07% | ** | 0.371 | 11.62% | *** | -0.094 | -3.07% | |
| Age4858 | 0.092 | 8.07% | *** | 0.402 | 12.46% | *** | 0.049 | 1.65% | |
| Black | 0.004 | 0.06% | | -0.056 | 1.20% | | -0.524 | -11.57% | *** |
| Hispanic | -0.266 | -3.85% | ** | -0.383 | -6.06% | *** | -0.778 | -19.12% | *** |
| Asian | -0.075 | -1.22% | | -0.153 | -3.03% | | -0.246 | -7.04% | |
| Male | 0.039 | 0.65% | | -0.259 | -5.59% | *** | 0.238 | 7.06% | *** |
| Children | -0.016 | -0.28% | | -0.037 | -0.08% | | -0.098 | -3.03% | *** |
| Married | 0.028 | 0.47% | | 0.005 | 0.01% | | 0.062 | 2.02% | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| High School | 0.166 | 2.94% | ** | 0.277 | 6.36% | *** | 0.057 | 1.09% | |
| Some College | 0.220 | 4.04% | ** | 0.321 | 7.05% | *** | 0.247 | 8.04% | *** |
| College | 0.362 | 7.21% | *** | 0.346 | 8.40% | *** | 0.511 | 10.13% | *** |
| Grad School | 0.253 | 4.89% | ** | 0.198 | 4.06% | ** | 0.655 | 14.21% | *** |
| Constant | -7.732 | | *** | -7.640 | | *** | -6.962 | | *** |
| Pseudo R$^2$ | 23.50 | | | 27.10 | | | 27.96 | | |
| LR Chi2 | 410.48 | | *** | 501.28 | | *** | 489.33 | | *** |

*p<.1, ** p<.05, *** p<.01

The results also indicate that men are less likely than women to have defined benefits plans but are more likely to contribute to IRAs. Also, the number of children an employee has negatively affects participation in IRA investments. This finding also validates past findings that the number of children is negatively associated with investment participation (Keister, 2003). Education level is a significant predictor of participation across all three models. This finding is also in agreement with the findings from past research (Bassett and Rodrigues., 1998). In this study, college attendance, completion of college, and graduate-level education variables are significant predictors of participation in defined benefits plans, defined contribution plans, as well as IRAs. Those who have at least a high school diploma are more likely to have a defined benefits plan or a defined contribution plan as opposed to those who have not completed high school. Income is positively associated with participation in defined benefits plans; it is also a positive predictor of defined contribution plan participation and increases the likelihood of an employee having an IRA.

### 4.3 Determinants of amounts saved within retirement plans

Results from a Tobit analysis of the determinants of amounts held within defined contribution plans and IRAs are presented in Table 3. Results indicate that public sector employees hold smaller savings within their defined contribution plans. Income is a predictor of greater wealth invested in defined contribution plans as well as in IRAs. Compared to the control age group of 58 or higher, respondents between 31 and 58 years of age have greater savings in their defined contribution plans. Both Blacks and Hispanics have lower savings in IRAs, while Hispanics also have lower savings within the defined contribution plans. This result is consistent with the findings on race and investment participation from prior literature (Springstead and Wilson, 2000). Having children is negatively associated with the amount of savings held within defined contribution plans as well as in IRAs. Educational attainment is a significant predictor of having greater savings in both defined contribution plans and IRAs. In this study, when compared with the reference group of respondents with less than a high school education, those who completed a high school education or higher saved more within their defined contribution plans and had more saved in their IRAs.

**Table 3**: Tobit model of amounts saved within retirement plans

| Variables | Savings in Defined Contribution Plans | | | Savings in Individual Retirement Accounts | | |
|---|---|---|---|---|---|---|
| | Coeff. | Robust St.Error | Sig | Coeff. | Robust St.Error | Sig |
| Gov Employee | -4.958 | 1.057 | *** | 0.454 | 0.483 | |
| Log Income | 7.195 | 0.741 | *** | 1.591 | 0.286 | *** |
| Age <31 | 2.916 | 2.098 | | -0.141 | 0.468 | |
| Age3140 | 4.665 | 1.798 | ** | -0.276 | 0.554 | |
| Age4148 | 4.485 | 1.722 | *** | -0.867 | 0.604 | |
| Age4858 | 3.169 | 1.633 | * | 0.002 | 0.782 | |
| Black | -0.180 | 0.227 | | -4.691 | 0.546 | *** |
| Hispanic | -1.132 | 0.560 | ** | -7.064 | 1.142 | *** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Asian | 0.042 | 0.726 | | -1.906 | 1.303 | | | | |
| Male | -0.291 | 0.307 | | -1.107 | 0.733 | | | | |
| Children | -0.178 | 0.074 | ** | -0.827 | 0.202 | *** | | | |
| Married | -0.081 | 0.357 | | 0.659 | 0.584 | | | | |
| High School | 0.777 | 0.307 | ** | 0.692 | 0.270 | ** | | | |
| Some College | 1.075 | 0.311 | *** | 2.446 | 0.522 | *** | | | |
| College | 1.345 | 0.330 | *** | 4.226 | 0.628 | *** | | | |
| Grad School | 0.947 | 0.435 | ** | 5.016 | 0.693 | *** | | | |
| Constant | -21.060 | 1.163 | *** | -57.791 | 2.740 | *** | | | |
| Pseudo R$^2$ | 25.47 | | | 21.72 | | | | | |
| Wald Chi2 | 692.76 | | *** | 556.61 | | *** | | | |

*p<.1, ** p<.05, *** p<.01

## 4.4 Preference for investment allocation within retirement plans

The results of the multinomial Probit analysis reveal that government employees are less likely to allocate all or most of their investments only in stocks and instead show preference for diversified investments. Government employees also have a greater preference for investing in bonds and annuities. Among control variables, income is a significant factor for all three investment types. When compared to those who are 58 or older, all age groups other than those between 48 and 58, show a preference for investing most or all of their wealth in stocks. However, those between the ages of 48 and 58 show a significant preference for a diversified portfolio. African-Americans, when compared with the reference group of Whites, are less likely to choose investments in a diversified portfolio and are more likely to allocate most or all of their investments in bonds. Having children also reduces the likelihood of investing most or all of their wealth in stocks. Higher educational attainment is a predictor of preference for stock allocation and diversified portfolio when compared with the reference group of those who have not completed high school. Attainment of some college education increases the likelihood of preference for bonds.

**Table 4**: Multinomial Probit of preference for investment allocation

| Variables | Mostly Allocated in Stocks | | | Majority Allocation Diversified | | | Mostly Allocated in Bonds | | |
|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | Marginal Effects | Sig | Coeff. | Marginal Effects | Sig | Coeff. | Marginal Effects | Sig |
| Gov.Employee | -0.585 | -3.60% | *** | 0.234 | 3.33% | ** | 0.487 | 1.72% | *** |
| Log Income | 0.313 | 1.46% | *** | 0.583 | 6.49% | *** | 0.248 | 0.28% | * |
| Age <31 | 0.518 | 4.11% | ** | 0.364 | 4.01% | * | -0.012 | -0.36% | |
| Age3140 | 0.432 | 2.58% | ** | 0.527 | 6.31% | *** | 0.319 | 0.46% | |
| Age4148 | 0.593 | 4.33% | *** | 0.447 | 4.84% | *** | 0.160 | 0.00% | |
| Age4858 | 0.047 | -0.28% | | 0.425 | 5.42% | *** | 0.141 | 0.14% | |
| Married | 0.056 | 0.50% | | -0.113 | -1.53% | | 0.159 | 0.43% | |
| Black | -0.017 | -0.53% | | -0.704 | -5.88% | * | 0.272 | 3.41% | *** |
| Hispanic | -0.050 | -0.43% | | 0.076 | 1.08% | | -0.169 | -0.40% | |
| Asian | -0.085 | 0.05% | | 0.169 | 0.33% | | -0.039 | 0.18% | |
| Male | 0.027 | 0.38% | | -0.189 | -2.56% | | 0.264 | 0.66% | |
| Children | -0.091 | -1.00% | ** | -0.074 | -0.43% | | 0.013 | 0.03% | |
| High School | 0.301 | 1.43% | * | 0.526 | 6.37% | *** | 0.349 | 0.60% | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Some College | 0.444 | 2.52% | *** | 0.550 | 6.40% | *** | 0.605 | 1.44% | ** |
| College | 0.545 | 4.02% | *** | 0.413 | 4.45% | *** | 0.348 | 0.59% | |
| Graduate | 0.662 | 5.53% | *** | 0.456 | 4.96% | *** | 0.262 | 0.23% | |
| Constant | -6.594 | | *** | -8.991 | | *** | -6.277 | | *** |

*p<.1, ** p<.05, *** p<.01

## 5. Discussion

This study investigates the factors associated with participation as well as savings within the retirement plans using the 2005 PSID data. Results from the Probit analyses of the likelihood of saving in retirement plans reveal that public sector employees are more likely than others to participate in defined benefit plans and are less likely to have defined contribution plans. This is not surprising, since the number of defined benefits plans offered in the private sector have reduced substantially over the years, and these have since been replaced by the defined contribution plans (Bassett and Rodrigues, 1998). Also, the relation between income and participation in retirement plans as well as IRAs suggests that investors with sufficient earnings for present consumption are more likely to be able to invest their savings into the tax deferred retirement plans and accounts. The significance of educational attainment in plan participation underscores the importance of human capital in retirement planning and retirement preparedness of individual investors. The negative relationship between black and hispanic households and IRA participation may imply a lack of retirement preparedness and perhaps a lack of investment experience in financial asset classes among minorities (Gutter et al., 2007). It is also possible that the minority households rely more heavily on other forms of public assistance, such as social security benefits.

In the next part of this study, results of the Tobit analysis for determinants of the amounts held within defined contribution plans and IRAs are examined. This analysis revealed that the public sector employees held lower wealth in their defined contribution plans than the private sector employees. Income and educational attainment are also positively associated with savings in defined contribution plans and IRA accounts. This relationship validates the study by Dynan, Skinner, and Zeldes (2004), which concludes that higher income earnings are predictors of greater savings.

The evidence from the final part of this study suggests that public sector employees show greater preference for a more balanced portfolio and for bonds rather than stocks. This shows a clear preference for risk aversion on part of the public sector employees. While public sector employees who choose to have a balanced portfolio show a degree of investment sophistication by diversifying their assets, others who prefer to invest most or all of their savings in bonds demonstrate a degree of investment naivety by preferring to hold most or all of their savings as bonds or annuities in their tax-advantaged accounts. The government and its agencies might consider providing some financial education programs and retirement planning seminars for their employees to better address this issue. African-American investors also show a preference for bonds and a lack of preference for diversification. More efforts need to be made to encourage minorities to save and participate in financial investments in order to better equip them for their financial future.

## 6. Conclusion

The findings of this paper are relevant for scholars of investment behavior, policy makers, and economists. The results indicate that while the public sector employees lag behind in defined contribution plan participation, private sector employees hold greater wealth in these plans. Also, in order to better prepare public sector employees for retirement, they must be encouraged to obtain greater financial asset ownership and increase their participation in IRAs. Those with lower educational attainment, minorities, and lower wage earners need special consideration, and greater community-based efforts must be made to prepare them for retirement. Future studies also need to

focus on studying substitution effects and opportunity costs of investing in different asset classes both within and outside the tax-sheltered plans.

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