

What People Don't Know About Their Pensions and Social Security

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I. Introduction

The role of employer-provided pensions and social security in shaping households' retirement and saving behavior has attracted an enormous amount of attention among both researchers and policy makers over the past 25 years.¹ In the research literature, the almost universal assumption is that workers are perfectly informed about the rules and regulations governing their employer- and government-provided pensions. However, to the limited extent that researchers have been able to test this assumption, results suggest that workers are less than fully informed (Bernheim, 1988; Mitchell, 1988; Gustman and Steinmeier, 1989) and that providing information can affect their behavior (Clark and Schieber 1996; Bayer, Bernheim and Scholz, 1996; Bernheim and Garrett, 1996; Madrian and Shea, 2000).

Despite a general lack of attention to these issues in research, policy makers have made the role of information in retirement planning a central issue. To improve retirement planning knowledge, the Social Security Administration (SSA) recently began to mail workers statements of their accrued and projected benefits. The SSA has also made a retirement planner available on its web site. The Department of Labor has initiated several programs to understand the extent of workers' lack of information and to improve participant knowledge about pensions and about retirement saving in general. Following the 1997 SAVER (Savings Are Vital to Everyone's Retirement) Act (PL 105-92), in 1998 there was a National Summit on Retirement Savings which emphasized the need for public education through media and other campaigns. This year there was a five year anniversary event hosted by The Department of Labor for its Retirement Savings Education Campaign. Recent legislative proposals by Rep. John Boehner of Ohio, HR 4747, 4748, and 4749, would significantly expand the role of financial education in the work

place by expanding the scope of investment advice that the employer is permitted to offer.

This paper provides a comprehensive analysis of what workers (don't) know about their pensions and social security. The analysis uses information from the Health and Retirement Study, which surveyed 7,607 households (or 12,652 individuals) in 1992 and re-interviewed them every two years through 1998. Relative to previous findings and current policy issues, the paper provides five key sets of information. First, it uses more recent data than previous studies. This is important because of the significant changes in the pension universe and in social security that have occurred over the last 15 years. Second, the paper focuses on differences between respondent reported values, and values obtained from linked records provided by the Social Security Administration, or detailed pension plan descriptions obtained from firms, emphasizing the distribution of differences at the level of the individual. It places a greater emphasis on the patterns of discrepancies at the level of the individual respondent than in previous studies. Third, the paper examines the effects of poor information on economic behavior. The latter issue is crucial to understanding the potential benefits of providing better information. Fourth, the paper analyzes whether the differences between the observations that have linked administrative social security and pension records available and those that do not, are related to demographic and other measures, improving our understanding of misreporting, and providing a foundation for imputing pension and social security outcomes when linked data are not available. Fifth, in the appendix we provide information that will be of use to researchers, including an analysis of the relation between respondent reported earnings histories and linked earnings histories from social security records, and development of a set of equations that will be useful in imputing pension

characteristics and plan values for observations without linked employer provided pension plan descriptions, and for researchers who do not have access to linked pension data.

Our findings suggest there is a great deal of misinformation about their pensions on the part of those approaching retirement age. Half of respondents with linked pension data correctly identify plan type, and fewer than half identify, within one year, dates of eligibility for early and normal retirement benefits. According to the firm provided data, two thirds of respondents will be able to retire early by the time they reach age 55; but less than half of respondents think they will be able to retire early by age 55. Those who are within 3 years of retiring forecast somewhat more accurately, but do not do a much better job of forecasting their ages of early retirement eligibility than the sample as a whole. Eighty percent of respondents with a defined benefit plan either do not think they are eligible for early retirement, or do not know what the benefit reduction rate is for their plans.

Respondents do better in reporting pension values than ages of eligibility, but the unexplained variation is still considerable. Only half the respondents venture a guess as to their expected social security benefits. Only a quarter of the respondents venture a guess as to their expected benefits, and come within \$1,500 of their actual yearly social security benefits. On the whole respondents are somewhat pessimistic in evaluating their defined benefit pensions, a contrast with findings from earlier studies. Pension benefit amounts are in rough agreement between respondent and firm based calculations for only 40 percent of the cases.

When we conduct a very preliminary analysis of the relation between knowledge of social security and pensions on the one hand, and retirement expectations, realization of those expectations, and wealth accumulation on the other, the relationships that emerge appear to be

complex. Because it is easier to adjust saving downward than upward as one approaches retirement, even symmetric errors in expectations should affect retirement and saving outcomes. Yet lack of knowledge about social security and pension wealth, and the error in determining plan type, have only modest effects on retirement plans, on whether those plans are met, and on saving outcomes.

Researchers would like to know the true value of pensions and social security, but in many surveys, all they have available are the respondent reports, which are subject to error. In the course of our study, we also investigate how respondent reported pension and social security values, together with other observables, can be used to estimate pension and social security values held by individuals in the survey. Together, respondent reports and other information about the respondent account for 80 percent of the variation in employer reported pension values; respondent reported work histories and other explanatory variables account for 75 percent of the variation in social security covered earnings measured from linked records. Thus prospects are good for imputing pension or social security values. They are not good for imputing the location or size of early retirement incentives.

Implications for policy depend importantly on two considerations, the precise behavioral channels through which misinformation affects retirement and saving, and whether increased educational efforts affect behavior and planning in a timely manner. We have little evidence on either.

II. Previous Work

There have been some basic studies of what workers know about their social security and pensions which suggest that their knowledge is imperfect. The basic methodology compares

respondent reports with information gleaned from linked data, social security records, or detailed employer provided pension plan descriptions.

Bernheim (1988) compared the benefits expected by respondents to the 1969-79 Retirement History Study with the benefits computed from linked social security records. He concluded that expectations about social security values are quite noisy, but unbiased. Bernheim faced a number of problems in his analysis of expected social security benefits that we also will face here. Among them, fewer than half the respondents ventured a guess as to their likely social security benefits. In addition, expected social security benefits are reported in dollars of some future year, and both he and we do not have a good fix on the price levels in that year. Nevertheless, Bernheim concluded that “When the noise is filtered out appropriately, it appears that consumers do think seriously about future events and report expectations that may well reflect, albeit imperfectly, their true beliefs.” (p. 313)

There also is evidence suggesting that the respondents’ knowledge of their pensions is quite imperfect. Mitchell (1988) investigated pension plan characteristics and their correlates. Using data from the 1983 Survey of Consumer Finances, which linked employer provided pension plan data with respondent descriptions of their plan characteristics, she found that people are sometimes misinformed about such key pension plan characteristics as plan type, contribution provisions and rules regarding benefit eligibility, age and/or service requirements workers must satisfy to draw retirement benefits. Regressions suggested that unionized employees, higher income workers, better educated workers, and those with seniority were better informed about these plan characteristics.

Gustman and Steinmeier (1989) evaluated the detailed benefit formulas from the Survey

of Consumer Finances linked employer pension provider descriptions. They used respondent work and earnings histories to determine actual dates of eligibility for early and normal retirement benefits, as well as the values of the benefits themselves. They then compared plan features, ages of eligibility and benefit values calculated from the employer plan descriptions with the same variables reported by respondents. Not only were key features like plan type found to be misreported, but comparing descriptive statistics, pension values reported by respondents and their firms match at the medians, but not at the means. Some respondents seemed to be highly optimistic, expecting to be able to retire earlier than their plans would permit, and at higher values.

There also is evidence that financial education may affect individual behavior. Firms that increase their efforts to inform workers about their pensions find that their workers respond by participating more in their plans (Clark and Schieber 1996; Bayer, Bernheim and Scholz, 1996; and Bernheim and Garrett, 1996). In addition, participation in a (401)k plan is influenced by the default option offered by the plan (Madrian and Shea, 2000), and households that are covered by a pension in which they have a choice of investments are more likely to hold stock outside of their retirement plan (Weisbenner, 1999), although this result may reflect selectivity on unmeasured characteristics. Respondents with pensions do not reduce their saving in other forms; instead total wealth increases by only a fraction less than their pensions are worth (Gustman and Steinmeier, 1999), perhaps suggesting that those covered by pensions are informed about the need for retirement saving through their pension plan. Lusardi (1999) suggests that some workers do not plan ahead for retirement, and consequently they do not save adequately. Maki (this volume) provides a more detailed discussion of the effects of financial education on

these and related outcomes. The evidence does suggest that participation in retirement programs, patterns of investment and related behaviors are influenced by financial education. There is no reliable information on whether educational programs run by the government have any discernable impact on saving or retirement behavior.

III. The Data

The Health and Retirement Study (HRS) is a longitudinal, nationally representative study of older Americans. The survey began in 1992 with an initial cohort of 12,652 individuals from 7,607 households, with at least one household member born from 1931 to 1941.

A. Linked Social Security Data

Altogether 74.9 percent of respondents have given permission to link social security earnings histories to their interview record. Records were linked for 95 percent of those who gave permissions.

The social security earnings records provided by the HRS are unique to this group of surveys. Only a few researchers who work at or with the Social Security Administration have access to comparable recent data. From these records, we can closely estimate for HRS respondents the amount of covered earnings, computed as Average Indexed Monthly Earnings (AIME), and values of their social security benefits, computed as the Primary Insurance Amount (PIA). Although there is a small chance of a mismatch, the earnings records are a gold standard as to covered earnings history. Therefore patterns of discrepancies between respondent reports of expected benefits and the benefits computed from the earnings histories are very informative.

Column 1 of Table 1 reports the results of a probit, where the dependent variable is equal to 1 if permission was given by the respondent in wave 1 allowing HRS to match the social

security record. Because the Social Security Administration was able to match 95 percent of the records of those who gave permission, to understand what determines the match rate, one needs to understand what determines the permission rate. The independent variables are various characteristics of the respondent and the respondent's job.² The partial effects of the probit are reported together with the z statistics. The independent variables account for only a small part of the variation in the social security permission rate.³ Among the individual variables that are significant, black and Hispanic respondents, respondents with higher assets and highest education, respondents who expect never to retire, or who do not report a specific retirement date, were less likely to grant permission.⁴

B. Social Security Values Estimated From the Respondent Survey

Social security values may also be estimated from respondent reports of their earnings and work history. Specifically, respondents were asked about the starting date on their current job, starting and ending dates for their last jobs, (i.e., the job last held by those not working in 1992), and starting and ending dates for the previous 5 year job held before the current or last job. Respondents were also asked about earnings at these dates. In addition, the survey asked respondents in Wave 3 about the date of entry into the labor force, how many years were worked before the date the previous job was secured, and how many years of work were in jobs covered by social security. From this information, we construct a covered earnings history⁵ and we use it as the basis for calculating the respondent's Average Indexed Monthly Earnings (AIME), and the social security benefit the respondent is entitled to (Primary Insurance Amount, or PIA).

C. Linked Pension Data

If a respondent were covered by a pension, the HRS also requested from the employer a

detailed description of the pension plan. Employer-provided pension plan descriptions proved to be more readily available for a respondent's current job than for jobs held in the past. The match rate was 65% for the 4,456 jobs that respondents held at the time of the survey, where they reported they were offered pensions. The match rate was 66% for the 1,387 cases for the last job held by respondents with no current job in 1992, who reported a pension on their last job. For the previous job of 5 years duration held before the current or last job, the match rate was 35% of 2,839 pensions. In addition, the survey identified another 750 jobs with pensions. Since the survey did not ask for the employer name and address for those jobs, none of the jobs had matched pensions.⁶

Averaging over all these jobs yields an exact match percentage for employer-provided plan descriptions of 51%. This combines a figure of almost two-thirds from current and last job pensions, with a much lower figure for pensions on previous jobs.

Table 2 reports probits where the dependent variable is an indicator of whether there is an employer-provided pension plan description for the respondent.⁷ The first column indicates the correlates of pension matches for all respondents who indicated they were covered by a pension on some job. Separate equations are shown for pension matches on the current job held in 1992, the last job for those with no current job, and the last five year job held previous to the last or current job. For the purpose of examining retirement incentives, it is the pension on the job just preceding retirement that is likely to be most important; though the survey has a lower pension match for previous jobs, this is less crucial for retirement modeling. That is, HRS respondents were young enough that most had not phased into partial retirement and left their long term jobs by 1992. (See Gustman and Steinmeier, 2000a.)

The likelihood of finding an employer plan description is not closely related to the independent variables included in Table 2. However, the fit is somewhat better than it was for the social security permission rate in Table 1. Across all pension plans, blacks, those with more schooling, homeowners, those with the shortest planning horizons, those with the longest tenure, and those with jobs in nonmanufacturing, are more likely to have a pension match. Those with the highest assets and earnings, those from firms employing fewer than 100, those in management jobs, and those who report they are covered by DC plans, are less likely to have a matched plan description.

In addition, the more valuable the plan, the higher the probability of a match. This last finding suggests that if one confined the sample only to those with matched pension plan descriptions, the measured value of the pension will overstate the value in the full covered population. Similarly, because the probability of a social security earnings record match is lower the higher an individual's earnings, if a researcher confines the sample to those with a social security match, he or she is omitting from the sample a disproportionate share of those who will receive the highest social security benefits.

D. Pension Values Estimated from the Respondent Survey

Respondents were also asked a series of detailed questions about their pensions. First the respondent was asked about pension coverage, and if covered, about plan type. If the respondent indicated plan type to be defined benefit, the question sequence asked about the dates of early and normal retirement, the year of expected retirement, and the associated yearly benefits. If the respondent reported plan type as defined contribution, the questions focused on the amounts currently in the account and on rates of contribution. When plan type is not reported, the

questionnaire asks about plan characteristics of a defined benefit plan.

E. The Implications of Errors in Employer Provided Pension Data and in Respondent Pension Reports

In the case of those with defined benefit plans, the Summary Plan Description (SPD) provided by the respondent's employer contains a full and accurate representation of the pension. To be sure, there are some possible sources of error. Most importantly, some plan descriptions will have been out of date, referring to provisions in place some time before 1992, but no longer relevant in 1992. Also, despite extensive checking, some plan features may have been miscoded. Moreover, if a firm has experienced complex merger activity, multiple plans may cover different individuals with similar apparent backgrounds, creating the possibility of a mismatch.⁸

In the case of defined contribution plans, the respondent report as to the balance in the account may be more accurate for estimating plan value. Because the HRS must preserve respondent privacy, when collecting pension plan descriptions, the name of the covered individual was not identified to the firm. Therefore, the amount accumulated in the pension account held by a particular respondent must be estimated from the firm's contribution rate as reported in the plan description, and the respondent's self reported work history and contribution rate. In addition, the HRS collects the plan description at a moment in time. However, both the contribution rates and the returns may have changed over time. Nevertheless, the respondent's answer may be subject to reporting error, perhaps to substantial error in some cases.

There are many behavioral questions raised by the existence of substantial reporting error, especially reporting error by a cohort that is so close to retirement. These questions are dealt with in later sections. But there also are more mechanical questions related to the structuring of

the Health and Retirement Study that are raised by reporting error. Answering one question incorrectly may lead the respondent to the wrong branch, resulting in questions that are irrelevant to the respondent's current pension.

The questionnaire first asks about pension coverage, then about plan type, then details about the particular plan. When someone initially misreports pension coverage, it is possible the error will be corrected as additional questions are asked. If a respondent says he is not covered by a pension, when in fact he is covered by a pension, he is skipped out of the pension sequence entirely, and no information is gleaned about the pension, either from the respondent, or from the employer. The only hope that a person who reports no pension will catch the mistake comes from a series of questions the respondent is asked about whether the employer offers the plan to others, about likely eligibility in the future, and about plans for future participation. These questions may jog the respondent's memory, and lead the respondent to change the answer to the pension coverage question.

When a person says they do have a pension, but in fact they are not covered, they are asked a set of superfluous questions. To be credited with a pension value they are not entitled to, a respondent would have to answer a number of the subsequent detailed questions about the pension in a misleading fashion. These questions not only ask about the plan, but about vesting, own dates of early and normal retirement, and expected benefits. Again a person who proceeds down this path will have the opportunity to catch the error and have the interviewer start again with the pension questions.

Consider next what happens if a respondent provides the wrong answer as to plan type, a common occurrence as we will see. The respondent is then asked a series of detailed questions

about the plan. Some of the questions are still useful, others are not. But the questions are not so unreasonable as to flag the fact that the respondent made a mistake in reporting plan type.

Consider, for example, what happens if the person actually has a defined benefit pension, where the future benefit is based on a formula that includes final salary and years of experience, but the respondent reports having a defined contribution plan. The respondent is asked some inappropriate questions, first requesting more details about what kind of DC plan this is, whether the plan is thrift or savings, 401k, etc., how much is in the account, if the respondent can choose how the money is invested, in stocks, etc.. The respondent can answer don't know to these detailed questions without it being too obvious he is in the wrong sequence. Other questions are relevant to a DB plan, including years of coverage, employer and own contribution, the possibility of a lump sum payment or an annuity, the earliest retirement age, and the expected age of retirement.

If in contrast the person has a defined contribution plan, so that the money is held in an account, and the person reports having a defined benefit plan, the respondent is asked a different set of irrelevant questions that may or may not result in don't know answers. These include: what is the earliest age for full or unreduced benefits (a question relevant for a few but not many DC plans), how much will these benefits be, what is the benefit reduction rate if you leave at the early retirement age, does the benefit (as opposed to the employer contribution) depend on the respondent's social security benefits. Questions that will be asked that are also relevant to DC plans, if sometimes confusingly worded for a person covered by a DC plan, inquire about: how much does the respondent contribute to the plan; for how many years has the respondent been included; when does the respondent expect to start receiving benefits; how much does the

respondent expect benefits to be; what will pay be when the respondent reaches early retirement age; what is the normal retirement age; could a lump sum be chosen. But, of course, because the person has identified the plan type as defined benefit, the most important question about a defined contribution plan will not be asked, that is, how much is in the account?⁹

In the remainder of the paper, we will be comparing outcomes from the linked social security and pension data with the information gleaned from respondent surveys, and then asking about the implications of the differences we find for retirement and wealth, and ultimately for research and policy. Because the HRS was unable to obtain linked data for each observation, because coverage by social security and pensions of various types varies among HRS respondents, and because of missing data, the sample sizes will vary with the question asked. Accordingly, before proceeding with the empirical analysis, it is useful to provide a guide to the sample sizes that apply to different parts of the analysis. The sample composition and the sample sizes for the different tables in the body of the paper are reported in Table 3.

III. Empirical Analysis

A. Social Security Comparisons

Table 4 relates respondent reports of their expected social security benefits to the benefits they will receive based on their earnings histories. Reports of expected social security values are heavily censored, and are subject to a number of other uncertainties.¹⁰ Altogether, 43 percent of respondents provide an estimate of their benefits. Roughly half of those whose social security records say they are entitled to benefits from \$7,500 to \$15,000 provide an estimate of their benefits. Only a third of those who expect benefits below \$7,500, or above \$15,000, provide an estimate of their benefits. Turn now to the errors among those who do provide an estimate of

their benefits. Three hundred and eighty three cases fall along the main diagonal, accounting for 26 percent of the 1484 cases who reported an expected social security benefit. An additional 531 hazarded a guess that fell within one cell of the actual benefit they would receive. Altogether then, 914, or 62 percent of those guessing, picked an amount that fell within one cell of the actual benefit, but once again, they represented only 42 percent of those with a matched social security earnings record. So only about a quarter of those with a matched record both guessed an amount, and knew the amount well enough to pick a value within one cell of the true value.

B. Pension Comparisons

1. Pension Coverage

As noted above, some individuals may not correctly report whether they are covered by a pension on their job. One way to search for such an error is to compare responses in wave 1 and wave 2 for respondents who said they were in the same job. If the respondent said he had a pension in wave 1, he was asked about changes in that pension in wave 2, wherein he could deny he had a pension. If the respondent said he did not have a pension in wave 1, he is asked in wave 2 whether he has a pension. As seen from Table 5, about 20% of those saying they did not have a pension in 1992 reversed their stance in 1994, but relatively few who said they did have a pension in 1992 denied it in 1994. Whether the asymmetry is due to the differences in the questions asked in 1994, or whether the respondent reports a pension only if he decides to participate, and those reporting coverage decided to participate in '94, is open to question. Given that a denial is stronger than simply responding afresh to the pension question, we would have expected this pattern to some degree, but perhaps not to this extent.

2. Pension Type

Table 6 contains four panels describing the joint distribution of plan types reported by respondents and their firms on jobs held by respondents in 1992. These data are only for respondents with a matched employer-provided pension plan description.

Table 6A contains the frequencies of plan type reported by covered respondents and by their employers. If the firm reports two plans, one a DB and one a DC, the firm is classified as offering both, and there is one entry in the “Both” row. In Table 6A, we find 1,881 cases where both the individual and the firm reported having a DB pension, with or without a DC pension: (777+380+409+315). For DC plans the comparable number is 916, where both the respondent and employer reported that the individual is covered by a DC plan (327+111+163+315).

The share of the total of 2,907 observations falling in each cell is reported in Table 3B. The observations along the diagonal in Table 6B represent only about half the joint distribution of firm and individual reported plan types, suggesting that respondents do a poor job of reporting the type of pension plan they are covered by. Some of the misreporting may be due to nonparticipation; even when the firm reports it offers both plan types, some 14 percent of respondents report they are covered only by a DB plan. This difference may reflect a failure of the respondent to report coverage by a DC plan when they don’t participate in the DC plan. Even allowing for this misreporting, the discrepancy in plan types is substantial, amounting to over one third of the plans. Because the sequence of questions asked about the pension is conditioned on the plan type reported by the respondent, this is a crucial problem for surveys that wish to determine pension values solely from respondent reports.

Comparisons between self reported and firm reported plan type based on means would suggest more agreement between respondent and firm reports of plan type than is found in the

micro data. At the micro level respondents and firms agree on plan type in 49 percent of the respondent-employer matches. In contrast, compare the fractions with only DB, only DC, or both types of plans computed separately from the reports of individuals and firms. From the bottom row in Table 6B, we see that 46 percent of respondents report that they are covered by DB plans only, 24 percent report they are covered by DC plans only, and 28 percent report they are covered by both types of plans. Similarly, from the last column of Table 6B, 48 percent of firm provider reports indicate that the plan is DB only, 21 percent indicate that the plans are DC only, and 31 percent indicate that the firm offers both types of plans. Thus when the descriptive statistics from firm and individual reports are compared, they suggest a much higher level of agreement between reported and actual plan type than is found at the level of the individual observation.

One might ask whether respondents are doing much better than chance in identifying plan type than if they answered the plan type questions randomly, where as a result of chance, one third would report DB plan only, one third would report a DC plan only, and one third would report both. Actually, in the case of firms where we know the plan is DB only, respondents do much better than they would by chance. As seen in the first column of Table 6C, which reports the distribution of respondent reports of plan type, conditional on the plan type reported by the firm, among respondents whose employers report they are covered by a defined benefit plan only, 56 percent report that their plan is DB only. This is significantly different from the 33 percent that would be recorded if reported plan type were randomly chosen by the respondent. An additional 27 percent of those whose employers report their plan is DB only report that their plan is both DB and DC. Thus among those whose employers indicate they are covered by a DB plan only, 83 percent of the respondents report coverage by a DB plan. Fifteen percent of those whose

employers report they are covered by a DB plan only report they are covered by a DC plan only. From the second row of Table 6C, among those whose employers indicate they are covered by a DC plan only, slightly more than half, 54 percent, get the plan type right. If DB only, DC only and both categories were equally likely, those covered by a DC plan only do little better than chance in identifying that they are covered by a DC plan. Altogether, among the observations where the employer reports a DC plan only, the respondent reports a DC plan, either held exclusively or (mistakenly) together with a DB plan, in 72 percent of the cases. Twenty six percent of those whose employer reports their plan is DC only, representing 14 percent of the sample with a matched pension plan, report their plan is DB only. For those whose employers report they are covered by both a DB and a DC plan, slightly more than a third, 35 percent, report coverage by both a DB and a DC plan. Among the remainder, 45 percent report they are covered by a DB plan only, and 18 percent report they are covered by a DC plan only.

Suppose for those without a matched pension we wish to determine plan type. The simplest idea would be to use the respondent report. But the respondent report will not be reliable for two reasons. First, there is a problem of selection bias; that is, the sample without a matched pension is different from the sample with a matched pension. Second, the respondent's report will be wrong for roughly half the cases. Consider the distribution of firm reports conditional on respondent reports as shown in Table 6D. For those respondents who report they have a DB plan only, 58 percent of the firms indicate they offer only a DB plan. Counting those whose firms report DB and DC coverage, DB plan descriptions will be available for 88 percent of those respondents reporting DB coverage, but DC plans will be missed for the additional 42 percent of those whose firms report they have only DC plans or both types of plans. Among

respondents who report they have only a DC plan, 47 percent will have an exact match provided by an employer who reports offering a DC plan only. But we will have DB plan descriptions from employers for 53 percent of respondents who report coverage by a DC plan only. Among respondents reporting coverage by both types of plans, descriptions of both plans are available from only 39 percent of their employers, suggesting about 60 percent of respondents are misinformed.¹¹

3. Normal Retirement Age

Table 7 examines the joint distribution of *normal* retirement dates predicted from provider plan descriptions and from respondent data. The median normal retirement age is 62 in both the respondent provided data and the firm-provided plan descriptions. The means are 61.3 and 60.7 when normal retirement ages are computed from firm reported plan provisions and respondent expectations respectively. Once again, however, the discrepancies are much wider in the individual data than they appear from the medians or means. Among those with normal retirement dates between 50 and 65, as computed from employer-provided plan descriptions, 33 percent of the observations lie along the diagonal in Table 7. Among this same group, 40 percent have an expected normal retirement age within one year of the date calculated from employer-provided data. The correlation between the normal retirement dates from provider and self reports is 0.352.

4. Early Retirement Age

Ages of early retirement are reported in Table 8 for respondents in jobs held in 1992, where both the respondent and the firm report the plan is defined benefit. When based on the firm-provided plan description, the early retirement date is about two years earlier than the early

retirement date reported by the respondent. The median age of early retirement reported by the respondent is 57. When applying the formula reported by the firm to respondents' self-reported work histories, the median age of early retirement across plans is 55. The average early retirement age is 57.6 when reported by the respondent, and 55.4 when calculated from the firm-provided plan description. According to the firm provided data, two thirds of respondents will be able to retire early by the time they reach age 55; but less than half of respondents think they will be able to retire early by age 55. Thus respondents to the HRS appear to be more pessimistic about their eligibility for early retirement than is warranted by the provisions of their plans. We will see below that some respondents may simply be ignorant of the opportunity to retire early, or perhaps otherwise consider it to be irrelevant.

It is also useful to examine the distribution of differences between the early retirement dates expected by respondents and the dates they will attain early retirement eligibility according to their firm reports. Of the observations with firm-reported retirement ages in the range from age 50 to 65, only 28 percent (435/1569) lie along the diagonal in Table 8, indicating that the respondent and firm based early retirement dates are identical. Moreover, only 43 percent of respondents (671/1569) report an early retirement date within one year of the firm-based early retirement date. The simple correlation between the provider reported and self reported retirement dates is 0.353.

We also consider the relation between errors in respondent reported early retirement and normal retirement ages. On the one hand, 35.4 percent (588/1660) of respondent reports of age of eligibility for early retirement benefits were within one year of the value calculated from the plan description, and 35.9 percent of the normal retirement ages were within one year. If there

were no correlation, then the number of reports within one year of both the actual early and normal retirement ages would be 232 ($=1660 \cdot .354 \cdot .395$). The actual number is close at 255. On the other hand, the correlation between the two errors is 0.311, which indicates some tendency that if the estimate of one age of eligibility is high, the estimate of the other age of eligibility will also be high.

How accurately are pension rules described by those respondents closest to retirement? Table 9 compares the respondent-reported early retirement dates with the dates calculated from the firm plan descriptions and respondent reported records, this time confining the sample to the 371 respondents in the 1992 wave 1 HRS survey who indicated that they wanted to retire by 1995. For this sample, although the median age of early retirement eligibility expected by respondents is the same as that expected by their firms, age 55, as we found for the full sample, the mean early retirement date based on respondent data is later than the mean date based on firm data, 57.0 vs. 54.8. Moreover, when in Table 9 we confine the sample to those who intend to retire by 1995, we continue to observe the same wide discrepancy between the early retirement dates computed from provider formulas and from respondent data that characterized the full sample in Table 8. Thus for the full sample, 28 percent of the observations lie along the diagonal, while those who expect to retire by 1995, 27 percent of the observations lie along the diagonal. The correlation coefficient is 0.359 for the data in Table 9, virtually identical to the correlation coefficient of 0.353 found for Table 8.

5. Benefit Reduction Rate

A key characteristic of the defined benefit pension is the benefit reduction rate. It is the rate at which benefits are reduced for each year the covered worker retires before the normal

retirement date. If the reduction rate is relatively low, early retirement is subsidized so that the benefit accrual peaks at early retirement age.

Respondents themselves have almost no idea how much the benefit reduction rate is. The benefit reduction rate is available from both the individual and the firm for relatively few of the 1881 jobs where both the respondent and the firm report coverage by a defined benefit plan. As can be seen in Table 10, we can compute early retirement reductions for only about 58 percent of firm observations; most of the remainder are cases where the worker joined the firm recently enough that he or she is not eligible for early retirement prior to the normal retirement age. The median benefit reduction rate reported by firms is 4 to 5 percent. Out of 1881 respondents with a defined benefit pension in their 1992 job, 1512, or 80 percent, either do not think they are eligible for early retirement or do not know what the benefit reduction rate is for their plans. Indeed, half of the respondents do not think they can retire before the normal retirement age. Of the remaining 369 respondents, the median reported benefit reduction rate is 5 to 6 percent, well above the average observed from provider data. Altogether, there are only 234 observations on benefit reduction rates that are jointly reported by the respondent and by the firm. Of these, only 26 lie along the diagonal. For this limited number of observations, the correlation coefficient is 0.524.

6. Voluntary Contributions

As Table 11 shows, there is agreement in a majority of cases about whether a DC plan allows voluntary contributions.¹² In 392 out of 873 observations, providers and respondents agree there are voluntary contributions. In another 121 cases, both respondents and the firm agree that there are no voluntary contributions. Thus, 59 percent of the cases lie along the main

diagonal. With respondents and firms disagreeing about voluntary contributions in 41 percent of the cases, the most likely misreport occurs where the firm reports there are voluntary contributions and the respondent reports there are none. These misreports account for 35 percent of the observations.

7. Defined Benefit Plan Values Derived From Self Reports and Firm Reports

This table and the next several tables pertain to individuals for whom the respondent and the firm agree on the type of pension, and for whom the principal ingredients of the pension (earnings, expected benefits, accumulations, etc.) are available and not imputed. Table 12 examines results for pensions from the current job at the time of the survey. The results for the first two columns are for individuals who said they had defined benefit plans whose value could be computed from the respondents' answers and whose firms indicated that the individual was indeed covered by a defined benefit plan. Combination plans with a defined benefit component are also included in these numbers. Individuals who reported they had both defined benefit and defined contribution parts to their pension, and whose firms agree that the pension had both components, may be in the columns in Table 12 for both plan types. Individuals who say they had only defined benefit plans but whose firms indicate only defined contribution plans, or vice versa, are not included in this table, although they are included in later tables.

Table 12 shows the dollar amounts associated with various points on the univariate distributions of defined benefit pension amounts, calculated both using the respondents' answers and the formulas in the pension documents obtained from the firms.¹³ For defined benefit plans, the survey asked when the respondent expected to start collecting the pension, and how much the pension would be. The pension value in column 1 of the table is the present value (discounted to

1992) of the expected benefits from the date of expected retirement forward, assuming that the pension remained the same in nominal terms.¹⁴ If the respondent failed to answer either the expected age when the pension would start or the amount of the pension, the pension value is not imputed. The second estimate of the pension value, which is in column 2 of the table, comes from applying the respondent's earnings and tenure at the expected collection date to the rules found in the pension documents.¹⁵ These rules give the value of the annual benefit, year by year. The value of the pension is again the discounted value of this stream of benefits.¹⁶ If the respondent's 1992 earnings were imputed, the value of the pension is not imputed, since the imputed earnings may not be a very accurate indication of actual earnings for individual respondents.

Table 12 indicates that for the defined benefit plans, the mean present value of benefits based on the employer reports, \$168,405, exceeds the mean value based on the respondent report, \$148,015. At the median, there is remarkable agreement between the defined benefit amounts based on the respondents' responses and those based on calculations from the pension documents. In fact, looking at the values in the 25th and 75th percentiles, the middle part of the distribution is almost identical. Only in the two tails are the pension amounts calculated from the firm documents noticeably higher than the amounts calculated from the respondents' expected pensions.

Although the distributions are similar for the defined benefit pension amounts calculated from the respondents' expectations and the pension documents, Table 13 indicates that there are substantial differences between the two amounts at an individual level. To some degree, this result could have been expected after looking at Tables 7, 8 and 9. If respondents are that

inaccurate in reporting the early and normal retirement ages of their plans, it seems unlikely that they would be more accurate in reporting their expected pensions, which presumably involve more complex calculations than do the early and normal retirement ages. The fact that the joint distribution is more or less symmetrically distributed around the main diagonal reflects the fact that the two individual distributions are similar, and indeed the fact that the largest entries are down the main diagonal is encouraging. However, only about 40 percent of the observations fall along the main diagonal. Moreover, the ranges of the categories in this table are very wide, and even being one entry off the main diagonal is consistent with the respondents' estimate of pension value being half or twice the corresponding amount calculated from the pension documents.¹⁷

8. Defined Contribution Plan Values Derived From Self Reports and Firm Reports

The last two columns of Table 12 pertain to individuals who said that they had defined contribution plans and whose firms indicated likewise. For defined contribution pensions, the value of the pension as determined by the respondent, which is in column 3 of the table, is simply the answer to the question regarding the current value of the accumulation. To arrive at the amount calculated from the plan documents, the required contribution amounts are calculated for each year that the participant has been employed in the firm. If this is expressed as a percent of the annual earnings, the percent is multiplied by the earnings in the year. These contributions are accumulated forward using a 6.3 percent nominal interest rate from the long run projections of the Social Security Administration, and the sum of these contributions is the implied present value. If the plan allows for voluntary contributions, the percentage of contributions in the survey year is extrapolated backward, and the individual is assumed to have contributed the same

percentage of previous years' earnings. The plans themselves indicate if the contributions began after the respondent began to work for the firm. If an individual's 1992 earnings are imputed, or if the respondent did not respond to the question about contributions and the plan had voluntary contributions, the present value is not imputed. The resulting calculated defined contribution pension values are in column 4 of the table.

For defined contribution plans, the situation is considerably different from that for defined benefit plans. The mean pension value based on firm reports of \$85,790, greatly exceeds the mean value based on the respondent report, \$59,105. While the upper tail for the distribution of DB plans exhibits provider values that exceed the values reported by respondents, the same is true for the top 90 percent of DC recipients; that is, for DC pensions the *entire* distribution of accumulations that the respondents report is much lower than the amounts calculated from the plan documents. In the middle and upper parts of the distribution, the respondents' accumulations are less than half as much as the amounts from the plan documents at the corresponding percentiles.

Table 14 shows the joint distribution for the defined contribution plans. The scatter of the plans is about the same as for the defined benefit plans, with 28 percent of the observations falling on the main diagonal.¹⁸

IV. Imperfect Information: Implications and Comparisons with Earlier Studies

A. Implications

1. Implications of Misreporting the Early Retirement Date

The wide variation between the respondent and firm reported dates of eligibility for early retirement benefits is a particularly important problem for analysts wishing to model retirement.

For many pension plans, benefit rules give covered workers a substantial benefit increment from working up to the point of early retirement age. By working the year a respondent becomes eligible for early retirement, the HRS respondent with a defined benefit plan typically increases the present value of the pension by an amount equal to two thirds of a year of pay, or more (Gustman and Steinmeier, 2000b). This provides a powerful incentive for respondents to remain at the firm. If, in formal models of retirement behavior, individuals appear to leave their firms before reaching that date, retirement models will indicate that individuals are not sensitive to economic incentives when making their retirement decisions. As seen in the responses tabulated in Table 8, many individuals will report an early retirement date that is later than the date they actually will become eligible for early retirement benefits. As they approach retirement age, in many cases the firm will make clear to them that they are being too pessimistic. But that new information may not be reflected in the individual responses to the survey, and the analyst will not have the correct answer unless the firm provided plan description is available. Unless an adjustment is made when using respondent reported data for those who seem to leave just before becoming eligible for early retirement benefits, this form of reporting error will cause the effects of pension incentives on retirement to be understated, and the parameter estimates will also lead to an understatement of the influence of social security on retirement.

2. Implications of Misreporting of Pension Values for Defined Contribution Plans

The systematic difference between the accumulated balances in defined contribution plans reported by the participants and the values calculated from the pension documents could have several potential explanations. Most obviously, the participants could be systematically under-reporting the plan accumulations. Alternatively, the rate of return used by the pension

program in calculating the pension reports may be higher than the actual return experienced by the participants. Finally, for the plans with voluntary contributions, the participants may have contributed substantially less in prior years to the plan than their current contribution rates would suggest.¹⁹ Note that the first of these explanations implies that the respondents' answers are systematically incorrect, while the last two imply that the amounts calculated by the pension program are incorrect.

To distinguish among these competing explanations, Table 15 presents the results for those DC plan participants whose plans do not allow for voluntary contributions. In contrast to Table 14, in Table 15 the number of entries above the main diagonal is approximately the same as the number below the diagonal. Although the number of observations is much lower than in Table 14, Table 15 suggests that among those participating in plans without voluntary contributions, there is no systematic tendency for the pension values calculated from the plan documents to be more or less than the accumulations reported by the respondents.

The fact that values appear close for plans without voluntary contributions, but not for those with voluntary contributions suggests that participants contributed less in prior years. The other two explanations should have equal force whether the firm permits voluntary contributions or not. This point is expanded in Table 16 and in Figure 1. This table groups defined contribution pensions according to the value calculated by the pension program on the basis of the pension documents. The top part of the table deals with defined contribution pensions without a provision for voluntary contributions. The first row indicates the median accumulation reported by respondents, and the second row indicates the median value calculated by the pension program. The solid line in Figure 1 calculates the ratio between the two. The ratio is about 1.5

for small pensions (below \$5,000 in present value), and about 1.0 for pensions between \$5,000 and \$50,000. Above \$50,000, where the number of pensions is low, the ratio fluctuates more widely, but there is no evidence of a systematic bias. All in all, the solid line confirms our more casual finding from Table 15, that the reported accumulations and values calculated from the program do not differ systematically for pensions without voluntary contributions.

The lower part of Table 16, which is reflected in the dotted line in Figure 1, indicates the results for pensions with voluntary contributions. For these pensions, for values above the first category, there is evidence of a systematic difference between accumulations reported by respondents and those estimated by the pension program using the pension documents. There is some indication that the degree of underestimation is worse for larger pensions.

This brings us to the question: what is the most accurate estimate of the true value of the pensions? The inaccuracies in respondent reports are obvious. However, it is also likely that the values calculated from the pension documents are not completely accurate. Part of the reason is that these calculations still employ uncertain information from the respondents, such as earnings, years of service, and the like. Another reason is that the program is forced to make assumptions about information not collected from respondents, such as the time path of earnings and the time path of voluntary contributions. Is the most accurate estimate of the true value of the pension the value calculated from the pension documents or the value calculated from the information that the respondents give? Or is it better to somehow combine the information in the two sets of numbers?

For defined benefit plans, the most accurate estimate is almost certainly the one calculated from the pension documents. It is subject to errors in earnings and years of service,

but it captures the details of the pension plan that most respondents may be unaware of unless they have already retired and asked the firm as to how the benefits were calculated. In cases where there are sharp differences, it seems much more likely that the respondent is making an uninformed guess than that the provider calculations are substantially wrong. The fact that the two distributions are similar does not give any cause to think that one or the other of the estimates is systematically biased.

Many of the same arguments hold for defined contribution plans with contributions that are completely specified by the plan. In addition to uncertainties regarding earnings and years of service, there is an additional uncertainty here having to do with investment returns. This uncertainty would be an argument in favor of the respondent reports of the accumulations. However, for many respondents the discrepancy between the accumulation as reported by the respondents and the accumulation calculated from the firm provided plan description is larger than can plausibly be attributed to uncertainties in investment returns. Since there do not appear to be systematic differences between the two sets of values which would indicate that one or the other was biased, this suggests that perhaps the accumulation calculated from the plan description is the more accurate measure of the value of the plan.

For defined contribution plans *with voluntary contributions*, the situation is murkier. There is a tremendous amount of scatter in Table 14, which means that for a substantial number of respondents, there is an order of magnitude of difference between the amounts calculated from the pension document and the amounts that the respondents report. Although increasing contribution rates could contribute to some of the scatter, it seems unlikely that this could be the explanation for a scatter of this magnitude. Moreover, the scatter appears to be approximately as

wide as the scatter in Table 13, for which the arguments that the scatter is due to respondent inaccuracies are more persuasive. This leads to the conclusion that while the amounts calculated from the pension documents are too high, much of the scatter in Table 14 is due to respondent misreporting.

Given this conclusion, it would appear that the amounts calculated from the pension documents, while too high, are probably better guides to the accumulations than are the respondent reports. In this situation, the approach likely to yield the most accurate estimates may be to take the values calculated from the pension documents and apply a correction to reduce the apparent bias. Table 17 presents the results of a median regression attempting to quantify this overestimation for the sample of plans with voluntary contributions. The dependent variable is the ratio of the accumulations reported by respondents to the value calculated from the plan documents, which is the amount plotted on the vertical axis in Figure 1. The independent variable is the log of the pension value calculated from the plan documents, and its square. This value is the variable plotted on the horizontal axis of Figure 1. The estimated function has a value of approximately unity at a pension value of \$1,000 and drops to 0.48 for a pension value of \$25,000 and 0.36 for a pension value of \$100,000. To correct for the apparent bias in the values calculated from the pension documents, when estimating the value of DC plans with voluntary contributions, we will adjust those values by reducing them according to the results implied by the regression in Table 17.²⁰

B. How Has Worker Knowledge Changed Over Time?

1. Comparing Plan Type

Comparing plan type reported in the HRS with plan type reported in the Survey of

Consumer Finances, we report the percentages from Gustman and Steinmeier (1989, Table 6), which provided results analogous to Table 6C using the 1983 Survey of Consumer Finances (SCF). In the SCF, 63 percent of respondents whose firms reported a DB plan only also reported coverage by a DB plan only, compared to 56 percent from the HRS in Table 6C. In the SCF, of respondents whose employers reported a DC plan only, 37 percent reported they had a DC plan only. This compares to 54 percent in Table 6C. Although the HRS respondents do a bit worse in identifying DB plans only, they do much better in identifying DC plans only than respondents in the SCF sample did, perhaps due to the increasing popularity of DC plans over the decade.

2. Comparing Retirement Age

In contrast to our findings in the HRS data, SCF respondents ten years earlier did not overstate the age of early retirement. In the data from the 1983 SCF, we found that the median early dates expected by respondents and the median early retirement dates computed from plan provisions and earnings histories were both age 55. Moreover, the SCF included workers from age 40 on, so that those sampled in the SCF were further from retiring than the HRS sample. Yet the median expectations of early retirement date in the SCF sample were more accurate than in the HRS sample.

Another piece of evidence suggests that, in relation to the rules in place, people are less optimistic today about when they can retire than they were in the past. In previous work using SCF data, we found that in the self-reported data, mean early retirement dates were lower than the median dates by about 3 years. Because the medians were equal between the self reported and firm reported data, this suggested that there were a few people who were highly optimistic about when they would be eligible for their early retirement benefits. In the HRS, evidence of

this optimism has disappeared: mean and median dates of expected eligibility for early retirement benefits are the same. This result corresponds with the findings from the direct comparisons of early retirement dates based on the respondent and firm-provided data. People are more pessimistic about the ages of eligibility for early retirement benefits in the HRS than they were in the past.

3. Comparing Plan Values

In our earlier analysis of data for the Survey of Consumer Finances, we found that pensions based on respondent reports were more valuable than pensions based on the plan formula (1989, Table 5). The findings in the HRS are just the opposite. We also found that unlike our earlier findings, people on average are now more pessimistic about their ages of eligibility that is warranted by the plan. Perhaps the finding that people are less optimistic about their pensions than they were ten years ago reflects a shift of attitudes in response to changing firm policies over the past decade.

V. Relation of Misreports to Retirement and Wealth Accumulation

What difference does misinformation about pensions and social security make to actual behavior? In Tables 18 and 19 we examine the relationship of reporting errors to retirement outcomes and to wealth accumulation. Here we address three types of questions. How does knowledge of social security and pensions affect retirement plans? realization of the retirement plans? and wealth accumulation? These analyses are descriptive.²¹

We look for, but do not find simple patterns in the data. For example, one might find that those who understate their social security and pension values have a nice surprise in store. If they always thought their pensions and social security were less valuable than they in fact were,

one might expect them to plan on a later retirement, disproportionately among those planning for a later retirement, to find them actually retiring earlier, and to have accumulated higher wealth to compensate for the lower pension or social security. The patterns we find are more complex, and certainly require a more complex model to explain.

A. Retirement Plans.

From line 1 in Table 18, we see that as of the first survey they were asked, 29 percent (18 + 10.7) of all respondents expected to retire before the last survey in which they were interviewed. Dividing respondents into groups according to whether their expectations of social security benefits were accurate, from the second row of the table, those whose expected benefits were less than 75 percent of their actual benefits were more likely to plan a late retirement than respondents with accurate benefit expectations or respondents who overestimated their social security benefits. This finding is consistent with our naive expectations. More than half (57 percent) of the sample responded that they did not know their expected social security benefits. Of those who did not know what their social security benefits would be, 24 percent, slightly less than for the sample as a whole, plan to retire before the last survey.

Those who correctly identify that they have a DB plan are more likely to plan to retire before the last survey (39.0 percent vs. 33.1 percent), and are less likely to plan to retire after the last survey (54.9 percent vs. 61.4 percent) than are those with incorrect knowledge or who report they don't know plan type. There is also a difference in planned retirement between those who indicated their expected pension benefits, and those who said they did not know what their expected benefits would be. Sixty one percent of those who did not know their benefits predicted they would retire after the last survey. Only forty nine percent of those with accurate benefit

expectations expected to retire after the last survey, with those who overstated or understated their pensions expecting to retire after the final survey in 56 percent and 53 percent of the cases respectively -- the opposite of our naive expectation.

B. Realization of Retirement Plans

Typically, the respondent was first interviewed in wave 1, and retirement status was determined as of wave 4, or an earlier wave if the respondent attrited from the survey. The figures in columns 1 and 4 pertain to those who retired according to their plans. A majority of those planning to retire early in fact did so, so that 63 percent ($18.0/(18.0 + 10.7)$) of those planning to retire before the last wave they were interviewed succeeded in their plans. Of the 59.8 percent of the respondents planning to retire after the last survey, 77 percent ($46.0/(13.8 + 46.0)$) actually did retire after the last survey. Thus almost two thirds ($18 + 46$) of all respondents had a planned retirement date and behaved consistently with their plan.

Consider now those who underestimated their social security benefits, with expected benefits less than 75 percent of their actual benefits. This group was more likely to meet their planned retirement date than respondents in general -- with three fourths of those who underestimated their social security benefits retiring according to plan. Sixty one percent of those with too low an expectation for their benefits both planned to and succeeded in retiring after the last survey, and 12.5 percent of this group both planned to and succeeded in retiring earlier than their last interview wave. Altogether, 83 percent of those planning to retire after the survey, among those who understate their social security, actually retire after the last survey. Our naive expectation was the opposite, that those who are pleasantly surprised to learn their social security is more valuable than they thought would retire earlier due to the windfall. Perhaps they were

not well informed even by the last wave of the survey. Or perhaps those who understated their social security had higher wealth, or were younger. That is, those closest to the social security early retirement age may have the most accurate expectations. We will explore these findings in more detail in subsequent work.

Those who had an accurate expectation of their social security benefits were slightly more likely to meet their retirement plans than were respondents as a whole, but less likely to meet their retirement plans than were those who underestimated their benefits. Those with accurate benefit expectations were twice as likely to expect to retire early and to succeed in retiring early than those who underestimated their benefits.

Those who overestimated their social security benefits were least likely to meet their retirement plans, with 62 percent retiring before or after the last survey as they forecast. One fifth of those who overestimated their benefits planned to retire before the last survey and carried out their plans, despite having overstated their expected social security benefits by 25 percent or more. Contrary to naive expectations, the share of those who planned to retire after the last survey and in fact did so was lower for respondents who overstated the value of their pensions than for respondents who understated the value of their pensions.

More than half (57 percent) of the sample responded that they did not know their expected social security benefits. Nevertheless, 62 percent of this group accurately forecast their retirement behavior. They were slightly less likely than the sample as a whole to plan to retire before the last survey.

Consider next the relation between the accuracy of retirement expectations and the accuracy of pension expectations. Those who correctly identify their pension plan type are only

slightly more likely to retire as planned than those who did not. The most identifiable difference between these groups is that a fifth of those who did not know what type of pension they had planned to retire before the last survey, and succeeded in doing so, while a quarter of those who correctly identified their plan type both planned to and succeeded in retiring before the last wave of the survey.

Lastly, the relationship between expected pension benefit amounts and accuracy of retirement expectations is in accordance with simple expectations. Among those who understated their pension values, and who planned on a later retirement, a larger share in fact retire earlier than is true for those who overestimated their pensions. However, the effect is small. Moreover, conditional on planning to retire after the last survey, the share retiring before the last survey is the same for those who overestimated the value of their pensions as it is for those who estimated the value of their pensions correctly.

Wealth-Lifetime Earnings Ratios

Table 19 addresses the relationship between planned retirement dates, errors in knowledge about social security or pension benefits, and accumulated wealth as a share of lifetime earnings. As seen in looking across the first row of the table, there is some relation between planned retirement and wealth-lifetime earnings ratios. Those who planned to retire before the last survey had higher wealth-lifetime earnings ratios than those who planned to retire after the last survey. However, causality is unknown. Moreover, those who planned to never retire had higher wealth-lifetime earnings ratios than those who did plan to retire. Those who did not know when they would retire also had high wealth-lifetime earnings ratios.

There also is some relationship between knowledge of one's benefits and wealth-lifetime

earnings ratios. From column 5 in Table 19, those who overstate their social security benefits have higher wealth- lifetime earnings ratios (.17) than those with accurate expectations, those who understate their benefits, or those who don't know what benefits to expect, with wealth-lifetime earnings ratios of .14-.15 for those in each group. There are some differences in the patterns of wealth-lifetime earnings ratios with planned retirement and errors in social security values, but the reasons for these patterns are not obvious.

Knowledge of plan type is related to wealth-lifetime earnings ratios. Those who don't know their plan type, nor when they plan to retire, have very low wealth-lifetime earnings ratios at .06. Those who do know their plan types and when they expect to retire have slightly lower wealth-lifetime earnings ratios than those who don't know the plan type.

The ratio of expected to actual pension plan value and planned retirement also interact in influencing wealth to lifetime earnings ratios. Among those giving specific planned retirement dates, those with accurate expectations of pension benefits have lower wealth earnings ratios than those who overestimate or underestimate their pension benefits. Those who plan never to retire and who are overly optimistic about their pension benefits have wealth-lifetime earnings ratios that are more than twice as large as those in any other category.

Of course, much more could be done to analyze the relation between knowledge about pensions and social security and retirement and wealth outcomes. For example, we would like to consider not only the ratio of wealth to lifetime earnings, but also the level of wealth. One may have poor knowledge of social security for a number of reasons, one of them being that with high wealth, social security is not very important. On the other hand, a person with low lifetime earnings may have low absolute wealth, but a reasonable wealth-lifetime earnings ratio, as long

as social security provides a high replacement rate. For analogous reasons, it would be useful to standardize for age when analyzing how knowledge of social security or pensions affect retirement plans and whether those plans are realized. An obvious next step is to embed indicators of knowledge of social security and pensions into standard models of retirement and saving to determine how knowledge of benefits is related to retirement and wealth outcomes. It also will be interesting to see whether variables measuring the accuracy of knowledge of benefits amounts continue to behavior differently from variables measuring the effects of planning activity on wealth accumulation (Lusardi, 1999).

In sum, we have conducted a very preliminary analysis of the relation between knowledge of social security and pensions on the one hand, and retirement expectations, realization of those expectations, and wealth accumulation on the other. It appears that the lack of knowledge about social security and pension wealth, and the error in determining plan type, have some systematic but modest effects on retirement plans, on whether those plans are met, and on saving outcomes. But these relations are complex, and no obvious over riding themes emerge. For example, we do not find that those who understate the value of their pensions or social security plan disproportionately to retire later, but end up retiring earlier than they planned once they realize the windfall. Nor do they have consistently higher wealth-earnings ratios.

VI. Conclusions and Questions for Further Research

Our analysis shows that respondent reports of social security and pension values and characteristics differ extensively from the comparable information obtained from linked data provided either by the Social Security Administration or employers. Respondent reports misstate the wealth older individuals will have in retirement, and the budget sets that eventually will

govern their decisions to retire. Although some of the errors are random, respondents are on the whole somewhat pessimistic. Most importantly, the misreports are extensive at the level of the individual.

These findings have implications both for researchers and policy makers who wish to determine whether preparations for retirement are adequate. They also have implications for those who wish to understand retirement and saving behavior, and for policy makers who would like to improve the information available to those approaching retirement, allowing them to better plan their retirement.

Implications for researchers who require imputed social security and pension values to determine the adequacy of retirement preparation.

When respondent reports differ from employer-provided plan descriptions, the researcher must address a number of issues. For some purposes, it may be possible to impute pension and social security benefit outcomes for those with missing records, e.g., to impute pension and social security wealth. We discuss the methodology for these imputations in the appendix to this paper. We report equations that relate pension and social security values estimated using linked employer provided pension or social security records to the values obtained from respondent reports, and to other independent variables. In addition, we will produce files for distribution to HRS users that contain the predicted values of these variables for all observations, including the observations for which linked data are available. This will make information from the linked data available to a wider group of researchers, including those who do not apply for or obtain permissions to use the linked data directly.²²

Implications for behavioral analyses of the retirement and saving decisions.

Our findings have implications for the specification of behavioral models of retirement and saving. Many people are approaching retirement age with a misunderstanding of both the wealth they will have in retirement and of the eligibility criteria for benefit receipt. Eventually as they approach retirement age they will learn what their social security and pensions are worth and when they are able to claim them, if only when they are on the door step of retirement. Behavioral models should be modified to determine the effects of learning and reoptimization as correct information is absorbed. Our findings suggest that models of retirement and saving that assume perfect foresight and planning are likely to misestimate the key parameters that supposedly drive retirement and saving behavior. The result will be a misunderstanding of how the provisions of pension and social security programs affect retirement and saving outcomes.

It will take a sophisticated model to isolate the effects of misinformation. Those who have undersaved because they initially overestimated the values of their pensions and social security may not be in a position to easily correct their errors. They may have to work longer, consume less once retired, or both. They will have a great deal of difficulty ramping up their savings if they are close to retirement. Those who find they have underestimated the value of the pensions or social security are in a position to correct their errors without substantial sacrifice, beyond the reduction in consumption they experienced in the runup to their retirement. Moreover, those who have misunderstood the date of early retirement, expecting it to be earlier than it actually is, will have a surplus of funds left to support their retirement by the time they reach the true age of eligibility under their retirement program; that is, if they do not also overstate the value of their pensions. Those who expected they would not be eligible for benefits until well after they in fact are eligible would in theory be in a position to retire at the plan's

retirement age, unless they have undersaved having expected a later retirement date. Thus not only are there asymmetries in terms of how respondents adjust to errors on the high and low sides, but outcomes will depend on how errors in expectations with regard to the timing of eligibility for retirement benefits are correlated with errors in expectations as to the levels of those expected benefits.

There also are more fundamental questions facing behavioral analysts. What is the source of the errors we have observed, and what are the implications of the particular reasons for these errors for saving and retirement behavior. Does misinformation affect the perceived budget set, the perceived risk associated with the budget set, or is poor information simply the result of a high time preference rate which makes the individual less forward looking?

One might argue that the errors in reported retirement dates and plan values are relatively modest at the aggregate level, and that they are random at the level of the individual, so they can be treated using standard approaches to measurement error. Even if one ignored the implications of the reporting error for behavioral modeling, it would be a mistake to ignore the implications for econometric estimation. In nonlinear retirement models, we have noted that the consequences for parameter estimates of these errors may be severe. If these errors are ignored in a retirement model, so that some seemingly retire before the measured date of eligibility for early retirement benefits, the investigator will conclude, mistakenly, that retirement is not responsive to economic rewards.

If information is imperfect because respondents are heavily discounting the future, this will raise questions about the efficacy of the life cycle model, in which the rewards from work to be realized in future periods, and consideration of future consumption, play such central roles in

shaping saving and labor market outcomes.

Implications for policy analysts and policy makers.

Our findings suggest there is much more work to be done before we can evaluate current programs and policies designed to increase the information of those planning for retirement. We need to know how the major errors in respondent reported plan features, eligibility dates for benefits, and benefit amounts enter into the retirement model. Different behavioral models of the role of misinformation imply very different reactions to various policies. If the rate of time preference is very high for those who are misinformed, and they are not paying attention because retirement is a few years away, then provision of general information programs is not going to be very effective. On the other hand, if there is genuine confusion about how much saving is required to finance an adequate replacement rate in retirement, these information programs may be much more effective.

Perhaps a continuous stream of general information on the need for retirement planning will make those who would not otherwise plan more sensitive to the need for earlier and systematic retirement planning. Currently, there is little information on the effectiveness of recent government efforts to educate workers about their pensions and social security. Employer financial education seems to be helpful. But we do not have enough systematic information about what causes the misinformation to have confidence in what types of educational programs might be most useful.

Once we have addressed fundamental questions about how imperfect information affects behavior, it will be possible to turn to more fundamental questions about the effectiveness of current policies.

Appendix

In this appendix, we ask the degree to which it is possible to predict pension and social security values, given the information available in the respondent interviews. We use the employer-provided pension records and Social Security Administrative data to calculate relatively good estimates of the true pension and social security values. We then attempt to explain these values using information from the respondent interviews, including respondent perceptions of pension amounts and earnings histories. In general, these results suggest that it is possible to predict pension and social security values fairly well based on the relationship between respondent reported outcomes and administrative or firm-provided data. The equations we estimate can then be used to predict pension and social security values for those in the HRS without an attached pension or social security record. The accompanying files we produce for HRS users can be used not just to impute pension and social security wealth levels for those without a matched record, but can also be used by researchers who require information on pension or social security wealth levels, but do not wish to or cannot obtain permission from the HRS to use restricted data.

A. Projecting Pensions from Linked Data for Those Without a Linked Employer Record

In this subsection, we focus on predicting pension values, given the information available in the respondent survey. One possible strategy would be to project defined benefit and defined contribution plans separately, using the respondent's estimate of the values of these plans plus other information gathered in the respondent interview. However, the approach is complicated by the fact that a substantial number of respondents are misinformed about the type of plan they have, as shown in Table 6. Therefore, we use an alternative strategy, which is to project the total

value of the pension, including both defined benefit and defined contribution components.

Appendix Table 3 tabulates the total pension values as calculated from plan documents vs. the total values calculated only from respondents' information. This table is limited to those respondents for whom the HRS obtained plan documents for the pensions. For defined contribution plans with voluntary contributions, the amounts calculated from the pension documents are reduced according to the coefficients in Table 17 to allow for the overstatement of respondent contributions because the contribution rate observed in 1992 is assumed to hold in all previous years. Another issue for both the values calculated from plan documents and the values calculated from the respondent interviews is that defined contribution amounts are accumulations as of the survey date, but defined benefit amounts are amounts expected at retirement. To put the two types of pensions on comparable footing, for defined benefit plans we multiply the amount expected at retirement by the fraction of years until retirement that have already been served before we add the two types of pensions to get the total pension value.

Note that unlike the previous tables, this one includes cases where the respondent told the survey that he or she had one type of pension but the plan documents indicated another type. The table looks reasonably symmetric around the main diagonal, as would be expected since we have eliminated systematic discrepancies between calculated values and reported accumulations for the defined contribution plans. However, there is a wide scatter, indicating that there remains a large difference between the amounts calculated from the plan documents and those reported by the respondents.

Appendix Table 4 reports on regressions to explain the values calculated from the plan descriptions, which are taken to be approximately correct.²³ In total there are six regressions.

The first four regressions use observations in which pension value estimates are available from both the provider and the respondent. The first and third of these regressions use only the value of the plan calculated from the survey questions as an explanatory variable. The second and fourth add additional explanatory variables. The second and fourth regressions use the preferred specification, and these results give some idea as to how much adding in the additional explanatory variables improves the fit of the regression. The fifth and sixth regressions explain the value of pensions obtained from provider plan descriptions, but pertain to observations where pension amounts are not available in the respondent survey. Since the final two regressions use only the observations for which the pension value cannot be calculated from the survey questions, it perforce does not include that value. From Table 13 we saw that respondents who did not report amounts for their pensions had, on average, lower values calculated from the plan documents than did respondents who did report a value. Hence, it would not be advisable to take a mechanical approach, applying a regression for those who did report pension values to impute pensions for those who did not report pension values without any further adjustment.

Equations 1 and 3 and equations 2 and 4 are related regressions. Because the distributions of pension values appear to be roughly loglinear, if regressions were run on the linear values computed from the plan documents vs. the linear values calculated from the survey questions, the regressions would give enormous weight to very high value pensions. To avoid this, we take the log of the pension values. However, this creates another problem, since some of the pensions, especially those calculated from the plan documents, have zero values. For the explanatory variable (the value calculated from the survey questions), we can take care of this by creating a binary variable which takes on a value of one if the pension value is zero. For the

dependent variable, it requires estimating the pension value in two steps. The first step is a probit for the probability that the pension value calculated from the plan documents will be zero. As might be expected, this probability declines rapidly as the pension value calculated from the survey questions increases. The second step is a regression of the log of the value from the plan documents on a set of explanatory variables, conditional on the value being positive. The probits are in equations 1, 2 and 5; the regressions are in the third, fourth and sixth equations.

For those who have positive employer-provided and respondent pensions, equation 3 suggests an elasticity of employer pension value with respect to reported respondent value of around .73. The R^2 for that equation is 0.63, suggesting that self reported plan value is associated with about two thirds of the variation in the plan value calculated from firm reports. Holding other plan features and job characteristics constant, equation 4 suggests an elasticity of firm reported plan values with respect to respondent values of .24, but that holds constant a number of plan characteristics that are associated with higher plan value. Thus equation 4 should be used to predict pension values, but a great deal of care should be exercised in attempting to interpret any particular coefficients.

B. Comparing Earnings From Respondent Reports and Linked Earnings Histories

Next we ask how well we can impute the value of social security benefits from the information in the respondent questionnaire. Again there are two approaches to calculating the value of benefits from the questionnaire. One is to use the information about the date the respondent expects to receive benefits and the amount of benefits expected, and to use this information to calculate the present value of benefits. This approach has the drawback that only a quarter of respondents are willing to provide an amount and know the amount to within about

\$1,000 per year of the true value of benefits. A more indirect approach, but one which yields considerably better results, is to impute an earnings history based on the information in the respondent questionnaire, and to calculate benefits based on the imputed earnings history. This has the advantage that a rough earnings history can be estimated for most of the sample, and the estimates are usually fairly close as compared to using the respondent's estimates of expected social security amounts.

Appendix Tables 5 and 6 report the relations between the present values of own benefits as computed from respondent earnings reports and those obtained from the Social Security Administration. Overall, the present value of own benefits is seen in Appendix Table 5 to be 5.9 percent too high when computed from respondent reported earnings. For men the lifetime benefits are about 1.2 percent too high when computed from respondent earnings histories, and for women they are 13.6 percent too high. From Appendix Table 6, we find that 68 percent of the observations are within one cell of the main diagonal (6428/9472), and that the observations along the main diagonal account for 34 percent of the observations (3251/9472).

Rather than estimate an equation for the present value of benefits, however, we estimate equations for the Average Indexed Monthly Earnings (AIME) on which benefits are based. We do this for several reasons. First, benefits are a non-linear function of the AIME, and it is probably better to estimate the relation before the transformation. Secondly, the AIME is frequently of interest in its own right, since it is roughly proportional to lifetime covered earnings. Finally, the AIME provides the means to calculate family social security benefits, which are often more than simply the sum of the values of the benefits of the two spouses on the basis of their own earnings records.

Appendix Table 7 reports coefficients for equations that relate the AIME on an annual basis, computed from the social security earnings record, to the value imputed on the basis of variables that are available in the survey. When separate equations are estimated for men and women, the regression accounts for 60 percent of the variance in annualized AIME for men, and 66 percent of the variance for women. Since this equation is meant for prediction, rather than for analytical purposes, it includes a number of different measures of earnings and benefits, including the AIME implied by the respondent's expected social security benefits. Consequently, the coefficients on particular variables are not readily interpretable.

Appendix Table 8 summarizes the distributions of AIME based on social security records vs. respondent reports of earnings histories for the 9472 respondents for whom HRS has a matched earnings record.²⁴ The data in the table are AIME computed on an annual basis, i.e., AIME multiplied by 12. Using respondent reports, including earnings on the current or last job in 1992, at the start of the current or last job, in a previous job, in past pension covered jobs, and incorporating information from wave 3 on the age the respondent initially entered the labor force, years of full time work, and years of covered work, the computed AIME amounts overestimate the true amounts by about 9.5 percent overall, by about 3.5 percent for men, and by about 23 percent for women. The last column in Appendix Table 8 first orders the differences, then presents the results for different parts of the distribution. Thus the median of the differences is not equal to the difference of the medians. When the differences are ordered from low to high, however, the median difference is greatly reduced.

Appendix Table 9 displays the joint distribution of the Average Indexed Monthly Earnings on a yearly basis. The dispersion is considerably narrower than the dispersion of

pension values. In this table there are a total of 9472 observations; of those, 7303, or 77 percent, fall within one cell of the diagonal, and 4066 observations, or 43 percent of the observations fall exactly on the diagonal. The correlation of these two amounts is 0.82.

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Table 1: Probit For Probability Permission Was Given in Wave 1 to Match the Social Security Earnings Record

Independent Variable	Partial Effect	z
Gender: Female	0.000	0.01
Marital Status: Single	-0.034	-2.94
Children: None	-0.018	-0.99
Not known	-0.173	-4.81
Race: Black	-0.028	-2.26
Hispanic	-0.061	-3.96
Education: High school drop out	0.014	1.22
Some college	-0.021	-1.69
College graduate	-0.028	-1.70
Some graduate school	-0.041	-2.50
Home owner	-0.008	-0.56
Assets: \$0 to 10K	0.075	4.02
\$10K to 25 K	0.072	3.64
\$25 K to 100K	0.035	2.99
\$250K to 1000K	-0.038	-3.00
\$1000+K	-0.010	-0.44
Not known	-0.190	-4.12
Retirement horizon: <2 years	-0.001	-0.08
2 to 4 years	0.006	0.33
10+ years	0.001	0.09
Never	-0.040	-2.29
Not applicable	-0.042	-2.21
Not asked from proxy	-0.540	-23.64
Not known	-0.047	-2.70
Firm size: 0 to 4 employees	0.021	1.04
5 to 14 employees	0.008	0.38
15 to 24 employees	0.012	0.38
25 to 99 employees	0.039	1.88
500+ employees	0.029	2.01
Not known	-0.013	-0.54
Industry: Nonmanufacturing	-0.002	-0.17
Not known	-0.035	-0.62
Occupation: Management	-0.010	-0.89
White collar	-0.015	-1.19
Not known	-0.172	-1.84
Union member: Yes	0.020	1.49
Not known	0.054	2.38
Annual earnings: \$0 to 15K	-0.015	-0.74
\$15 to 30K	-0.029	-1.51
\$30 to 50K	-0.036	-1.90
\$100+K	-0.035	-0.96
Not known	-0.069	-2.02
Pension covered: Yes	-0.009	-0.76
Not known	0.184	1.95
Number of Observations, 12,652	Log Likelihood, -7158.599	Pseudo R2, 0.0652

Source: Authors' calculations.

Table 2: Probit for Probability There Is a Matched Pension Provider Survey

Independent Variable	All Pensions		Current Job Pension		Last Job Pension		Previous Job Pension	
	Partial Effects	z	Partial Effects	z	Partial Effects	z	Partial Effects	z
Gender: Female	0.010	0.75	0.010	0.54	0.073	2.08	-0.011	-0.49
Marital Status: Single	-0.023	-1.40	-0.018	-0.87	-0.044	-1.03	-0.036	-1.30
Children: None	0.014	0.54	0.004	0.11	0.015	0.24	0.051	1.29
Not known	-0.032	-0.66	-0.100	-1.62	-0.071	-0.61	0.093	1.18
Race: Black	0.053	3.10	0.000	0.01	0.107	2.68	0.103	3.54
Hispanic	-0.020	-0.78	-0.041	-1.26	-0.123	-1.89	0.053	1.15
Education: High school drop out	-0.076	-4.51	-0.034	-1.53	-0.114	-3.24	-0.102	-3.43
Some college	0.033	2.06	0.007	0.33	0.070	1.67	0.046	1.75
College graduate	0.082	3.89	0.087	3.04	0.133	2.28	0.042	1.30
Some graduate school	0.097	4.72	0.120	4.37	0.174	2.76	0.042	1.28
Home owner	0.050	2.35	0.018	0.63	0.133	2.46	0.055	1.61
Assets: \$0 to 10K	0.030	1.13	0.018	0.50	0.113	1.68	0.017	0.39
\$10K to 25 K	-0.009	-0.32	-0.021	-0.57	-0.022	-0.31	0.030	0.65
\$25 K to 100K	-0.001	-0.08	0.017	0.87	-0.031	-0.81	-0.004	-0.17
\$250K to 1000K	-0.005	-0.28	0.026	1.16	-0.049	-1.22	-0.010	-0.36
\$1000+K	-0.114	-3.18	-0.106	-2.08	-0.116	-1.34	-0.113	-2.07
Not known	-0.051	-0.65	0.060	0.60	0.157	0.66	-0.338	-1.94
Retirement horizon <2 years	0.062	3.45	0.010	0.30	0.136	1.62	0.136	4.66
2 to 4 years	0.036	1.68	0.043	1.77	0.075	0.52	0.024	0.60
10+ years	-0.019	-1.12	-0.013	-0.65	0.142	1.42	-0.026	-0.86
Never	-0.037	-1.38	-0.040	-1.20	0.049	0.37	-0.011	-0.27
Not applicable	0.005	0.12	-0.042	-1.14	0.130	1.37	-0.009	-0.12
Not asked from proxy	-0.012	-0.39	0.005	0.15	0.129	1.19	0.042	0.82
Not known	-0.013	-0.49	-0.027	-0.69	-0.119	-0.95	0.010	0.24
Tenure: 0 to 1 years	0.013	0.37	-0.027	-0.69	0.029	0.35	-0.197	-1.20
2 to 4	0.024	0.99	-0.039	-1.36	0.083	1.27	0.089	1.50
10+	0.058	3.81	0.016	0.74	0.058	1.23	0.077	3.40
Not known	-0.138	-1.16	-0.333	-1.51	-0.124	-0.50	0.029	0.14
Firm size: 5 to 14 employees	-0.409	-9.05	-0.391	-8.33	-0.421	-4.08	n.a.	n.a.
15 to 24 employees	-0.254	-4.74	-0.283	-4.86	-0.165	-1.51	n.a.	n.a.
25 to 99 employees	-0.238	-8.86	-0.248	-8.63	-0.193	-3.43	n.a.	n.a.
500+ employees	0.014	0.88	0.012	0.68	0.025	0.75	n.a.	n.a.

Independent Variable	All Pensions	Current Job Pension	Last Job Pension	Previous Job Pension
Not known	-0.221	-0.227	-0.074	n.a.
Industry: Nonmanufacturing	-3.98	3.98	0.055	0.069
Not known	5.57	0.088	0.055	0.069
Occupation: Management	0.46	0.043	-0.090	0.071
White collar	-7.09	-0.047	-0.141	-0.141
Not known	-0.75	-0.031	-0.075	0.040
Union member: Yes	-2.08	-0.062	-0.075	-0.362
Not known	0.38	0.044	-0.007	n.a.
annual earnings: \$0 to 15K	-2.13	-0.169	0.235	n.a.
\$15 to 30K	0.77	0.062	-0.109	0.051
\$30 to 50K	-0.28	0.025	-0.105	0.007
\$100+K	-0.03	0.028	-0.125	0.051
Not known	-5.35	-0.285	-0.347	-0.281
Play type: DC plan	-1.04	-0.047	0.224	-0.179
Combination plan	-5.96	-0.190	-0.074	-0.165
Not known	-1.67	-0.055	0.131	-0.072
DB plan: annual benefits \$0 to 2K	-5.16	-0.189	-0.070	0.016
\$2 to 5K	-3.44	-0.073	-0.151	-0.037
\$10 to 25K	-2.35	-0.087	-0.074	-0.009
\$25+K	4.35	0.026	0.080	0.209
Not known	4.54	0.152	-0.027	0.203
DC plan: \$0-10K in account	0.19	-0.016	-0.078	-0.191
\$10-25K in account	1.70	0.085	-0.093	0.032
\$100-250K in account	2.29	0.073	0.141	-0.012
\$250+K in account	1.88	0.084	-0.033	0.150
Amount not known	2.15	0.132	0.199	0.134
	1.96	0.064	-0.079	0.056
No. Of Obs.	8682	4448	1384	2839
Pseudo R2	0.1574	0.1164	0.1355	0.1221
Log Likelihood	-5031.335	-2539.922	-772.28188	-1606.1744

Source: Authors' calculations.

Table 3: Sample Sizes by Table

Table Number and Characteristics of Sample	Number in Sample
Table 1. Number of total HRS respondents in wave 1.	12,652
Table 2. Respondents reporting coverage by a pension.	8,682
Table 2. Respondents reporting coverage by a pension on current job.	4,448
Table 2. Respondents reporting coverage by a pension on last job if no current job.	1,384
Table 2. Respondents reporting coverage by a pension on previous job.	2,839
Table 4. Financial respondents with matched social security records who were asked to project their social security benefits	3,443
Table 5. Respondents reporting whether covered by a pension in both 1992 and 1994	3,138
Table 6. Respondents reporting pension coverage on current job with a matched employer plan description.	2,907
Tables 7, 8, 10 and 13. Respondents reporting defined benefit coverage on current job, with plan description reporting defined benefit coverage	1,881
Table 9. Respondents reporting defined benefit coverage on current job, with plan description reporting defined benefit coverage who intend to retire by 1995.	371
Table 11. Those with DB plans reporting voluntary contributions.	873
Table 12. Those where respondent and firm report DB plans, and expected benefit amounts.	1,122
Table 14. Respondents who report a DC pension on current job as does their matched pension plan description.	916
Table 12, Table 16. Respondents who report a DC pension on current job as does their matched pension plan description, and who also report amounts in account.	641
Table 15. Respondents who report a DC pension on current job as does their matched pension plan description, where the plan has no voluntary contributions.	188
Table 17. Respondents who correctly report a DC pension on their current job and also report amounts, who had voluntary contributions, and whose calculated balance was positive.	467
Tables 18 and 19. Respondents with planned retirement dates.	6,539

Source: Authors' calculations.

Table 4
 Distribution of Social Security Benefits Based on Respondent Reports and SSA Records
 (in Thousands of 1992 Dollars)

Respondent Report	Social Security Records														Total
	0.0-1.5	1.5-3.0	3.0-4.5	4.5-6.0	6.0-7.5	7.5-9.0	9.0-10.5	10.5-12.0	12.0-13.5	13.5-15.0	15.0+				
0.0-1.5	5	4	5	3	2	2	3	3	3	3	1	1	0	31	
1.5-3.0	9	18	16	9	6	1	3	4	0	0	1	0	0	67	
3.0-4.5	13	9	25	20	14	9	7	3	2	2	2	4	4	108	
4.5-6.0	14	14	35	56	49	29	30	12	6	1	1	1	1	247	
6.0-7.5	3	2	9	21	39	38	24	8	12	1	1	1	1	158	
7.5-9.0	0	2	9	19	27	49	54	21	6	9	5	5	5	201	
9.0-10.5	0	2	4	16	23	26	109	56	26	17	2	2	2	281	
10.5-12.0	1	1	2	7	8	32	61	60	34	21	7	7	7	234	
12.0-13.5	0	0	0	0	1	1	5	6	2	6	0	0	0	21	
13.5-15.0	0	0	0	0	1	7	11	15	10	18	7	7	7	69	
15.0+	1	0	1	1	3	6	10	16	13	14	2	2	2	67	
Total Providing a Value	46	52	106	152	173	200	317	204	114	91	29	29	29	1484	
Don't Know	151	137	208	266	262	242	232	206	119	83	53	53	53	1959	
Total Including Don't Know	197	189	314	418	435	442	549	410	233	174	82	82	82	3443	
Fraction Providing a Value	0.234	0.275	0.338	0.363	0.398	0.452	0.577	0.498	0.489	0.523	0.354	0.354	0.354	0.431	

Source: Authors' calculations.

Table 5: Pensions Over Time In The Same Job

		1994 Observation	
		No Pension	Pension
1992 Observation	No Pension	1075	271
	Pension	73	3138

Source: Authors' calculations.

Table 6: Pension Plan Type as Reported by the Respondent and the Firm, for Current Job Held in 1992, Including Only Those Respondents with a Matched Pension Plan

6A: Self Reported vs. Firm Provided Plan Types

Self Reported					
Provider Report	DB	DC	Both	DK	Total
DB	777	213	380	22	1392
DC	160	327	111	10	608
Both	409	163	315	20	907
Total	1346	703	806	52	2907

6B: Percentages with Self Reported vs. Firm Provided Plan Types

Self Reported					
Provider Report	DB	DC	Both	DK	Total
	%	%	%	%	%
DB	27	7	13	1	48
DC	6	11	4	0	21
Both	14	6	11	1	31
Total	46	24	28	2	100

6C: Percentages with Self Reported Plan Type Conditional on Firm Report of Plan Type (Percent of Row Total)

Self Reported					
Provider Report	DB	DC	Both	DK	Total
	%	%	%	%	%
DB	56	15	27	2	100
DC	26	54	18	2	100
Both	45	18	35	2	100
Total	46	24	28	2	100

6D: Percentage with Firm Reported Plan Type Conditional on Respondent Report of Plan Type (Percent of Column Total)

Self Reported					
Provider Report	DB	DC	Both	DK	Total
	%	%	%	%	%
DB	58	30	47	42	48
DC	12	47	14	19	21
Both	30	23	39	39	31
Total	100	100	100	100	100

Table 7: Self Reported vs. Firm Provider Reported Dates of Normal Retirement for Plans Reported as Defined Benefit by Both the Respondent and the Firm

Provider Reported	Self Reported																			Total
	<50	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	>65	DK	
<50	1	1	2	2	2	6	1	1	1	1	3	5	1	1	2	1	1	1	22	
50		7				6	1	1		5	7	2						5	41	
51			1			1				1	1	2						1	8	
52	1	1	1	1		2		1		2	2	1						1	13	
53				4	1	5		1		1	1	2						1	16	
54	1			1	1	3	1			1	1	5						1	13	
55	4	2	1	1	2	81	2	3	3	1	3	15	13	2	2	2	13	2	146	
56						9	3	1	1	1	3	3	3	3	1	3	3	2	26	
57						13	4	7	2	2	2	2	1	1	1	4	4	1	37	
58						8	2	5	4	1	1	5	6	5	1	6	6	2	38	
59	1			1	1	11	3	3	4	3	4	3	1	3	1	4	4	3	39	
60	1	2	1	1	4	63	6	9	5	15	69	6	6	67	7	2	50	26	343	
61						4	1	1	5	13	13	2	2	5	7	2	5	2	35	
62	5	2	1	3	2	19	4	5	7	8	13	10	10	95	10	4	68	16	293	
63						2		1	1	1	1	1	5	5	1	1	3	1	19	
64						3		2	2	1	1	1	1	1	2	1	2	1	17	
65	5	2	2	4	3	74	3	12	15	21	41	7	7	188	6	7	287	17	739	
>65														3	1	4	4	6	17	
DK	1							1	1	1	1	1	1	6	1	1	6	1	19	
Total	20	19	8	17	14	310	27	49	44	56	166	25	415	31	21	466	58	123	1881	

Source: Authors' calculations.

Table 8: Self Reported vs. Firm Provider Reported Dates of Early Retirement for Plans Reported as Defined Benefit by Both the Respondent and the Firm

Provider Reported	Self Reported																			Total	
	<50	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	>65	DK		
<50	19	5	5	3	5	2	54	1	2	2	7	23	1	2						7	138
50	7	24	6	3	4	1	65	3	4	4	8	14	1	1						17	168
51	3	6		2	1		5	1	2	2	3	5		1						3	36
52	1	3	2				11		1	1	7	1								4	31
53	2		1	8	1		9		2	2	3	1	1	1						2	32
54				3	1	2	8		1	1	5	4		1						3	31
55	15	11	4	6	9	12	314	22	22	22	37	160	4	46	7				43	769	
56	3	2	2	2			20	2	2	1	6	9	1	5	2				4	62	
57	3		1	1			11	4		3	6	9	2	1					7	53	
58		1				1	6	1	8	6	3	9	1	3	3				4	46	
59	1					2	11		3	4	3	6		5					6	52	
60	9	5	1	3	1	6	26	8	4	7	8	68	2	17	1				25	236	
61		1					4	1	1	1	7	7	4	1					2	29	
62	2	1			1		13	1	3	3	7	28	3	11	1				7	88	
63							1				1	6	2	2	2			2	1	13	
64	1						1		1		1	8	2	1					3	18	
65							2				2	21	4	8	1				8	44	
>65							1	2			1	3	1	5	1				3	17	
DK							1	1	2	2	1	8		2	1				3	18	
Total	66	59	20	31	25	26	562	48	52	58	61	390	20	111	15	152	22	390	152	1881	

Source: Authors' calculations.

Table 9: Self Reported vs. Firm Provider Reported Dates of Early Retirement for Plans Reported as Defined Benefit by Both the Respondent and the Firm, Including Only Observations Of Wave 1 Respondents Who Plan to Retire By 1995

Provider Reported	Self Reported																				Total
	<50	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	>65	DK		
<50	6	2	1	2	1	17	1					3		5					2	40	
50	1	5		1	2	17		2	1			2		1		1			2	36	
51	1	3				2						1		2					1	10	
52		1				4		1				1							2	10	
53			1			3				1		1							1	8	
54						4				1		3								8	
55	4	3	1	2	3	57	2	5	1	5	10	1	1	27	2	1	4	1	5	135	
56	1	1				9				2	2		2	1	1					15	
57	2					2	1						2	1	1				1	10	
58						2	1	3	1		1			1					1	10	
59					1	1					1								1	4	
60	1	1		2		8		1		2	10			10	1	3			3	45	
61						2					3			1					1	7	
62						2		1		1			1	6		1			1	13	
63											1			2	1					4	
64						1					1			1						3	
65						1								4	1	1	1		3	10	
>65											1			1						2	
DK														1				1		1	
Total	16	16	4	6	7	6	132	5	13	3	11	41	4	62	6	3	9	3	24	371	

Source: Authors' calculations.

Table 10: Self-Reported vs. Provider Annual Early Retirement Reduction Rates, for Plans Reported as Defined Benefit by Both the Respondent and the Firm

Provider Reported	Self Reported											Total
	0-1%	1-2%	2-3%	3-4%	4-5%	5-6%	6-7%	7-8%	8-10%	>10%	DK/NA	
0-1%	1	9	4	6	1	4	4			5	102	136
1-2%	5	3	3	2	2	4	4	4	1	6	83	117
2-3%	1	3	2	5		8	2	6		4	97	128
3-4%	2	2	4	7		10	3	2	1	3	123	157
4-5%	3	7	4	5	3	5	4	4	2	9	191	237
5-6%	4	1	3	1	1	6	4	2		7	102	131
6-7%				1		1			1		47	50
7-8%		1		1					1		27	30
8-10%	2			2		2	1		1	2	31	41
>10%		1		1		2	3			3	62	72
NA	7	28	14	20	2	16	7	9	6	26	647	782
Total	25	55	34	51	9	58	32	27	13	65	1512	1881

Source: Authors' calculations.

Table 11: Self-Reported vs. Provider Voluntary Contributions

Provider Report	Self Reported		
	No	Yes	Total
No	121	57	178
Yes	303	392	695
Total	424	449	873

Source: Authors' calculations.

Table 12: Distribution of Pension Values for Current Jobs Held at Time of the Survey (\$1992)

	Defined Benefit Plans		Defined Contribution Plans	
	Respondent Reported	Provider Reported	Respondent Reported	Provider Reported
Percentile				
95	385,497	523,704	200,000	347,265
90	311,775	387,276	128,322	223,951
75	211,733	227,373	45,000	100,030
50	116,327	112,380	15,000	29,067
25	48,084	49,767	4,500	6,093
10	16,805	24,223	1,200	750
5	9,231	11,252	400	0
Mean Values	148,015	168,405	59,105	85,790
Number of Observations	1,122		641	

Source: Authors' calculations. Columns 1 and 2 are present values as of the date of expected retirement, discounted to 1992. They are not prorated to allow comparisons between individual and firm reports of DB plan values, as the individual reports were as of the date of expected retirement. The DB and DC amounts in this table are not comparable since the DC amounts are account balances as of 1992, and do not include future contributions.

Table 13: Self Reported Vs. Provider Reported Amounts Accumulated in Defined Benefit Plans

Provider Reported	Self Reported											DK	Total
	0	0-5K	5-10K	10-20K	20-50K	50-100K	100-200K	200-500K	500-1M	>1M			
0	6	3	3	3	5	4	6	5	1			157	190
0K-5K		2		1	1			1				7	12
5K-10K	3	2		2	1	1	3	2				6	20
10K-20K	5	13	7	3	6	3	3	1				42	80
20K-50K	3	19	31	38	65	25	9	1				133	324
50K-100K	2	3	8	91	51	55	14					141	365
100K-200K	1	5	3	63	21	131	62	1				113	401
200K-500K			6	16	7	84	147	2				63	325
500K-1M	1			3	3	5	43	7	2			6	67
> 1M							2	2					4
DK	1	22	47	61	165	218	314	287	14	2		82	93
Total	1	22	47	61	165	218	314	287	14	2		750	1881

Source: Authors' calculations.

Table 14: Self Reported Vs. Provider Reported Amounts Accumulated in Defined Contribution Plans

Provider Reported	Self Reported											DK	Total		
	0	0-5K	5-10K	10-20K	20-50K	50-100K	100-200K	200-500K	500-1M	>1M					
0	2	28	8	9	6	4	2						38	97	
0K-5K	1	58	14	7	5	1	1							25	112
5K-10K		22	13	5	2	1		1						12	56
10K-20K	1	18	22	23	13	3	2							26	108
20K-50K	1	18	19	21	37	10	2	1						31	142
50K-100K		9	12	13	27	18	15	3						35	132
100K-200K		5	5	11	27	16	12	6	2	1				21	106
200K-500K		1	1	3	14	15	14	14	2	3				12	79
500K-1M						1		4						1	6
> 1M			1			1		1							4
DK		4	1	4	11	3								51	74
Total	5	163	96	96	142	73	48	31	6	4	252	916			

Source: Authors' calculations.

Table 15: Self Reported Vs. Provider Reported Amounts Accumulated in Defined Contribution Plans for Plans without Voluntary Contributions

Provider Reported	Self Reported												Total
	0	0-5K	5-10K	10-20K	20-50K	50-100K	100-200K	200-500K	500-1M	>1M	DK	Total	
0	1	10	3	1	1	1							28
0K-5K		15	4	2	2	1	1						34
5K-10K		4	4	3	1	1							15
10K-20K		4	2	6	5	2	2						27
20K-50K		3	4		8	2	2	2	1				30
50K-100K		2		2	2	3	2	2					27
100K-200K		2	1		3	1	1	2	1	1			16
200K-500K					1	1		1		2			5
500K-1M													
> 1M													
DK				1	1								4
Total	1	40	18	15	24	12	12	7	2	3	54	188	

Source: Authors' calculations.

Table 16: Reported Accumulations and Calculated Values of Defined Contribution Pensions

	Calculated Value of Pension								
	0-5K	5-10K	10-20K	20-50K	50-100K	100-200K	200-500K	500K-1M	>1M
	Pensions Without Voluntary Contributions								
Median Accumulation Reported By Respondents	1,900	7,000	14,000	24,850	92,000	40,000	400,000	-	-
Median Value Calculated from Pension Documents	1,207	7,668	15,924	27,972	67,050	142,295	287,970	-	-
Number of Observations	42	13	21	22	17	12	5		
	Pensions With Voluntary Contributions								
Median Accumulation Reported By Respondents	3,375	4,200	7,000	15,000	30,000	37,500	94,500	206,000	201,750
Median Value Calculated from Pension Documents	1,146	6,945	15,090	30,389	69,141	131,885	292,690	550,933	1,151,112
Number of Observations	104	31	61	89	80	73	62	5	4

Source: Authors' calculations.

Table 17: Median Regression for the Over Prediction of Pension Values Calculated from Plan Documents

Defined Contribution Plans with Voluntary Contributions

Dependent variable is the ratio of the value of the pension calculated from plan documents to the accumulation reported by the respondent.		
Explanatory Variables:	Coefficient	t-statistic
Constant	3.1822	3.56
ln (pension value calculated from plan documents)	-0.4200	2.39
[ln (pension value calculated from plan documents)] ²	0.0152	1.77
Number of Observations	467	

Source: Authors' calculations.

Table 18
Effect of Pension and Social Security Knowledge on Accuracy of Retirement Expectations

	Planned Retirement						Number of Observations
	Before Last Survey		After Last Survey		Don't Know		
	Before	After	Before	After	Before	After	
Actual Retirement (Relative to Last Survey)	18.0%	10.7%	13.8%	46.0%	3.9%	7.6%	6539
All Respondents							
Social Security Benefits (Expected / Actual)							
Less than 75%	12.5	7.5	12.9	61.3	0.7	5.1	296
75-125%	24.8	13.5	12.5	42.4	2.6	4.1	847
More than 125%	20.6	14.9	13.2	41.5	3.0	6.8	341
Don't Know	14.3	9.7	14.4	47.8	5.0	8.7	1959
Knowledge of DB Pension							
Correct	25.5	13.5	10.4	44.5	1.3	4.7	1754
Incorrect or Don't Know	20.8	12.3	13.6	47.8	1.9	3.6	536
Pension Benefits (Expected / Actual)							
Less than 75%	26.6	13.2	11.8	44.2	0.9	3.3	567
75-125%	29.4	17.3	8.8	40.5	0.5	3.4	341
More than 125%	26.1	17.7	9.5	43.8	1.4	1.5	383
Don't Know	20.6	10.0	12.6	48.2	2.2	6.4	971

Notes: Social Security and pension observations are restricted to those with matched social security or employer provided records.
Source: Authors' calculations.

Table 19
 Median Ratios of Wealth to Lifetime Earnings
 (Excluding Pension and Social Security Wealth)

	Planned Retirement				Number of Observations
	Before Last Survey	After Last Survey	Never	Don't Know	
All Respondents	0.19	0.15	0.18	0.19	6539
Social Security Benefits (Expected / Actual)					
Less than 75%	0.17	0.13	0.14	0.23	296
75-125%	0.15	0.13	0.17	0.16	847
More than 125%	0.17	0.17	0.26	0.21	341
Don't Know	0.15	0.13	0.16	0.13	1959
Knowledge of DB Pension					
Correct	0.17	0.14	0.13	0.15	1754
Incorrect or Don't Know	0.18	0.16	0.14	0.06	536
Pension Benefits (Expected / Actual)					
Less than 75%	0.19	0.18	0.09	0.14	567
75-125%	0.13	0.14	0.13	0.09	341
More than 125%	0.18	0.14	0.40	0.14	383
Don't Know	0.17	0.15	0.13	0.13	971

Source: Authors' calculations.

Appendix Tables

Appendix Table 1: Matching Rates of Social Security Records and Pension Plan Descriptions With Respondent Records

	Matching Rates for Social Security Records	Number of Total Observations	Matching Rates for Pension Plan Descriptions	Number of Observations
Gender				
Men	71.1	[5867]	55.5	[4972]
Women	72.2	[6785]	54.6	[3710]
Combined	71.6	[12652]	55.2	[8682]
Age				
<= 50	73.7	[1595]	60.7	[971]
51-61	71.3	[9742]	54.7	[6951]
>= 62	72.4	[1315]	57.7	[1008]
Marital Status				
Married	72.4	[9896]	56	[6997]
Single	70.1	[2756]	53.4	[1685]
Parents				
Yes	72.2	[11743]	55	[8003]
No	68.3	[754]	57.9	[547]
Race				
White	71.8	[9415]	54.7	[6870]
Black	71.7	[2064]	62.7	[1360]
Hispanic	69	[1173]	48.4	[452]
Education				
< HS	73.4	[3696]	47.6	[1675]
HS Grad	74.1	[4424]	54.5	[3064]
Some Coll	69.4	[2320]	55.7	[1812]
Coll Grad	68.6	[1040]	56.3	[951]
Grad Sch	66.7	[1172]	62.4	[1180]
Residence Status				
Homeowner	71.1	[10205]	56.2	[7517]
Renter	73.3	[2447]	49.6	[1165]
Assets				
< 10K	75.8	[1949]	49.9	[781]
10-25K	77.5	[812]	51.8	[447]
25-100K	74.6	[3565]	56	[2571]
100-250K	70.8	[3304]	57.7	[2744]
250K-1M	65.2	[2393]	57.5	[1809]
1M+	63.9	[534]	33.1	[280]
Retirement Horizon				
< 2 Yrs	73.5	[2939]	62.7	[2146]
2 to 4 years	74.2	[1040]	61.6	[972]
4 to 9 years	74.5	[2071]	55.6	[1794]
10+	74.1	[2396]	50.1	[2077]

	Matching Rates for Social Security Records	Number of Total Observations	Matching Rates for Pension Plan Descriptions	Number of Observations
Never Retire	71.1	[1069]	45.5	[549]
Self Employed				
Yes	67.9	[1564]	0	[184]
No	72.8	[10022]	56.8	[8498]
Combined	72.1	[11586]	55.2	[8682]
Tenure with Firm				
< 2 Years	72.6	[578]	51.7	[269]
2 to 4 Years	71.2	[775]	52.5	[657]
5 to 9 Years	73.8	[2286]	41.7	[1825]
10+ Years	71.7	[7944]	60	[5894]
Size of Firm				
< 5	71	[805]	17	[90]
5-14	72.4	[609]	25.3	[163]
15-24	65.4	[242]	45.4	[97]
25-99	74.6	[611]	40.3	[432]
100-499	75.2	[750]	56.5	[710]
500+	72.7	[1634]	73.9	[1784]
Industry				
Manufacturing	74.7	[2520]	49.5	[2318]
Other	71.5	[8971]	57.5	[6283]
Occupation				
Mgmt/Prof	69.2	[3318]	57	[3006]
White Collar	70.7	[2871]	52.6	[2113]
Blue Collar	75.4	[5356]	55.2	[3528]
Union Status				
Union	72.1	[2122]	70.1	[2253]
Nonunion	71.9	[5448]	62.1	[3576]
Annual Earnings				
< 15K	74.4	[4630]	44.2	[2427]
15-30K	71.9	[3519]	54.6	[3169]
30-50K	70.3	[2089]	63.5	[2069]
50-100K	72.4	[879]	67.2	[810]
100K+	63.5	[191]	30.4	[128]
Pension				
Yes	72.6	[5056]		
No	71.8	[6530]		

The observations in this table use the HRS survey weights. Percentages in column 2 are for permissions as reported in V136, wave 1. Job characteristics in column 1 are for the longest job. Calculations for columns 3 and 4 include only jobs offering pensions. Numbers in brackets are the observations over which the percentage is taken. Percentages are weighted averages. Source: Authors' calculations.

Appendix Table 2: Matched Pension Plans by Type of Pension and Pension Value

Respondent Reported Pension Characteristic	Matching Rates for Pension Plan Descriptions	Number of Observations
Pension Type		
Defined Benefit	59.1	[4528]
Defined Contrib	40.8	[2446]
Combination	69.2	[1368]
DB Annual Benefit		
< 2K	41.8	[664]
2-5K	49.8	[663]
5-10K	61.4	[794]
10-25K	71.6	[1475]
25K+	76.9	[642]
DC Account Value		
< 10K	46.9	[1258]
10-25K	58.9	[627]
25-100K	54.5	[641]
100-250K	68.1	[184]
250K+	52.0	[86]

Source: Authors' calculations. The observations in this table use the HRS survey weights.

Appendix Table 3: Pension Value As Calculated From Plan Documents Vs. Pension Value As Calculated From Respondent Reports, All Plans

Provider Reported	Self Reported											Total
	0	0-5K	5-10K	10-20K	20-50K	50-100K	100-200K	200-500K	500-1M	>1M	DK	
0	5	67	30	35	31	14	11	4	2	0	295	494
0K-5K	1	77	20	7	11	1	2	1	0	0	88	208
5K-10K	0	26	24	22	14	2	5	0	0	0	81	174
10K-20K	1	20	26	43	49	18	4	2	0	0	98	261
20K-50K	0	11	12	38	92	61	31	14	2	0	176	437
50K-100K	0	3	4	9	39	90	72	21	2	0	163	403
100K-200K	0	1	5	2	15	59	121	56	4	2	111	376
200K-500K	0	1	0	4	4	15	67	128	9	1	53	282
500K-1M	0	0	0	0	2	0	3	26	6	2	6	45
>1M	0	0	0	0	0	0	0	2	2	1	0	5
DK	1	4	2	2	10	4	3	1	0	0	143	170
Total	8	210	123	162	267	264	319	255	27	6	1214	2855

Source: Authors' calculations.

Appendix Table 4: Regression of Provider Total Pensions on Self-Reported Pensions Plus Other Variables

Dependent Variable: Sample: Self-Reported Values Provider Values	Binary Variable for Provider Pension = 0		In Provider Pension Positive Values Only		Binary Variable for Provider Pension = 0		In Provider Pension Positive Values Only		Binary Variable for Provider Pension = 0		In Provider Pension Positive Values Only	
	Coefficient	z	Coefficient	t	Coefficient	z	Coefficient	t	Coefficient	z	Coefficient	t
Independent Variables:												
Constant	1.852	7.61	1.908	17.52	2.882	1.17	2.882	17.52	0.506	2.580	2.580	1.29
Respondent reports zero pension value	-1.558	-3.63	-0.165	14.30	6.275	-0.31	6.275	14.30	2.089			5.85
In of value respondent reports	-0.300	-12.30	-0.133	48.89	0.735	-3.16	0.735	48.89	0.239			11.82
Current age			0.002			0.16			0.064	-0.004		-0.34
Age at hire			0.003			0.45			-0.059	0.026		4.08
Age expects benefits to begin			0.023			1.12			-0.030	-0.046		-2.27
Age benefit expected missing									-0.468	-0.468		-0.37
Respondent has only dc plan			2.151			1.67			-2.763	0.313		0.23
Respondent has db and dc, or combination plan			-0.289			-1.25			-0.263	-0.432		-1.80
Early retirement age, db plan, =0 for DC plan			0.017			0.84			0.003	0.020		1.06
Respondent reports can collect benefits at any age									-0.004			0.01
Early retirement age missing			0.882			0.72			0.102	1.403		1.23
Normal retirement age, db plan, =0 for DC plan			-0.019			-1.09			-0.003	0.006		0.35
Normal retirement age missing			-1.525			-1.32			-0.161	0.371		0.32
Annual reduction factor, db plans, =0 for dc plans			-3.553			-0.95			-0.014	1.013		0.64
Reduction factor missing			-0.287			-1.01			-0.020	-0.013		-0.05
Contribution rate for 401k/403b/sra plans, 0 otherwise			-0.845			-0.58			1.270	-4.323		-2.26
Contribution rate missing			-0.140			-0.87			0.152	0.238		1.15
Female			0.012			0.18			0.137	-0.386		-2.80
High School Dropout			0.114			0.76			-0.016	-0.268		-1.66
Some College			0.111			0.78			-0.036	0.360		2.38
College Graduate			0.202			1.07			0.082	-0.032		-0.14
Some Graduate School			0.438			2.42			0.015	0.646		2.84
In earnings			-0.359			-3.24			0.786	-0.312		-2.10
Earnings missing			-3.407			-2.50			8.128			12.93
Fulltime			-0.065			-0.40			-0.119	-0.121		-1.75
												-0.66
												-1.38
												14.58
												-23.67
												-1.68
												-3.25
												-5.42
												-2.46
												-3.31
												1.92
												-3.56
												0.33
												0.42
												-0.07
												1.38
												1.89
												3.28
												3.51
												1.19
												1.76
												2.03
												2.06
												14.72
												-3.14

Dependent Variable: Sample: Self-Reported Values Provider Values	Binary Variable for Provider Pension = 0		Binary Variable for Provider Pension = 0		In Provider Pension Positive Values Only		In Provider Pension Positive Values Only		Binary Variable for Provider Pension = 0		In Provider Pension Positive Values Only	
	Coefficient	z	Coefficient	z	Coefficient	t	Coefficient	t	Coefficient	z	Coefficient	t
Estimation Method:	Probit		Probit		Regression		Regression		Probit		Regression	
Independent Variables:												
Union	0.255	2.25	0.025	0.61	0.137	1.18	0.178	3.00	0.137	1.18	0.178	3.00
Manufacturing	0.227	1.39	-0.042	-0.63	-0.221	-1.02	-0.245	-2.77	-0.221	-1.02	-0.245	-2.77
Public employment	0.357	2.15	0.403	6.86	0.000	0.00	0.443	4.44	0.000	0.00	0.443	4.44
Manager or professional	0.242	1.41	0.244	3.84	0.183	0.88	-0.064	-0.65	0.183	0.88	-0.064	-0.65
White collar	-0.020	-0.13	0.238	4.16	0.414	2.43	0.047	0.56	0.414	2.43	0.047	0.56
Firm size >100	0.046	0.30	-0.045	-0.67	-0.407	-2.38	0.078	0.70	-0.407	-2.38	0.078	0.70
Firm size missing	0.703	1.72	0.033	0.16	-0.235	-0.50	-0.094	-0.26	-0.235	-0.50	-0.094	-0.26
Health is good	-0.084	-0.77	0.006	0.14	0.093	0.75	0.006	0.95	0.093	0.75	0.006	0.95
Health is poor	0.032	0.17	-0.037	-0.50	0.016	0.08	-0.079	-0.82	0.016	0.08	-0.079	-0.82
Planning horizon < 2 years	0.164	1.39	-0.002	-0.05	0.099	0.74	-0.004	-0.05	0.099	0.74	-0.004	-0.05
Planning horizon > 10 years	0.065	0.38	0.069	1.02	-0.042	-0.19	-0.011	-0.10	-0.042	-0.19	-0.011	-0.10
Planning horizon not available	0.273	0.85	0.225	1.59	-0.328	-1.12	-0.064	-0.42	-0.328	-1.12	-0.064	-0.42
Number of words recalled in second test	-0.019	-1.02	0.017	2.39	-0.018	-0.89	0.002	0.02	-0.018	-0.89	0.002	0.02
Missing recall measure	-0.008	-0.03	-0.037	-0.27	0.141	0.44	0.164	0.99	0.141	0.44	0.164	0.99
Number of Observations	1614		1415		1067		776		1067		776	
Adjusted or Pseudo R2	0.1525		0.6297		.4288		.7267		.4288		.7267	

Source: Authors' calculations.

Appendix Table 5: SSA Vs. Respondent Present Value of Social Security Benefits (1992 Dollars)

	All Respondents			Male Respondents			Female Respondents		
	Respondent	SSA	Difference	Respondent	SSA	Difference	Respondent	SSA	Difference
Mean	55745	52622	-3123	71880	71035	-844	42170	37130	-5041
Percentile									
95	113163	109625	28315	119057	117684	32868	97495	85268	24281
90	100862	97570	17501	110794	108923	20649	83782	72367	14584
75	81624	76572	5558	94583	92596	7374	62816	54192	4128
50	55678	50471	-1423	75379	72692	-400	42207	36548	-2585
25	29682	26637	-11635	51592	49702	-9327	13963	13511	-13789
10	3331	6807	-26340	26403	30988	-23195	0	2977	-27956
5	0	2031	-38845	4891	14643	-36082	0	665	-40012
Number of Obser.	9472			4328			5144		
Correlation	0.81			0.75			0.77		

Source: Authors' calculations. This table includes the social security records obtained with permissions granted by respondents to HRS waves 1, 2 and 3.

Appendix Table 6: Distribution of Present Values of OWN Social Security Benefits Based on Respondent And SSA Reports
(1,000's of 1992 Dollars)

		SSA Records														Total
Respondent Report	0 -	10 -	20 -	30 -	40 -	50 -	60 -	70 -	80 -	90 -	100 -	110 -	120 -	130 +	Total	
0 - 10	10	20	30	40	50	60	70	80	90	100	110	120	130	+	1372	
10 - 20	788	249	104	73	69	30	17	13	9	6	6	6	1	1	530	
20 - 30	137	151	92	71	40	20	8	5	2	3	0	1	0	0	488	
30 - 40	78	101	126	91	52	20	6	4	3	2	2	2	1	0	712	
40 - 50	54	91	112	225	130	53	18	13	8	3	2	2	0	1	1023	
50 - 60	57	63	95	213	343	132	70	20	21	5	0	3	1	0	1048	
60 - 70	32	44	46	98	285	286	157	58	23	12	2	4	1	0	898	
70 - 80	24	19	18	52	131	210	227	138	50	20	3	5	0	1	888	
80 - 90	20	12	22	30	73	118	195	231	125	40	16	1	3	2	777	
90 - 100	10	1	9	13	30	60	102	204	206	100	29	9	3	1	743	
100 - 110	7	8	7	13	25	35	53	927	157	260	63	17	2	4	417	
110 - 120	3	5	1	6	9	7	12	23	50	103	155	38	4	1	313	
120 - 130	9	0	1	4	5	7	8	15	19	20	67	127	23	8	128	
130+	1	2	1	0	1	4	1	6	4	7	13	29	52	7	135	
Total	1223	746	635	890	1193	986	877	826	678	585	368	255	110	100	9472	

Source: Authors' calculations. This table includes the social security records obtained with permissions granted by respondents to HRS waves 1, 2 and 3.

Appendix Table 7: Regressions of Average Indexed Yearly Earnings Calculated from Social Security Records on Average Indexed Yearly Earnings Calculated from Earnings Imputed From Survey

Independent Variables	All Observations With Matched Social Security Earnings Records				Observations for Males With Matched Social Security Earnings Records				Observations for Females With Matched Social Security Earnings Records			
	Coefficient		t		Coefficient		t		Coefficient		t	
	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t		
Constant	1863	-19.02	5404	14.65	3990	4.24	1757	5.27				
AIME calculated from earnings imputed from survey	0.778	137.80	0.511	45.63	0.499	26.27	0.466	32.49				
AIME imputed from expected benefit amount			0.097	11.91	0.097	7.86	0.080	7.89				
AIME from expected benefit missing			600	2.97	-71	-0.15	574	2.91				
AIME from earnings imputed from survey interacted with missing value indicator			-0.014	-1.23	0.020	0.94	-0.023	-1.47				
Female			-5019	-37.64	(dropped)		(dropped)					
Married			149	1.10	1568	5.57	-711	-5.51				
High School Dropout			-645	-4.69	-795	-3.20	-592	-4.21				
Some College			-407	-2.67	-1064	-3.82	204	1.32				
College Graduate			242	1.12	292	0.80	21	0.09				
Some Graduate School			972	4.27	464	1.24	1482	5.73				
Respondent working at time of survey			502	1.99	896	1.05	596	2.76				
Earnings in current job			0.031	5.95	0.018	2.29	0.041	5.95				
Indicator respondent had section G job			-628	-2.32	-1131	-1.29	-317	-1.35				
Earnings from section G job			0.040	5.56	0.044	3.78	0.060	6.11				
Self employed			-1247	-7.56	-1205	-4.36	-1358	-7.48				
Worked for federal government in past			-1349	-7.16	-2281	-7.39	-198	-0.93				
Worked for a state government in past			-402	-3.03	-414	-1.76	-304	-2.20				
Reported a nonsocial security job in past			-1027	-6.94	-1172	-4.69	-1113	-6.88				
Current or last five year job was full time			-312	-2.12	-671	-2.09	-7	-0.05				
Respondent had a pension in any job			2347	17.15	2950	11.68	1987	14.29				
Union in main job			155	1.12	313	1.37	-49	-0.31				
Management/professional in main job			807	5.38	1068	4.23	636	3.88				
Manufacturing in main job			1708	12.11	1923	8.54	1289	7.80				
Indicator survey available for 1996			34	0.21	675	2.43	-813	-4.49				
Reported health excellent or very good			24	0.19	85	0.39	57	0.44				
Reported health fair or poor			-548	-3.55	-718	-2.61	-373	-2.34				
Planning horizon < 2 years			-306	-2.52	-520	-2.33	-89	-0.74				
Planning horizon > 10 years			-186	-0.97	69	0.20	-394	-1.99				
Planning horizon not available			-432	-1.45	-387	-0.74	-567	-1.78				
Words recalled in second test			16	0.81	33	0.86	20	1.04				
Recall variable missing			356	1.10	454	0.84	323	0.87				
Number of Observations		9472		9472		4328		5144				
Adjusted R2		0.6672		0.7549		0.6016		0.6587				

Source: Authors' calculations. This table includes the social security records obtained with permissions granted by respondents to HRS waves 1, 2 and 3. Average Indexed Yearly Earnings equals AIME times 12.

Appendix Table 8: SSA Vs. Respondent Reported Earnings (AIME, Expressed on an Annual Basis, in 1992 Dollars)

	All Respondents			Male Respondents			Female Respondents		
	Respondent	SSA	Difference	Respondent	SSA	Difference	Respondent	SSA	Difference
Mean	13738	12548	-1190	19909	19230	-680	8545	6926	-1620
Percentile									
95	31958	30820	7720	33341	32587	10221	24526	20228	4702
90	29422	28252	4785	32022	31034	6915	20330	16211	2950
75	22922	20773	1481	28356	27261	2609	13280	10425	778
50	12110	10070	-453	21866	20551	-245	6554	5067	-611
25	3969	3513	-3660	12366	11570	-3778	1850	1754	-3572
10	462	903	-8225	3853	4772	-8815	0	394	-7730
5	0	264	-11952	757	2180	-13526	0	91	-10945
Number of Obser.	9472			4328			5144		
Correlation	0.82			0.72			0.76		

Source: Authors' calculations. This table includes the social security records obtained with permissions granted by respondents to HRS waves 1, 2 and 3. Average Indexed Monthly Earnings, expressed on an annual basis, equals AIME*12.

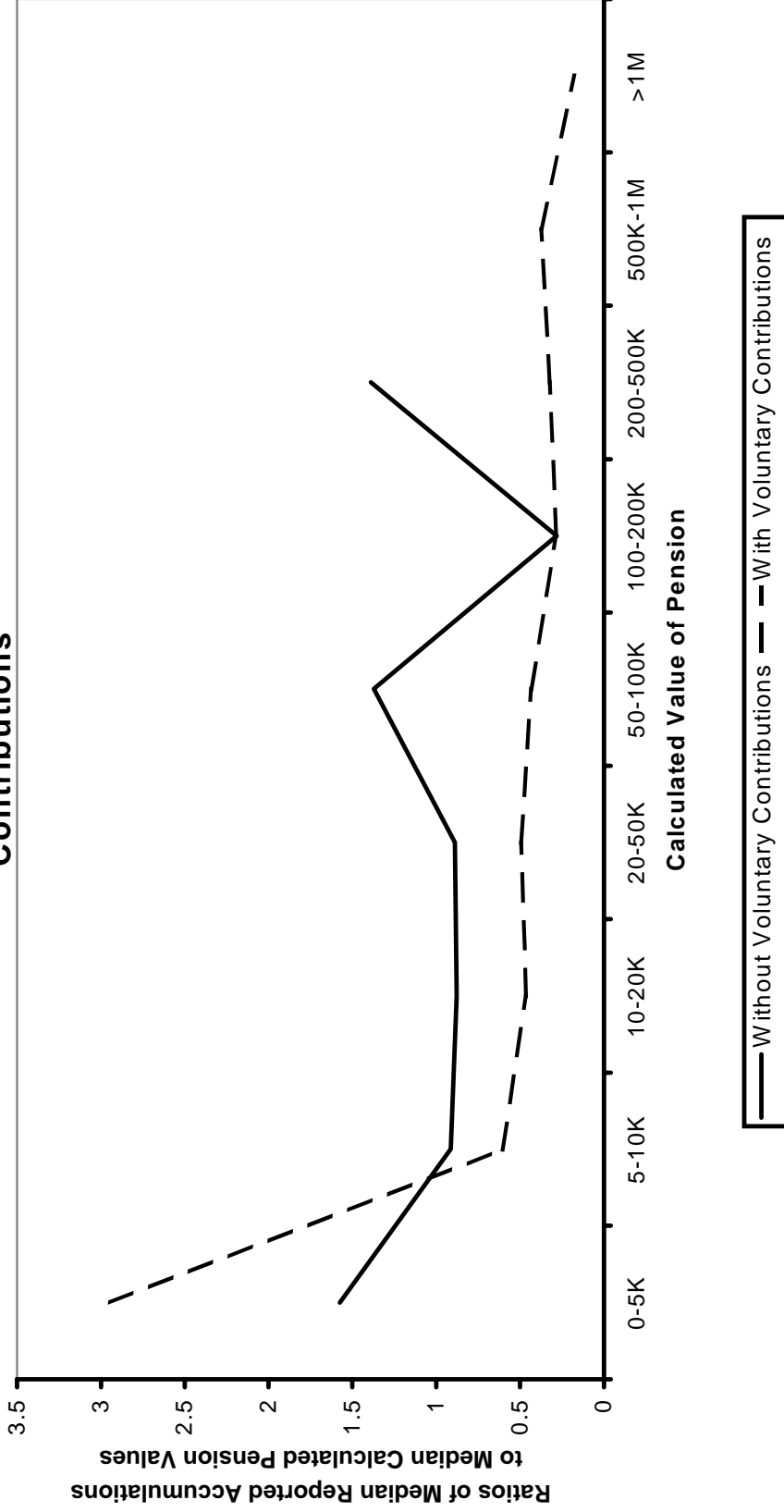
Appendix Table 9: Distribution of Respondent And SSA Reports of Average Indexed Yearly Earnings (Thousands of 1992 Dollars)

Respondent Report	SSA Records												Total
	0 - 4	4 - 8	8 - 12	12 - 16	16 - 20	20 - 24	24 - 28	28 - 32	32 - 36	36 - 40	40+		
0 - 4	1803	358	105	34	27	21	18	14	2	0	0	2382	
4 - 8	395	519	182	70	32	16	10	4	2	0	0	1230	
8 - 12	173	338	358	136	49	25	10	6	2	0	0	1097	
12 - 16	72	148	264	228	144	63	22	9	0	0	0	950	
16 - 20	47	62	145	217	178	125	75	18	3	1	0	871	
20 - 24	31	40	63	117	195	184	136	41	10	0	0	817	
24 - 28	32	13	46	50	94	206	287	125	16	0	0	869	
28 - 32	13	20	14	23	39	76	188	334	83	0	0	790	
32 - 36	6	6	16	14	24	25	44	141	172	0	0	448	
36 - 40	0	1	0	0	0	1	3	3	4	3	0	15	
40+	0	0	0	0	1	0	1	0	1	0	0	3	
Total	2572	1505	1193	889	783	742	794	695	295	4	0	9472	

Source: Authors' calculations. This table includes the social security records obtained with permissions granted by respondents to HRS waves 1, 2 and 3. Average Indexed Yearly Earnings equals Average Indexed Monthly Earnings, expressed on an annual basis, which equals AIME*12.

Figure 1

Ratios of Median Reported Accumulations to Median Calculated Pension Values for DC Plans With and Without Voluntary Contributions



Endnotes

1. See, for example, surveys by Lumsdaine (1996), Lumsdaine and Mitchell (1999) and Gustman and Juster (1996).

2. Appendix Table 1, column 1, reports the social security permission rates in wave 1 for respondents according to individual and job characteristics.

3. Haider and Solon (1999) and Olson (1999) reach similar conclusions.

4. Despite the relatively poor fit in the social security permission equations, in the appendix we will include these covariates in regressions relating the value of benefits computed from social security records to the value computed from respondent answers. The inclusion of these variables will adjust predictions for whatever selection is systematically associated with these observables.

5. Wage profiles are forced through all observations, and values for missing years are projected backward off the profiles on the basis of experience and education. The wage profile coefficients are taken from Anderson, Gustman and Steinmeier (1999) and are based on data from the Survey of Consumer Finances. Coefficients are: experience .0138221, experience squared -.0002827, and experience * education .000996. Note that the wage profiles are not smooth, as they would be if they were based only on the coefficients in the wage equation. Rather, they have sharp discontinuous breaks at points where actual wage observations anchor the profile. Moreover, we do not use wage observations from all years, but only for the number of years worked as reported in the retrospective work history.

6. These counts are for individual jobs, not individual pensions. That is, if an individual had both a DB and a DC pension in a job, it would be counted once in these tallies. However, an individual may have more than one entry if he or she had pensions in both the current job and a previous job, or in the last job and a previous job.

7. Appendix Table 1, column 3, reports the pension matching rates in wave 1 for respondents according to individual and job characteristics.

8. Staff from the Health and Retirement Study coded the Summary Plan Descriptions provided by employers. Software written for that purpose was used to evaluate the coded plan descriptions. The software generates pension values by applying the coded rules from the pension plan to respondent reports of earnings and tenure. The user specifies assumptions as to interest rate, wage growth, and which respondent reports of retirement dates are to be used. Details about the procedures employed are available in Gustman, Mitchell, Samwick and Steinmeier (2000).

9. These questions are answered from memory. Respondents were not encouraged to collect financial documents in advance or to refer to them.

10. The benefit the respondent expects is reported in question N46 of the HRS. The problems with using the expected social security benefit amounts include the following. First, less than half of the respondents ventured a guess as to the amount. Looking at the counts for question N46, 5,815 respondents reported that they expected to receive social security benefits, but only 2,563 ventured an amount. Secondly, since the question was in section N, the financial respondent answered the question for both spouses, meaning that there is a non-random sample of respondents answering the question for themselves. Third, there is a temporal mismatch: the amount constructed from the record pertains to earnings through 1991, but the amount self-reported presumably includes the effects of any future work. In addition, expected social security benefits are reported in dollars of some future year, and we don't have a good fix on the price levels in that year.

11. Among those in Table 6D who responded they don't know their plan type, according to their employers, over 80 percent have a DB plan. Of this same group, 58 percent have a DC plan. The convention in the HRS has been to ask those who do not know their plan type questions that apply to a DB plan. As noted in the previous section, many of these questions also provide information that is relevant for a DC plan. However, respondents are not asked plan balance.

12. The self-reported voluntary contribution variable is a dummy variable for whether the plan has a 401(k) component. As such it would be incorrect to infer that a plan with voluntary contributions does not also have required contributions.

13. In Table 6 there were 1,923 plans where both the respondent and the firm reported plan type as defined benefit. Table 12 reports pension values for 1,122 defined benefit plans. The difference is accounted for by missing data, primarily because only two thirds of respondents in Table 6 reported expected pension amounts (or percentage of pay). For similar reasons, Table 12 reports results for 641 observations, whereas there were 916 observations in Table 6 where both the respondent and the firm reported there was a defined contribution plan.

14. By assuming that benefits stay constant in nominal terms, we ignore the fact that some pensions have benefits that are reduced when the participant becomes eligible for social security. About 12 percent of participants in defined benefit plans indicated that their pensions would be subject to such provisions. The pension calculator program incorporates the automatic cost of living adjustment in the few plans that offer one, but does not include the ad hoc cost of living increase that historically have accounted for most cost of living adjustments.

15. The projected future earnings are calculated using Social Security Administration projections, increasing the 1992 earnings by 5% per year.

16. Some difference might arise because the respondent might assume future wage growth different than the 5% growth (the Social Security Administration's intermediate projection) we assumed when evaluating the firm pensions. Therefore, we adjusted the respondent's projected benefits to allow for implied differences in wage growth assumptions. To be more specific, the survey asked about the expected benefits on the date the individual expects to start them and the wages both in 1992 and at the normal retirement age. To project the wage to the benefit start date, we interpolate the wage between 1992 and the normal retirement age. We then calculate

the implied ratio of the benefit to the wage that the respondent is expecting at the benefit start date. Finally, we multiply this ratio by the wage the respondent would have if the 1992 wage grows by 5% per year. This essentially adjusts the reported benefit for differences in wage growth assumptions. However, there are some observations for which this procedure does not work very well. These observations have the common feature that the individual is almost at the normal retirement age but expects to work several more years. For instance, the individual may be 59, have a normal retirement age at 60, expect to retire at 65, and report earnings of \$40,000 at 59 and \$80,000 next year. Continuing this rate of growth until 65 yields a value which is clearly nonsense. Therefore, we compared the computed wage at expected retirement to the wage which would be obtained by simply growing the 1992 wage by the growth rate assumed in the social security projections. In the relatively few cases where the former exceeded the latter by more than 50%, we took the expected pension benefits at the expected retirement age at face value and did not try to make any adjustments.

17. The correlation coefficient, which is heavily influenced by the larger values, is 0.615.

18. The correlation coefficient for the observations in Table 14 is 0.302.

19. The pension calculation program assumes a constant contribution rate for participants of plans with voluntary contributions.

20. Regressions with additional variables were tried, but in these regressions only a small number of variables were significant, and they suffered from the problem that they yielded negative predicted values for some of the pensions.

21. For careful analyses of the economic factors determining the differences between retirement expectations and realizations, see Bernheim (1989) and Disney and Tanner (1999).

22. A procedure has been established at HRS, in coordination with the National Institute on Aging and the Social Security Administration, to protect respondent confidentiality when linked data are made available. A researcher must apply for access to restricted data. The application requires a research plan, a data protection plan, a demonstration of grant support from a federal agency, and a promise not to link the restricted data to any but specified respondent files. The basic respondent survey, without linked data, is available on an unrestricted basis.

23. Note that the provider plan values for DC plans with voluntary contributions in Appendix Table 4 are adjusted according to the coefficients in Table 17. The regressions include variables for missing values for plan characteristics, with the value for the missing variable indicator set to 1 if the characteristic is relevant to the type of plan and the plan characteristic is missing, and the value of the missing variable set to zero, so that the value is picked up in the coefficient of the variable indicating the value is missing.

24. Appendix Table 8 includes the social security records obtained based on permissions granted by respondents in wave 1, as analyzed in Table 1, and in addition it includes social security records obtained with permissions granted by respondents in waves 2 and 3.