PENSIONS, SOCIAL SECURITY, WEALTH AND LIFETIME EARNINGS: EVIDENCE FROM THE HEALTH AND RETIREMENT STUDY

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CRR WP 2006-14
Released: August 2006
Draft Submitted: June 2006

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Abstract

Using data from the Health and Retirement Study (HRS), we calculate the relationship between socio-economic status and a utility based measure of annuity value. We find considerable variation between groups once we take account of not only socio-economic differences in mortality, but also pre-annuitized wealth and longevity risk pooling in marriage.

Using HRS data on subjective survival probabilities, we then construct a subjective life table for each individual in the HRS. We show that these tables vary appropriately between groups and aggregate closely to group level averages. We calculate the value each household would place on annuitization, based on the husband and wife's subjective life tables, and the household's degree of risk-aversion and proportion of pre-annuitized wealth. A significant minority would perceive themselves as suffering a net loss from mandatory annuitization.

I. Introduction

Defined benefit (DB) pension plans had been a staple of the U.S. pension system for decades, before heading into a persistent and secular decline over the past 30 years. Although defined contribution plans continue to grow faster than the more traditional DB plans, DB plans nevertheless continue to play an important role in the pension system. Especially when including Social Security, a public defined benefit system, defined benefit plans provide a significant amount of retirement income for many elderly households.

Yet the effects of such plans on retirement income are controversial. Benefits from defined benefit plans are tax-preferred; they are typically paid as annuities, making them illiquid; and they are usually unindexed for inflation. These factors, combined with uncertainty about the relative importance of the major motives for saving (e.g., retirement, precautionary, down payments), the differing importance of such motives over the life-cycle, difficulties with measuring DB pension wealth, and other issues, have made estimation of the impact of DB pensions on wealth a difficult exercise.

This paper offers a new analysis of how private defined benefit pensions and Social Security affect household wealth with special attention to examining how to interpret estimates of the offset between defined benefit pension wealth and other wealth. We obtain several key results. First, "raw" defined benefit pension wealth must be adjusted in a particular way to yield meaningful coefficients in a cross-section regression of non-pension wealth on pension wealth. Second, most previous work has not made such adjustments. Third, the adjustments that have been made in the past do show significant changes in the interpretation of how defined benefit pensions affect wealth. Fourth, the Health and Retirement Study data used in this study show little offset between "raw" pension wealth and non-pension, and making the adjustments to defined benefit pension wealth has relatively modest effects on the estimated overall offset between pension wealth and other wealth. Fifth, the results do show statistically significant differences in offsets among households who have different levels of educational attainment.

Section II describes a model of defined benefit pensions and household saving that pays special attention to how one measures DB pension wealth and estimates the offset from that procedure. Section III reviews prior studies, again emphasizing how these issues were addressed there. Section IV describes the data set that we employ. Section V presents the central regression results. Section VI concludes.

II. A Life-Cycle Model of Pensions and Wealth

A. A Model with Discrete Time Periods

Whether pensions raise wealth is a question about the effects of changing the composition of employee compensation, holding the level of compensation constant. But, for regressions that control for cash earnings and pension wealth, the coefficient on pension wealth will pick up the standard substitution effect or offset between pensions and other wealth, but it will also pick up an income or wealth effect associated with raising the household's total compensation via adding a pension.[1] As a result, these estimates will systematically overstate the effect of pensions on wealth—that is, understate the true level of offset.[2]

Table 1 provides an example of this bias. As in all of the following examples, the interest, discount and inflation rates are set to zero, for simplicity. Worker A has total compensation in period 1 of 110 units, of which 100 units are paid as a cash wage and 10 are paid as deferred compensation.[3] He smooths consumption at 55 units per period, and so holds 45 units of non-pension wealth at the end of period 1. Worker B has the same cash wages of 100 in period 1, but no pension. He smooths consumption at 50 units per period, and holds 50 units of non-pension wealth at the end of period 1.

Now consider the results of estimating the pension offset on these two workers at the end of period 1, controlling for cash wages. Since worker A has 10 more units of

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[1]A related point, but not a necessary condition for the results that follow, is that the existing literature suggests that the burden of financing "employer-provided" benefits tends to fall largely on workers via reduced cash wages (Gruber and Krueger (1991), Montgomery et al (1992), Gruber (1995)). That is, pensions are a form of deferred compensation rather than added compensation.

[2]Bernheim and Scholz (1993b) make a similar point, noting that other things equal, an increase in pension wealth raises lifetime resources and also shifts resources toward retirement. Estimates that control for cash wages measure "gross displacement" and are ambiguous in sign; estimates that control for all resources measure "net displacement" and are unambiguously negative.

[3]To be consistent with any of a number of studies, the cash wages may be thought of as current cash earnings, age-adjusted cash earnings, or lifetime cash earnings.

pension wealth (calculated as the present discounted value of all future pension income) and 5 fewer units of non-pension wealth than worker B does, the estimated offset would be 50 percent.[4] However, the true offset—the reduction in non-pension wealth from deferring a part of compensation, holding total compensation constant—is 100 percent. The true offset can be estimated by regressing non-pension wealth on total compensation and pension wealth.[5]

Table 2 extends the example to show that the same bias holds even when the true offset is not 100 percent. In table 2, the true offset is 50 percent, but an estimate using second period wealth would, as shown in the table, yield an estimated offset of 25 percent. Thus the ratio of the estimated offset to the true offset (25/50) is the same in this example as it is in table 1 (50/100). That is, the amount of the bias does not depend on the initial true offset percentage.

Table 3 extends the example to show that the bias varies over the life-cycle, as years of service in the pension plan vary. In Table 3, workers A and B earn cash wages of 100 for two periods and worker A receives a pension of 10 for two periods. Worker A consumes 55 in each period and saves 45 in periods 1 and 2. Worker B consumes 50 in each period and saves 50 in periods 1 and 2. The estimated offset at the end of period 1 is 25 percent, because worker A has 5 fewer units of non-pension wealth than worker B but has 20 more units of pension wealth. The estimated offset at the end of period 2 is 50 percent, because worker A has 10 fewer units of non-pension wealth, but 20 more units of pension wealth. The estimated offset at the end of period 3 remains at 50 percent; worker A has 10 more units of pension wealth and 5 fewer units of non-pension wealth. Table 3 thus shows that the estimated offset rises (that is, the bias declines) with the worker's number of years in the pension plan during the working years, but is constant after retirement, and is always below the true offset of 100 percent.

These results have an intuitive explanation. Let S(A) be the number of years that a worker of age A has been covered by a pension plan and let T be S(A) plus the

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[4]Let the estimating equation be $W = \alpha E + \beta P$, where W is non-pension wealth, E represents cash earnings (net of employer provided pensions), and P is pension wealth. The equations would be $45=\alpha 100+\beta 10$ for worker A and $50=\alpha 100$ for worker B. These equations imply estimates of $\alpha=0.5$ and $\beta=-0.5$.

[5]The equations are $45=\alpha 110+\beta 10$ and $50=\alpha 100$, implying estimates of $\alpha=0.5$ and $\beta=-1$.

remaining lifetime of the worker. In this example, in the years before retirement, a true offset of 100 percent implies an estimated offset of only S(A)/T at age A.[6] The intuition is that, controlling for cash earnings, the pension represents added compensation, rather than a change in the composition of compensation. The worker spends the added compensation evenly over the T periods from the beginning of coverage to the end of life. At age A, the worker has been in the plan for S(A) years, and has spent S(A)/T of the pension wealth. This spending is financed by reductions in non-pension wealth. He thus has S(A)/T less in non-pension wealth per dollar of pension wealth, so that the estimated offset is S(A)/T even though the true offset is 100 percent. This intuition applies until retirement. After retirement, pension and non-pension wealth fall at the same rate so that the estimated offset remains constant, but is still biased.

One way to remove the bias is to adjust the measure of pension wealth used in the regression. In this example, the appropriate adjustment is to multiply pension wealth by S(A)/T. This yields an estimated coefficient that equals the true offset in each of the examples above. This adjustment is generalized and applied in the empirical estimates below.

This adjustment has been made in empirical work by Gale (1998), Attanasio and Brugiavini (2003), Attanasio and Rohwedder (2003), and Gale, Muller, and Phillips (2005), each of whom have found large offsets after making the adjustment. Controlling for total resources would seem to be an alternative approach, but, as discussed below, it is not valid in the presence of less than perfect offset.[7]

B. A Model with Continuous Time

This subsection develops a model of the effects of pensions on household wealth accumulation in continuous time, based on Gale (1998), which in turn is an extension of Summers (1981) to include pensions. In particular, the model developed here and in Gale (1998) provides measures of the appropriate adjustments to be made to pension

[6]More generally, for any value of the true offset, the estimated offset will be S(a)/T as large in absolute value.

[7]In a study of the effects of social security on wealth, Bernheim (1987) controls for lifetime resources inclusive of social security and pension benefits. His study finds much larger offsets for social security wealth than most previous studies.

wealth so that the estimated coefficient on pension wealth can be interpreted as the appropriate theoretical measure of offset.

Consider a worker (or household) beginning a job at age or time period 0. The job provides cash earnings as well as annual defined benefit pension annuities at retirement. The worker chooses current and future consumption and saving to maximize lifetime utility, subject to a lifetime budget constraint that equates the present value of wage and pension income to the present value of consumption. Cash earnings, pension income and interest rates are exogenously given. If the within-period utility function is isoelastic (i.e., exhibits constant relative risk aversion), then the household solves the following problem:

(1) $$V = \int_0^T \frac{C_t^{1-\rho}}{1-\rho} e^{-\delta t} dt + \lambda \left[\int_0^R E_t e^{-rt} dt - \int_0^T C_t e^{-rt} dt + \int_R^T B_t e^{-rt} dt \right]$$

where

t = index of age or time period,

C_t = consumption in period t,

ρ = coefficient of relative risk aversion (1/ ρ = intertemporal elasticity of substitution),

δ = pure rate of time preference,

E_t = real cash earnings in period t (net of employer contributions and other employer-provided fringe benefits),

r = real interest rate,

B_t = real pension benefit received in period t,

R = age of retirement and age when pension benefits begin, and

T = lifespan.

Maximization of (1) implies the following first-order conditions:

(2) $$C_t = C_0 e^{\left(\frac{r-\delta}{\rho}\right)t}$$

(3) $$C_0 = \frac{x}{e^{xT}-1}\left[\int_0^R E_t e^{-rt}dt + \int_R^T B_t e^{-rt}dt\right]$$

where

(4) $$x = \frac{r-\delta}{\rho} - r \ .$$

Equation (2) is standard consumption growth equation. Equation (3) determines consumption in the initial period. Together, these equations show that the model embodies complete offset between pensions and other wealth: consumption in the initial period and in any subsequent period depends only on the sum of lifetime resources, not on the allocation of such resources between wages and pension benefits, or on the timing of the receipt of those income flows.

As discussed and emphasized below, however, this is done for simplification purposes only. None of the key intuitions or biases depends on the simplifying assumption that there is complete offset.

These equations can be used to calculate the age-wealth profile. Non-pension wealth at age A (W_A) is given by the accumulated value of all prior earnings, all prior pension benefits received, less consumption:

(5) $$W_A = \int_0^A \left(E_t + B_t - C_t\right)e^{r(A-t)}dt$$

Substituting (3) into (2) and the result into (5) yields the following equation for a worker who is retired (i.e., when A < R):

(6) $$W_A = \left(1-Q\right)\left[\int_0^A E_t e^{r(A-t)}dt\right] - Q\left[\int_A^T (Et + B_t)e^{r(A-t)}\right]$$

$$(7) \qquad Q = \left[\frac{e^{xS} - 1}{e^{xT} - 1}\right] \quad if\ x \neq 0$$

$$= \frac{S}{T} \quad if\ x = 0$$

Equation (6) relates non-pension wealth at age A to the cash wages received in the past, and cash wages and pension benefits expected in the future. Under the assumptions above, the household has consumed by age A a portion Q (which will be a function of A) of all lifetime resources (wages and pension benefits). Thus, resources received previously (wages) raise wealth by a factor of 1-Q and resources expected in the future (including pension benefits) reduce current wealth by a factor of Q.

Clearly, the key variable for current purposes is the adjustment factor, given by Q, several features of which are worth noting. First, Q is just the generalized version of the ratio S(A)/T that was derived above. In the special case where x = 0, Q=S/T. This will occur if the rate of inflation, the real rate of return, and rate of time preference are all zero.

Second, a cross-section regression of non-pension wealth on the variables on the right hand side of (6) would yield a coefficient of -Q on pension wealth, even though the true offset is 100 percent.[8] It should be clear, however, that Q is between 0 and 1 because S < T. Therefore, a model with complete offset will yield an estimated coefficient that is biased toward zero and away from -1 if the regression controls for past earnings and past pension benefits. Third, the value of Q rises with S, holding T constant, so that even when the true offset is 100 percent at all ages, the estimated offset rises with the worker's years of service in the pension plan. These observations are derived in a multi-period model in Gale (1998) and in a 4-period model in Attanasio and Brugiavini (2003) and Attanasio and Rohwedder (2003).[9]

[8] Equation (6) also has implications for how to control for age, retirement age, and lifespan in regression equations. See Gale (1998).

[9] Brown, Coile, and Weisbenner (2004) develop similar intuition in the case of people who receive inheritances. They point out that more of the inheritance will have been consumed, the longer it has been since the inheritance was received. The analogy with pensions is strong. If someone is thought to

The quantitative implications of (6) can be readily obtained. Consider a worker who starts working at age 25 at a job that initially pays $20,000 per year. The worker retires at age 65 and dies at age 85. The real wage grows by 1 percent per year. The real rate of time preference and the real interest rate are set at 2 percent per year. Upon being hired at age 25, the worker is immediately vested in a defined benefit pension plan, where the annual benefit is set equal to one percent times the years of service times the average wage in the highest five years.

Figure 1 shows this worker's non-pension wealth W and his pension wealth P as a function of age (or, in this example, also years of service in the pension plan). Pension wealth is defined as the discounted value of future income flows from the pension. Pension wealth rises during the working years and then falls in retirement. Non-pension wealth initially falls below zero to finance consumption in the early part of the life cycle, but then rises steadily until the age of retirement. Now consider a second worker, with the same cash earnings, but no pension. The evolution of his wealth holdings is given by W*.

Controlling for cash wages, the estimated pension offset at age S would be –Q. The difference in non-pension wealth for the two workers is W-W*. Using (6) and (7) , that difference expressed as a fraction of pension wealth P is equal to –Q. Figure 2 plots the value of Q. The estimated coefficient is always less than 100 percent (even though the model generates complete offset by construction). The coefficient rises in absolute value as the worker ages, but remains flat in retirement, when both W and W* are falling.

Table 4 provides values of Q (or Q*) as a function of a worker's current age and years of service in the plan, where all workers are assumed to have a lifespan of 85 years. For example, a 50 year old worker who has participated in a pension plan since age 35 would have an estimated coefficient of only 41 percent, even though the true offset is 100 percent. Overall, the table suggests that low estimated coefficients (that is, Q values that are far from 1 in absolute value) can be consistent with full offset for young workers or workers and retirees with relatively short years of service in the pension plan.

"receive" a lifetime defined benefit pension at the time they start their job, they will consume some portion of those resources over time, and the total amount consumed over time rises, as discussed in section III.

The intuition for these results is straightforward. From (2) and (3), a one-dollar increase in pension wealth at time 0 raises consumption by $me^{[(r\text{-d})/\text{r}]t}$ in period t, where m is chosen to equate the present value of increased lifetime consumption and the increase in pension wealth:

(8) $$\int_0^T me^{[(r-\delta)/\rho]t}e^{-rt}dt = 1$$

Equation (8) implies that

(9) $$m = \frac{1}{e^{xT} - 1}$$

The added consumption in each period is financed by reductions in nonpension wealth. Therefore, after S periods in the pension plan, the present value of cumulative consumption to date has increased, and nonpension wealth has decreased, by

(10) $$\int_0^S me^{[(r-\delta)/\rho]t}e^{-rt}dt = \frac{e^{xS} - 1}{e^{xT} - 1}$$

where the right-hand side is equal to Q and is derived using (9). Thus, when the true offset is 100 percent, each dollar of increased pension wealth at time 0 reduces nonpension wealth at age S by Q, where Q rises with S.

The model above contains some special features that merit discussion. First, the increase in pension benefits is recognized at age 0. The same intuition applies, however, for an increase in benefits recognized at any age A^*. The increase in wealth is allocated to consumption over all time periods between A^* and the date of death. Thus the adjustment factor is $Q^* = (e^{rS^*} - 1)/(\text{e}^{rT^*} - 1)$, where S^* is A - A^*, and T^* is S^* plus remaining life expectancy. This generalization aids the empirical work because it allows consideration of households whose pension coverage started at different ages.

The most important special feature above is the assumption of perfect offset, but as discussed above this assumption is not necessary and the bias holds even if this assumption is removed. To analyze this case requires an alternative explicit model generating reasons why offset is imperfect, or must proceed in a somewhat less formal manner. Unfortunately, general formulations that produce imperfect offset are difficult to exploit for these purposes. For example, Engen and Gale (1993) simulate the effects of tax-deferred saving accounts in a stochastic life cycle model with borrowing constraints and precautionary saving against uncertain life span and wages. Their model generates imperfect offset as an endogenous response to the illiquidity of such accounts. However, with stochastic income and most specifications of the utility function (including the CRRA specification used in [1]), analytical solutions generally do not exist. Thus it is difficult to extract an analytical formula for the adjustment factor from these results.

A less formal approach can generalize the intuition developed above to apply to the case with imperfect offset. Suppose that the true offset is some level β^* (where $\beta^* = 1$ represents perfect offset, and $\beta^* < 1$ represents imperfect offset). This implies that, for a one dollar increase in pension wealth at time 0, a proportion β^* is allocated smoothly to consumption across all future time periods (and the remaining $1 - \beta^*$ is not consumed until retirement, as discussed below). This effect causes consumption during any period t to rise by $m^* e^{[(r-\delta)/r]t}$ such that the discounted increase in consumption equals β^*:

$$\int_0^T m^* e^{[(r-\delta)/\rho]t} e^{-rt} dt = \beta^*$$

Calculations similar to those in (9) and (10) imply that $m^* = m\beta^*$, where m is defined in (9). Thus, after S years in the pension plan, the increase in the present value of cumulative consumption to date and the corresponding decrease in nonpension net worth will be $Q\beta^*$. That is, when the true offset is β^*, each dollar of pension wealth at time 0 reduces nonpension wealth at age S by $Q\beta^*$ dollars. Thus a regression would yield an estimated pension wealth coefficient of $-Q\beta^*$. That is, the ratio of the estimated offset to the true offset would still be Q.

Removing the bias is straightforward, in principle. Equation (6) indicates that if pension wealth is multiplied by Q, the adjusted pension wealth measure (Q times pension wealth) will yield an estimated offset equal to the true offset. This is the approach taken below.

An alternative approach—controlling separately for lifetime compensation (rather than cash earnings) and pension wealth—may seem to be a more natural way to resolve the bias (see Bernheim 1987; Bernheim and Scholz 1993b). This approach, however, will in general not yield the true offset when the true offset is less than 100 percent. The reason, intuitively, is that controlling for lifetime compensation requires that past wages, future wages, and future pension benefits all have the same effect on consumption. This holds only when the true model involves perfect offset.

III. Previous work

Previous research on the impact of defined benefit pensions on overall household wealth has not focused on the need to adjust defined benefit pension wealth until the last decade or so.[10] The problem arises because current wealth in a DC plan or with most other assets (house, stocks, bonds) is generally defined as the current balance in the account or current market value. Current defined benefit wealth is a trickier concept. Workers have one level of benefits they would receive if they stopped working today, but a different level if they continue to be employed at the firm. Moreover, the wealth accrual is non-linear over time; workers can not access the funds before retirement and must accept the payment in annuity form.

Gale (1995, 1998) uses a sample of 40-64 year olds from the 1983 SCF and finds a range of effects, depending on the specification. Using a standard specification, he finds offsets between 0 and 10 percent, consistent with much of the literature. However, the paper also highlights several biases in the literature that are detailed in section IV

[10] Previous contributions include Cagan (1965), Katona (1965), Munnell (1974, 1976), Kotlikoff (1979), Blinder, Gordon, and Wise (1980), Diamond and Hausman (1984), Dicks-Mireaux and King (1984), Hubbard (1986), Avery, Elliehausen, and Gustafson (1986), Bernheim and Scholz (1993a), Samwick (1994), and Venti and Wise (1994). See CBO (1998) for a recent review of social security and saving.

below. Controlling for several of those biases, he finds offsets that range between 40 and 80 percent.

Gustman and Steinmeier (1998) perform a careful and comprehensive analysis of pensions and wealth accumulation using the Health and Retirement Survey. They define current DB wealth as a fraction of the DB wealth the worker would have if he stayed at his current job until retirement, where the fraction is the ratio of years worked in the plan to date divided by the years that the worker would have been in the plan if he stayed until retirement. They find large effects of pensions on wealth accumulation, with more than half of pensions representing new saving in virtually all of the estimates, and up to 100 percent or more representing new saving in some of the specifications.

Khitatrakum, Kitamura, and Scholz (2000) use data from the Health and Retirement Study. They adjust defined benefit pension wealth along the lines indicated by Gale (1998), but they also adjust defined contribution wealth to equal its expected value at retirement. They find no offsets at the median of the wealth distribution but larger offsets among higher-income households.

Attanasio and Brugiavini (2003) and Attanasio and Rohwedder (2003) make adjustments to defined benefit wealth along the lines proposed in Gale (1998) and use the adjusted measures to examine the effects of plausibly exogenous changes in pension laws in Italy and England, respectively. They find substantial offsets in private saving in responses to changes in public defined benefit pension wealth.

Gale, Muller, and Phillips (2005) use data on retirees from the Survey of Income and Program Participation. They find that the adjustments described above can significantly affect estimates of how defined benefit pensions affect household wealth accumulation. They find that about two-thirds of defined benefit pension wealth and three-quarters of Social Security wealth represents net additions to private saving.

Most of the results described above focus on average or typical offsets. That is, they require that each household have the same response to pension wealth. Households may respond differently, however, for a number of reasons. First, borrowing constrained households may be unable to offset as much pension wealth as they would like (Hubbard 1986). This suggests that the offset should be related to factors correlated with borrowing constrained status, such as liquid assets and net worth (Jappelli 1990).

Second, models that contain both retirement saving and precautionary saving suggest that the relative importance of the two motives changes over the life-cycle (Engen and Gale 1993, Hubbard, Skinner, and Zeldes 1995, Samwick 1994). Because pensions are a poor substitute for precautionary saving, the offset should depend on items correlated with the demand for precautionary saving, including income uncertainty, liquid assets, and age. Third, some households may be poor planners, financially illiterate, or "rule of thumb" consumers. For these households, the pension offset may be very small, suggesting that the offset should be related to factors that determine whether a household is in this category. Hence, the offset may be correlated with education or net worth.

Attanasio and Brugiavini (2003), Attanasio and Rohwedder (2003), Bernheim and Scholz (1993a, b), Gale (1995, 1998) and Gale, Muller, and Phillips (2005) find important variation across households in their response to pensions. Generally, the research shows that more-educated, older, higher-income, and wealthier households are more likely to offset increases in pension wealth with reductions in other wealth.

IV. Data

Our analysis focuses on households from the baseline Health and Retirement Study (HRS) interview in 1992. The HRS is a nationally representative panel of older Americans. The baseline survey contains interviews with respondents aged 51-61 in 1992 (the 1931-1941 birth cohort) and their spouses of any age. The baseline survey contains information on respondent health, wealth, income, labor market activity, and family, among other variables. The RAND Corporation provides a user-friendly version of the HRS data that was used in this analysis. The data can be linked to administrative data from the Social Security Administration on earnings and benefits for those respondents who provided consent (about 70 percent of the baseline respondents). Linking to the administrative records requires prior approval from HRS and SSA. The HRS also obtained information on employers of respondents. With the employer- and self-reported data, the HRS staff used a pension calculator to construct pension wealth variables that are also used in this analysis.

To be eligible for inclusion in the sample, households had to meet several criteria: the respondent was age-eligible in the 1992 interview; Social Security administrative matching data were available for both the respondent and the spouse, and neither was in current receipt of Social Security disability income; the age-eligible respondent was currently working and not retired; and the respondent reported tenure on his or her current job. These criteria reduce our sample from about 7,500 to about 3,000, with the requirement of availability of Social Security matching data having the largest effect on sample size.

The analysis features two measures of annuity pension wealth – employer defined benefit (DB) pensions and Social Security. Our regression specifications call for the calculation of the present discounted value of DB and Social Security pensions. For the purpose of calculating the current value of the future stream of benefits, we assume that marital status as of the HRS interview in 1992 does not change in the future, with the exception being widowhood. Similarly, we assume those who report being unmarried in 1992 never (re)marry. We use pension wealth measures as calculated by the HRS.

In order to adjust for the biases described earlier, we adjust the PDV of pension wealth by the factor *Q*. We calculate *Q* by calculating (a) age at death using life expectancy data from SSA (2002); (b) age when enrollment in the firm began (for DB plans) and age of first covered employment (for Social Security) and (c) current age. We calculate Q separately for each pension and person. We use two measures of non-pension wealth, financial wealth and the sum of financial and housing wealth.

Appendix Table 1 reports mean characteristics of various samples: all singles, all married couples, and the two samples combined. We will focus on the combined sample. Average age is 55; about 25 percent of the sample represent single, female-headed households. Average expected lifespan is 79 years. Less than a quarter of the sample has a college degree. Average lifetime earnings are about $1.2 million. Average defined benefit pension wealth is on the order of $100,000 or more and average Social Security wealth is of the same magnitude. Adjusting the wealth figures for Q reduces the private pension figures by 50 percent and reduces the Social Security wealth measures by about 40 percent. The pension figures are large relative to other wealth. Mean financial wealth (which does not include defined benefit pensions or Social Security) is about $67,000, and the sum of financial and housing wealth averages $124,000.

V. Results

The main empirical results are presented in Tables 5 and 6, for the combined sample of married couples and singles, with assumed ages of retirement of either 62 or 65. Each table reports four regressions. The regressions vary by the dependent variable – either net financial wealth or the sum of net financial wealth and housing equity – and by the presence of an adjustment of Social Security and defined benefit wealth. All of the regressions control for several household economic and demographic characteristics listed in the tables.

The regressions allow for a full set of interaction between the college graduate indicator and the other variables. This allows the effects of each of the determinants of wealth accumulation to differ between college graduates and other households. The expectation is that college-educated households will offset a greater share of pension wealth with reductions in private saving than would other households. This could be because educated, retiree households have a longer investment horizon, more assets to shift, less need for precautionary saving, are less likely to be borrowing constrained, or for other reasons.

Tables 5 and 6 show several key results. First, the determinants of overall wealth accumulation patterns appear to be different for households with and without college degrees. Second, controlling for other factors, lifetime earnings exert a positive but apparently quite small effect on lifetime wealth accumulation for both those with and without college education.

Given the differences described above in the basic determinants of wealth accumulation between households with and without college education, it should not be surprising to find differences in the ways that Social Security and defined benefit pensions affect the two groups.

The data show little offset between non-pension wealth and unadjusted pension wealth. The adjustment for Q – that is, the correction that allows the appropriate concept of defined benefit pension wealth for purposes of measuring pension offset – has a statistically significant but quite small effect in this sample on the estimated offset. The same is true of differences in offsets between households with and without college educations – there are real differences, but they are economically small. These results are different from earlier results reported in a variety of papers summarized above.

Appendix Tables 2-5 provide similar regressions, for the sample of single respondents and the sample of married couples, with results generally similar to those presented in Tables 5 and 6.

VI. Conclusion

This paper provides new evidence on how defined benefit pensions and Social Security wealth affect household wealth accumulation. The research presented here emphasizes the need to correct for a variety of biases in common econometric constructions, and the need to allow for heterogeneous responses to pensions across households with differing educational status.

The analysis shows that previous empirical research contains a series of econometric biases that can understate the offset between defined benefit pension wealth and non-pension wealth. This implies that even previously estimated positive effects of pensions on non-pension wealth may be consistent with full offset or a substantial amount of offset once the biases have been removed. The results apply to the literature on the effects of Social Security as well. Moreover, the paper shows that in many cases it is possible to correct for the biases. This yields potentially superior estimates of the offset between pensions and other wealth. The empirical findings indicate that correcting for the biases can have significant effects, but in the samples investigated, these effects are generally small in empirical magnitude.

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Table 1

Controlling for Cash Wages and Pensions with no Adjustment (Perfect Offset)

Worker	Income and Wealth	Period 1	2
A	Cash earnings, pension	100	10
	Consumption	55	55
	Non-pension wealth*	45	0
	Pension wealth*	10	0
B	Cash earnings, pension	100	0
	Consumption	50	50
	Non-pension wealth*	50	0
	Pension wealth*	0	0
	True Offset	-1	--
	Estimated Offset	-0.5	--
	Ratio: Estimated/True	0.5	--

* Wealth measures are reported at the end of the period

Table 2

Controlling for Cash Wages and Pensions with no Adjustment (Imperfect Offset)

Worker	**Income and Wealth**	**Period**	
		1	**2**
A	Cash earnings, pension	100	10
	Consumption	52.5	57.5
	Non-pension wealth*	47.5	0
	Pension wealth*	10	0
B	Cash earnings, pension	100	0
	Consumption	50	50
	Non-pension wealth*	50	0
	Pension wealth*	0	0
	True Offset	-0.5	--
	Estimated Offset	-0.25	--
	Ratio: Estimated/True	0.5	--

* Wealth measures are reported at the end of the period

Table 3

Total Compensation versus Cash Wages: More than 2 Periods (Perfect Offset)

Worker	Income and Wealth	Period			
		1	**2**	**3**	**4**
A	Cash earnings, pension	100	100	10	10
	Consumption	55	55	55	55
	Non-pension wealth*	45	90	45	0
	Pension wealth*	20	20	10	0
B	Cash earnings, pension	100	100	0	0
	Consumption	50	50	50	50
	Non-pension wealth*	50	100	50	0
	Pension wealth*	0	0	0	0
	Estimated Offset	-0.25	-0.5	-0.5	--

* Wealth measures are reported at the end of the period

Table 4
Estimates of the Adjustment Factor Q

Age when Pension Coverage Started	Current Age 25	30	35	40	45	50	55	60	65
25	0.000	0.136	0.259	0.371	0.472	0.563	0.646	0.720	0.788
30		0.000	0.143	0.272	0.389	0.494	0.590	0.676	0.755
35			0.000	0.151	0.287	0.410	0.522	0.622	0.714
40				0.000	0.160	0.305	0.437	0.556	0.663
45					0.000	0.173	0.329	0.471	0.599
50						0.000	0.189	0.360	0.515
55							0.000	0.211	0.402
60								0.000	0.242

$Q = (e^{xS} - 1)/(e^{xT} - 1)$ if $x \neq 0$, $Q = S/T$ if $x = 0$.
S = years of service in pension = current age - age when started pension.
T = remaining life expectancy = S + (85 - current age).
$X = (r - \delta)/\rho - r$.

Table 5
Regression Coefficients, Married and Single Respondents, Retirement at Age 62

Dependent Variable	Financial Wealth	Financial Wealth	Financial Plus Housing Wealth	Financial Plus Housing Wealth
DB and SS Adjusted?	No	Yes	No	Yes
DB Wealth	**0.048**	**0.092**	**0.067**	**0.127**
	(0.018)	(0.034)	(0.020)	(0.037)
	[2.60]	[2.69]	[3.40]	[3.48]
DB Wealth*College	**-0.086**	**-0.162**	**-0.099**	**-0.187**
	(0.036)	(0.068)	(0.041)	(0.077)
	[-2.35]	[-2.38]	[-2.40]	[-2.42]
SS Wealth	**0.698**	**1.149**	**0.886**	**1.490**
	(0.112)	(0.186)	(0.097)	(0.161)
	[6.26]	[6.19]	[9.11]	[9.28]
SS Wealth*College	**0.066**	**-0.112**	**0.443**	**0.383**
	(0.319)	(0.539)	(0.367)	(0.618)
	[0.21]	[-0.21]	[1.21]	[0.62]
Age	**-284**	**570**	**338**	**1402**
	(1068)	(1019)	(1160)	(1119)
	[-0.27]	[0.56]	[0.29]	[1.25]
Age*College	**5410**	**5576**	**3172**	**3915**
	(4716)	(4963)	(5828)	(5882)
	[1.15]	[1.12]	[0.54]	[0.67]
Female	**-13011**	**-4959**	**7548**	**15589**
	-10444	(10090)	(7599)	(7610)
	[-1.25]	[-0.49]	[0.99]	[2.05]
Female*College	**-61281**	**-70061**	**-107793**	**-102284**
	-30106	(33634)	(80734)	(80441)
	[-2.04]	[-2.08]	[-1.34]	[-1.27]
White	**24061**	**23259**	**42773**	**41812**
	-3528	(3489)	(4398)	(4371)
	[6.82]	[6.67]	[9.73]	[9.57]
White*College	**26340**	**23238**	**18222**	**10962**
	20383	(20599)	(24328)	(24118)
	[1.29]	[1.13]	[0.75]	[0.45]

Married	**-53925**	**-49831**	**-28325**	**-27711**
	-18625	(18670)	(10208)	(10048)
	[-2.90]	[-2.67]	[-2.77]	[-2.76]
Lifetime Earnings	**0.002**	**0.001**	**0.003**	**0.003**
	(0.001)	(0.001)	(0.001)	(0.001)
	[1.71]	[1.64]	[2.77]	[2.73]
Lifetime Earnings*College	**0.012**	**0.012**	**0.014**	**0.014**
	(0.006)	(0.007)	(0.008)	(0.008)
	[1.77]	[1.82]	[1.83]	[1.86]
Constant	**-16723**	**-63223**	**-66030**	**-122921**
	(56929)	(54500)	(61614)	(59932)
	[-0.29]	[-1.16]	[-1.07]	[-2.05]
College Graduate	**-242527**	**-227660**	**-89301**	**-105039**
	(291495)	(305213)	(370869)	(375293)
	[-0.83]	[-0.75]	[-0.24]	[-0.28]

(standard deviation)
[t-statistic]

Table 6
Regression Coefficients, Married and Single Respondents, Retirement at Age 65

Dependent Variable	Financial Wealth	Financial Wealth	Financial Plus Housing Wealth	Financial Plus Housing Wealth
DB and SS Adjusted?	No	Yes	No	Yes
DB Wealth	**0.047**	**0.091**	**0.063**	**0.122**
	(0.022)	(0.042)	(0.022)	(0.042)
	[2.08]	[2.15]	[2.85]	[2.93]
DB Wealth*College	**-0.08**	**-0.153**	**-0.086**	**-0.165**
	(0.034)	(0.062)	(0.036)	(0.067)
	[-2.37]	[-2.46]	[-2.38]	[-2.48]
SS Wealth	**0.670**	**1.103**	**0.852**	**1.434**
	(0.110)	(0.183)	(0.097)	(0.161)
	[6.10]	[6.02]	[8.75]	[8.90]
SS Wealth*College	**0.039**	**-0.124**	**0.403**	**0.362**
	(0.290)	(0.494)	(0.329)	(0.560)
	[0.13]	[-0.25]	[1.22]	[0.65]
Age	**96**	**972**	**796**	**1905**
	(1082)	(1034)	(1167)	(1124)
	[0.09]	[0.94]	[0.68]	[1.69]
Age*College	**5471**	**5542**	**3580**	**4215**
	(4787)	(5026)	(5808)	(5854)
	[1.14]	[1.10]	[0.62]	[0.72]
Female	**-15728**	**-7115**	**3792**	**12510**
	-10365	(9972)	(7386)	(7352)
	[-1.52]	[0.71]	[0.51]	[1.70]
Female*College	**-62290**	**-70662**	**-110145**	**-103221**
	(29862)	(33468)	(80898)	(80470)
	[-2.09]	[-2.11]	[-1.36]	[-1.28]
White	**24150**	**23279**	**42929**	**41866**
	(3519)	(3477)	(4396)	(4365)
	[6.86]	[6.69]	[9.76]	[9.59]
White*College	**26395**	**23001**	**18521**	**10560**
	(20449)	(20727)	(24319)	(24120)
	[1.29]	[1.11]	[0.76]	[0.44]

Married	**-58346**	**-54173**	**-34407**	**-33835**
	(18765)	(18816)	(10495)	(10319)
	[-3.11]	[-2.88]	[-3.28]	[-3.28]
Lifetime Earnings	**0.002**	**0.001**	**0.003**	**0.003**
	(0.001)	(0.001)	(0.001)	(0.001)
	[1.75]	[1.67]	[2.82]	[2.77]
Lifetime Earnings*College	**0.012**	**0.012**	**0.014**	**0.015**
	(0.007)	(0.007)	(0.008)	(0.008)
	[1.80]	[1.83]	[1.86]	[1.88]
Constant	**-38707**	**-86433**	**-92453**	**-151777**
	(57487)	(55222)	(61998)	(60286)
	[-0.67]	[-1.57]	[-1.49]	[-2.52]
College Graduate	**-243227**	**-223969**	**-111554**	**-122198**
	(294856)	(308351)	(368473)	(372669)
	[-0.82]	[-0.73]	[-0.30]	[-0.33]

(standard deviation)
[t-statistic]

Appendix Table 1
Descriptive Data

Dependent Variable	Single	Married: Husband	Married: Wife	Married: Household	Combined Sample
Age (yrs)	**55.2**	**55.4**	**51.4**		**55.3**
	(-3.2)	(3.2)	(5.4)		(3.2)
Single Female Head	**0.688**				**0.251**
	(0.464)				(0.434)
Lifespan	**80.9**	**77.8**	**81.9**		**79.0**
	(2.2)	(0.7)	(0.7)		(2.1)
College Graduate	**0.196**	**0.247**	**0.171**		**0.228**
	-0.397	(0.431)	(0.376)		(0.420)
Lifetime Earnings ($)	**488246**	**1473210**	**234897**	**1708107**	**1262372**
	(700808)	(2414103)	(326468)	(2431758)	(2067961)
DB Wealth at 62 ($)	**61295**	**91367**	**36901**	**128268**	**103796**
	(124081)	(209548)	(129701)	(275859)	(234404)
DB Wealth at 62, Adjusted ($)	**28832**	**49210**	**17005**	**66215**	**52556**
	(62368)	(117208)	(63339)	(147932)	(124461)
DB Wealth at 65 ($)	**78593**	**112620**	**44182**	**156803**	**128225**
	(160758)	(272924)	(150238)	(344088)	(293216)
DB Wealth at 65, Adjusted ($)	**36232**	**59871**	**20172**	**80043**	**64035**
	(79370)	(150395)	(72809)	(188601)	(154388)
SS Wealth at 62 ($)	**75666**			**165146**	**132450**
	(29755)			(49062)	(56966)
SS Wealth at 62, Adjusted ($)	**40435**			**96975**	**76316**
	(16682)			(24743)	(35094)
SS Wealth at 65 ($)	**82331**			**179658**	**144095**
	(31975)			(43725)	(61512)
SS Wealth at 65, Adjusted ($)	**43892**			**105502**	**82990**
	(17619)			(26601)	(37984)
Financial Wealth ($)	**39472**			**83731**	**67559**
	(165891)			(241705)	(218107)
Financial Plus Housing Wealth ($)	**73314**			**153389**	**124129**
	(199997)			(275669)	(253594)

Sample Size	**1056**		**1834**	**2890**

(standard deviation)

Appendix Table 2
Regression Coefficients, Single Respondents, Retirement at Age 62

Dependent Variable	Financial Wealth	Financial Wealth	Financial Plus Housing Wealth	Financial Plus Housing Wealth
DB and SS Adjusted?	No	Yes	No	Yes
DB Wealth	**0.094**	**0.202**	**0.106**	**0.230**
	(0.075)	(0.150)	(0.074)	(0.146)
	[1.24]	[1.35]	[1.44]	[1.57]
DB Wealth*College	**-0.240**	**-0.454**	**-0.249**	**-0.483**
	(0.192)	(0.437)	(0.216)	(0.483
	[-1.25]	[-1.04]	[-1.15]	[-1.00]
SS Wealth	**0.378**	**0.751**	**0.630**	**1.208**
	(0.143)	(0.245)	(0.162)	(0.279)
	[2.65]	[3.06]	[3.90]	[4.34]
SS Wealth*College	**0.491**	**0.905**	**0.752**	**1.488**
	(0.512)	(1.046)	(0.631)	(1.288)
	[0.96]	[0.86]	[1.19]	[1.16]
Age	**2153**	**2398**	**2454**	**2856**
	-1524	(1495)	(1586)	(1556)
	[1.41]	[1.60]	[1.55]	[1.84]
Age*College	**-14716**	**-14030**	**-18365**	**-17398**
	(10348)	(10151)	(12741)	(12507)
	[-1.42]	[-1.38]	[-1.44]	[-1.39]
Female	**-4985**	**152**	**8857**	**16679**
	(5363)	(4898)	(6452)	(6115)
	[-0.93]	[0.03]	[1.37]	[2.73]
Female*College	**-95466**	**-89812**	**-114658**	**-103543**
	(66733)	(62670)	(80673)	(76139)
	[-1.43]	[-1.43]	[-1.42]	[-1.36]
White	**24880**	**24090**	**38302**	**37192**
	(4841)	4814	(5940)	(5932)
	[5.14]	[5.00]	[6.45]	[6.27]
White*College	**40415**	**42272**	**43591**	**44398**
	(27507)	(27881)	(32222)	(32565)
	[1.47]	[1.52]	[1.35]	[1.36]

Lifetime Earnings	**0.017**	**0.015**	**0.015**	**0.013**
	(0.018)	(0.017)	(0.018)	(0.017)
	[0.97]	[0.88]	[0.87]	[0.76]
Lifetime Earnings*College	**0.005**	**0.006**	**0.008**	**0.009**
	(0.021)	(0.017)	(0.021)	(0.021)
	[0.23]	[0.30]	[0.36]	[0.43]
Constant	**-145092**	**-162573**	**-169327**	**-196531**
	(85029)	(84274)	(88364)	(87559)
	[-1.71]	[-1.93]	[-1.92]	[-2.24]
College Graduate	**866684**	**820493**	**1071794**	**1003606**
	(588152)	(572237)	(723820)	(704592)
	[1.47]	[1.43]	[1.48]	[1.42]

(standard deviation)
[t-statistic]

Appendix Table 3
Regression Coefficients, Single Respondents, Retirement at Age 65

Dependent Variable	Financial Wealth	Financial Wealth	Financial Plus Housing Wealth	Financial Plus Housing Wealth
DB and SS Adjusted?	No	Yes	No	Yes
DB Wealth	**0.133**	**0.285**	**-0.275**	**0.291**
	(0.093)	(0.186)	(0.088)	(0.175)
	[1.43]	[1.53]	[-1.46]	[1.66]
DB Wealth*College	**-0.266**	**-0.517**	**-0.275**	**-0.541**
	(0.173)	(0.399)	(0.189)	(0.431)
	[-1.54]	[-1.30]	[-1.46]	[-1.26]
SS Wealth	**0.325**	**0.665**	**0.628**	**1.104**
	(0.133)	(0.222)	(0.151)	(0.257)
	[2.45]	[2.99]	[1.22]	[4.30]
SS Wealth*College	**0.436**	**0.835**	**0.628**	**1.303**
	(0.415)	(0.874)	(0.517)	(1.077)
	[1.05]	[0.96]	[1.22]	[1.21]
Age	**2459**	**2710**	**2808**	**3216**
	-1447	(1397)	(1511)	(1461)
	[1.70]	[1.94]	[1.86]	[2.20]
Age*College	**-14678**	**-14064**	**-18366**	**-17448**
	(9978)	(9857)	(12274)	(12145)
	[-1.47]	[-1.43]	[-1.50]	[-1.44]
Female	**-6441**	**-1030**	**6227**	**14281**
	-5363	(4970)	(6509)	(6155)
	[-1.20]	[-0.21]	[0.96]	[2.32]
Female*College	**-93446**	**-90369**	**-114010**	**-106381**
	(66092)	(63000)	(79122)	(76001)
	[-1.41]	[-1.43]	[-1.44]	[-1.40]
White	**25651**	**24854**	**38968**	**37856**
	4987	(4943)	(6054)	(6030)
	[5.14]	[5.03]	[6.44]	[6.28]
White*College	**41080**	**41938**	**43053**	**43153**
	(27652)	(27746)	(33160)	(33032)
	[1.49]	[1.51]	[1.30]	[1.31]

Lifetime Earnings	**0.014**	**0.011**	**0.012**	**0.009**
	(0.016)	(0.015)	(0.016)	(0.015)
	[0.87]	[0.71]	[0.78]	[0.60]
Lifetime Earnings*College	**0.011**	**0.012**	**0.012**	**0.015**
	(0.016)	(0.019)	(0.020)	(0.020)
	[0.54]	[0.63]	[0.78]	[0.75]
Constant	**-161990**	**-180187**	**-188504**	**-216366**
	(80026)	(79024)	(83547)	(81520)
	[-2.02]	[-2.31]	[-2.26]	[-2.65]
College Graduate	**866772**	**824857**	**1081107**	**1014896**
	(568892)	(557934)	(699648)	(687119)
	[1.52]	[1.48]	[1.55]	[1.48]

(standard deviation)
[t-statistic]

Appendix Table 4
Regression Coefficients, Married Respondents, Retirement at Age 62

Dependent Variable	Financial Wealth	Financial Wealth	Financial Plus Housing Wealth	Financial Plus Housing Wealth
DB and SS Adjusted?	No	Yes	No	Yes
DB Wealth	**0.036**	**0.070**	**0.055**	**0.105**
	(0.019)	(0.035)	(0.021)	(0.038)
	[1.89]	[2.01]	[2.66]	[2.76]
DB Wealth*Husband College	**-0.060**	**-0.119**	**-0.079**	**-0.153**
	(0.034)	(0.063)	(0.041)	(0.076)
	[-1.74]	[-1.90]	[-1.93]	[-2.02]
SS Wealth	**0.658**	**1.054**	**0.858**	**1.38**
	(0.103)	(0.161)	(0.117)	(0.183)
	[6.40]	[6.54]	[7.37]	[7.52]
SS Wealth*Husband College	**0.209**	**-0.011**	**0.395**	**0.274**
	(0.411)	(0.637)	(0.454)	(0.711)
	[0.51]	[-0.02]	[0.87]	[0.38]
Husband Age	**-2520**	**-1570**	**-2890**	**-1656**
	(1670)	(1615)	(1844)	(1793)
	[-1.51]	[-0.97]	[-1.57]	[-0.92]
Husband Age*Husband College	**14428**	**14651**	**13513**	**14021**
	(5581)	(5791)	(6430)	(6631)
	[2.59]	[2.53]	[2.10]	[2.11]
Wife Age	**1316**	**1475**	**2523**	**2724**
	(903)	(920)	(1023)	(1043)
	[1.46]	[1.60]	[2.47]	[2.61]
Husband White	**26019**	**25451**	**51751**	**51006**
	(5963)	(5958)	(7288)	(7270)
	[4.36]	[4.27]	[7.10]	[7.02]
Husband White*Husband College	**29861**	**23846**	**15334**	**4450**
	(36181)	(35514)	(40115)	(39865)
	[0.83]	[0.67]	[0.38]	[0.11]
Lifetime Earnings	**0.001**	**0.001**	**0.003**	**0.003**
	(0.001)	(0.001)	(0.001)	(0.001)
	[1.50]	[1.45]	[2.56]	[2.52]

Lifetime Earnings*Husband College	**0.010**	**0.011**	**0.013**	**0.014**
	(0.007)	(0.007)	(0.008)	(0.008)
	[1.51]	[1.55]	[1.60]	[1.64]
Wife College Graduate	**41990**	**42758**	**55865**	**57016**
	(25908)	(25829)	(27663)	(27603)
	[1.62]	[1.66]	[2.02]	[2.07]
Wife College*Husband College	**470**	**280**	**9985**	**9623**
	(42627)	(42416)	(47640)	(47384)
	[0.01]	[0.01]	[0.21]	[0.20]
Constant	**-10214**	**-64373**	**-51149**	**-121411**
	(73573)	(71061)	(82858)	(80590)
	[-0.14]	[-0.91]	[-0.62]	[-1.51]
Husband College Graduate	**-790875**	**-759494**	**-745144**	**-721543**
	(329235)	(338949)	(374366)	(384804)
	[-2.40]	[-2.24]	[-1.99]	[-1.88]

(standard deviation)
[t-statistic]

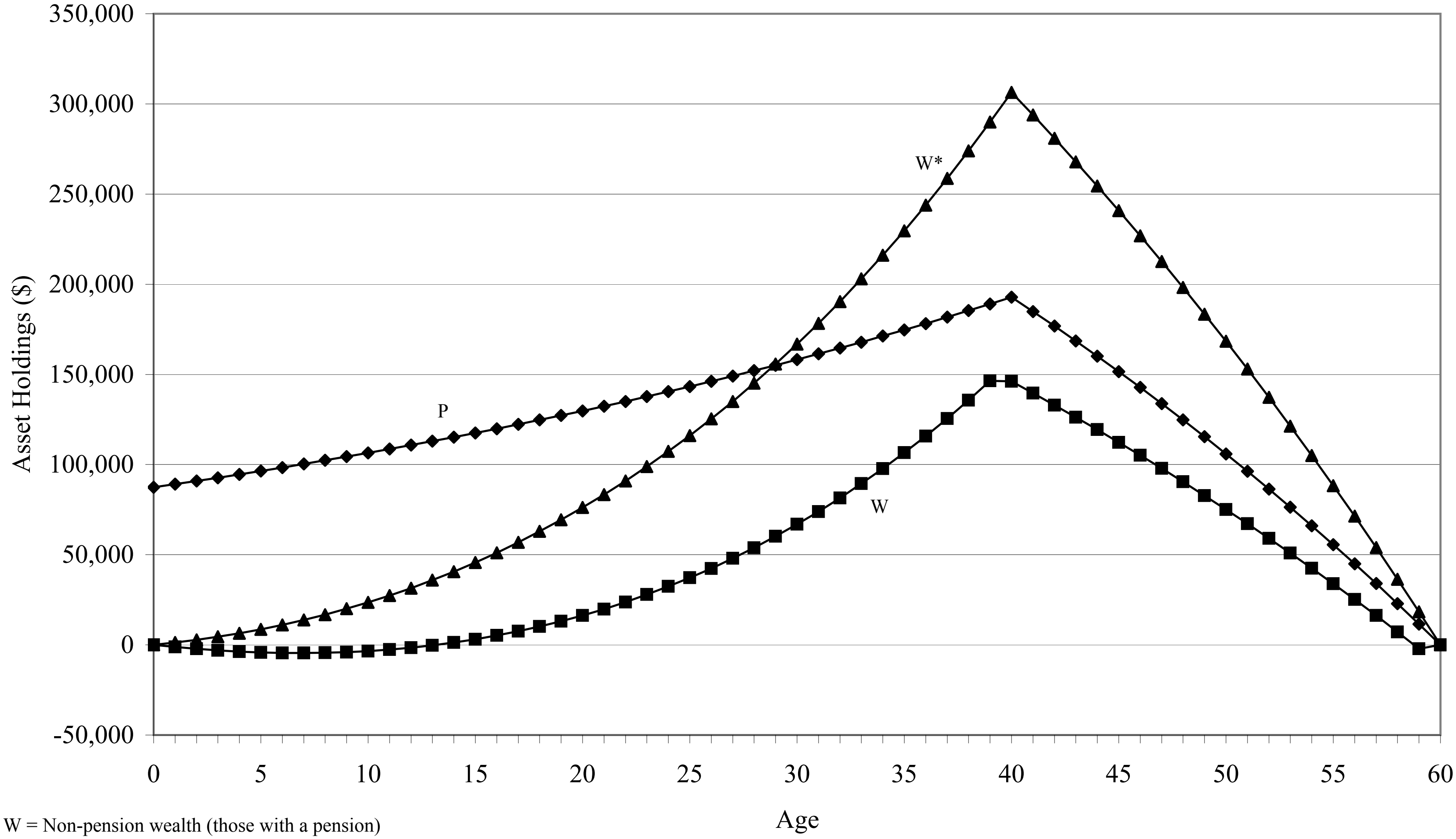
Appendix Table 5
Regression Coefficients, Married Respondents, Retirement at Age 65

Dependent Variable	Financial Wealth	Financial Wealth	Financial Plus Housing Wealth	Financial Plus Housing Wealth
DB and SS Adjusted?	No	Yes	No	Yes
DB Wealth	**0.026**	**0.052**	**0.045**	**0.087**
	(0.015)	(0.027)	(0.017)	(0.031)
	1.75	[1.88]	[2.70]	[2.83]
DB Wealth*Husband College	**-0.049**	**-0.099**	**-0.060**	**-0.120**
	(0.028)	0.050	(0.032)	(0.058)
	[-1.75]	[-1.98]	[-1.87]	[-2.04]
SS Wealth	**0.640**	**1.025**	**0.834**	**1.340**
	(0.104)	(0.164)	(0.116)	(0.183)
	[6.12]	[6.25]	[7.19]	[7.33]
SS Wealth*Husband College	**0.193**	**-0.008**	**0.408**	**0.318**
	(0.368)	(0.574)	(0.410)	(0.647)
	[0.53]	[-0.01]	[1.00]	[0.49]
Husband Age	**-2187**	**-1211**	**-2435**	**-1160**
	(1643)	(1584)	(1815)	(1763)
	[-1.33]	[-0.76]	[-1.34]	[-0.66]
Husband Age*Husband College	**14683**	**14746**	**14072**	**14463**
	(5678)	(5855)	(6515)	(6676)
	[2.59]	[2.52]	[2.16]	[2.17]
Wife Age	**1277**	**1443**	**2490**	**2702**
	(904)	(921)	(1024)	(1045)
	[1.41]	[1.57]	[2.43]	[2.59]
Husband White	**26278**	**25581**	**52041**	**51107**
	(5872)	(5867)	(7218)	(7195)
	[4.48]	[4.36]	[7.21]	[7.10]
Husband White*Husband College	**30444**	**23351**	**16548**	**3593**
	(36148)	(35515)	(39944)	(39742)
	[0.84]	[0.66]	[0.41]	[0.09]
Lifetime Earnings	**0.001**	**0.001**	**0.003**	**0.003**
	(0.001)	(0.001)	(0.001)	(0.001)
	[1.56]	[1.49]	[2.61]	[2.55]

Lifetime Earnings*Husband College	**0.010**	**0.011**	**0.013**	**0.014**
	(0.007)	(0.007)	(0.008)	(0.008)
	[1.52]	[1.55]	[1.61]	[1.64]
Wife College Graduate	**41754**	**42530**	**55021**	**56256**
	(25820)	(25718)	(27534)	(27449)
	[1.62]	[1.65]	[2.00]	[2.05]
Wife College*Husband College	**794**	**686**	**9554**	**9503**
	(42501)	(42289)	(47448)	(47205)
	[0.02]	[0.02]	[0.20]	[0.20]
Constant	**-32172**	**-87827**	**-82234**	**-154946**
	(72101)	(69551)	(81376)	(79200)
	[-0.45]	[-1.26]	[-1.01]	[-1.96]
Husband College Graduate	**-807661**	**-765888**	**-789940**	**-755799**
	(333603)	(341816)	(377541)	(386478)
	[-2.42]	[-2.24]	[-2.09]	[-1.96]

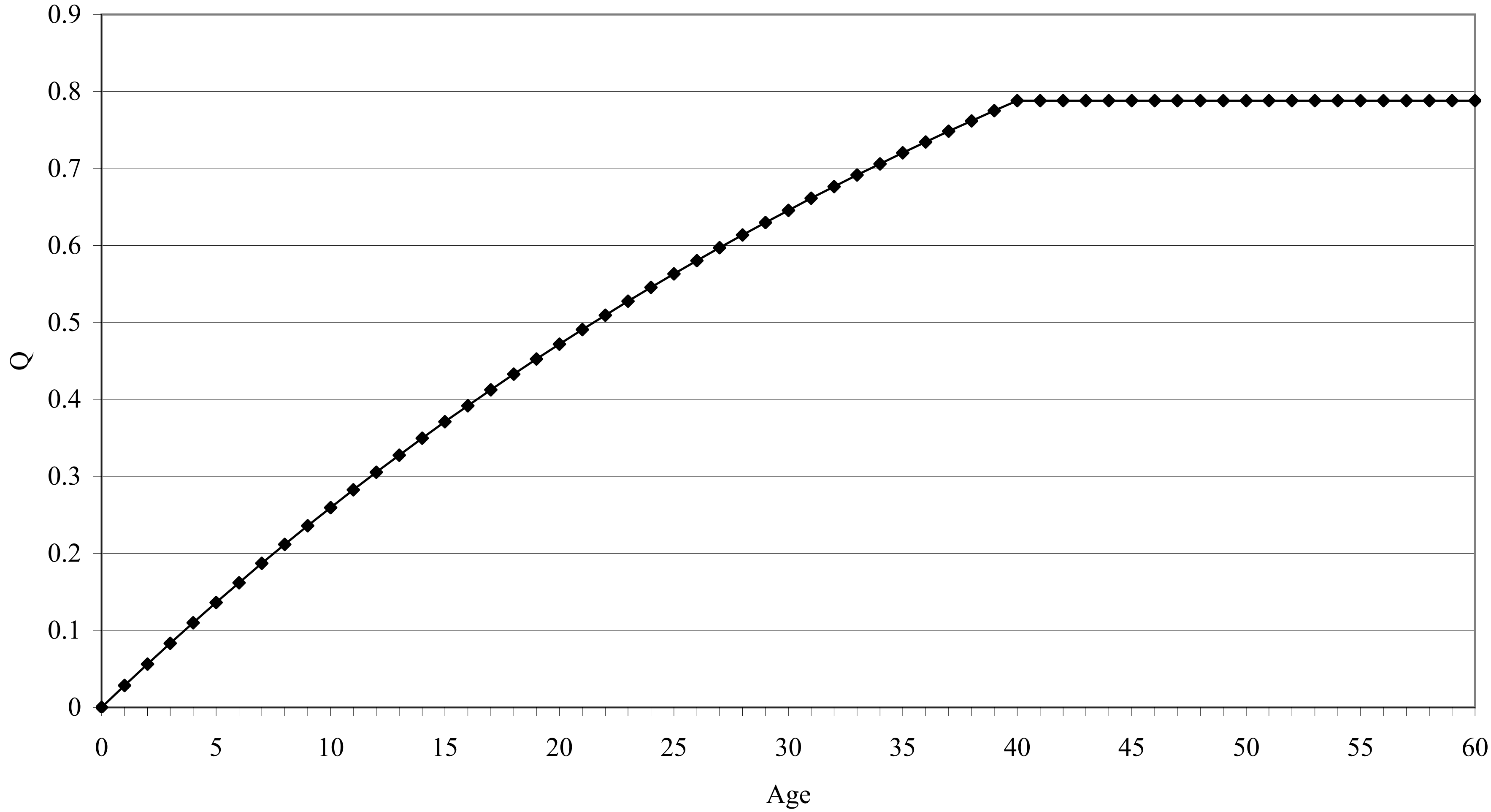
(standard deviation)
[t-statistic]

Figure 1: Age-Wealth Profiles



W = Non-pension wealth (those with a pension)
W* = Non-pension wealth (those without a pension)
P = Present Value of future pension benefits

Figure 2: How the Estimated Offset Varies with Age



Q is the coefficient on pension wealth that is consistent with full offset of pension wealth (when the regression controls for cash wages but not total compensation). These values of Q are based on the simulation described in the text.

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