Sensitivity of a Retirement Analysis Framework to Changes in Retirement Analysis Parameters

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A retirement analysis framework was applied to data from a large sample of consumers to explore the difference in required retirement savings rates when the operational definitions of three retirement analysis factors were varied. Four retirement analyses were completed. The first incorporated the value of the parameters used by Duncan, Morgan, and Mitchell (1984). In the other analyses, the use of home equity, income, and net worth varied from the original study. Varying the definitions of two factors produced significantly different required retirement savings rates. Required savings rates are significantly different for members of different age groups for all four retirement savings rate analyses.

KEY WORDS: *retirement, financial planning*

Emphasis on the importance of financial planning for retirement has increased in recent years as a result of the aging of the U.S. population. Concern over the viability of the Social Security system and employer pensions as well as individual concern about the adequacy of retirement income has contributed to this interest.

Early studies of retirement related issues extended in three directions. Modigliani and Brumberg's (1954) life cycle hypothesis and subsequent variations and refinements (Freidman, 1956; Ando and Modigliani, 1963) focused on calculating appropriate consumption and savings rates functions. The second direction was more applied in nature and included attempts to determine the effect of the availability of Social Security and other private pension plans on retirement savings behavior (Katona, 1965; Cagan, 1965; Munnell 1074a, 1974b; Feldstein, 1974; Darby, 1979; Koskela and Viren, 1983; Lesnoy and Leimer, 1981, 1985). The third direction encompassed studies of relationships between several sociodemographic variables and retirement timing decisions. These variables included age, education, occupation, health, marital status, retirement income, and asset levels (Barfield and Morgan, 1969; Feldstein, 1974; Schwab, 1974; Parnes, Adams, Kohen Adnrisani, and Nestel, 1975; Schultz, 1976; Boskin and Hurd, 1978; Hogarth, 1981).

Research in the area of retirement planning from a planner or counselor's point of

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view is scarce. In attempts to measure savings rates needed to meet retirement goals, the life cycle hypothesis has been applied to consumer finance data by Duncan (1984), Burns and Widdows (1988) and Burns (1988). Others have attempted to specify the value that replacement rates (the percentage of annual pre-retirement income needed to fund one year of retirement) should assume (Meier, Dittmar and Torrey, 1980). There is however little research concerning retirement analysis equations or the formulas financial planners and individuals use to calculate retirement needs and retirement income.

Duncan, et al. (1984) proposed a framework for the setting of retirement savings goals. The framework was designed to calculate the proportion of current income one would need to save from the time of analysis until retirement to meet retirement goals.

The framework is a basic model in which values are set for parameters such as length of working life and retirement, expected retirement age, and real growth rates on the current stock of assets. In addition, Duncan, et al. (1984) made assumptions about the use of assets during retirement, and the relative income base to use when defining the parameters in the analysis framework. Retirement savings needs were projected in terms of current purchasing power, and relative to current income. All asset holdings were assumed to be accumulating for retirement and were not reduced by current debt load before being used in the framework. In addition, all assets, including the principal

residence, were used in the retirement analysis as income generating assets rather than expense reducing assets.

The retirement analysis framework is versatile and suitable for computer applications because it is easy to vary the value of parameters such as length of working life and replacement rates to suit individual situations. However, research has not been completed about the operational definitions of the parameters in the retirement analysis framework. It is not known whether one should determine retirement savings rates relative to current income or account for a real growth in income. In addition, most retirees continue to live in the principal residence for some time after retirement and do not draw against the equity in the home for cash income, but use the home to decrease or eliminate a portion of retirement expenses. And in other types of financial analyses, assets are offset by debts and a resulting net worth is used in financial analysis ratios.

Duncan et al. (1984) offered some hypothetical examples of how the framework could be applied using data on the financial situation of families. The framework was applied in individual retirement analyses using data from a group of employees of a large Midwestern university to study the differences in retirement savings rates required for individuals with varying perceptions of retirement analysis parameters (Burns, 1988) and to data from the *Survey of Consumer Finances* to estimate savings needs to adequately fund baby boomers' retirement (Burns & Widdows, 1988).

The Duncan, Mitchell, and Morgan framework (henceforth the DMM framework) proved to be a viable tool for the analysis of retirement savings needs. Given this, it would be useful for financial planners, educators, and consumers to ascertain the sensitivity of estimates of savings needs to the modification or variation of assumptions underlying the operational definitions of three parameters in the framework. Some initial sensitivity analysis to the value of parameters has been carried out by Duncan et al. (1984) and Burns (1988). The purpose of this paper is to apply the retirement analysis framework to data from a large sample of consumers and to explore the variation in required savings rates when three factors in the framework are redefined. In addition, a test for differences in required savings rates among members of different age groups will be performed.

Duncan, Mitchell and Morgan's Framework

The DMM approach to estimating retirement savings needs is to estimate the total assets that an individual will have accumulated at the date of retirement and to compare this sum to what is needed to maintain a given consumption level during retirement. Should there be a "retirement gap," a deficiency in projected total asset accumulation compared to consumption needs, then the individual would need to undertake additional savings in order to close the gap or modify needs accordingly. The annual rate of savings needed to fill the gap is defined to be retirement savings needs (Duncan, et al. pp. 28-29).

Following the DMM framework, asset accumulation at retirement (A) can be represented as:

$$A = ((SS + P) * R) + HE + OA \quad (1)$$

where SS is annual Social Security benefits after retirement; P is the estimated value of annual pension benefits after retirement; R is expected number of years of retirement; HE is the value of home equity upon the date of retirement, and OA is the value of any other assets available to the individual at retirement.

Assets needed at retirement (N) are estimated by nominating a percentage of current annual income that the client wishes to consume annually after retirement, and accumulating needs as follows:

$$N = (Y * k) * R \quad (2)$$

where Y is current annual post-tax income and k is a constant representing the desired consumption ("replacement") rate relative to current consumption. (Duncan, Mitchell and Morgan set k equal to 100%.) The retirement gap (D) is:

$$D = N - A. \quad (3)$$

If D, the retirement gap, is greater than zero, then the additional annual savings (S) necessary to fill the gap are:

$$S = D/W \quad (4)$$

where W is the number of years until retirement. The annual savings rate (SR) expressed as a percentage of annual income is:

$$SR = S/Y. \quad (5)$$

As Duncan et al. (1984) point out, the requirement of additional savings would reduce current consumption below its kY level. To even out consumption over the lifetime - a feature of the DMM framework - the following adjustment needs to be made:

$$ASR = SR/(1 + SR) \quad (6)$$

where ASR is termed the adjusted savings ratio. An ASR of .10 means that a respondent would have to save 10% of his/her current annual income from now until retirement to fund his/her retirement consumption. In this analysis if his/her real (after inflation) income increases he/she must save the same amount in dollars, but the percentage relative to the higher income level would decrease. The opposite would be true if real income decreases.

The savings calculations can also be carried out for a negative retirement gap. In the case of a negative gap, the adjusted savings ratio would represent the extent to which

savings rates could be decreased while still leaving enough asset accumulation to meet retirement needs.

Sensitivity of the Required Savings Rate to Framework Parameters

The calculation of adjusted savings ratios is potentially sensitive to three parameters. These parameters are the number of years the individual expects to be retired (R), the number of working years left until retirement (W), and the desired replacement rate of consumption (k). The parameters R and W are subject to an individual's preference for labor force participation and health status. The parameter R can be estimated by subtracting one's retirement age from his/her life expectancy. The parameter W may be estimated by either mandatory retirement ages or the age at which full Social Security benefits are paid. The replacement rate, k, is sensitive to an individual's preferences for current and future consumption rates. Retirement income need is often based on a replacement rate or the percentage of current income needed to fund retirement for a one-year period. The ratio of expenditures of current retirees relative to a pre-retired cohort is often used as the replacement rate. Other measures include standard budgets for the elderly, and a sliding replacement rate based on one's pre-retirement income (Meier, Dittmar & Torrey, 1980). A replacement rate between sixty-five and eighty percent of pre-retirement income is often suggested (Garman and Forgue, 1988).

Duncan et at. show that average adjusted savings rates vary dramatically with changes in retirement age (1984, pp. 37-38). Burns and Widdows (1989) showed that respondents' perceptions of life expectancy vary over the life cycle, and that savings needs are sensitive to changes in life expectancy. Average savings rates have been shown by Burns (1988) to be very sensitive to k, the desired replacement rate of consumption.

Varying the value of the parameters requires a simple substitution of desired values for standard values and will not affect the usefulness of the framework. For instance, a client may not want to retire until age 70. This constraint would require changing the number of years until retirement and the number of years of retirement. One of the strengths of the DMM method as a tool in retirement planning is that the individual can be shown how changes in his/her plans and expectations might impact on savings needs. Thus, a standard calculation might use statutory retirement age and life expectancy tables to set values for R and W, and have k equal to one (replace all current income). The resulting savings rate would be a conservative estimate of needed savings, but would serve as a good starting point for exploration of an individual's alternatives.

In their hypothetical cases, Duncan, et al. used standard values for parameters: a 75% replacement rate, a retirement age of 65, and set length of retirement at 20 years.

Changing the Operational Definitions of Three Framework Parameters

In their framework, Duncan, et al. calculated the savings rates needed to fund retirement in equation 5 as a proportion of current post-tax income. While this is a useful starting point, modifications to the framework may be warranted. Duncan, et al. showed that savings goals need to be recalculated if earnings change over the life

cycle or if changes are expected in tax rules (1984, pp. 39-41). The recalculation may become more complicated if it is also recognized that the desired replacement rate, k, varies over the life cycle (Burns & Widdows, 1989). More subtle is the question of whether individuals base their consumption replacement decisions on current income, or on permanent ("normal") income (Friedman, 1956). Consequently, one might wish to examine the savings rates needed if he/she expects a positive real income growth rate.

In equation 1 a number of data inputs are required, and it is likely that the specification of the inputs will affect adjusted savings rates. For instance, Duncan, et al. use the value of other savings (savings and investments excluding home value) as a significant portion of the retirement portfolio. It can be argued that an individual's wealth is a function of the value of assets *and* debts and that in a retirement analysis framework the value of other savings should be reduced by the value of outstanding, non-mortgage debt.

Duncan, et al. (1984) separate the value of home equity from calculations of other assets and debts. While home equity is used as a retirement portfolio asset in equation 1 in Duncan, et al.'s framework, the equity in one's home can be used in another way during retirement. Many retirees continue to live in their home during retirement and some until death. Consequently, unless a retiree enters into a reverse annuity mortgage contract or borrows against the equity in his/her home, the value of home equity can be considered a non-use asset. Because only 19% of families with a head over age 65 have mortgage debt (Avery, Elliehausen, Canner, & Gustafson, 1984), and the value of the home is often the largest asset of a retiree (U.S. Bureau of the Census, 1985) the value of home equity cannot be ignored in a retirement analysis. However, if a retiree continues to live in the home during retirement, his/her out-of-pocket expenses for shelter are reduced. Consequently equation 2 can be reduced by an imputed rent value. The annual value of imputed rent can be set at approximately 6% of the value of the home. If equation 2 is reduced by an imputed rent value then home equity must not be included in equation 1.

The effect of changing the operational definitions of these three factors on the required retirement savings rates will be examined. It is expected that required savings rates will be significantly different for members of different age groups. Thus, required savings rates are examined for sensitivity to age.

Methodology

The source of data for the calculations was the 1983 *Survey of Consumer Finances*, a representative sample of 3,824 households (1985). The data set included the requisite data on pensions plans, Social Security benefits, home equity, and private asset and debt holdings. Data for the survey were collected by the Survey Research Center at the University of Michigan between February and August 1983. The sample was a randomly selected, nationally representative, area probability sample of all U.S. households. A supplemental sample of high income households was drawn but not used in this study.

Sample

The sample was confined to non-retired, non-student households where the head of household and/or the spouse was 39 or older. This age requirement was imposed because many couples do not begin to make formal retirement plans until after their child-bearing years and the data required for this study contained no missing values where the head was 39 or older. The purpose of this study was not to analyze the behaviors of current retirees but pre-retirees. Hence the requirement to be non-retired. In addition, students would not be expected to have planned for retirement if they have not yet finished investing in human capital. Members of the high-income sample were also excluded from this study. Imposing the qualifications for inclusion in this study resulted in an N of 1,548.

Calculating Required Retirement Savings Rates

The result of using a retirement analysis framework is a required retirement savings rates (the adjusted savings ratio). This is the percent of gross income a person would have to save annually from the time of analysis until retirement to fund his/her retirement needs. In any type of financial analyses all calculations need to be made relative to today's dollars or in future value terms. For ease in understanding, all calculations were made in terms of 1983 dollars and at the time of the survey. Only financial data attributable to the head of household and spouse were included in this study.

For the purposes of this study, a standard retirement savings rate was calculated for a representative sample of U.S. households with the assumptions that 75% of the current annual adjusted gross income would be consumed each year after retirement (k = .75). It was also assumed that the retirement age would be 65 and that retirement funds would be needed for 20 years.

The definition of the standard calculation varies somewhat from DMM's framework and is summarized in Table 1. Table 1 also includes the definition of all other calculations of required savings rates. The standard estimate for
a required savings rate is termed ASR1. In calculating ASR1, a net worth value (NW) was used in place of other assets (OA) in (1):

$$A = ((SS + P) * R) + HE + NW + IRAKeogh + Retthrif. \quad (8)$$

Net worth was calculated by subtracting the sum of non-mortgage debts from the total value of all non-real estate, non-pension assets. The value of Social Security benefits and pension benefits were imputed[1] by Avery and Elliehausen (1988) and are defined as the gross present value of Social Security benefits and the gross present value of private pension benefits respectively. The present value of monies held in IRA/Keogh accounts and retirement thrift accounts were entered separately and were not included in the net worth figure. The only other alteration to the DMM framework is that the annual savings rate in equation 5 was calculated by dividing the retirement gap by a measure of average permanent income[2] determined by Avery and Elliehausen (1988) instead of current income.

For ASR2, current gross income is substituted for the average permanent income in equation 5.

ASR3 includes varying the use of home equity in the retirement analysis framework. In ASR3 an imputed rent value of 6% of home equity reduces retirement needs such that equation 2 now becomes:

$$N = ((k * Y) * R) - ((.06 * HE) * R). \quad (9)$$

Equation 1 would also have to be adjusted to account for the alternate use of the home equity:

$$A = ((SS + P) * R) + NW + IRAKeogh + Retthrif. \quad (10)$$

Instead of utilizing respondents' net worth in equation 8, when calculating ASR4, the value of the sample member's other savings was employed.

Statistical Procedures

A *t*-test was employed to test whether the mean difference between ASR1 and each of the other methods of calculating retirement savings rates was significantly different. In addition, the sensitivity of each of the required savings rates to age was tested using a one-way analysis of variance.

Table 1
Description of Standard and Variations of Required Retirement Savings Rate Calculations

Input	ASR1	ASR2	ASR3	ASR4
75% Replacement Rate	X	X	X	X
Net Worth	X	X	X	
Non-mortgage Assets				X
Permanent Income	X		X	X
Current Income		X		
Home Equity (asset)	X	X		X
Home Equity (imputed rent value)			X	

Results

Table 2 outlines the median value of the factors used in the retirement analysis and the distribution of the sample by demographic variables. The median current income was $25,000 with a range of $883 to $611,514 in annual income. The estimates of permanent income provided a much narrower range (- $25,693 to $80,442) and a median value of $28,988. The median value of income expected during the last year of work was $22,091. However, the median permanent income was $28,988.

Median net worth excluding home equity and pension assets was $13,317 and respondents had a median home equity of $35,914. The median balance in retirement thrift, IRA, and Keogh accounts was 0. The median value of years to retirement was 12.

Respondents were fairly evenly distributed among the three younger age groups while the age group over 65 contained 9% of the household heads. Most heads of household were female (53%), Caucasian (83.9%) and married (68.1%). Approximately one-third had high school diplomas, 21.4% had a college degree, and 32.3% did not graduate from high school. A very small proportion of either the heads of households (12%) or spouses (8.8%) were self-employed.

Almost 47% of the household heads expected to receive pension benefits while only 28% of spouses expected private pension coverage. Almost 91% of household heads expected Social Security benefits and 62.6% of spouses expected to be covered by

Social Security.

Table 3 summarizes the mean and median required retirement savings rates for the sample and for six age sub-groups. The mean rates shown in Table 3 represent the proportion of annual income that one would have to save to fund retirement needs. Three observations are noteworthy. First, median adjusted savings rates are in general higher than mean rates. Large income and asset portfolios of a small portion of the sample skew the data.

Second, regardless of the calculations used, required savings rates decrease a great deal for sample members between the ages of 55 and 64. Financial planners assume that the bulk of retirement savings will be accrued in the 10 to 15 years prior to retirement. The data suggests that this assumption is correct. The required savings rates reflect the decreasing proportion of consumer and mortgage debt in one's balance sheet and the increasing proportion of home equity the consumer holds. In addition, most workers, if covered by a private pension plan, will be fully vested by this time in the life cycle stage. Last, note the increase in required savings rates for those over age 75. These rates may be inherently biased because the group members are not retired and in fact, may not have enough retirement income and assets to forego labor force participation.

Table 2
Description of the Sample

	Median Value
Current Annual Gross Income	$ 25,000
Permanent Income Estimate	$ 28,988
Expected Income in Last Year of Work	$ 22,091
Average Annual Income Until Retirement	$ 20,129
Non-Mortgage Assets	$ 16,990
Net Worth (excluding home equity)	$ 13,317
Home Equity	$ 35,914
Present Value of Gross Social Security Benefits	$ 61,169
IRA/Keogh Account Balances	$ 0
Retirement Thrift Account Balances	$ 0
Present Value of Gross Pension Benefits	$ 2,998
Years to Retirement	12 years

	N	%
Head Expects Pension	724	46.8%
Spouse Expects Pension	440	28.4%
Head Expects Social Security	1406	90.8%
Spouse Expects Social Security	969	62.6%
Head Self-Employed	185	12.0%
Spouse Self-Employed	136	8.8%
Age of head:		
39 - 44	425	27.8%
45 - 54	511	33.0%
55 - 64	402	26.0%
65 +	204	9.2%
Sex of head:		
Male	715	46.3%
Female	833	53.7%
Race of head:		
Caucasian	1299	83.9%
Black (non Hispanic)	194	12.5%
Other	49	3.5%

Table 2 continued

	N	%
Marital Status of head:		
Married	1054	68.1%
Separated	58	3.7%
Divorced	176	11.4%
Widowed	199	12.9%
Never Married	61	3.9%
Education of head:		

0 - 8	266	17.2%
9 -12 (no diploma)	232	15.0%
High School Diploma	506	32.7%
Some College (no degree)	212	13.7%
College Degree	332	21.4%

Table 4 presents the results of a *t*-test of differences between the mean adjusted savings rates. Results for median rates are similar, and are not shown here. As can be seen in Table 4, two required savings rates derived by varying the operational definitions of retirement analysis factors from the standard definitions used in ASR1 result in significantly different required savings rates. A significant difference in mean required savings rates does not occur when current income is used as the relative base instead of a permanent income estimate. Ceteris paribus, using imputed rental value of homes to decrease retirement living expenses instead of using home equity as a retirement income earning asset makes a significant difference in the mean adjusted savings rate. The use of net worth instead of non-home other savings also significantly affects the mean value of the required savings rates.

The direction of the differences suggests that the use of current income does not reduce the adjusted savings ratio. Incorporating imputed rental values from home equity assets into retirement analysis equations reduces the estimate of savings needs by 1%. Allowing debt to decrease the value of retirement savings increases the adjusted savings ratio by .5% on average.

Table 5 presents the result of a one-way analysis of variance of the difference in mean required savings rates by age group. There is a systematic difference in required savings rates between members of the six age groups for all four calculations. The pattern of variation in required savings rates by age is illustrated in Figure 1.

Table 3
Mean (Median) Adjusted Savings Rates by Age and Method of Calculation

	ASR1	ASR2	ASR3	ASR4
Overall Mean	.18 (.26)	.18 (.21)	.17 (.21)	.17 (.21)
Age Group:				
25 - 34 (n = 6)	.32 (.33)	.22 (.22)	.21 (.22)	.22 (.22)
35 - 44 (n = 425)	.25 (.27)	.23 (.23)	.23 (.22)	.23 (.22)
45 - 54 (n = 512)	.21 (.29)	.21 (.24)	.20 (.23)	.21 (.24)
55 + (n = 403)	.10 (.21)	.12 (.16)	.10 (.14)	.12 (.15)
65 - 74 (n = 138)	.03 (.08)	.06 (.06)	.06 (.05)	.06 (.06)
75 + (n = 62)	.07 (.12)	.08 (.12)	.10 (.16)	.08 (.12)

Figure 1
Mean Adjusted Savings Rate by Age and Method of Calculation

Table 4
T - Test of Mean Differences of Adjusted Savings Ratios Using Different Retirement Analysis Factor Definitions

	Mean Difference	T	p
Permanent vs. Current Income	-.000	-0.06	.94
Home Equity vs. Imputed Rent Value	.010	13.41	.0001***
Net Worth vs. Other Savings	.005	6.30	.0001***

***p < .01

Table 5
One-way Analysis of Variance of Adjusted Savings Ratios by Age Groups

	ASR1	ASR2	ASR3	ASR4
F value (5df)	.12.73***	8.33***	8.81***	8.26***

*** $p < .01$

Conclusions

The purpose of this paper was to test whether modifying the operational definitions of three factors in the retirement analysis framework proposed by Duncan, et al. (1984) would result in significantly different required savings rates. The modifications adopted were relatively straightforward and should be of concern to users of retirement analysis frameworks. They reflect differing approaches that a financial planner might take in calculating the financial preparedness of a client for retirement.

Two of the modifications result in mean required savings rates significantly different from the standard estimates. Estimating savings needs as a proportion of current or permanent income does not make a difference. Using home equity in two different manners produces significantly different estimates of savings needs. Accounting for non-mortgage debts also makes a significant difference in the required savings rates.

Perhaps this is an indication that assets, debts, Social Security and pension benefits are closely associated with income levels and thus the required savings rates will "automatically" be adjusted for individuals participating in these programs.

A significantly lower required savings rate resulted when the home equity was used as an expense reducing asset instead of an income generating asset. This difference appeared larger for those sample members under age 55. This may suggest that younger clients will have greatly reduced required savings rates when they hold some equity in a home. However, this difference disappears with age because a large proportion (67%) of the population owns their homes outright at retirement. Thus, "late bloomers" might buy a home later in the life cycle, but either invest more equity up-front or pay off the mortgage in a shorter time period. If reverse annuity mortgages become more popular, a home could be both an income earning asset and an expense reducing asset. In return for this benefit, the homeowner will forego some equity in the home and lose the potential for a large capital gain when the home is sold at a later date. The use of home equity in a retirement analysis framework needs to be examined in greater detail.

Accounting for non-mortgage debt seems to only result in higher required savings ratios when people are young. During the earlier life cycle stages,non-mortgage debt is at its peak because consumers are purchasing a large amount of consumer durables. As consumers age, debt decreases to a very low proportion of one's balance sheet and virtually disappears about the time of retirement. Because financial planning is a dynamic process, using a net worth figure (not just non-mortgage assets) is recommended. Required savings rates reflect debt load if net worth is used and one will have a more realistic assessment of what he/she needs to save for retirement. A $100 decrease in debt, ignoring taxes, will produce the same change in a required savings rate as a $100 contribution to a retirement plan. Thus, the counselor could suggest either behavior as a method of decreasing required savings rates.

The results of this study enhance the evidence of the sensitivity of the DMM framework to the values which the factors in the retirement analysis framework take on as well as to the operational definition of the factors. Due to the versatility of the framework the sensitivity itself is not a problem. Results can be readily interpreted by financial planners and clients as long as clients are clear about what assumptions are made when retirement analyses are conducted. Furthermore, users are free to vary the known sensitive parameters and their values and obtain a range of required savings rates. This gives the framework a flexibility which is conducive to informed retirement planning.

The results also add to the evidence that retirement savings needs can be sensitive to the age of the individual concerned. Results of these analyses are beholden to the specific standard assumptions and definitions used and the modifications adopted. Repeated tests of a similar nature, varying more than one parameter at a time, are needed to establish formal patterns of dependency between savings rates and parameters of the framework. However, the DMM framework is a practical tool for the analysis of retirement savings needs.

End Notes

[1]*The gross present value of Social Security and pension benefits were calculated in several steps. First, an annual benefit was determined for the head of household using the Social Security Administration's formula for benefit determination. For pensions, the annual expected benefit in the first year of retirement was used. The length of retirement was calculated based on the SSA's sex-based mortality tables which include the probability of dying each year. Social Security benefits were assumed to grow at a 4% rate during retirement. It was assumed that pension benefits would not increase in real terms. The total value of Social Security or pension benefits was then priced as of the date of first benefits and discounted back to 1983 using the 1983 long-term government bond rate of 10.85%.*

[2]An annual expected income was created by using data from the March 1983 Consumer Price Survey. The regressions were calculated for three different age spans, controlling for race and sex. Separate regressions were computed for each 1980 3-digit occupation code. The predicted value is for a full-time annual income. Where no predicted value existed, current income was substituted.

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