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PENSIONS, SOCIAL SECURITY, AND ASSET ACCUMULATION

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Heated debate has surrounded the effects of the growing coverage and generosity of Social Security and private pensions on the timing of retirement and on saving behavior. In an influential 1974 article [7], Martin Feldstein argued and offered empirical support for the proposition that the availability of Social Security has reduced aggregate saving and potentially harmed aggregate capital accumulation. But Feldstein opened the door to a broad debate over the effects of Social Security by noting that Social Security could have not only a "wealth-replacement effect" (meaning that the availability of Social Security substitutes for private asset accumulation), but also an "induced-retirement effect" (meaning that the earlier retirement patterns caused by the availability of Social Security could result in greater pre-retirement saving to finance a longer retirement).

In fact, evidence inconsistent with Feldstein's findings about the effects of Social Security on private saving has been turned up by several studies [15; 19, 81-8]. In addition, Barro [2] expanded the theoretical scope of the debate by suggesting that changes in the pattern of voluntary intergenerational transfers may offset the intergenerational transfers imposed by Social Security, thus blunting any negative impact of Social Security on saving. Although the debate remains unresolved, the tide would seen to be turning against the proposition that Social Security depresses private asset accumulation.

The growth of private pensions has sparked many of the same concerns about retirement and saving behavior. The influence of pensions on saving and asset accumulation has been examined in several studies that have been reviewed by Munnell [19, 72-9]. The results of these studies are mixed, but two that use household data and control for various determinants of saving—Munnell [18] and Waters [22]—find substantial displacement of individual assets by expected pension benefits, suggesting that the "wealth-replacement effect" of pensions outweighs the "induced-retirement effect."

The effects of pension wealth and Social Security wealth on pre-retirement asset accumulation are intertwined with their effects on the timing of retirement. Although contention has surrounded the effects of retirement assets on the timing of retirement, most of the recent studies have found that increases in retirement wealth tend to induce earlier retirement [4; 5; 10].

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In this paper, we use household data from the 1983 Survey of Consumer Finances to examine some of the above issues of retirement and asset accumulation. The 1983 Survey of Consumer Finances is unusually well-suited to investigating these questions, not only because it offers extensive data on retirement expectations, asset holdings, and coverage by pensions and Social Security, but also because it is the first survey of household wealth to be taken since 1978, when amendments to the Age Discrimination in Employment Act increased the age at which workers could be forced to retire from 65 to 70.

The questions we focus on are the following: (1) Does retirement wealth, in the form of Social Security or private pensions, induce individuals to plan an earlier retirement? (2) How do Social Security and private pensions affect the accumulation of pre-retirement financial and property assets?

In the following section, we present a brief treatment of the life-cycle model, which motivates our empirical work. Section II describes the 1983 Survey of Consumer Finances, and some of the key variables we have constructed from it. In section III, we present our results.

I. The Life-Cycle, Retirement, and Asset Accumulation

The life-cycle framework of Modigliani and Brumberg [17] has become standard in analyzing retirement decisions and saving behavior. Many have viewed the life-cycle model as something to be tested, and hence have defined a highly restrictive model so as to obtain tight hypotheses and testable implications [3]. We turn to the life-cycle model mainly for guidance in specifying an econometric model of general form, and hence begin with as general a model as possible [6, 310-13].

Suppose that an individual worker's lifetime utility depends on consumption of goods (C_t), and leisure (L_t) in each period:

$$U = U(C_0, L_0, \ldots, C_D, L_D,), \tag{1}$$

where subscripts denote time periods (assumed to be years), and D refers to the year of death. Lifetime utility is maximized subject to a lifetime wealth constraint which can be written:

$$\sum_{t=0}^{D}(1+r)^{-t}p_tC_t + \sum_{t=0}^{D}(1+r)^{-t}w_tL_t = W_0 \tag{2}$$

$$= A_0 + \sum_{t=0}^{D}(1+r)^{-t}w_tT.$$

Here, p_t is the price of consumptions goods in year t, w_t is the wage rate in year t, r is the discount rate, A_0 is initial endowment of wealth, T is the total time available in each year, and W_0 is lifetime full wealth. Equation (2) states that the discounted stream of consumption plus the discounted stream of leisure must equal lifetime full wealth (W_0), defined as the sum of initial wealth and the discounted stream of full income in each year.

Solving the maximization problem posed by equations (1) and (2) yields a set of consumption demand and leisure demand functions for each year that can be written as follows:

$$C_t = C_t(W_0, r, p_0, \ldots, p_D, w_0, \ldots, w_D) \tag{3}$$

$$L_t = L_t(W_0, r, p_0, \ldots, p_D, w_0, \ldots, w_D). \tag{4}$$

Because of the issues that we are interested in exploring and the data available to us, our concern is not with consumption demand and leisure demand at a given time, but rather with asset holdings and labor supply at a given time. Equations (3) and (4) are easily

transformed to accommodate these interests. Since labor supply is simply the difference between time available and leisure consumed in a period ($H_t = T - L_t$) equation (4) may be rewritten as:

$$H_t = H_t(W_0, r, p_0, \ldots, p_D, w_0, \ldots, w_D), \tag{5}$$

which is the labor supply function for year t.

Also note that saving in each period is simply the difference between income in each period (which is endogenous in this model) and consumption in each period (which is also endogenous, as illustrated by equation (3)). Since the sum of saving over all years up to year t will be asset holdings in year t, we can write the following function for asset holding in year t:

$$A_t = A_t(W_0, r, p_0, \ldots, p_D, w_0, \ldots, w_D). \tag{6}$$

Clearly, the life-cycle framework places extraordinary—indeed impossible—demands on data. The functions (5) and (6) link labor supply and asset holdings in each period to present and future time endowments, assets, prices, and wages. Below, we estimate an equation for the age of planned retirement based on equation (5), and equations for the accumulation of nonretirement assets that are guided by equation (6). In this empirical work, we attempt to control for present and future wages by including a set of variables—such as education, race, health, and occupation—that determine labor market opportunities. Further, we include variables that may be related to differing tastes for assets and retirement wealth—age, household size, and self-reported risk attitudes. Finally, we include estimates of retirement wealth—that is, the present discounted value of future streams of income from Social Security and pensions—with two goals in mind. First, we wish to estimate the influence of Social Security and pension wealth on retirement plans; and second, we wish to estimate tradeoffs between retirement assets and nonretirement assets.[1]

II. The Data and a Description of the Sample

We address the issues discussed above using a relatively recent and as yet little used data base—the 1983 Survey of Consumer Finances (hereafter, SCF). The SCF is the most recent of a varying series of surveys designed to estimate the wealth holdings of a representative sample of households in the U.S. [1]. It is by far the most extensive of these surveys in that it includes information on pensions and retirement wealth, as well as data on more conventional asset holdings such as property and financial wealth. In addition, the SCF includes retrospective data on the employment histories of both the respondent and spouse (if present).

The clear strength of the SCF, compared with other data that might be used for the purposes we have in mind, is its data on asset holdings and coverage by private pension plans. Although asset holdings and pension coverage are self-reported, inspection of the questionnaire and the asset and pension data themselves suggest that considerable lengths were taken to obtain a consistent picture of households' assets and pension expectations.

For the calculation of Social Security wealth, no survey can match the Social Security Administration's Retirement History Survey. Nonetheless, the SCF's retrospective employment data are sufficient to construct a reasonable proxy for this variable, as described below. A more pressing problem is that the size of the SCF sample is only 3,824 households, and after deleting (for comparability with other studies) single female households, households

[1]No attempt is made to control for goods prices in the empirical work. The rate of time discount, r, is implicit in our computations of the value of retirement wealth, and to some degree on our controls for individual characteristics.

in which the respondent or spouse was a disabled male, and households in which the respondent or spouse was a man younger than 50 or a man 50 or over who has retired, we are left with a sample of only 508. Although smaller than we would like, this sample size is similar to that found in other studies of wealth and consumption that have used household data [9; 12; 13].

The variables of central interest to us are measures of total asset holdings (or wealth accumulation), Social Security wealth, and pension wealth. We discuss the construction of each in turn.

Total asset holdings include equity in up to two residential properties, average checking and saving account balances (for as many as five accounts each), average balances in money market funds, Individual Retirement and Keogh account balances, the dollar value of short-term certificates and certificates of deposit, U.S. bonds, Treasury bills, municipal and corporate bonds, stock and other mutual funds, stocks, call money accounts, trust accounts, life insurance, tangible assets (such as gold, jewelry, and other objects), and net business assets. Computation of most of these items is straight-forward, except for equity in residential property, and the value of life insurance.

We computed equity in up to two residential properties from information on households' annual mortgage payments, whether those payments included taxes and insurance, the mortgage interest rate, the term of the mortgage, the number of years payments had been made, the existence and amount of balloon payments, and the reported current market value of the house.[2] Up to two mortgages on a single property were considered. In addition, if land contracts or notes of other property were owed to the household, their net value was included in property wealth.

The value of life insurance was calculated by subtracting from the face value of straight (or whole life) insurance the amount of borrowing against the policy. The face value of term insurance was excluded because term insurance is not a true financial asset, in that it cannot be borrowed against.[3]

Social Security wealth—that is the present discounted value of the Social Security benefits for which a household is eligible—was computed in a way resembling the method Feldstein [8] used with the 1963-64 Survey of Financial Characteristics of Consumers. (The 1963-64 Survey is similar to the 1983 SCF we are using here.) For both the respondent and spouse, annual earnings from the current job (if now employed) and each past job (at the termination of that job) were recorded. Earnings prior to 1979 were brought forward to 1979 using the wage index factor used by the Social Security Administration [21].[4] These 1979 indexed earnings, and earnings from 1980, 1981, and 1982, were divided by 12 and applied to the Primary Insurance Amount (PIA) schedule for the appropriate year. We then took the largest PIA from among those calculated for each individual (respondent and spouse), and chose as the household PIA the larger of (a) the sum of the respondent's and spouse's PIAs, or (b) 1.5 times the larger of the two individual PIAs.[5]

To convert this Primary Insurance Amount for the household into Social Security wealth, we computed the expected age of death of the man in each household, according to his current age and race [20]. We calculated a PIA at the start of benefit receipt, assuming that benefits started at age 65 and that the household PIA calculated for 1979, 1980, 1981, or 1982 grew at a rate of 2 percent up to the time of retirement. This PIA at retirement was assumed to grow at a rate of 1 percent until the year of death, and was discounted back to the present at 3 percent.

Pension wealth—that is, the present value of pension benefits for which a household is eligible—was calculated as follows. For both men and women expecting to receive a pension from current or previous jobs, we used the self-reported age of expected receipt and pension amount to calculate a present value of the flow of future pension receipts. (We assumed that the pension would be received until the time of death–estimated from the life tables by age, race, and sex—and discounted the stream of pension receipts to the present at a rate of 3 percent.) If individuals were contributing to their plans, the present value of contributions from the present until the date of expected pension receipt was subtracted to obtain net pension wealth. For those eligible for a defined-contribution pension plan, the current amount reported in their account was used as pension wealth if it exceeded their pension wealth as calculated from their reported expected pension amount, or if they did not report an expected pension amount. The dollar amount in any profit-sharing plan held by the individual was also included as pension wealth. As many as three pensions for each individual (both respondent and spouse) were considered and their present values summed to arrive at a total household pension wealth variable.

Descriptive statistics and brief notes on the other variables used in estimation are provided in Table I, column 1, and in the table notes. Although most of these variables are self-explanatory, one deserves special mention.

A *Pension of Unknown Value* variable was constructed to take account of pension eligibility of individuals who reported that they were eligible for a pension, but reported neither an expected pension amount nor an amount in their contributory account. Pension of Unknown Value takes a value of one for such individuals. Hall and Johnson [11] used a similar variable to examine the influence of uncertain retirement income on retirement behavior, and we have followed their approach here.

III. Results of Estimation

Table I, column 2, displays the results of estimating the expected retirement age function (based on equation (5)), using ordinary least squares. Table I, columns 3 and 4, give results of estimating the asset holding function for the same households, again using OLS.[6]

Turning first to the estimates of expected retirement age in column 2, we note that the availability of any type of retirement wealth tends to reduce the planned retirement age. An additional $100,000 of either Social Security wealth or of pension wealth reduces

[2] In some cases, we needed to impute the current market value of the residence from information on the purchase price of the residence and the year of that purchase.

[3] Note that our measure of household assets excludes the value of many household durables, such as automobiles and household appliances.

[4] This procedure simplified the computation of the Social Security wealth measure by taking advantage of the newer Decoupled Formula Method, under which the Primary Insurance Amount depends on average indexed monthly earnings, rather than on the so-called average monthly wage. This aspect of our computation tends to give an upward bias to the Social Security wealth measure.

[5] This amounts to assuming that the highest calculated indexed monthly earnings figure for each individual reflects the true average indexed monthly earnings (AIME) that would be used to compute the Primary Insurance Amount. More likely it is an overestimate of the AIME. PIAs for jobs not covered by Social Security were coded to zero. Also, an estimate of the total number of quarters each individual had been covered by Social Security was used to determine whether each person would receive any benefits.

[6] In the belief that the error terms of equations (5) and (6) might be correlated, we have also estimated the expected retirement and asset holding functions jointly by Zellner's GLS technique of estimating seemingly unrelated regressions. The correlation between the error terms of the two equations, however, was too low for joint GLS to improve the efficiency of the estimates.

Table I. Descriptive Statistics and OLS Estimates
(standard errors of OLS coefficients in parentheses)

	Dependent Variable			
Variables	(1) Mean (Std. Dev.)	(2) Exp. Ret. Age	(3) Asset Holdings	(4) Asset Holdings
Expected Retirement Age	66.04	—	—	—
	(6.48)			
Asset Holdings ($100,000s)	1.607	−0.316	—	—
	(3.545)	(0.122)		
Social Security Wealth ($100,000s)	1.078	−0.528	3,105	−69,693
	(0.726)	(0.399)	(22,766)	(20,166)
Pension Wealth ($100,000s)	0.521	−1.232	48,491	−29,937
	(1.081)	(0.263)	(15,843)	(14,714)
Pension of Unknown Value	0.254	−2.058	−8,618	16,874
	(0.436)	(0.633)	(37,815)	(32,339)
Man's Age	57.06	−1.942	5,254	6,383
	(5.52)	(0.784)	(3,950)	(3,373)
Man's Age Squared/1,000	—	18.096	—	—
		(6.778)		
Man's Education	12.02	−0.632	6,545	2,132
	(3.49)	(0.439)	(6,393)	(5,468)
Man's Education Squared/100	—	3.347	—	—
		(1.940)		
Man's Work Experience	36.31	−0.175	3,647	1,538
	(8.11)	(0.119)	(2,357)	(2,018)
Man's Work Experience Squared/100	—	0.526	—	—
		(0.210)		
Man's Health Status	0.815	0.709	13,962	22,997
	(0.389)	(0.693)	(41,451)	(35,394)
Man's Occupation				
Professional/Managerial	0.370	1.822	58,042	11,951
	(0.483)	(0.705)	(40,837)	(35,030)
Sales/Clerical	0.097	2.462	4,480	−22,927
	(0.296)	(0.954)	(56,970)	(48,679)
Self Employed	0.112	3.455	42,867	54,523
	(0.316)	(0.836)	(50,264)	(42,921)
Woman's Age	53.66	−0.082	−1,983	−1,038
	(7.51)	(0.155)	(1,610)	(1,376)
Woman's Age Squared/1000	—	−0.364	—	—
		(1.789)		
Woman's Education	12.36	0.990	18,223	11,595
	(2.73)	(0.583)	(6,576)	(5,636)
Woman's Education Squared/100	—	−3.762	—	—
		(2.436)		
Woman's Work Experience	13.65	−0.059	3,289	−2,215
	(11.96)	(0.068)	(1,378)	(1,179)
Woman's Work Experience Squared/100	—	0.209	—	—
		(0.182)		
Respondent's Race	0.860	−0.434	27,351	22,965
	(0.347)	(0.795)	(46,472)	(39,676)
Household Risk Attitude	0.165	0.105	−11,609	−17,960
	(0.372)	(0.695)	(41,810)	(35,698)
Household Size	2.87	0.256	−2,697	−8,574
	(1.35)	(0.214)	(12,251)	(10,468)
Household Earnings ($1,000s)	32.26	—	—	5.629
	(39.18)			(0.416)
Constant	—	121.110	−493,544	−449,974
		(22.868)	(205,263)	(175,270)
Adjusted R-Squared F	—	0.257	0.094	0.340
		8.627	4.278	16.305

NOTES: Expected Retirement Age is the self-reported age at which the man in each household expected to retire. Asset Holdings are pre-retirement assets, defined as the sum of financial and property assets (which excludes Social Security and pension wealth). Social Security Wealth, Pension Wealth, and Pension of Unknown Value are described in section II. Work Experience refers to years of full-time work. Man's Health Status equals one for men reporting themselves to be in good health. Man's Occupational variables equal one if the man was Professional/Managerial, Sales/Clerical, or Self-Employed. Respondent's race equals one if white. Household Risk Attitude equals one if household reported itself willing to take "above average" or "substantial" financial risk. Household Earnings are 1982 annual earnings.

the expected age of retirement by one-half to one and one-quarter years (although the Social Security wealth coefficient differs from zero at only the 85-percent confidence level). Eligibility for a pension of unknown value tends to reduce expected retirement age by about 2 years. This latter is a surprisingly strong effect, implying that a pension of known value must have a present value of about $160,000 before its effect on expected retirement is as large as the effect of a pension of unknown value.

In contrast, nonretirement asset holdings appear to affect retirement expectations to a far smaller extent. An additional $100,000 of asset holdings reduces expected retirement by only 4 months. This result has important implications for the life-cycle model because it suggests that households have important motives for accumulating financial and property assets other than retirement security.[7]

The human capital and other variables included in the expected retirement function are intended to control for lifetime earnings of the household and for labor market opportunities. Higher educational attainment by the man, self-employment, and employment in white-collar occupations all tend to increase the expected retirement age–presumably because the opportunity cost of retiring is higher for these men.

Taken as a whole, the results in column 2 suggest that increased pension wealth induces substantially earlier planned retirement, and that increased Social Security wealth may also tend to induce earlier retirement. The next question is whether these earlier expected retirement ages, induced by greater pension and Social Security wealth, lead in turn to increased nonretirement asset holdings.

Estimates of the asset holding function (columns 3 and 4) suggest that the answer depends importantly upon the specification of the asset holding function. In the specification displayed in column 3, we have attempted to control for lifetime earnings by including a vector of human capital variables. We observe here that Social Security wealth is unrelated to asset holdings. This finding seems consistent with the weak negative relationship between Social Security wealth and expected retirement age seen in column 2. That is, if Social Security wealth does induce somewhat earlier planned retirement, we would expect a complementary increase—or at least no decrease—in asset holdings, in order to finance the longer retirement.

The relationship between private pension wealth and asset holdings is by contrast large, positive, and statistically nonzero, with the estimates suggesting that an additional $100,000 in pension wealth is related to asset holdings that are greater by nearly $50,000 (column 3). This finding of a strong positive relationship between private pension wealth and asset holdings is again consistent with the finding, reported in column 2, that increased pension wealth leads to earlier planned retirement. That is, pensions and nonretirement assets are complements.[8]

Column 4 differs from column 3 in that the specification includes current household earnings—a clearly improper inclusion because earnings in any given year are endogenous within the life-cycle context. That is, the life-cycle approach suggests that earnings in any given year are chosen by a household—there is no reason to suppose that earnings at a given age reflect lifetime earnings. For example, earnings at age 55 would be below the lifetime average for a household that has chosen to ease into early retirement. Hence, current household earnings will be correlated with the error term and result in inconsistent estimates.

[7]None of the coefficients in the expected retirement age equation are altered by excluding asset holdings.

[8]The result is in apparent conflict with Munnell's [18] and Waters's [22] findings, which are also based on household data. Differences between our approach and theirs, however, make their results only indirectly comparable with ours. For example, Munnell examined explicitly saving—as opposed to asset accumulation—in pre-retirement years. Waters focused on the effects of pension eligibility, rather than on the effects of pension wealth.

Nevertheless, we have estimated this specification because several earlier studies have used current (or very recent) earnings as a proxy for lifetime earnings.

The estimates that result from including current household earnings in the asset holding function (column 4) differ dramatically from those that exclude current earnings. Column 4's estimates suggest that both Social Security wealth and pension wealth reduce asset holdings by large amounts—by nearly $70,000 for each $100,00 of Social Security wealth and by nearly $30,000 for each $100,000 of pension wealth.

We interpret the dramatic changes in the Social Security and pension wealth coefficients that occur with the inclusion of a current earnings measure as a result of the endogeneity of current earnings. That is, current earnings are inappropriate as a measure of lifetime earnings in a sample such as ours, which ranges over all households where a pre-retirement male aged 50 or more is present.

We further prefer the results of column 3 because they are consistent with the robust findings on expected retirement age displayed in column 2. If increases in Social Security and pension wealth do induce earlier retirement plans, it follows that households will increase—not decrease—their asset holdings to finance a longer retirement and to smooth consumption over the life-cycle.

Although we prefer, for both econometric and theoretical reasons, the specification showing that both Social Security and pension wealth tend to increase asset holdings, we recognize an important limitation of the data we are using—that they fail to provide a true measure of lifetime earnings. We have no way of knowing whether the human capital and other variables we have used as proxies for lifetime earnings are adequate. With this caveat about our results in mind, we would suggest nevertheless that the main finding of some earlier studies using household data—that Social Security depresses asset holdings—should be interpreted with great caution. Our findings using the 1983 SCF suggest not only that estimated asset holding functions can be fragile, but also that the inclusion of current or recent earnings in asset holding functions estimated in earlier studies could be responsible for the finding of a negative relationship between Social Security and household assets.

IV. Summary and Conclusions

In this paper, we have used a sample of households from the 1983 Survey of Consumer Finances to examine the influences of Social Security and private pensions on two variables: the age of planned retirement and nonretirement asset holdings. Our results are consistent with the idea that increased private pension wealth induces both earlier planned retirement and greater pre-retirement asset holdings (presumably to finance the anticipated longer retirement period). That is, we find that the induced-retirement effect of pensions outweighs their wealth-replacement effect. Further, our findings suggest that greater Social Security wealth may induce slightly earlier planned retirement, but has little influence on pre-retirement asset accumulation. In finding little if any effect of Social Security on pre-retirement asset accumulation, our study buttresses the findings of two other studies—by Kurz [14] and by Menchik and David [16]—also based on household data.

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