Living with Defined Contribution Pensions

Remaking Responsibility for Retirement

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Part II
Preserving Defined Contribution Pension Accumulations for Retirement

Chapter 6
Implications of the Shift to Defined Contribution Plans for Retirement Wealth Accumulation

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Pension wealth constitutes a sizable portion of households' retirement resources. Close to half of civilian nonagricultural workers participate in pension plans.[1] Future income flows from private pensions accounted for 20 percent of the wealth of households aged 65–69 in 1991 (Poterba, Venti, and Wise 1994, table 1). Thus the relation between pensions and other household wealth can have important implications for policy issues, such as how to raise the saving rate or assure adequate saving for retirement, as well as for more fundamental issues, such as how people make economic decisions about the future.

Over the past twenty years, the U.S. pension system has shifted toward defined contribution plans and away from defined benefit plans. This shift provides opportunities as well as risks. For example, workers typically possess more authority to determine participation, contribution levels, and portfolio choices in defined contribution plans than in defined benefit plans. The effects of such changes on the role of pensions in retirement wealth accumulation remains an open question.

This chapter examines these issues. The first section provides background on the shift toward defined contributions plans. The second section reviews evidence on the effects of pension wealth on households' nonpension wealth. An important shortcoming of that literature is the absence of a distinction between the potentially different roles of defined contribution and defined benefit plans. The third section discusses how DC and DB plans might differentially affect wealth accumulation. The fourth section presents estimates from the 1980s and the 1990s on these issues.

A final section provides concluding remarks. We find that understand-

ing the implications for retirement saving of the trend toward defined contribution plans is a complex and unsettled issue for at least three reasons. First, the effects of pensions on wealth accumulation has proven to be complicated and difficult to untangle. Second, there are numerous differences between the features of defined contribution plans and those of defined benefit plans. Third, the nature of the plans and the samples of workers they attract have changed over the past decade and a half. Despite these difficulties, we note some relatively clear evidence of heterogeneity across workers in their response to different types of pensions, and highlight the uncertainties that remain.

The Rise of Defined Contribution Plans

By almost any measure, the U.S. pension system has shifted toward defined contribution plans over the past twenty years. The share of defined contribution plans rose from 67 percent to 87 percent of all plans from 1975 to 1992, from 29 to 60 percent of all active participants, from 35 to 72 percent of all contributions, and from 28 to 45 percent of all pension assets (USDOL 1996).[2] What is perhaps less well known is that at least part of the trend appears to predate the passage of ERISA in 1974. Among plans initiated before 1941 but still in effect in 1985, 10.4 percent were defined contribution plans (Clark and McDermed 1990). The figure rises to 16.8 percent for plans initiated in 1942–53, 24.8 percent for plans initiated in 1954–63, 31.3 percent for plans initiated between 1964–73, 47.4 percent for plans initiated between 1974–79, and 60.0 percent for plans initiated in 1980–85. A related trend is the recent growth in hybrid plans, which combine features of defined benefit and defined contribution plans. While less is known about these plans, they may be seen as an attempt to balance the costs and benefits of defined contribution and defined benefit plans (EBRI 1996; Rappaport 1996).

These trends have been attributed in varying degrees to increased regulation of defined benefit plans following the passage of ERISA in 1974, the changing composition of the work force, and other factors.[3] From 1984 to 1992, however, contributions to DC plans rose by $50 billion, while 401(k) contributions alone rose by $48 billion. Thus, explaining the growth of defined contribution plans since 1984 is in large part an effort to explain the growth of 401(k)s.

Ippolito (1993, 1995) provides a model of the advantages of 401(k)s. Workers with low discount rates — those who place a relatively high value on the future over the present — are assumed to be more productive than others. For example, they may place a higher value on future wages than would a high discounter, and so would work harder to develop a reputa-

tion as a reliable employee. A 401(k) plan can help firms retain low discounters and exclude high discounters. High discounters will find leaving the firm more attractive, because 401(k) balances can be cashed in upon exit. Low discounters will have incentives to stay because the matching provision of 401(k)s implies that they are in effect paid more than high discounters. Ippolito provides evidence consistent with these hypotheses. As discussed below, this model has important implications for examining the role of pensions on saving.

Effects of Pensions on the Accumulation of Wealth

Theoretical Concerns

In the simplest life cycle economic models, workers are posited to save only for retirement. Changing the form of workers' compensation from current wages to future pension benefits has no effect on consumption, and no effect on overall (pension plus nonpension) wealth or saving. Increases in pension wealth are offset completely by reductions in other wealth.

A number of issues, however, complicate the model when we move toward more realism. First, pensions are typically illiquid, tax-deferred annuities, unlike conventional taxable assets. Illiquidity implies that pensions may raise overall saving for households that cannot borrow as much as they would like (Hubbard 1986). Deferral of taxes raises the after-tax return on pension contributions relative to fully taxable saving. If pensions are the marginal source of saving, the higher return will generate income and substitution effects that work in opposite directions, so that the effect of pensions on overall saving is ambiguous. On one hand, if pension saving is inframarginal, raising the return on contributions should reduce overall saving. Also, as annuities, pensions provide insurance against uncertain lifespan, which would reduce overall saving (Hubbard 1987). As group annuities, pensions can provide more favorable terms than individual annuities, which will induce income and substitution effects in opposite directions (Feldstein 1978). On the other hand, pensions may also induce earlier retirement, which would be expected to raise saving among workers (Feldstein 1974). Therefore, even in a model where people save only for retirement, the effect of pension wealth on other wealth accumulation is ambiguous.

Also, people save for reasons other than retirement. Pensions will be poor substitutes for precautionary saving (Samwick 1994), intended bequests (Bernheim 1991), or saving for other nonretirement purposes. In such cases, changing a worker's compensation to include more pension wealth and less cash wages may not reduce other saving.

Additionally, a number of alternative models of saving have been proposed in which households are believed to make saving decisions based on psychological or behavioral models (Thaler 1990; Bernheim 1996) and frequently lack basic levels of economic literacy (Bernheim 1994, this volume). In these models, pension wealth may not reduce, and may even raise, nonpension wealth.[4]

Empirical Findings

Numerous studies have examined the impact of pensions on wealth.[5] Most of the studies suggest that an increased dollar of pension wealth reduces other wealth by at most 20 cents, and almost half of the studies suggest either that pensions have no effect at all on nonpension wealth or that pensions raise nonpension wealth. Previous empirical work, however, imposes a series of systematic statistical biases, which cause the studies to overstate the effect of pensions on other wealth (Gale, 1996). Some of the biases can generate an estimated positive effect of pensions on nonpension wealth, even when increases in pensions in fact reduce other wealth. These biases cast doubt on prior findings.

Correcting for none of the biases, Gale (1996) finds that a dollar increase in pension wealth reduces other wealth by 10 percent or less. After correcting for five (of the eight) biases, he finds that a dollar increase in pension wealth reduces other wealth by 40–80 cents, depending on the specification. Some estimates also suggest substantial heterogeneity in how households respond to pensions (Bernheim and Scholz 1993; Gale 1996). Thus, there remains substantial uncertainty concerning the impact of pensions on household wealth.

Studies of the impact of 401(k)s on saving have also produced discordant results[6] and also suffer from a series of econometric biases, most of which overstate the impact of 401(k)s on saving and at least one of which may lead to an understatement of the effects.

The Correlation Between Pension Coverage and Preferences for Saving

One of the clearest biases, and one of the most difficult to resolve, arises if households with pensions also have higher "tastes" or preferences for saving than households with similar observable characteristics that do not have pensions. This could occur in several ways. Firms where employees had stronger than average tastes for saving could face more demands to create pension plans. Alternatively, if firms provided pensions randomly, workers with stronger tastes for saving would naturally be more attracted to firms with better pension plans, other things being equal.

These patterns would bias the empirical relationship toward finding that pensions raise overall household saving. Some evidence suggest that pension coverage (or wealth) is positively correlated with tastes for saving, but the findings are not conclusive.[7] We consider this issue in greater detail below.

Distinctions Between Defined Contribution and Defined Benefit Plans

Studies of how pensions affect wealth have largely ignored differences between DB and DC plans. But differences in the features of the plans could have an impact on how pensions affect wealth; so the impact of pensions on wealth could be changing over time as the pension system evolves. This section highlights how several differences between the plan types might differentially influence wealth accumulation.[8]

Worker Choices and Sample Selection

At first glance, it may seem plausible that eligibility for 401(k)s is independent of household's tastes for saving. After all, as Poterba, Venti, and Wise (1995, p. 10) note, "eligibility is determined by employers." But while employers ultimately decide on the policy, the relevant issue is whether employers take employee preferences into account. In a survey of a broad range of employers, "perceived employee interest" was the second most frequently stated reason that a firm installed a 401(k) plan and was noted by 63.5 percent of respondents (Buck Consultants, 1989). This should not be surprising; it would be strange if employers created benefits without regard to employee preferences. Moreover, even if firms did provide 401(k)s randomly, we would expect workers with high tastes for saving to seek out firms with 401(k)s or to encourage their firms to provide 401(k)s. Either way, eligibility is likely to be positively correlated with tastes for saving.

Ultimately, this is an empirical issue. Poterba, Venti, and Wise (1995) present regressions showing that eligible households have about the same level of nonpension, non-401(k) financial assets as ineligible households, controlling for income and other factors. They conclude that 401(k) eligibility is exogenous with respect to tastes for saving. But Engen, Gale, and Scholz (1994, table 8), using the same data set, a slightly different test format, and a longer list of explanatory variables, find that eligible families have higher levels of nonpension, non-401(k) financial assets, net financial assets, and net worth. Moreover, Poterba, Venti, and Wise (1995) omit pensions. Families eligible for 401(k)s are between 24 and 33 percentage points more likely to be covered by a defined benefit

pension plan than other families, controlling for other factors (Engen, Gale, and Scholz, 1994). Again, this implies that eligible households have higher non-401(k) wealth than ineligible households.[9]

The Poterba, Venti, and Wise test has another problem that creates a potentially large bias in favor of finding that eligibility is exogenous: the test ignores all 401(k) wealth and thereby *assumes* that all 401(k) saving is new saving. To determine whether 401(k) eligibility is exogenous requires knowing whether eligible families would have saved more than ineligible families in the absence of 401(k)s. Since no data sources track eligible families before 401(k)s were introduced, the exogeneity test used by Poterba, Venti, and Wise requires some assumption about what would have happened to 401(k) wealth had 401(k)s not existed. If x percent of 401(k) wealth would have existed anyway, an appropriate test of exogeneity compares the non-401(k) assets of ineligible families to the sum of non-401(k) assets plus x percent of the 401(k) wealth of eligible families. Clearly, assuming that all 401(k) saving is new saving ($x=0$) — as in the Poterba, Venti and Wise test — creates a strong bias in favor of finding that eligibility is exogenous. For all these reasons, we believe that 401(k) eligibility and participation are positively correlated with tastes for saving. This implies that cross-sectional tests of the effects of 401(k)s that do not control for households' tastes for saving will overstate the effects of 401(k)s on wealth accumulation.

A related issue is how the difference in tastes for saving between 401(k)-eligible and ineligible households has changed over time. Bernheim (1996) claims that the average "taste for saving" among eligible households has become diluted over time. The logic of the claim is that the most dedicated savers are most likely to become eligible for 401(k)s early on. As less dedicated savers became eligible, average tastes for saving fell among eligible households.

But the direction of the net bias caused by dilution is unclear. Over time, the most dedicated savers among *ineligible* households are the ones most likely to become eligible; so there is dilution among ineligible households, too. The key issue for estimation is the relative dilution of the two groups, not the absolute dilution in one group. Bernheim claims that trends in IRA participation are a "good indication" of dilution. But dilution concerns unobservable characteristics ("tastes for saving"), whereas IRA participation depends on observable and unobservable factors. Probit analysis using the SIPP shows that controlling for household characteristics, IRA participation among eligible households fell by only 1.3 percentage points relative to ineligible households from 1987 to 1991. Thus, changes in unobservable variables — the source of dilution — led to only a slight change in relative IRA participation.

If dilution of the sample of 401(k)-eligible workers were empirically important, the proportion of such workers making 401(k) contributions should have fallen over time. Instead, data from the Current Population Survey show that it rose from 57 percent in 1988 to 65 percent in 1993 (Bassett, Fleming, and Rodrigues 1996).[10] Also, workers with low tastes for saving can and frequently do liquidate their 401(k) upon leaving a firm (Bassett, Fleming, and Rodrigues 1996), which raises the average tastes for saving among eligible families and may reduce it among ineligible families. The model in Ippolito (this volume) also suggests a mechanism by which average tastes for saving among eligible workers could plausibly rise, not fall, over time. Thus, it is unclear whether the sample of eligible households became more or less diluted relative to ineligible households over this period.

A question still remains concerning whether DB pension coverage remains positively correlated with tastes for saving, now that 401(k) plans have expanded so greatly. It is worth noting that households with DB pensions have higher rates of 401(k) eligibility than those who do not have traditional pensions.[11] This suggests substantial overlap between households with 401(k)s and households with DB plans and suggests that households with DB plans may still have higher than average tastes for saving. But the degree of selection into these pension plans may have decreased over time.

Benefit Levels

It is often asserted that defined contribution plans are on average less generous than defined benefit plans. If so, then the impact of DC coverage should have a smaller (in absolute value) effect on other wealth than DB coverage would have. However, in a study of several hundred pension plans in existence in the 1980s, Samwick and Skinner (1993) conclude that defined contribution plans are on average about as generous as defined benefit plans.

Risks

DB and DC plans create different kinds of risks. In DB plans, benefits are linked to the highest few years of earnings, whereas in DC plans benefits are essentially a weighted average of earnings over many years. Thus, different patterns of earnings uncertainty will create different risk patterns across the two types of plans.

Rules regarding (nominal) benefits in a DB plan are set by the employer in advance. Benefits in a DC plan depend on the rate of return

earned on pension assets, which depends on choices made by the participant. Both DB and DC benefits are subject to inflation risk.

Samwick and Skinner (1993) conclude that DC plans present less risk to participants than DB plans do.[12] If so, then DC plans may well engender less precautionary saving than DC plans do, and so have a larger negative impact on other saving.

Liquidity

Participants in DC plans can often borrow against their pension balance or access the funds for hardship reasons. Upon leaving a job, DC participants frequently roll over the balance into another pension or cash in the proceeds, subject to tax and penalty (Bassett, Fleming, and Rodrigues 1996). Although DB benefits have become increasingly liquid over time and can be cashed in upon exiting the firm in certain circumstances (mainly when the present value of future benefits is low), DB benefits are in general less liquid than DC benefits. Increased liquidity makes assets in DC plans better substitutes for household precautionary saving or for target saving, such as saving for downpayments or for college expenses, than DB plans are. This increased substitutability may raise DC contributions, but make those contributions more likely to be removed before retirement than would DB contributions. The net effect on retirement saving is ambiguous.

Visibility and Simplicity

Accruing balances are probably simpler to understand in DC plans for most participants. Whether increased visibility raises or reduces households' other saving depends in part on whether the household accrues more or less than it would otherwise have guessed in its DC plan. By providing periodic updates on balances, DC plans may more effectively remind households of the need to save for retirement. Of course, there is no reason why such updates could not also be provided in a DB plan.

In short, although the plans differ in several ways, it is difficult to identify unambiguous implications of these differences for how pensions affect wealth. Nevertheless, several items are worth emphasizing. The mechanisms through which pensions affect wealth can be exceedingly complex. There is no reason to expect the two types of plans to have identical impacts on the level or structure of household wealth, even if the benefit levels were held constant. There can be substantial variation within plan types as well as across plan types. And secular shifts in the pension system could be altering the way pensions affect retirement wealth accumulation.

Empirical Analysis

To analyze these issues further, we examine the relation between non-pension wealth, defined benefit coverage, and defined contribution coverage in two separate data sets from the 1980s and 1990s.

Evidence from the 1983 Survey of Consumer Finances

The 1983 Survey of Consumer Finances (SCF) contains interviews with 3,824 U.S. households in 1983, along with a supplemental survey of 438 high-income households. The SCF was designed specifically to collect data on household balance sheets. It also contains detailed information on pensions, demographic characteristics, income, and other variables.[13]

Ideally, the regressions would control for the present value of previous and future earnings and inheritances. Because it is not generally possible to construct earnings histories and futures with the available data, the regressions instead control for age of the household head, years of education (averaged over the head and spouse), earnings of the head and spouse, an interaction term between age and earnings, family size, marital status, and an indicator variable for the presence of two earners. These variables will be correlated with lifetime measures of wages and provide proxies for consumption demands as well.

The regressions also contain a variable that takes the value of 1 if either the head or spouse is covered by a defined benefit plan or defined contribution plan (this variable is called pension coverage) and a second variable indicating whether either the head or spouse has a defined contribution plan. The first variable shows differences between the population with pensions and those without and is meant to capture the effect of having a pension. The second captures the effect, conditional on having a pension, of having a defined contribution pension, and thus provides information on the difference between DC and DB plans on wealth accumulation. Of course, the DC variable will also pick up other differences between the two plans, such as differences in the types of households enrolled in each. Ideally, pension wealth measures would be used here. But using pension wealth introduces a number of additional biases, which are exacerbated when estimating the differential effects of DB versus DC plans (Gale 1995).

We explore the effects of pension coverage on two different measures of wealth: financial assets and nonpension private wealth, including housing (but not Social Security benefits). In each case, balances in defined contribution plans, profit-sharing plans, and so on are excluded from the measure of nonpension wealth, but trigger the pension variables to take the value 1. IRA and Keogh plans do not count as pension

TABLE 1 Sample Characteristics, 1983 Survey of Consumer Finances

Variable	All households		Households with IRA or Keogh		Households without IRA or Keogh	
	Mean	Median	Mean	Median	Mean	Median
Financial assets	65,699	8,875	149,185	36,187	26,075	3,098
Net worth	214,541	84,134	420,353	145,912	116,858	59,532
Age of head	50.1	50	51.8	52	49.3	48
Education	12.5	12	13.8	14	11.9	12
Family earnings	47,119	38,253	67,801	55,574	37,301	32,133
Family size	2.9	3	2.9	3	2.9	3
Married	0.650	—	0.747	—	0.603	—
Two earners	0.401	—	0.491	—	0.358	—
Have DB plan	0.615	—	0.658	—	0.594	—
Have DC plan	0.111	—	0.146	—	0.094	—
Have DB or DC plan	0.706	—	0.784	—	0.669	—
Have IRA or Keogh	0.322	—	1.000	—	0.000	—
Sample size	829		339		490	

Source: Authors' calculations using the 1983 Survey of Consumer Finances.
Note: All dollar figures are in 1995 dollars. "Financial assets" are defined as the sum of checking and saving accounts, money market accounts, certificates of deposit, bills and bonds, stocks, mutual funds, cash value of life insurance, balances in employment-related thrift accounts, and other financial assets. "Net worth" is defined as the sum of housing equity, financial assets, business equity, and other real estate, less unsecured debt. Other variables are defined in the text.

coverage and so are included in the measures of nonpension wealth. The literature indicates that using broader measures of wealth often produces larger estimates of the offset between pensions and other saving.[14] As discussed above, the pure life cycle model suggests that pensions should substitute for other retirement saving, but not necessarily for other saving. The problem in practice is determining what qualifies as a retirement asset: for example, should housing wealth be included as retirement wealth? Our view is that it is best not to prejudge or assume the answer. Thus, the most relevant measure for estimates of pension offset is the broadest possible measure of wealth.[15] For example, if most saving is nonretirement saving, that will show up in the estimates as little offset. However, the distinction, even at a conceptual level, is murky. Precautionary saving balances that do not get used up in the working years become retirement saving.

The sample focuses on households where the head is age 40 to 64, where the head works at least 1,000 hours per year and describes that activity as working full time, where no one in the household is self-employed, and where no one in the household is a farmer or farm manager. These restrictions were imposed to provide a sample of households with a minimum of extenuating circumstances regarding wealth accumu-

TABLE 2 Effects of Pension Coverage on Nonpension Wealth,
1983 Survey of Consumer Finances

Dependent variable	Coefficient on . . .	LAD regression coefficients (t-statistics)		
		All families	Families with IRA or Keogh	Families without IRA or Keogh
Financial assets	DC coverage	18,028	23,437	2,604
		(1.91)	(1.11)	(0.59)
	Pension coverage	(27,349)	(61,411)	(8,535)
		(3.77)	(3.38)	(1.37)
Net worth	DC coverage	31,129	167,690	22,315
		(1.61)	(2.02)	(0.65)
	Pension coverage	(81,927)	(273,393)	(66,600)
		(5.25)	(2.27)	(1.27)
Sample size		829	339	490

Source: Authors' calculations using the 1983 Survey of Consumer Finances.
Note: All dollar figures are in 1995 dollars. "Financial assets" are defined as the sum of checking and saving accounts, money market accounts, certificates of deposit, bills and bonds, stocks, mutual funds, cash value of life insurance, balances in employment-related thrift accounts, and other financial assets. "Net worth" is defined as the sum of housing equity, financial assets, business equity, and other real estate, less unsecured debt.

lation. Hence, the results may not be applicable to the broader population. We also excluded households that could not say whether their pension was a DC or DB plan. The remaining sample consists of 829 households.

Two caveats are immediately relevant for this sample. The first is the relatively small sample size. The second is the finding in Mitchell (1988), based on a comparison of answers in the original SCF survey and in a supplemental pension provider survey, that a sizable minority of respondents appeared to misstate their pension type in the original survey.

Table 1 reports the means and medians of the variables used in the analysis. The sample is relatively affluent, most households are married, fewer than half have two earners. About 61 percent of the households have defined benefit coverage, while 11 percent have defined contribution coverage. There is remarkably little overlap: few households in the sample have both DB and DC coverage. About one-third of the sample holds an IRA or Keogh plan.

Table 2 reports the regression results for the effects of defined benefit and defined contribution pension coverage for the overall sample. Because there is substantial heterogeneity in households' tastes for saving, ordinary least squares estimation generates nonsensical results for estimates of pension offsets.[16] To address this issue, we use least absolute deviations estimators. These regressions indicate the effects of pensions

on the typical, or median, household rather than the average (mean) household, and are thus much less sensitive to the presence of outliers in the data.

The results are shown in the first column of Table 2. The typical household with a pension accumulated about $17,000 less in financial assets than the typical household without a pension, controlling for other factors. This effect is statistically significant. Households with defined contribution plans had more nonpension financial assets than those with defined benefit plans, but still less than the typical household without a pension.

These results must be interpreted cautiously. While they suggest that DB plans displace more wealth than DC plans do, the finding could be due to differing selection processes into each plan, as well as a host of other issues.

Moreover, the estimates above 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). 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). Pensions seem likely to be poor substitutes for precautionary saving, but may be good substitutes for other retirement saving. Third, some households may be poor planners, financially illiterate, or "rule of thumb" consumers. For these households, pension offset may be very small, suggesting that the offset should be related to factors that determine whether a household is in this category.

To capture these differences across households, we estimate separate equations for different groups, across which we expect the pension offsets to differ. Zeldes (1989) uses this strategy to test for the presence of borrowing constraints. A large number of additional studies of consumption and saving have followed similar strategies. In the current context, this strategy may help resolve two additional problems as well. First, the same reasoning that suggests that the coefficient on pension wealth will differ across groups also suggests that the response of wealth to *any* of the right hand side variables could vary as well. For example, a borrowing-constrained household may have a different response to pension wealth as well as a different age-wealth profile, so borrowing constraints would affect the coefficient on age as well as the pension offset. Second, under certain circumstances discussed below, estimating different equations for different groups may be a natural way to control for heterogeneity in

unobservable tastes for saving and the potential endogeneity of such tastes with respect to pensions.[17]

The sample is divided into subsamples depending on whether the household has a positive balance in an IRA/Keogh. Households with positive saving incentive balances are less likely to be borrowing constrained,[18] more likely to be saving for retirement, and more likely to be financially literate. Thus, we expect households with saving incentives to exhibit more substitution between pensions and other wealth than other households would. There is of course no claim that this criteria splits the sample into two perfectly homogeneous groups. Rather, the idea is to split the sample such that households in one group differ systematically on average from households in the other group.

Although it allows for different groups to have different responses to pensions, the sample-splitting strategy we employ may generate a potential endogeneity problem. For example, households with IRAs exhibit stronger tastes for saving than other households, controlling for observable characteristics (Gale and Scholz 1994; Engen, Gale, and Scholz 1994). When the dependent variable is net worth, however, splitting the sample on the basis of tastes for saving may create sample selection bias. In any case, the direction of the bias for estimating pension offset is unclear, and the selection bias disappears under certain distributional assumptions.[19] Nevertheless, potential sample selection bias is an important caveat to all the results below that examine the heterogeneity of responses to pension wealth across groups. The smaller sample size created in each subsample is an additional caveat to these results.

The last four columns of Table 1 report means and medians for the samples with and without IRAs and Keoghs. Households holding such accounts are more affluent, more likely to be married and to have two earners, and more likely to have either a defined benefit or a defined contribution plan.

The last two columns of Table 2 show the results of splitting the sample. The negative effect of pensions on wealth is larger among households with IRAs or Keoghs than those without. This is consistent with more offset occurring in the group with IRAs or Keoghs, but could also be caused by those households' having larger pensions. In each case, the impact of DB plans is estimated to be larger in absolute value than the impact of DC plans.

Evidence from the Health and Retirement Study

The Health and Retirement Study (Wave I) contains interviews with 7,702 households where either the head or spouse was aged between 51

TABLE 3 Sample Characteristics, 1992 Health and Retirement Study

Variable	All households		Households with IRA or Keogh		Households without IRA or Keogh	
	Mean	Median	Mean	Median	Mean	Median
Financial assets	53,639	15,207	100,126	52,140	16,546	2,390
Net worth	152,942	84,510	245,146	164,023	79,374	43,450
Age of head	55.6	55	56.0	56	55.3	55
Education	12.6	12	13.5	13	12.0	12
Family earnings	44,796	39,105	55,509	49,967	36,248	31,501
Household size	2.3	2	2.3	2	2.3	2
Married	0.611	—	0.685	—	0.551	—
Two earners	0.369	—	0.452	—	0.304	—
Have DB plan	0.567	—	0.635	—	0.512	—
Have DC plan	0.361	—	0.471	—	0.273	—
Have DB or DC plan	0.711	—	0.799	—	0.641	—
Have IRA or Keogh	0.444	—	1.000	—	0.000	—
Sample size	2,641		1,053		1,588	

Source: Authors' calculations using the 1992 Health and Retirement Study.
Note: All dollar figures are in 1995 dollars. "Financial assets" are defined as the sum of checking and saving accounts, money market accounts, certificates of deposit, bills and bonds, IRA and Keogh balances, stocks, mutual funds, and investment trusts. "Net worth" is defined as the sum of housing equity, financial assets, business equity, and other real estate. Other variables are defined in the text.

and 62 in 1992. The HRS collected detailed data on households' wealth, health and disability status, income, and demographic factors. In the near future, a pension provider survey may be available, which will allow more detailed examination of pensions and wealth.[20]

The basic sample exclusions are similar to those using the SCF: all households where the head was working less than 1,000 hours per year, all farm households, all households where someone is self-employed, and all who did not know what type of pension they had. The remaining sample consists of 2,641 households.

Table 3 shows the means and medians of the variables used in the analysis. Like the 1983 SCF sample, the 1992 HRS sample is affluent. Defined benefit coverage is lower in the HRS, but defined contribution coverage more than tripled from 1983. A potentially important difference with the 1983 sample is that roughly 40 percent of defined contribution plans are held by families that also have defined benefit coverage. In the 1983 sample, there was virtually no overlap. This is an important caveat in comparing the coefficients across the samples.

The first column of Table 4 reports regression results for the overall sample. Financial assets are smaller for those with pensions than for those

TABLE 4 Effects of Pension Coverage on Nonpension Wealth, 1992 Health and Retirement Study

Dependent variable	Coefficient on . . .	LAD regression coefficients (t-statistics)		
		All families	Families with IRA or Keogh	Families without IRA or Keogh
Financial assets	DC coverage	6,477	1,993	234
		(4.69)	(0.48)	(0.49)
	Pension coverage	(3,814)	(8,505)	92
		(2.54)	(2.30)	(0.23)
Net worth	DC coverage	21,998	7,277	6,635
		(2.50)	(0.72)	(1.61)
	Pension coverage	(4,820)	(26,677)	13,528
		(0.28)	(1.60)	(3.23)
Sample size		2,641	1,053	1,588

Source: Authors' calculations using the 1992 Health and Retirement Study.
Note: All dollar figures are in 1995 dollars. "Financial assets" are defined as the sum of checking and saving accounts, money market accounts, certificates of deposit, bills and bonds, IRA and Keogh balances, stocks, mutual funds, and investment trusts. "Net worth" is defined as the sum of housing equity, financial assets, business equity, and other real estate.

without. But the typical household with a defined contribution plan has more wealth than the typical household with a defined benefit plan and even more than the typical household without a pension.

Table 3 also shows means and medians of variables for the samples with and without IRAs and Keoghs. The relative patterns are the same as in 1983. The sample with IRAs and Keoghs is much more affluent that households without either saving incentive.

The last two columns of Table 4 show the results of splitting the sample by saving incentive status. Pension coverage has a larger negative effect on households with IRAs and Keoghs than on other households. Controlling for pension coverage, the impact of defined contribution coverage on nonpension wealth is estimated to be positive but not significantly different from zero.

Discussion and Comparisons

These results present interesting patterns. First, the impact of pension coverage on nonpension wealth is consistently negative in 1983, but not in 1992. This could be due to shifts in the tastes for saving of households covered by pensions relative to those not covered by pensions. As discussed above, there are a number of reasons to think that the sample of 401(k)-eligible households raised their tastes for saving relative to ineligi-

ble households. Second, controlling for pension coverage, DC plans had a consistently positive coefficient in 1983, though not always significant. The effect in 1992 was generally smaller and less statistically significant.

Unfortunately, we are unable to conclusively identify just one interpretation of these results. They could be due to changes in relative tastes for saving among the groups, changes in the relative generosity of different plans, or the fact that DC plans in 1992 were much more likely to represent second plans. In addition, the SCF sample is somewhat younger than the HRS sample, which could also influence the results.

Conclusion

The long-term shift toward defined contribution plans could have important effects on how pensions interact with preparations for retirement. Each of the differences between DB and DC plans along dimensions of risks, liquidity, visibility, sample selection, and so on, has implications for how other saving should be affected. As described above, understanding the effects of pension on wealth is a complex task. Disentangling the differential impacts of DC and DB plans is even more difficult due to data limitations, shifts in unobserved variables (such as the tastes for saving among the pool of DC participants), and a large number of underlying models of saving behavior.

Against this backdrop, the empirical results developed here suggest that DB and DC plans can have different effects on wealth, that there is heterogeneity in responses to pensions, and that important endogeneity problems may be biasing the results. However, more definitive evidence on the precise nature of the links between pension type and wealth accumulation will have to await further developments of theory and data.

Notes

1. EBRI (1994, table 2). This participation rate includes salary reduction plans as well as more traditional defined benefit and defined contribution plans.

2. Other data provide further evidence on these trends. The proportion of the workforce with a defined benefit plan as the primary pension fell from 39 percent to 26 percent over the same period, while the proportion with primary defined contribution plans rose from 6 to 20 percent, and the proportion with supplemental defined contribution plans rose from 9 to 17 percent (USDOL 1996).

Defined contribution plans covered 80 percent of active participants in plans established since 1975, compared to 33 percent in plans established before 1975 (Beller and Lawrence 1992).

3. On the role of regulations, see Clark and McDermed (1990), Gale (1994), and Lichtenstein (1992). On the role of shifts in industrial composition and employment, see Gustman and Steinmeier (1992), Ippolito (1995) and Kruse (1991). See also Warshawsky (1995) for a related discussion.

4. An older tradition in the pension literature also advocates alternative models of saving, with similar findings. Cagan (1965) suggests that the provision of pensions makes workers realize the need to save for retirement, which raises their nonpension saving. Katona (1965) suggests that pensions raise nonpension saving because they make households feel that attaining a reasonable standard of living in retirement is more feasible, and because people tend to intensify their efforts (e.g., saving) as they come closer to achieving their goal (e.g., reasonable living standards in retirement).

5. See Gale (1995) for a review of the literature.

6. The literature is reviewed in Bernheim (1996), Engen, Gale, and Scholz (1996), and Poterba, Venti, and Wise (1996).

7. Johnson (1993), using experimental data from the first wave of the Health and Retirement Survey, finds that workers with higher risk aversion or lower time preference rates are more likely to be covered by pensions. Also see Ippolito (1993) and Allen, Clark, and McDermed (1993).

8. For further discussion, see Bodie, Marcus, and Merton (1988) and Samwick and Skinner (1993).

9. Along similar lines, Bernheim and Garrett (1995) find that 401(k) eligibility "raises" total wealth by about four times as much as it "raises" retirement wealth. Unless one is willing to believe that 401(k) contributions crowd in several times their value in non-401(k) saving, these findings suggest that eligibility is positively correlated with tastes for saving.

10. This increase is unlikely to be due to an increase in employer matching. In 1993, among eligible workers that did not receive a match, 60 percent contributed. Our own probit analysis using the SIPP indicates that between 1987 and 1991, controlling for household characteristics (including pension coverage), the 401(k) participation rate of eligible households rose by 8 percentage points, and the increase was statistically significant.

11. Data from the 1991 SIPP suggest that, controlling for a host of household characteristics, families with DB coverage are 25 percentage points more likely to be eligible for a 401(k) and 13 percentage points more likely to participate than observationally equivalent households without DB coverage.

12. This calculation does not include the risk that taxpayers face through possible pension bailouts by the Pension Benefit Guaranty Corporation.

13. For further information on the SCF, see Avery and Elliehausen (1988).

14. See Avery, Elliehausen, and Gustafson (1986) and Gale (1995). We estimate the effects of pension coverage on the level, rather than the log of wealth, for two reasons. First, some households have negative wealth, for which the log is undefined. Second, pension offset is an arithmetic effect—a dollar of pension wealth changes nonpension wealth by x cents—rather than a multiplicative effect. A result framed in terms of an elasticity of wealth with respect to pensions— say, that a 1 percent increase in pension wealth is associated with an x percent change in nonpension wealth— is not useful in determining pension offsets.

15. Engen, Gale, and Scholz (1996) and Gale (1995, 1996) provide extensive discussions of the value of examining the impact of pensions on broad measures of wealth.

16. Samwick (1994), for example, obtains ordinary least squares estimates that suggest that one dollar of pension wealth raises other wealth by as much as six dollars.

17. Another way to capture these different responses to pension wealth is to make the measured offset a function of household characteristics. This strategy is used, for example, by Venti and Wise (1990) and Gale and Scholz (1994) in analyses of how IRAs affect saving, but would be difficult to apply in the current context because it requires estimates of several additional parameters, which would not be feasible given the relatively small sample size.

18. Since the data are from 1983 and universal eligibility for IRAs was not present until 1982, "having an IRA" is likely to be closely correlated with "making an IRA contribution" in 1983, suggesting that those with IRAs are not likely to be borrowing constrained. Gale and Scholz (1994) provide further evidence on this issue.

19. For example, suppose tastes for saving are given by $e = v_1 + u$ for households with saving incentives and $e = v_2 + u$ 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, in separating the sample, the v's would be subsumed into the constant term in the regression and the expected value of u would be zero in each subsample.

20. For more information on the Health and Retirement Study see Gustman, Mitchell, and Steinmeier (1995) and the articles in Burkhauser and Gertler (1995).

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