

Determinants of Couples' Defined Contribution Retirement Funds

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The study examined factors associated with the amount of defined contribution retirement funds using the 1992 Survey of Consumer Finances. Couples with larger amounts of income and smaller amount of nonfinancial assets had larger amounts of defined contribution funds. Also, the funds increased as years of employment and employer contribution rate increased. Households with lower levels of education, less skilled occupations, and with respondents who were unwilling to take financial risks, or who were Black and Hispanic had smaller amounts of defined contribution funds, all other things equal. Most households 30 or more years from retirement had predicted fund levels of zero.

KEY WORDS: *defined contribution plan, pensions, retirement, savings*

Social Security and private pensions are the most important sources of retirement income. For all private sector pensioners who also receive Social Security benefits, the median wage replacement rates are 25% and 37% for private pension and Social Security respectively. The combined replacement rate is 67% (U.S. Department of Labor, 1995). Private pension plans can be classified into two basic types: defined benefit and defined contribution. While defined benefit plans calculate benefits to be received at retirement through a predetermined formula, the benefits from defined contribution plans are based on contributions, and any income, expenses, gains and losses, and (in some cases) forfeitures allocated to the account (U.S. Department of Labor, 1992). An important difference between plans is the form of benefit payment, with defined benefit plans generally providing pension benefits through a life annuity while virtually all defined contribution plans permit retiring or terminating employees to receive a lump sum distribution of the vested value of their account (U.S. Department of Labor, 1995).

Since the Employment Retirement Income Security Act (ERISA) of 1974 was passed, there has been a trend away from pension coverage under defined benefit plans and toward defined contribution plans (Foster, 1996a).

During the mid-1980's, the trend toward defined contribution plans accelerated as 401(k) plans became increasingly common. Data from the Employee Benefits Survey showed that in 1985, 41% of full-time workers in medium and large private establishments participated in defined contribution retirement plans compared to 80% in defined benefit plans. By 1993, 49% of full-time workers participated in defined contribution plans compared to 56% in defined benefit plans (Foster, 1996b).

All private pension plans which provide benefits in the form of an annuity are required by law to provide a joint and survivor annuity as the standard form of benefit for married recipients (U.S. Department of Labor, 1995). A joint and survivor benefit provides, in the event of the death of the recipient, that benefits will be continued at a reduced rate to a surviving spouse. As a result, couples' retirement funds are shared and become a continued resource although one spouse may be deceased. The shift to defined contribution plans was the focus for the study. The importance of providing for spouses was the reason for limiting the sample to couples. The study attempts to determine "What factors distinguish couples who are accumulating funds for retirement in defined contribution plans?" The study

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uses the most recent data available, the 1992 Survey of Consumer Finances, to examine factors affecting the amount of savings in couples' defined contribution accounts.

Background for the Study

Defined Benefit Plans

Defined benefit pension plans provide a specific amount of benefit to a plan participant at the plan's specified retirement age (Leimberg & McFadden, 1995). The defined benefit pension plan is referred to as a formula-type plan because the benefit is customarily based upon some multiple of the employee's earnings and years of employment with the sponsor (McLeod, Moody, & Phillips, 1993). In the defined benefit plan, the participant receives the promised income upon retirement. However, if the service is terminated prior to the anticipated retirement, the participant receives only the present value of the vested "accrued benefits." The value of accrued benefits is determined by a formula known as the fractional rule (Mittra, 1995).

Defined Contribution Plans

An account-type or defined contribution plan offers employees the option of putting money into a retirement account or receiving the same amount as taxable cash compensation (Leimberg & McFadden, 1995). The amounts that are contributed to the plan are not taxable to the participants until withdrawn. There is a limit on the annual contribution (\$9,240 in 1995), but the amount of the contribution is indexed for inflation. Types of defined contribution plans include: money purchase pension plans, simplified employee pension plan (SEP), profit sharing plan for private employees, 401(k) plan, stock bonus plan, thrift plan, employee stock ownership plan (ESOP), 457 plans for employees of state and local government, and 403(b) plans for non-profit groups such as teachers and hospital employees. Savings and thrift plans are the most prevalent type of defined contribution plan (Wiatrowski, 1993).

Employees bear investment risk in defined contribution plans because they select their own funds from choices offered by the employer and determine the distribution among the funds. Many plans provide some type of matching employer contributions to encourage employees to participate in the defined contribution plans. The defined contribution plans have features that are more beneficial to employees who work for several employers. Defined contribution plans establish individual accounts for each employee and the emphasis is on accumulating funds, rather than determining future pension payments. The value of the account--the accumulation of employer and employee contributions and investment earnings--at

any given time is known (Wiatrowski, 1993).

The Life Cycle Saving Hypothesis

The life-cycle savings hypothesis (Modigliani & Brumberg, 1954) is the most influential model of household savings behavior. The life-cycle saving hypothesis suggests that the accumulation of assets during individuals' working lives is mainly for financing consumption after retirement when earned income is reduced. Therefore, households dissave in retirement using the wealth accumulated by saving during their working years. Because maintaining pre-retirement levels of consumption during the retirement years is the ultimate purpose of savings, all factors affecting the pre-retirement consumption level are important considerations of savings behavior. These factors include pre-retirement income, wealth, and occupational status.

The life-cycle model assumes maximization of lifetime utility and decision making under certainty. An individual is assumed to know with certainty the date of retirement, longevity, and future income and prices. The model implies that young persons will borrow against the future if they expect increases in future income and they have a preference for a steady stream of consumption. It suggests that individuals tend to save a greater proportion of income in the years approaching retirement. Thus, the number of years until retirement, and attitudinal variables such as risk tolerance and expectation of future income should be considered in analyzing saving for retirement.

Factors Affecting Defined Contribution Funds

Based on the life-cycle savings hypothesis and previous research, four sets of factors are believed to affect the amount in couples' defined contribution accounts: demographic characteristics, financial resources, nature of employment, and attitudes.

Demographic factors including household size, educational attainment, health, and race/ethnicity are expected to affect retirement savings. The U.S. Department of Labor (1992) reported that contribution rates of 401(k) plans are highly correlated with the demographic characteristics of the workers. Educational attainment has a positive influence on participation in 401(k) plans (Foster, 1996a). Good health, smaller households, and being white have also been found to have a positive relationship with financial preparation for retirement (DeVaney, 1995a; DeVaney, 1995b; Malroux & Xiao, 1995; Turner, Bailey & Scott, 1994).

Income and wealth are important determinants of family

saving behavior (Xiao, 1995). Financial factors which are likely to impact couples' retirement savings are whether couples have a defined benefit plan in addition to a defined contribution plan, financial assets, nonfinancial assets, debt, income, and home ownership. Employee participation in 401(k) plans has been found to increase with income level (Foster, 1996a; Poterba, Venti & Wise, 1995). The U.S. Department of Labor (1992) reported that after controlling for the effects of other factors, family income had a positive effect on participation in 401(k) plans. Research using data from the Panel Study of Income Dynamics found that the number of employer-provided pensions reported by heads of households and their spouses was positively associated with an increase in net worth even after controlling for the effects of other factors (Morgan & Juster, 1990). Although no studies have investigated the relationship between defined contribution plans and defined benefit plan ownership, defined benefit plans represent availability of financial resources for the household. Home ownership is often viewed as a means for retirement saving (DeVaney, 1995b; Garman & Forgeue, 1994).

Factors related to employment which could impact retirement savings include: number of years until retirement, occupational status, self-employment, length of time on the job, and the employer's contribution rate to the plan. Traditionally, Americans have worked until age 65. Federal income tax provisions are more generous for those aged 65 and older, and full Social Security benefits are available at age 65. However, employer pension plans frequently discourage continuation of employment after a certain age. In many companies, continued employment yields no additional benefits once a pre-determined age limit is reached. Pension plans rarely provide actuarial increases in benefits to employees who choose to work beyond retirement age (Wiatrowski, 1993). Ippolito (1990) noted that since 1965, pension plans generally have changed rules in favor of encouraging earlier retirement.

Professional workers who tend to have higher salaries show higher participation in savings and thrift plans than other occupational groups (Foster, 1996a). Upper income workers are more likely to contribute to 401(k) plans than are low income workers such as blue-collar or service workers (Foster, 1996a; U.S. Department of Labor, 1992). Job tenure has a positive influence on participation in 401(k) plans (Foster, 1996a; U.S. Department of Labor, 1992). All savings and thrift plans require a basic employee contribution subject to the employer's matching contribution, and employer

matching has a positive effect on employee participation in 401(k) plans (Foster, 1996a; Poterba et al., 1995; U. S. Department of Labor, 1992).

Attitudinal characteristics such as risk tolerance and expectation of future income also affect the amount saved in these funds. The shift toward defined contribution plans places a greater responsibility on the worker to make decisions about how much money to put into a defined contribution plan, how to allocate the contributions among funds, and how to effectively manage the assets when the distribution is made (U.S. Department of Labor, 1995). In effect, the participant has almost all of the same investment risks as those faced by an individual investor. The expectation of future income is likely to affect the amount saved in defined contribution funds since studies have shown a positive relationship between income and participation in a defined contribution plan.

Methods

Data

Data were drawn from the 1992 Survey of Consumer Finances. The Survey, sponsored by the Federal Reserve Board in cooperation with the Department of the Treasury, is conducted by the National Opinion Research Center at the University of Chicago (Board of Governors of the Federal Reserve System, 1992). For the final release of the 1992 SCF public use tapes, missing and incomplete data were adjusted by multiple imputation techniques developed for the SCF (Kennickell, 1991). Thus, five complete data sets were created and all five data sets were used for the analyses. The data were weighted to produce descriptive statistics and conduct multivariate analyses.

Sample

Because the objective of the study was to examine determinants of couples' defined contribution retirement funds, non-retired couples aged 70 years or younger were selected for study. Only married couples, including people living with a partner, where either the husband or wife was working were selected. The sample consisted of 1,961 couples.

Dependent Variable

The dollar value of couples' defined contribution retirement funds was the dependent variable. IRA and Keogh funds were not included but the following tax-deferred saving accounts were included: 401(k) plans, 403(b) plans, ESOP, SRA, thrift/savings, stock ownership plans, and profit sharing plans.

Independent Variables

The four sets of independent variables used were: demographic, financial, employment, and attitudinal variables. Demographic characteristics included household size, husband's education, couples' health, and race and ethnicity. Household size was coded in four categories from two persons to five and more. Husband's education was coded as five categories. Health of each spouse was coded as 1 if excellent, and 0 otherwise. Race/ethnic status was coded as 1 if the household head was Black or Hispanic, and 0, otherwise.^a

Financial factors which could impact retirement savings were financial assets, nonfinancial assets, debt, non-investment household income (hereafter referred to as income), ownership of a defined benefit plan, and home ownership. Financial assets, nonfinancial assets, debt and income were included as continuous variables. Financial assets excluded pension assets to avoid double counting. Income included all sources of household income in 1991 before taxes and other deductions with the exception of income from investments. The following items were included in the income variable: wages, salaries, self-employed income, unemployment or worker's compensation, child support, income from annuities, income from Aid to Dependent Children, Aid to Families with Dependent Children, food stamps, or other forms of welfare or assistance. Home ownership was coded as 1 for homeowners and 0, if otherwise.

Ownership of a defined benefit retirement plan was included in the financial factors. Although 40% of the couples indicated that they had a defined benefit pension plan, only a few (4%) reported their balance. Thus, ownership was considered instead of dollar value of a plan, and coded as 1 if the couple had a defined benefit plan and 0, if otherwise.

Factors related to employment included: the number of years until retirement, couples' working years, contribution rate by employer to couples' defined contribution plans, husband's occupation, and self-employment. The number of years to retirement was calculated by subtracting the current age from expected age of retirement. If both husband and wife were working, the longer period was used to capture the period of ultimate income reduction in the couples' life cycle. The period was coded as three dummy variables: 0-14 years, 15-29 years, and 30 years and over until retirement.^b Interaction terms for income and years until retirement were created using the income variable and the dummy variables for years until retirement to test for those effects.

Length of time on the current job and percentage contribution by employer to the defined contribution plan were included as continuous variables. If these variables were available for a household for both husband and wife, the greater number of years and the higher rate were used since the dependent variable was the combined amount of couples' defined contribution retirement funds. Husband's occupation was coded as seven categorical variables following the classifications used in the 1980 U.S. Census Occupation Code. Self-employment was coded as 1 if the husband or wife was self-employed, and 0, otherwise.

Risk tolerance and the expectation of future family income were included as attitudinal characteristics which could affect the amount saved in the defined contribution plans. Risk tolerance was coded as 1 if couples were not willing to take any financial risk, and 0, if otherwise. Expectation about family income was obtained from the question: "Over the next years, do you expect your total family income to go up more than prices, less than prices, or about the same as prices?" The response, "more than prices" was coded as 1, and the other responses were coded as 0.

Analysis

To examine the factors affecting the amount of defined contribution funds, tobit analysis was performed. The use of a linear function such as OLS regression leads to biased and inconsistent estimates of the coefficients when the dependent variable is truncated (Maddala, 1992). Over half (59%) of the sample had zero values for defined contribution funds. Since there were five imputed data sets in the survey, tobit analysis was performed for each set as well as for the combined data set. Inferences from each data set were combined using the method suggested by Rubin (1987).

Results*Descriptive Statistics*

Table 1 shows the participation rate and the average amount of couples' defined contribution funds by categorical variables. The overall participation rate was 41% and the average amount of the couples' defined contribution funds was \$15,995. A lower participation rate was related to couples with the following characteristics: household size of five and more, lower level of husband's education, Black and Hispanic, no home ownership, farming, forestry, and fishing occupations, self-employed, and being unwilling to take risk. Couples who had 15-29 years to retirement had higher participation rates than those with either more or less time until retirement. The participation rate was over

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50% for couples where the husband had a college or professional degree and he was employed in managerial, professional and specialty occupations. Descriptive statistics for categorical and continuous variables using the combined data sets are shown in the Appendix.

Determinants Defined Contribution Retirement Funds

The results of the tobit analysis on the amount of defined contribution funds held by couples are presented in Table 2. Husband's educational attainment and racial and ethnic status significantly influenced the amount in the fund. Compared to otherwise similar couples where the husband had a professional degree, those couples where the husband was a high school graduate or had less than a high school diploma, had a smaller amount in defined contribution funds. Compared to otherwise similar couples from other racial and ethnic groups, Black and Hispanic couples had significantly smaller amounts of defined contribution funds.

Income had a positive effect on the amount of the defined contribution funds. This was consistent with previous findings (Foster, 1996a; Poterba et al., 1995; U.S. Department of Labor, 1992). Couples who were homeowners had larger amounts in the fund than otherwise similar couples. The amount of nonfinancial assets was negatively associated with the amount of defined contribution funds. The amount of financial assets excluding pension did not significantly affect the amount in the defined contribution fund. Couples having defined benefit plans had smaller amounts of the defined contribution funds than otherwise similar couples, i.e., the ownership of a defined benefit pension plan had a negative impact on amount of the defined contribution funds.

The amount of the fund increased significantly with years of couples' employment and employer contribution to the fund. These findings are consistent with previous studies on participation in 401(k) plans (Foster, 1996a; Poterba et al., 1995; U.S. Department of Labor, 1992). Compared to couples with husbands employed in managerial, professional, or specialty occupations, couples were likely to have less in a defined contribution fund when husbands were working in technical, sales, and administrative support fields or as operators, fabricators, and laborers. Couples where either husband or wife was self-employed had significantly smaller amounts in a fund than otherwise similar couples. Risk tolerance had a significant effect on the defined contribution funds. Couples who were not willing to take any risk had significantly smaller amounts of the fund than otherwise similar couples.

Table 1

Participation Rate and Mean of Couples' Defined Contributions using the Combined Data Set (N=1,961)

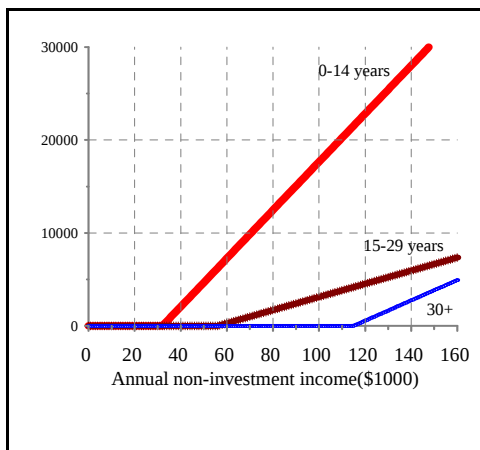
	Participation rate (%)	Mean (\$)
Overall	41.4	15,995
Demographic variables		
Household size :		
2	40.2	20,626
3	43.6	14,090
4	46.7	16,060
5 & more	33.5	11,306
Husband's :		
education		
less than high school	19.0	1,585
high school graduates	37.0	9,566
some college	46.3	10,432
college graduates	50.8	23,246
more than college	51.4	38,970
Husband's health :		
excellent	46.6	21,411
others	37.0	21,693
Wife's health :		
excellent	46.8	21,220
others	36.8	27,509
Race/ Ethnicity :		
Black & Hispanic	27.0	7,017
White & others	44.2	17,773
Financial Variables		
Have a defined benefit pension :		
yes	42.9	17,342
no	40.3	15,083
Home ownership :		
yes	46.6	20,695
no	27.1	3,209
Employment Variables		
Years to retirement :		
0-14 years	41.1	34,242
15-29 years	45.4	12,707
30 & more years	36.9	5,054
Husband's occupation :		
managerial, professional & specialty	52.0	34,159
technical, sales & administrative	45.8	11,145
service	31.4	4,781
precision production craft & repair	43.4	9,169
operators, fabricators & labors	30.4	4,319
farming, forestry & fishing	5.7	172
not currently working	24.0	6,273
Self-employment :		
yes	30.4	17,217
no	44.4	15,656
Attitudinal variables		
Risk tolerance :		
not willing to take any risk	31.0	5,895
others	47.9	22,415
Future household income expectation :		
up more than price	43.2	15,305
others	40.5	16,295

Figure 1 provides an illustration of how the estimated potential amount in the defined contribution pension fund by the number of years until retirement and annual non-investment income of a example couple. The example couple is assumed to have the following characteristics : household size is 2 and home owner, husband is college graduate and employed in managerial, professional, or specialty occupations, the couple is willing to take some risk, does not expect future household income to go up more than prices, and has median levels in all continuous variables including financial assets, nonfinancial assets, debts, working years, and employer's contribution rate. As the graph shows, the relationship between the amount in DC plans and

annual non-investment income was much stronger for those 0 to 14 years from retirement than for those 15-29 years from retirement. In this example, the income threshold for having any DC funds was under \$40,000 for those 0 to 14 years from retirement, but over \$50,000 for those 15 to 29 years from retirement and over \$100,000 for those 30 or more years from retirement.

Figure 1

Predicted Potential Amount in Defined Contribution Plans, By Annual Income and Years to Retirement.



Based on Tobit results in Table 2, for household with no defined benefit plan, head manager or professional, risk tolerant, household size=2.

Table 2
Tobit of Defined Contribution Retirement Funds.

Demographic variables	Estimate
Household size (vs. 2 persons)	
3 persons	-5584.96
4 persons	2382.47
5 and more persons	-6536.74
Husband's education (vs. more than college)	
less than high school	-52242.77‡
high school graduates	-21795.86*
some college	-17221.24
college graduates	-6701.57
Husband's health (excellent vs. others)	2248.17
Wife's health (excellent vs. others)	6950.50
Black & Hispanic	-29233.81†
Have a defined benefit pension	-20221.58*
Financial asset in \$1000 (excl. pension)	10.70
Nonfinancial asset in \$1000	-1.97‡
Demographic variables	Estimate
Debt in \$1000	4.66
Non-investment income in \$1000	259.47*
Home ownership	19849.97*
Years to retirement (vs. 0-14 years)	
15-29 years	4375.30
30 & more years	-4234.85

Working years	2638.06‡
Employer's contribution rate	5497.76‡
Husband's occupation (vs. managerial, professional & specialty)	
technical, sales & administrative	-19650.41*
service	-25789.79
precision production craft & repair	-9995.10
operators, fabricators & labors	-30537.57*
farming, forestry & fishing	-104331.20
not currently working	-35350.03
Self-employment	-52209.02†
Years to retirement* income in \$1000	
15-29 years* income	-188.90‡
30 & more years* income	-150.17
Take no financial risk	-24063.46†
Household Income up more than price	2468.04
Constant	-56281.16†
*p<.05 †p<.01 ‡p<.001	
Combined Data Set (N=1,961)	

Discussion

This study examined factors associated with the amount of couples' defined contribution retirement funds using the 1992 Survey of Consumer Finances. Results of tobit regression show that several demographic, financial, employment, and attitudinal factors affected the amount of couples' defined contribution funds. Higher income, home ownership, more years of employment, and higher employer contribution rates were associated with larger amounts of defined contribution funds. In contrast, larger amounts of nonfinancial assets, being employed in blue collar occupations, self-employment, unwillingness to take risks, lower educational attainment of husbands, and being Black and Hispanic were associated with smaller amounts of the funds. Also, couples with defined benefit plans had smaller amounts of defined contribution plans.

The findings suggest that defined contribution funds are more likely to be held by couples who have adequate financial resources to maintain current consumption while deferring funds to tax advantaged retirement savings. Also, based on the husband's occupational status, it is assumed that couples will be able to continue setting aside funds for retirement. Couples who were more risk tolerant had larger amounts of funds which implies that couples regard the decision to defer money for retirement in a defined contribution fund as an investment decision similar to other investments. The effect of education on fund accumulation supports the concept of gaining an education as the development of human capital. Also, the finding for Blacks and Hispanics suggests that these groups are less likely to be financially prepared for retirement. However, Blacks and Hispanics may be depending on other forms of retirement savings such as Social Security. Health of husbands and wives and the expectation about future family income did not affect the

amount of defined contribution funds. Since this study used cross-sectional data, it may not be possible to observe the effects of these variables. Results may differ if panel data becomes available for analysis.

In summary, focusing attention on savings in defined contribution funds is warranted. Increases in life expectancy and early retirement indicate that retirement income will be needed for longer periods. Concern about possible changes in Social Security requirements and benefits should encourage couples to increase retirement savings. The development of any kind of financial resources is certainly preferable to no preparation (Malroux & Xiao, 1995). Participating fully in defined contribution plans should provide some financial security in retirement for those who are eligible.

Implications

Implications for Educators, Counselors, and Planners

The determinants of couples' defined contribution fund were identified through the use of cross-sectional data. Financial educators, counselors and planners can serve their clients better if they are aware of findings relating to participation in defined contribution funds. Clients should be made aware of the need to begin participation as soon as possible, to fully fund their plans, to seek employer matching funds, and to know when employer contributions are vested. Level of risk tolerance should be discussed in regard to selecting funds for the defined contribution investment. Since defined contribution plans impose all the investment risk on the participants, they require participants to take a greater role in planning for their retirement.

This study showed that working years and employers' contribution rates had large effects on the amount of the defined contribution fund. Thus, when planning for retirement, these factors should be considered. Workers employed in blue collar occupations, with lower levels of educational attainment and minorities may need special attention in education for retirement.

Implications for Future Research

This study focused on predictors of the amount of couples' defined contribution funds. Future research should examine ownership of retirement funds using longitudinal data. The sample should include non-married as well as married people. Also, it is important that policy makers understand the determinants of the private pension funds. This study could serve as a background for policy decisions about adequate preparation for retirement. Determinants of different portfolios of retirement funds could be examined to compare in terms of adequate resources for retirement.

Foster (1996a) suggested that understanding relative worker preferences for the various characteristics of savings and thrift plans could assist in designing these plans to encourage maximum employee participation. Future research could consider the relationships between the amount of the retirement fund and other resources such as the investment portfolio, other assets, income, and debt, in terms of complementary or substitute effects.

Endnotes

- a. In the 1992 SCF, race or ethnicity were classified into 4 categories: Hispanic, non-Hispanic black, non-Hispanic white, and other. The SCF public use tape did not separate the *other* category for confidentiality reasons. (*American Indian /Eskimo /Aleut /Asian /other*).
- b. The coding for the number of years to retirement was calculated by subtracting the current age from expected age of retirement. Since the sample includes couples where either husband or wife was working full time or part time, they correspond to one of the following categories;
 - 1) when both husband and wife were working full time, the longer year was used.
 - 2) when only husband or only wife was working full time, the year from the working person was used.
 - 3) when both husband and wife were working part time, the longer year was used.
 - 4) when only husband or only wife was working part time, the year from the working person was used.
 Then, it was coded as three dummy variables:
 0-14 years, 15-29 years, and 30 years and over to retire.

Appendix

Sample Characteristics of selected variables (N=1,961)

	Proportion (%)	
Have a defined benefit pension	40.34	
Years to retirement	0-14 years	
15-29 years	38.66	
30 or more years	34.02	
Self-employment	21.78	
Take no financial risk	38.86	
Household income up more than price	30.26	
Continuous Variables	Mean	Median
Defined contribution (\$)	15,995	0
Financial assets (\$)	61,560	30,847
Nonfinancial assets (\$)	215,889	186,240
Debt (\$)	60,842	50,088
Non-investment income (\$)	56,713	59,070
Working years (year)	11	12
Employer contribution rate (%)	2.5	0

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