The Effects of Pensions on Household Wealth: A Reevaluation of Theory and Evidence

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This paper examines the extent to which households offset pension wealth with reductions in other wealth. Systematic econometric biases imply that the estimated offsets in previous empirical studies are smaller than the true offset and may even have the wrong sign. New empirical estimates that do not correct for the biases generate little offset between pensions and other wealth. Estimates that correct for the biases show substantially more offset (a smaller impact of pensions on overall saving) than in most previous studies. The estimates also indicate that the effects of pensions on wealth vary significantly across households.

This paper provides a new analysis of an old question: To what extent do increases in pension wealth induce changes in households' non-pension wealth? Private pensions accounted for 21 percent of household net worth in 1994 (Board of Governors 1995) and the vast majority of net personal saving in recent years (Shoven 1991; Sabelhaus

1997). Thus the effects of pensions on saving can have implications for policy issues, such as how to raise national saving, as well as for more fundamental questions, such as how households make economic decisions about the future.

The theoretical relation between pensions and other wealth is complex. In the simplest life cycle models, workers save only for retirement. Changing workers' compensation from wages to pension benefits has no effect on consumption. Increases in pensions are offset completely by reductions in other wealth. A number of issues, however, complicate the analysis.

First, unlike conventional taxable assets, pensions are typically illiquid, tax-deferred annuities. Illiquidity implies that pensions raise overall saving for households that face binding borrowing constraints (Hubbard 1986). Tax deferral raises the after-tax return on pensions relative to other saving. This creates income effects that reduce overall saving and, if pensions are the marginal source of saving, substitution effects that raise saving. As annuities, pensions provide insurance against an uncertain life span, which should reduce overall saving (Hubbard 1987). Pensions may also induce earlier retirement, which should raise saving among workers (Feldstein 1974). Thus, even when households save only for retirement, pensions have ambiguous effects on other wealth.

Second, when households save for reasons other than retirement, pension wealth will not be fully offset by reductions in other wealth. Third, alternative approaches to saving, in which households create mental accounts for different assets (Thaler 1990) or lack basic levels of economic literacy (Bernheim 1994), suggest that pensions could raise nonpension wealth. Given all these factors, pensions can have any effect from reducing nonpension wealth by more than pension wealth (an offset of more than 100 percent) to raising nonpension wealth (an offset of less than zero). Moreover, to the extent that these factors vary across households, the relation between pensions and other wealth should vary as well.

These theoretical ambiguities highlight the need for empirical research. Previous empirical studies, however, differ widely in their specifications and results. Many suggest no offset at all or a positive effect of pensions on other wealth (Cagan 1965; Katona 1965; Munnell 1974; Kotlikoff 1979; Blinder, Gordon, and Wise 1980; Venti and Wise 1996). Several others find offsets of 20 percent or less (Diamond and Hausman 1984; Hubbard 1986; Samwick 1995). Only a few studies have found substantial offsets: Munnell (1976), Dicks-Mireaux and King (1984), and Avery, Elliehausen, and Gustafson (1986) estimate offsets of 62 percent, 27–50 percent, and up to 66 percent, respectively.

This paper reexamines the relation between pensions and saving. The central result is that previous empirical studies contain econometric biases that lead to understatements of the offset between pensions and other saving (i.e., overstatements of the effects of pensions on total saving). One bias arises from the fact that all previous studies control for workers' cash wages and pension wealth separately in regression equations. Section I provides a model that illustrates how the problem arises and how it may be removed. A second bias occurs when analyses focus on how pensions affect narrow measures of nonpension wealth rather than broad measures.

Section II examines the quantitative importance of these two biases, using data from the 1983 Survey of Consumer Finances. Specifications containing the biases yield results similar to previous findings: small offsets or positive effects of pensions on other wealth. However, correcting for the biases yields offsets that are larger than most previous estimates. Section III discusses caveats, implications of the findings, and directions for additional research.

I. Theoretical Framework

A household (or worker) at age or time period 0 chooses current and future consumption to maximize lifetime utility, subject to a lifetime budget constraint and exogenous cash earnings, employer-provided pension benefits, and interest rates. If the within-period utility function is isoelastic (constant relative risk aversion [CRRA]), the household solves the following problem:

$$\max_{\{C_t\}} V = \int_0^T \frac{C_t^{1-\rho}}{1-\rho} e^{-\delta t} dt$$

$$+ \lambda \left(\int_0^R E_t e^{-rt} dt - \int_0^T C_t e^{-rt} dt + \int_R^T B_t e^{-rt} dt \right),$$

(1)

where t indexes age or time, C is consumption, ρ is the coefficient of relative risk aversion ($1/\rho$ is the intertemporal elasticity of substitution), δ is the time preference rate, E is real cash earnings, r is the real interest rate, B is real pension benefits, R is the age of retirement and the age at which pension benefits begin, and T is life span. Maximization of (1) implies

$$C_t = C_0 e^{[(r-\delta)/\rho]t}$$

(2)

and

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

where

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

Equation (3) determines initial consumption; (2) determines consumption growth. These equations show that the model embodies complete offset between pensions and other wealth: consumption in each period depends on the present value of total compensation, but not on the allocation of compensation between wages and pensions. In the preretirement period, nonpension wealth at age A (W_A) equals the accumulated value of all prior earnings less consumption:

$$W_A = \int_0^A (E_t - C_t) e^{r(A-t)} dt. \tag{5}$$

Substituting (3) into (2) and the result into (5) yields

$$W_A = \int_0^A E_t e^{r(A-t)} dt - Q\left[\int_0^R E_t e^{r(A-t)} dt\right] - Q\left[\int_R^T B_t e^{r(A-t)} dt\right], \tag{6}$$

where

$$Q = \begin{cases} \dfrac{e^{xS} - 1}{e^{xT} - 1} & \text{if } x \neq 0 \\[2ex] \dfrac{S}{T} & \text{if } x = 0 \end{cases} \tag{7}$$

and S represents years of service in the pension and, in this example, equals age.

Equation (6) relates nonpension wealth to the present value of cash wages earned to date, the present value of lifetime cash earnings multiplied by an adjustment factor Q, and the present value of future pension benefits multiplied by Q. A regression of nonpension wealth on the right side of (6) would yield a pension wealth coefficient of $-Q$; Q will fall between one and zero because $S < T$. Thus controlling for cash wages and pensions separately yields an estimated offset that is biased toward zero and away from the true offset (which is 100 percent in this example, or a coefficient of -1). More-

over, since Q rises with S, the estimated offset rises with the worker's years in the plan.

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

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

Equation (8) implies that

$$m = \frac{1}{e^{xT} - 1}. \tag{9}$$

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

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

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 $Q < 1$ dollar, 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 $Q^* = (e^{rS^*} - 1)/(e^{rT^*} - 1)$, 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 is the assumption of perfect offset. A key question concerns the appropriate adjustment factor when the true offset is not 100 percent. 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 pre-

cautionary 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 $m^* e^{[(r-\delta)/\rho]t}$ 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.

A third special feature is that the entire analysis has focused on the preretirement period. As noted above, a proportion β^* of pension wealth will be consumed smoothly across all time periods, and the remaining $1 - \beta^*$ of pension wealth will not be consumed at least until retirement. Several factors affect whether and when pension wealth is consumed in retirement. Some sources of imperfect offset, such as borrowing constraints and precautionary saving against uncertain wage income, may diminish or disappear in retirement and thus not cause imperfect offset during that period. Other sources, such as bequest motives, may be more likely to remain in force during retirement. However, the substitutability of pensions and other saving in the presence of operative bequest motives is complicated by the fact that households may purchase life insurance to offset pension annuities, which would allow them effectively to bequeath pensions as well as other wealth (Bernheim 1991). Thus the

TABLE 1

ESTIMATES OF THE ADJUSTMENT FACTOR Q

AGE WHEN PENSION COVERAGE BEGAN	CURRENT AGE							
	30	35	40	45	50	55	60	65
30	0	.204	.371	.507	.619	.711	.786	.847
35		0	.210	.381	.522	.637	.731	.808
40			0	.217	.395	.541	.660	.757
45				0	.227	.413	.565	.690
50					0	.241	.438	.599
55						0	.259	.472
60							0	.287

NOTE.—$Q = (e^{xS} - 1)/(e^{xT} - 1)$; S is years of service in pension, which equals current age minus age when started pension; $T = S +$ remaining life expectancy, which equals $S + (85 -$ current age); $x = [(r - \delta)/\rho] - r = -.04$.

degree of offset depends in part on features of the market for life insurance. In any case, analysis of the appropriate adjustment factor during retirement is beyond the scope of this paper, but it can be shown that some adjustment factor is still required.

Whether the bias outlined above materially affects the interpretation of previous empirical work depends on the magnitude of Q. Table 1 indicates values of Q (or Q^*) as a function of a worker's current age and years of service. Real interest rates and discount rates are set at .04, implying that $x = -.04$. Age of death is set at 85 for all workers. The table shows, for example, that a 50-year-old who participated in a pension since age 35 would have a Q of 52 percent. Thus an estimated coefficient of $-.26$ for someone with those characteristics would imply a true offset of 50 percent.

The results in table 1 suggest that the adjustments embodied in Q can have a significant impact on the interpretation of observed empirical coefficients. In particular, low values of estimated offsets are consistent with high values of the true offset for young workers and for all workers in the first five years after obtaining pension coverage. No study of pensions has corrected for the bias described above. Thus, to the extent that the bias matters, previous estimates understate the offset between pensions and other wealth.

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 1993). 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.

II. Empirical Analysis

I use data from the 1983 Survey of Consumer Finances (SCF), which contains interviews with a cross-section of 3,824 U.S. households in 1983, and a supplemental survey of 438 high-income households. The SCF provides data on households' assets, debts, demographics, income, and other variables and very detailed information on pensions (see Avery and Elliehausen 1988).

The empirical model extends (6) to allow for household-specific observable and unobservable effects on wealth accumulation. For each household, the estimated equation has the form

$$W = \mathbf{Z}\alpha + \beta \sum_i \sum_j P_{ij} Q_{ij} + \epsilon, \tag{11}$$

where the α's and β's are parameters and ϵ captures unobservable influences on saving.

Independent variables.—It is difficult to construct wage histories from the SCF, but the present value of previous wages (in [6]) will be correlated with a worker's age, education (as a proxy for experience and wage growth), and current wage. Future wages will be correlated with those variables and retirement age. Thus $\mathbf{Z}$ includes the age of the head of the household, years of education (averaged over the head and spouse), earnings of the head and spouse, and an interaction term between age and earnings. Some specifications also include the age at which the household head plans to retire from full-time work.[1] The vector $\mathbf{Z}$ also includes other factors that may affect household saving: family size, marital status, and an indicator for the presence of two earners.

Dependent variable.—Pension wealth can be accumulated over long periods, providing numerous opportunities to adjust holdings of a wide variety of other assets. Hence, examining the impact of pensions on narrow wealth measures may miss much of the offset. For example, Avery et al. (1986) find large offsets (66 percent) when

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[1] If the head plans never to retire, the retirement age is set to 72. This provides consistency with SCF calculations of social security wealth. If the head reports already being retired or does not know when he or she will retire, the household is excluded from the sample.

using a broad measure of nonpension wealth but small offsets (11 percent) when using the same data and a narrow measure of non-pension wealth. Engen and Gale (1997) examine the effects of 401(k) plans and find larger estimated offsets for broader measures of wealth. In the SCF, nonpension net worth includes financial assets plus equity in the primary residence, other real estate, businesses, and vehicles, less unsecured debt. To measure the bias created by using a narrow measure of net worth, an alternative specification uses financial assets as the dependent variable.[2]

Pension wealth.—The SCF respondents and spouses provided in-formation on years of participation and expected date and amount of initial benefits for pensions from their current jobs and up to three previous jobs. The designers of the SCF used this information and data on interest rates, survivor benefits, and mortality probabili-ties to calculate each worker's social security wealth and pension wealth for the current job and up to three previous jobs. Imputations were made for respondents who did not report expected benefits.[3] I calculate unadjusted pension wealth for person i ($i =$ head, spouse) in pension plan j ($j =$ private pension, social security) as $P_{ij} = GP_{ij} - EC_{ij}$, where GP_{ij} is the gross value of pension benefits, and EC_{ij} is the present value of future employee contributions. Employee con-tributions (based on questions about current contributions and an SCF estimate of future wages) were subtracted because they are al-ready included in cash wages. A household's total unadjusted pen-sion wealth is $\sum_i \sum_j P_{ij}$.

Pension wealth adjustment.—The value of Q is calculated for each person and pension as $Q_{ij} = (e^{xS_{ij}} - 1)/(e^{xT_{ij}} - 1)$, where S_{ij} is the number of years person i has participated in plan j, and T_{ij} equals S_{ij} plus the individual's expected remaining life span, taken from U.S. life tables as a function of age, sex, and race. The parameter x is set to -0.04, consistent with real interest rates and time preference rates equal to 4 percent. Adjusted pension wealth for each house-hold is $\sum_i \sum_j P_{ij} Q_{ij}$.

Sample.—The sample includes households in which the head is aged between 40 and 64, the head works at least 1,000 hours per year and describes that activity as working full-time, and no one is self-employed. Younger households are excluded because of missing

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[2] Financial assets include checking, savings, and money market accounts; stocks; bonds; mutual funds; certificates of deposit; cash value of life insurance; individual retirement accounts (IRAs); Keogh accounts; other financial assets; and work-related thrift accounts.

[3] Gale (1995) provides additional information on the pension and social security wealth calculations and discusses the validity of using self-reported and imputed pension wealth.

TABLE 2

CHARACTERISTICS OF THE SAMPLE ($N = 638$)

Characteristic	Median	Mean
Age of head	50	50.0
Family earnings	26,000	32,167
Education (years)	12	12.5
Family size	3	2.9
Percentage married	· · ·	65.8
Percentage with two earners	· · ·	43.9
Percentage with pension	· · ·	78.8
Net private pension wealth	16,760	36,736
Net social security wealth	50,591	58,531
Net total pension wealth	72,022	95,267
Net private pension wealth (adjusted)	6,459	20,726
Net social security wealth (adjusted)	27,784	36,158
Net total pension wealth (adjusted)	41,909	56,884
Nonpension net worth	59,764	164,562
Households with pensions	62,232	155,915
Households without pensions	39,161	196,674
Financial assets	6,450	48,606
Household with pensions	7,200	51,132
Households without pensions	2,500	39,225

NOTE.—Data are weighted to reflect 1983 population weights in the Survey of Consumer Finances.

pension wealth data. Older households are excluded to avoid issues involving the saving behavior of the elderly. Households in which the head is retired or works part-time or in which anyone is self-employed are excluded because these situations may vary in important ways that are difficult to capture. Other exclusions include farmers or farm managers (because Avery et al. [1986] and Hubbard [1986] show that farmers have accumulation patterns different from those of other households), households in which workers had pensions from previous jobs (because data problems make it difficult to calculate Q), households with missing pension or social security wealth, and households in which the head did not know when he or she would retire. The remaining sample consists of 638 households.

Table 2 reports sample characteristics. The typical household in the sample is relatively affluent. This is as expected, given the focus on older households with a full-time worker. Pension wealth, whether adjusted or unadjusted, is sizable relative to nonpension wealth. Financial assets are a small portion of wealth. Notably, differences in financial assets between households with and without pensions are smaller than, and can even have the opposite sign from, differences in net worth. This suggests that pensions can have different impacts on financial assets than on nonpension net worth.

Table 3 presents the main econometric results. Least absolute de-

TABLE 3

EFFECTS OF PENSION WEALTH ON NONPENSION WEALTH

Dependent Variable	Pension Wealth	Basic Specification	Add Retirement Age
		A. Median Regression	
Net worth	Adjusted	−.770	−.823
		(.241)	(.316)
Net worth	Unadjusted	−.523	−.538
		(.316)	(.371)
Financial assets	Unadjusted	−.105	−.108
		(.110)	(.102)
		B. Robust Regression	
Net worth	Adjusted	−.334	−.393
		(.037)	(.037)
Net worth	Unadjusted	−.212	−.320
		(.024)	(.025)
Financial assets	Unadjusted	.006	−.041
		(.006)	(.007)

NOTE.—The table shows the coefficient on pension wealth in a regression that explains households' nonpension wealth accumulation as a function of several variables. The basic specification controls for age of the head of the household, years of education (averaged over the head and spouse), earnings of the head and spouse, earnings interacted with age, family size, marital status, and an indicator for the presence of two earners. Standard errors are shown in parentheses.

viation (LAD) regressions for financial assets, in the last row of panel A, show an estimated offset of 10 percent. This is close to the 17 percent offset estimated by Samwick (1995) using LAD estimates, the same data set, and the SCF's pension provider survey. The second row shows that broadening the dependent variable to nonpension net worth raises the estimated offset to 50 percent and raises the statistical significance of the estimate. The estimates in the first row adjust the pension wealth measure to remove the bias from controlling for pensions and cash wages separately, and imply an estimated offset of 77 percent. Evaluated at conventional levels of statistical significance, this estimate is different from zero and not significantly different from an offset of 100 percent. Column 3 shows that including retirement age in the regression raises the estimated offset by a small amount. Taking all these factors into account suggests that 82 percent of pension wealth is offset by reductions in other wealth. This estimate exceeds any in the previous literature.

Panel B shows similar qualitative patterns for robust regressions.[4]

[4] The procedure uses ordinary least squares estimates to exclude outliers and then works iteratively; weights in each iteration are based on absolute deviations in the previous estimate. Huber weights are used until the estimates converge, at which point biweights are used until the estimates converge again (Stata 1993, 2:126–31).

Using a broad measure of nonpension wealth, adjusting pension wealth by Q, and including retirement age yields an estimated offset of 39 percent, which is significantly different from both zero and 100 percent. Hence, while the LAD and robust regressions do not provide clear evidence on the precise level of the offset, the results show that adjusting for the use of cash wages and examining a broad measure of nonpension wealth can have a substantial impact on the estimated offset.

Separating the components of pension wealth yields median offsets of 92 percent (standard error, 42 percent) for private pensions and 51 percent (33 percent) for social security. The robust estimates yield offsets of 49 percent (4 percent) for private pensions and 11 percent (11 percent) for social security. Other sensitivity analyses include adding health status indicators, race and sex indicators, industry and occupation indicators, and quadratic terms in age and earnings; using gross pension wealth or gross pension wealth less future employer and employee contributions instead of the pension measure used above; and excluding households with earnings below $10,000. In these cases, median regressions yield offsets of 64–83 percent, and robust regressions yield offsets between 20 and 40 percent. The estimates are statistically significant at conventional levels, except for two of the LAD regressions. Finally, x was varied between −.02 and −.06. This range covers all values of r and δ between .02 and .06 and all values of ρ between 1 and 4. A value of −.06 generated LAD estimates of 75 percent offset (30 percent) and robust estimates of 25 percent (3 percent). A value of −.02 generated LAD estimates of 94 percent offset (68 percent) and robust estimates of 45 percent (4 percent).

The estimates above require each household to have the same response to pension wealth. But borrowing constraints, precautionary saving, financial literacy, and other factors that affect pension offsets likely vary across households. One way to address heterogeneity would be to specify the offset directly as a function of household characteristics, as in Venti and Wise (1990) and Gale and Scholz (1994). This approach is difficult to apply here, however.

Instead, I split the sample into different groups whose pension offsets may be expected to differ. An advantage of this approach is that factors that cause heterogeneous pension offsets also imply heterogeneous responses of nonpension wealth to any of the independent variables. For example, borrowing constraints affect the age-wealth profile and thus the coefficient on age. Thus all the coefficients could differ across the groups (Zeldes 1989; Gale and Scholz 1994).

The first sample split is based on whether households have saving

incentive accounts (an IRA, Keogh, or work-related thrift saving plan—an after-tax forerunner of 401(k) plans). Households with saving incentives are less likely to face borrowing constraints (Gale and Scholz 1994), are more likely to save for retirement rather than for precautionary motives (Engen and Gale 1993), and may be more likely to be good planners or be financially literate. They are expected to show more offset than other households. A second split, following Bernheim and Scholz (1993) and Venti and Wise (1996), is based on whether the household head has 16 or more years of education. More educated households face lower relative demands for precautionary saving (Carroll and Samwick 1995) and may be less likely to be financially illiterate. They are expected to show more offset than other households.

Splitting the sample may generate selection bias. Households with saving incentives have stronger tastes for saving (Gale and Scholz 1994), and educational attainment may be correlated with households' time preference rates. The direction of the bias for estimating pension offset, however, is unclear, and the selection bias disappears under certain assumptions.[5] Nevertheless, potential selection bias is an important caveat to the results below.

Table 4 shows that groups with higher expected offsets (i.e., those with saving incentive accounts or with 16 or more years of education) have higher income and net worth. Within groups with higher expected offsets, households without pensions have higher levels of financial assets and net worth than those with pensions. This is consistent with, but does not imply, substantial offsets in these groups. Within groups with lower expected offsets, households without pensions have lower levels of financial assets and net worth than those with pensions. This is consistent with, but does not imply, small offsets in these groups. For all groups, financial assets are a small part of wealth, and differences in wealth across households with and without pensions far exceed differences in financial assets. As before, this suggests that examining the impact of pensions only on financial assets may be misleading.

Table 5 estimates pension offsets. The LAD estimates for groups with higher expected offsets show little offset when the dependent variable is financial assets (third row of panel A). Using net worth as the dependent variable raises the offset to 70 percent or more

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[5] For example, suppose that tastes for saving are given by $\epsilon = v_1 + u$ for households with saving incentives and $\epsilon = v_2 + u$ for households without saving incentives, where the v's are constants, $v_2 > v_1$, u is normally distributed with mean zero, and the u's and v's are uncorrelated. Then, if the sample were separated, the v's would be subsumed into the constant term in each regression and the expected value of u would be zero in each subsample.

TABLE 4

MEDIAN CHARACTERISTICS OF ALTERNATIVE SUBSAMPLES

| | SAVING INCENTIVE PLAN | | YEARS OF EDUCATION | |
CHARACTERISTIC	With	Without	≥16	<16
Age of head	50	49	47	50
Family earnings	35,368	20,000	36,000	25,000
Education (years)	14	12	16.5	12
Family size	3	3	2	3
Percentage married	75.0	57.6	54.8	67.9
Percentage with two earners	54.8	34.1	37.1	45.1
Percentage with pensions	84.7	73.5	84.6	77.7
Net private pension wealth	27,535	9,616	24,048	16,264
Net social security wealth	58,316	39,576	35,224	52,500
Net total pension wealth	93,586	59,266	56,137	74,868
Net private pension wealth (adjusted)	12,228	4,164	7,393	6,346
Net social security wealth (adjusted)	34,924	22,731	15,853	30,261
Net total pension wealth (adjusted)	52,050	32,971	30,849	42,491
Nonpension net worth	91,116	35,517	109,338	53,371
Households with pensions	90,761	40,419	104,154	59,858
Households without pensions	103,787	27,970	238,381	33,893
Financial assets	19,040	1,360	23,750	5,226
Household with pensions	19,000	1,831	22,666	6,251
Households without pensions	21,575	700	67,600	1,450
Sample size	346	292	142	496

NOTE.—Data are weighted to reflect 1983 population weights in the Survey of Consumer Finances.

(second row). Adjusting for the use of cash wages generates virtually complete offset (first row). None of these coefficients, however, is precisely estimated. Estimates for the other groups show less offset. The estimated offset is 17 percent for households without saving incentives and 64 percent for less educated households. Robust estimates show similar qualitative patterns but smaller impacts. For groups with higher expected offsets, estimated offsets are between 60 and 70 percent and are estimated precisely. For households with less education, the estimated offset is 37 percent and is estimated precisely. For households without saving incentives, the offset appears small and insignificant.

III. Conclusion

There are many reasons why pension wealth may not be offset fully by reductions in other wealth, at least for some households. This paper shows, however, that previous empirical research understates the offset between pensions and nonpension wealth (overstates the effect of pensions on wealth) because of biases created by control-

TABLE 5

EFFECTS OF PENSION WEALTH ON NONPENSION WEALTH IN ALTERNATIVE
SUBSAMPLES

DEPENDENT VARIABLE	PENSION WEALTH	SAVING INCENTIVE		EDUCATION	
		With	Without	≥ 16	<16
		A. Median Regression			
Net worth	Adjusted	−1.047	−.172	−1.164	−.647
		(−.578)	(−.662)	(−1.078)	(−.302)
Net worth	Unadjusted	−.738	−.045	−.773	−.500
		(−.625)	(−.450)	(−.512)	(−.424)
Financial assets	Unadjusted	−.167	−.008	.085	−.191
		(−.164)	(−.040)	(.425)	(.094)
		B. Robust Regression			
Net worth	Adjusted	−.662	.076	−.680	−.369
		(−.078)	(.052)	(−.227)	(−.043)
Net worth	Unadjusted	−.477	.085	−.535	−.295
		(−.524)	(.038)	(−.158)	(−.030)
Financial assets	Unadjusted	−.032	.005	−.033	.033
		(.023)	(.002)	(−.060)	(.005)

NOTE.—Standard errors are shown in parentheses. The regressions control for all the variables in the basic specification (table 3) and retirement age.

ling for cash wages and pensions separately and by examining how pensions affect narrow measures of nonpension wealth. Removing these biases can have significant effects on the estimated relation between pensions and other wealth. The results suggest that even previously estimated positive effects of pensions on nonpension wealth may be consistent with substantial offsets once these two biases have been removed.

The results, however, may still understate the offset between pensions and other saving because of several other biases. First, households exhibit wide variations in propensities to save (Diamond and Hausman 1984; Dicks-Mireaux and King 1984; Gale and Scholz 1994). When one controls for observable characteristics, if people who are more likely to save are also more likely to seek out and accept jobs that have pensions (or jobs with more generous pensions), pension wealth will be positively correlated with unobserved propensities to save. Second, pension wealth data are of generally poor quality; all methods of calculating pension wealth in defined benefit plans are likely to create measurement error. This will bias toward zero the estimated pension wealth coefficient. Third, pension wealth is typically measured on a pretax basis, whereas other wealth is typically measured on a posttax basis. This overstates pension wealth, which can understate the pension wealth coefficient in

absolute value terms (i.e., bias it toward zero). Because these biases are not removed in this paper, the results are likely to continue to understate the true offset between pensions and saving. These problems apply equally to all previous studies of pensions, none of which controls for these additional factors, or the two examined in this paper (see the analysis in Gale [1995] and Engen, Gale, and Scholz [1996a, 1996b]).

However, the empirical findings should be interpreted cautiously. The sample is small and contains households that are older and more affluent than average. One would expect to find more offset in this sample than in the overall population. Thus the empirical results are perhaps best interpreted as showing that the biases can be quantitatively important, rather than as precise estimates of the true offset.

The results also show substantial heterogeneity across population groups in how pensions affect nonpension wealth. One implication is that expanding pension coverage could raise saving and reduce the inequality of wealth if the newly covered households are taken from groups that exhibit less offset between pensions and other wealth.

These findings leave an ambitious agenda for future research. One issue is adjusting for, or eliminating, the biases created by endogeneity, measurement error, tax burdens, and other factors. A second issue concerns the robustness of the results, which can be examined by extending the sample to other data sets or age groups. With these extensions, pension data would be a valuable source of information to test between alternative theories of saving.

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