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WORKER KNOWLEDGE OF
PENSION PROVISIONS

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ABSTRACT

This paper evaluates the quality of workers' information regarding pension offerings using both administrative records and worker reports of pension provisions. Missing and misinformation proves to be widespread. Unionized employees, higher income workers and those in large firms, the better educated, and those with greater seniority are better informed about their pensions. There are also demographic differences: nonwhites have less pension knowledge than whites, but women are better informed than men along several pension dimensions.

Myopia about pension incentive structures is troubling since workers may save or consume suboptimally, change jobs, or retire earlier than they would have if equipped with better pension information. The prevalence of missing data should also be troubling to empirical pension analysts using data sets reporting workers' assessments of pension provisions.

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Worker Knowledge of Pension Provisions¹

This paper explores the topic of what workers know about their company-sponsored pension plans, and the factors associated with misinformation and/or missing information about pension features. The issue is of interest for at least three reasons. First, private-sector firms providing pensions are legally obliged to prepare and disburse more than a dozen documents disclosing pension provisions,² yet some urge the mandating of yet additional plan documentation on grounds that workers remain ignorant of their pension plan provisions. There is little systematic evidence on this matter, or on whether lack of knowledge is associated with firm-side or worker-side characteristics making the information gaps more or less costly to correct. A second reason the question is of interest is that policymakers are concerned with the problem of economic hardship during retirement. If low wage, uneducated or otherwise disadvantaged workers have undue difficulty in obtaining pension information, they may make myopic and perhaps suboptimal decisions regarding how much to save for retirement, or when to change jobs and retire. Hence labor market disadvantage may be translated into poverty during retirement. A third group interested in the question of worker pension knowledge is labor economists. Recent research posits that pensions spur productivity by tying workers to firms (Mitchell, 1982), discouraging shirking (Lazear, 1979), and ensuring optimal retirement flows (Lazear, 1983). Significant gaps in worker knowledge of pension characteristics would cast doubt on these roles for company-sponsored pensions.

Previous studies have compared worker knowledge of non-pension job characteristics with administrative data and discern some important biases in worker knowledge, but pensions have not been the subject of careful scrutiny despite their overwhelming importance in the

compensation package.³ The objective of the present paper is to determine how workers' understanding of their pension plans differs from descriptions provided by firms, and the extent to which pension misinformation (or lack of information) is systematically associated with company and worker characteristics. Data are taken from the 1983 Survey of Consumer Finances which reports pension information gathered from both workers and administrative records. Section I of the paper describes the data set and response errors. Section II considers systematic response errors when data are not missing, and then goes on to examine the pattern of missing data. Section III offers concluding remarks.

I. Procedures

In a world of perfect and costless information, worker and company reports regarding specific pension provisions would be identical. However reports may diverge if providing and gathering pension information is costly, and if costs vary systematically across people and firms. Focusing first on workers, those who do invest effort will probably be more accurate about their firm's pension offerings. It is surmised that such investment will be greater, the more likely the employee is to receive benefits and the greater he expects them to be $[E^e(B)]$, and the more readily he can process often complex and technical pension plan documents (Ω):

$$\begin{aligned} & \text{[Worker Investment} \\ & \text{in Information]} = f (E^e(B), \Omega) \quad \text{where } f_1, f_2 > 0. \end{aligned}$$

In the dataset to be described below, $E^e(B)$ is proxied empirically by a worker's tenure which is expected to be positively associated with pension eligibility, and with benefit levels at retirement (Mitchell and Luzadis, 1986). Unionized and higher income workers are also more likely to anticipate higher benefits (Allen and Clark, 1986). One

would expect that females and nonwhites would be relatively less well informed, since benefits are lower for these workers than for white male employees (Lazear and Rosen, 1987).

The Ω term represents an information-processing efficiency factor, acknowledging that specialized legal, actuarial and benefit expertise are often required to understand pension plan documents.⁴ Worker efficiency of this type should be positively associated with four sets of employee characteristics: education, income, whether production employees are prevalent, and union status. The first three should be positively associated with general (versus specific) human capital; union workers may benefit from scale economies in the production and dissemination of pension information. Workers with more tenure will presumably embody more firm-specific capital of use in understanding their firm's pension provisions.

An alternative explanation for erroneous or deficient worker pension information is that firms may differ in the pension information provided to workers. Such information is probably more plentiful when the plan's expected benefits are relatively generous [$E^F(B)$], and the plan relatively inexpensive to operate (μ):

$$\begin{aligned} & \text{[Firm Production} \\ & \text{of Information]} = g (E^F(B), \mu) \text{ where } g_1 > 0, g_2 > 0. \end{aligned}$$

Empirical evidence on plan generosity and cost parameters is difficult to obtain. One possibility is that profitable firms are more likely to provide better benefits (profitability is proxied below by return on investment, ROI), and hence more accurate worker knowledge regarding pension provisions. Scale economies in pension administrative costs, as well as economies in providing pension information, suggest that workers in large firms may be better informed (Mitchell and Andrews, 1981).

Combining the equations above into a model suitable for empirical analysis produces the following reduced form equation:

$$\text{Prob. (Disagree)} = h (E^e(B), E^r(B), \Omega, \mu).$$

where the dependent variable "Disagree" is equal to one if employer and employee answers regarding pension provisions are in conflict, and zero otherwise. Two-way models of this type are estimated below using maximum likelihood multinomial Logit. In addition, a three-way extended model addresses the probability of observing missing data, versus disagreement or agreement between workers and their firms. Missing data arises when workers are unable to offer answers to questions regarding their pension provisions.

Data from the 1983 Survey of Consumer Finance (SCF) are employed to assess employee misinformation and lack of information regarding pension provisions. Created by the Federal Reserve Board of Governors and the US Department of Health and Human Services, this dataset consists of two parts (Avery et al. 1984a, b; Curtin, 1985). The first component, the Respondent File, is a nationally representative survey of 3,826 randomly selected households. This file contains information collected by personal interview on each respondent's current employment status and labor market history, socio-demographic characteristics, and other attributes (spouses, if any, were queried as well). In addition, individuals with work experience were questioned about their pension coverage status. Those so covered were asked to identify the provider of that plan -- usually their current employer -- and were surveyed about that plan's key features. From this file is extracted a sample of 750 private sector nonagricultural workers covered by an employer-provided pension on their current job, of whom 637 individuals have non-missing data on key explanatory variables. Missing values on

dependent variables are not grounds for sample exclusion in the three-way extended models as explained below.

The second and unique component of the SCF data set is the Pension File. This contains information from administrative records (Summary Plan Descriptions, or SPDs) for each pension plan identified by covered individuals in the Respondent file. Since the Employee Retirement Income Security Act of 1974 (ERISA) specifies that this SPD is a legally binding document, Pension File data are expected to accurately depict pension plan features. The SCF Pension File is the source of administrative information used in the present analysis. The Pension File extract used here consisted of 551 different plans pertaining to the 637 workers identified previously.

The SCF dataset does not report information on firms' benefit accrual data to compare with workers' assessments of likely retirement benefits. Nevertheless, even if they were available, such data would probably be useless. Worker reports about expected benefits will incorporate a myriad of assumptions about future wage growth, seniority and age at retirement, inflation, and mortality (among others). In contrast, current law states that a firm's legal pension obligation consists only of benefits owed to vested employees based on accrued service and salary to date if the firm were to cease operation ("shutdown liability").⁵ When the two sides compute benefits using underlying assumptions which differ and are unknown to the researcher, a comparison of benefit amounts is rendered virtually impossible.

Of more interest are three sets of pension plan provisions highly associated with workers' eventual pension claims. They are interesting in their own right and also because they have been used as proxies for pension benefits by other researchers.⁶ They are: (1) pension plan type; (2) pension plan contribution data; and (3) pension plan

requirements for early and normal retirement. "Type" refers to whether the pension is a defined contribution or a defined benefit plan. In defined benefit (DB) plans, employers promise that benefits payable at retirement will conform to a prespecified function of the worker's pay and/or service. In contrast, companies offering a defined contribution (DC) plan do not specify the retirement formula or payment; rather they indicate yearly contributions on a worker's behalf, usually a function of employee pay. "Contribution" provisions refer to whether employees and employers contribute to the pension fund, and whether contributions are linked to workers' pay. "Retirement requirements" pertain to rules regarding benefit eligibility and the age and/or service requirements workers must satisfy in order to draw retirement benefits. Means and standard deviations of pension provision variables are reported in Table 1, as well as the pattern of missing observations (which arise when workers do not provide answers to pension provision questions).

Plan Type

Table 1 shows that most workers are quite well informed about what type of plan they have (TYPE): employer and employee responses agree (are identical) almost 90% of the time.⁷ However, the agreement rate on plan type differs among pension types (measured against company reports): workers having a DB plan know that they do more often than employees covered by DC plans. Since most private sector covered employees have DB plans (Kotlikoff and Smith, 1983), some of those in DC plans may surmise their plan type from crude knowledge of pensions in the labor market as a whole.⁸ Interestingly, the missing data rate for this question also differs by type of plan: many fewer DC-covered workers know what type of plan they have as compared to DB-covered workers. Both findings suggest that workers in DC plans tend to be

less well-informed about their pensions than are their counterparts in DB plans.

Contribution Information

Pension plan contributions derive from two sources: employee payments and employer contributions. Employer contributions, and earnings on these contributions, are not taxable to a plan participant until retirement at which point the retiree is usually in a lower tax bracket. Hence tax-deferral on employer contributions generates significant tax savings to higher income workers. In contrast, employee contributions are payable out of after-tax income. This difference in tax treatment would lead one to expect that higher income workers would be better informed regarding their own and their employers' pension contributions.

Worker reports differ considerably from company records regarding both employee and employer pension contributions. When asked whether workers themselves are required to contribute (ECONTREQ), a little over half as many people respond in the affirmative as compared to employers' files (disagreement is slightly higher in DC plans).⁹ This high error rate is troubling since pension benefits have been demonstrated to be higher in plans where employees contribute (Gustman and Steinmeier, 1987). A high error rate on this variable hence undermines the expected positive link between anticipated benefit levels and accuracy of worker information. Missing data on this question turns out to be widespread; most workers offer opinions about whether they contribute directly to their pension plans, though many are incorrect. Those who say they contribute prove relatively well informed about the association between their contributions and pay (ECONTPAY), with match rates in the high 90%'s.¹⁰ Greater accuracy among contributing employees confirms practitioners' longstanding claim

that "sharing in the cost will increase the employees' awareness" of the pension benefit (Beam and McFadden, 1985: p. 479).

Survey questions regarding employer contributions are addressed only to DC plan participants. Though over 90% of the companies report making pension contributions, only half as many workers believe that their employers contribute (RCONT). As with employee contributions, most workers answer questions about the nature of employer contributions though many are incorrect.¹¹ Those who do know their firms contribute are frequently in error about the basis for the contribution (RCONTPAY). Only 3% of covered workers recognize that employer contributions depend on employee pay, whereas in actuality firms report that pay is used as a determinant of contributions almost 60% of the time. In addition to low match rates on this question (30%), another 16% of the workers do not answer the question at all. The prevalence of missing data here calls into question the notion that employees place a high value on the provision of DC pensions, and further casts doubt on the productivity-enhancing role of such pensions. That is, linking pension promises to employee performance measures like pay will probably have little impact on productivity if workers do not perceive this critical link.

Requirements for early and normal retirement.

Several questions are available to compare worker and firm views on retirement formulas among DB plan participants. Early and normal retirement provisions are summarized separately using eligibility variables and variables indicating the degree of agreement regarding retirement ages.

Early retirement:

All but a handful of pension plans state that early retirement is permitted, but only about three-quarters of the respondents believe

that they will be eligible to retire early (EARLYPOS).¹² These differences are not surprising given that particular workers may well have insufficient seniority to retire early even when a plan permits some to leave early. However the fact that 17% of the respondents cannot provide any answer to the early retirement eligibility question suggests that worker information regarding early retirement rules is far from complete. This degree of ignorance is especially disturbing since a majority of workers now retires quite early; the average retirement age is about age 63.5 for married men, and 62 for married women (Fields and Mitchell, 1984; Pozzebun and Mitchell, 1987).

Further evidence on knowledge of retirement rules is available for the subset of workers who believe they will eventually be eligible for early retirement.¹³ Eligibility is typically a function of a worker's age, service, or age plus service; these functions are apparently so complex that fully 39% of the respondents cannot answer the eligibility question at all, and those who do respond can estimate early eligibility requirements accurately only about one-third of the time (EARLYREQ). Workers' assessments of their plan's early age are similarly erroneous. About one-third of the workers do not venture any guess regarding the plan's early retirement age, and about two-thirds of those workers who offer answers to early retirement questions are inaccurate (EARLYAGE).

Normal Retirement:

One would expect that employee information on normal retirement would be superior to early retirement data, since not all workers are eligible to retire early but many will eventually qualify for normal retirement benefits. This surmise is confirmed in the data: virtually all workers can answer the normal retirement questions and the answers are fairly accurate. Normal eligibility requirements (NORMREQ) and

normal retirement ages (NORMAGE) are known by workers at least twice as often as compared to the early retirement questions. Despite the fact that rules vary from one plan to the next regarding eligibility for and the age of normal retirement, workers appear to have far better information than they do for early retirement provisions. This finding is reassuring insofar as normal retirement provisions are the single most important plan provision predicting benefit generosity (Gustman and Steinmeier, 1987).

II. Multivariate Analysis

A multivariate Logit approach is used to judge whether disagreement on pension type, contribution rules, and retirement variables is systematic. Explanatory variables sketched above are drawn from the SCF, which contains information on individual worker responses, and industry-level averages, used to proxy key firm-level variables because individual firms are not identified in the dataset. The latter are merged with the micro datafile using 2- and 3-digit SIC industry codes. An Appendix Table summarizes descriptive statistics for all explanatory variables along with data sources and definitions.

Response Differences

Table 2 reports estimated multinomial Logit coefficients from a model relating a vector of worker and firm-side characteristics to two-way (disagree/agree) outcomes. Here a positive coefficient indicates a higher probability of worker/plan disagreement regarding a pension provision, while a negative coefficient indicates a greater probability of agreement. Supplemental models are also estimated to determine whether whether vested workers or older workers are in possession of better pension information (complete results are not reported in full because of space constraints, but are available on request). Table 3 extends the analysis to a three-way formulation which includes

observations with missing data for the dependent variables where missing data is widespread. Here two columns of results appear for each dependent variable. In the first column, a positive (negative) coefficient indicates the variable increases (decreases) the probability of a missing data report, versus agreement between the worker and the employer; and in the second column a positive (negative) coefficient indicates a higher (lower) probability of disagreement versus agreement. In addition both tables display Chi-square statistics testing the hypothesis that a constant term summarizes the data as well as the vector of coefficients appearing in the column directly above.

Pension Type (TYPE): Many workers are wrong about their pension type and many cannot answer the question at all. Nevertheless, few explanatory variables are systematically associated with disagreement error in the multivariate analysis.¹⁴ No firm-side factor is statistically significant at conventional levels. The statistically significant findings for worker-side variables are consistent with predictions: unionized employees are less likely to disagree with their companies regarding type (Tables 2 & 3), a finding compatible with scale economies; and workers with longer job tenure are less likely to have missing data (Table 3) suggesting more investment among those closer to retirement. There are also race differences: Table 3 indicates that nonwhites reveal less pension knowledge than do whites with regard to pension type. Adding age and tenure interactions (results not shown) confirms the strong effect unions have on this form of pension knowledge, particularly among those nearest retirement, but weakens the statistical significance of the race effect.

Pension Contributions: Tabulations above demonstrated that worker information regarding contributions is not particularly accurate vis a vis administrative records. Multivariate analysis of both employee

contribution variables in Table 2 shows that the inaccuracy is systematic with regard to firm size, and in the predicted direction.¹⁵ Employees in large firms are generally more knowledgeable both about their own contributory status (ECONTREQ) and the links between their contributions and their pay (ECONTPAY), perhaps because of scale economies in the production of pension information. The data are not completely in accord with predictions however; for instance, missing data is more prevalent regarding ECONTPAY for union workers (Table 3), which contradicts the scale economies view just enunciated.¹⁶ Another surprising outcome is the result that women are more likely, rather than less likely, to know about how employee pension contributions are determined -- contrary to the notion that those expecting less will invest less in pension information (see Tables 2 & 3; this finding is also especially robust to the inclusion of age and tenure interactions.)

While few worker and firm-side variables explain disagreement patterns on employee's required pension contributions, the evidence is even weaker for questions regarding employer contributions (RCONT, RCONTPAY). Employees' views are quite inaccurate, but the errors are apparently not systematically associated with any of the variables included in the empirical analysis (including age and seniority interactions); this is confirmed by the small Chi-square values. Separate analysis on missing data is precluded by small sample sizes.

Retirement Requirements:

Early retirement (EARLYPOS, EARLYAGE): Response accuracy on early retirement questions is strongly linked to several worker-side and a few firm-side variables. Educated workers tend to know whether their plan has an early retirement option (Table 2), while education and tenure improve worker accuracy in estimating a plan's early retirement

age and further reduce the likelihood that a worker cannot offer any opinion regarding early retirement provisions (Tables 2 & 3). Both sets of findings support the view that those who have more to gain will be more likely to invest in the information. However Table 3 also indicates that educated and senior workers are more rather than less likely to have missing data when it comes to knowledge of early retirement requirements, and this perverse education effect is robust to the inclusion of age and tenure interactions. It appears as though this group focuses merely on the age requirements for early retirement because they have already fulfilled the plan's seniority conditions, which explains why they know the age provision but do not know the combination of age plus service. Reporting patterns differ across sex and race in the ways discerned previously: women are better informed regarding whether early retirement is possible, but nonwhites are less well informed about early retirement provisions. Models allowing interactive terms for age and seniority show that there are fewer systematic error patterns among older and more senior workers, as compared to younger ones. Low income turns out to be a predictor of missing data for both the early retirement age and for early retirement requirements. In general, the findings support the hypothesis that employees more likely to receive benefits do invest more in pension information, at least insofar as early retirement benefits are concerned.

Only one firm-side variable, ROI, is a significant predictor of one outcome, EARLYPOS, in both the two- and three-way models. This implies, consistent with predictions, that profitable firms offer better information regarding the possibility of early retirement, insofar as their workers are less likely to have missing answers to pension questions and the answers offered are on target more often.

Patterns for other firm-side variables are less clearcut in all the models examined.

Normal Retirement (NORMREQ, NORMAGE): Virtually all SCF workers are able to provide accurate answers to the normal retirement questions making it unnecessary to analyze missing data patterns. Worker/firm disagreement over normal retirement provisions is not very systematic. With regard to both NORMAGE and NORMREQ, family income is the only significant worker-side variable and not in the anticipated direction: higher income workers are less rather than more accurate. It may be that they report their own anticipated retirement ages rather than the plan's normal retirement age, though why this would be more prevalent for upper income workers is not clear. The sole firm-side factor which enters significantly, ROI, is associated with more agreement regarding normal retirement ages, as anticipated. These patterns do alter when age and seniority interactions are controlled. As a whole, then, misinformation regarding normal retirement provisions is both less prevalent and less systematic than for early retirement provisions studied.¹⁷

III. Discussion and Conclusions

Comparing administrative records with worker knowledge of pension provisions yields some informative insights regarding worker knowledge of their pension plan provisions. First, pension misinformation and missing information are quite widespread, with information deficiencies being the most severe for provisions relating to the requirements for early retirement. Specifically, about one-third of workers queried cannot answer questions about early retirement requirements at all, and about two-thirds of those workers who offer answers to early retirement questions are wrong. This is disturbing in light of the widespread popularity of early retirement. Workers' answers are more accurate for

questions about normal eligibility and retirement ages. Since benefit levels are closely tied to normal retirement provisions, it is reassuring to observe better information about these provisions.

Having pointed out where workers are informed, the question remains as to what is associated with good information. Generally speaking, good information appears more prevalent among unionized employees, workers in large firms, the better educated, the higher income, and those with greater seniority. These findings support the hypotheses that information is more accurate when benefits are expected to be more generous, and when there are technical efficiencies in producing and processing pension information. There are also some surprising demographic differences: nonwhites reveal less pension knowledge than do whites with regard to pension type and early retirement provisions, but women appear better informed along several pension dimensions.

These findings clearly show that regulations currently on the books have not resolved the problem of worker ignorance regarding key pension plan features. More research is needed on the best and least-cost mechanisms of generating more pension information, but it seems clear that better pension data would, to some degree, benefit less advantaged workers.¹⁸ A related point is that policymakers are concerned with the problem of economic hardship during retirement. Low wage, nonunion workers in small firms apparently find it difficult to obtain and process pension information, and hence will also be more likely to make myopic and perhaps suboptimal decisions regarding when to change jobs or retire, or how much to save for retirement. This may be one method by which disadvantage during the worklife tends to carry over to the retirement period.

Finally, the results are relevant for pension researchers. On the one hand it is reassuring to find that workers most likely to receive pensions are, in fact, most aware of key plan provisions. After all, pension plans are costly to maintain and would presumably not be offered (in the private sector at least) unless some subset of workers perceived them as providing valuable benefits. On the other hand, data sets which report workers' assessments of pension provisions contain a great deal of error and some serious understatements regarding contributions and retirement eligibility. Consequently researchers using worker-side reports of benefit provisions will underestimate the generosity of pension plans covering these workers, and overstate the degree of eventual retirement income inequality. Measurement error also appears to be correlated with variables commonly included in economic models involving pensions (e.g. unions, firm size), so that studies relying on worker-side provision information will generate biased coefficient estimates.¹⁹ In addition, it should be recognized that employee misperception of pension incentive structures may induce workers to save (or consume) suboptimally, change jobs, or retire earlier or later, than they would have done had they been equipped with better pension information.²⁰ Further research on how pension expectations are formed may help explain why worker behavior frequently deviates from fully optimal labor market and savings paths.

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² Allen, Melone and Rosenbloom (1984) describe pension reporting requirements under the Employee Retirement Income Security Act (ERISA) of 1974.

³ Mellow and Sider (1983) compare firm and worker reports of wages, hours worked, union status, industry and occupation. Duncan & Hill (1985) mention pension coverage in passing but concentrate in their study on comparisons between employee and firm-side reports of earnings, unemployment and job tenure. Bernheim (1987b) examines the association between anticipated and actual Social Security benefits but does not evaluate company-provided pensions. Gustman and Steinmeier (1987) refer to differences between worker and company reports of pension provisions but do not investigate whether these discrepancies are systematic.

⁴ Pension plan documents which must legally be made available to plan participants under the law, they are often difficult to obtain and even more difficult to understand (MG Associates, 1982).

⁵ Ippolito (1986) and Kotlikoff and Wise (1984) theorize that workers trade off wages for expected retirement benefits rather than shut-down liabilities. Mitchell and Pozzebun (1987) survey and extend the recent literature on wage/pension tradeoff.

⁶ For example, pension type and contributory status are used by Ippolito (1986) as proxies for benefit levels in a wage-pension tradeoff equation. Normal and early retirement ages and pension contributory status are used by Ehrenberg (1980) in a similar context.

⁷ The SCF Respondent File terminology in this instance differs slightly from that used to code administrative records in the Pension File. Workers with pensions were asked whether they have a "money accumulation plan" (which most would probably take to mean a DC plan), or a "plan based on service" (which most would probably equate with a DB plan), or, in a few cases, a third option -- "both". Initial examination of the "both" category indicated that these are probably DB plans, and they are coded as DB's in the analysis below. In contrast, the Pension File indicates whether a pension's documents were those of a DC plan, a DB plan, or whether both kinds of documents were forwarded to the surveyors. Preliminary analysis of the "both" group in this case suggested that these are firms offering both a primary DB plan with a secondary DC plan (probably benefiting primarily high-wage workers). In the few cases where a firm reported offering plans with both a DB and a DC component, these were combined with the DB plans since their DC components appeared to have been later, and minor, additions. Therefore for the purpose of the plan "type" analysis, plans with two documents are coded as DB.

⁸ Various measures of association are available (Goodman and Kruskal, 1979). A referee suggested using the following measure:

$$\lambda = \log \{ \text{prob}(\text{yes}, \text{yes}) \text{prob}(\text{no}, \text{no}) / \text{prob}(\text{yes}, \text{no}) \text{prob}(\text{no}, \text{yes}) \},$$

which takes account of the fact that the ease of finding matching answers depends on the simple probabilities. The value of λ ranges from plus to minus infinity, with independence indicated by a value of zero. For TYPE, $\lambda = +2.47$, indicating that errors are not independent;

workers exaggerate the probability of being in a DB plan relative to employers' reports of DB coverage. Systematic error patterns are examined in more depth in the next section.

⁹ The value of λ is +1.26 for ECONTREQ (see note 8), indicating that errors are not independent: many more workers believed they were not required to contribute than actually was the case.

¹⁰ In 2-3% of the cases, pension documents did not indicate whether or not employee contributions were proportionate to pay. This is the only case where administrative records contain missing data.

¹¹ Though other factors are not held constant, the errors do not appear systematic since $\lambda = 0.1$ (where 0 implies independence; see note 8).

¹² Here $\lambda = +1.46$ implying that errors are not independent; workers' answers are more often negative than are employers'.

¹³ In some cases plans have more than one set of early retirement requirements or ages. A worker's answer to the early retirement question was judged a "match" if his answer agreed with any of the formulas given in his pension plan document. A similar approach was followed for the normal retirement variables. This method provides a conservative estimate of the degree of worker inaccuracy regarding pension provisions; greater inaccuracy results from narrower definitions of retirement eligibility rules.

¹⁴ Though many individual coefficients are not statistically significant, at the 10% significance level the Chi-square statistic on TYPE in Table 2 implies rejection of the null hypothesis that the entire vector of coefficients except for the constant term is equal to zero. On the other had the null cannot be rejected for the TYPE equation in Table 3.

¹⁵ Chi-square values for the ECONTREQ and ECONTPAY models in both Tables imply rejection of the null hypothesis that all coefficients but the constant term are zero at least at the 10% level.

¹⁶ There are too few missing observations for ECONTREQ to analyze this dependent variable in a three-way model.

¹⁷ Chi-square values for all but one of the normal and early retirement variables imply rejection of the null hypothesis that all coefficients but the constant term are zero at least at the 10% level; the exception is EARLYREQ in Table 2 alone.

¹⁸ Obviously it is necessary to assess whether increases in labor costs as a result of providing additional pension information would be offset by lost jobs or other benefits. This task is beyond the scope of the present paper.

¹⁹ Examples of studies using worker-side assessments of pension variables include Mellow (1981) and Clark and McDermed (1986).

²⁰ This may explain why, for example, Fields and Mitchell (1984) find that economic factors explain only about a quarter of the variance in retirement behavior, and why Bernheim (1987a) reports that the economic life cycle savings hypothesis is found to be only partly borne out by savings data.

Table 1.
Variable Descriptions and Descriptive Statistics
 (EE=employee; ER=employer)

	%AGREE %miss		EE report Mean %miss		ER report Mean %miss	
<u>I. VARIABLES AVAILABLE FOR ALL PLANS</u>						
<u>A. Plan Type</u>						
TYPE (1=DB, 2=DC)						
Entire sample	0.87	0.19	1.10	0.19	1.47	0.00
Those with DB plans	0.94	0.18	1.06	0.18	1.00	0.00
Those with DC plans	0.49	0.24	1.35	0.24	2.00	0.00
<u>B. Employee Contributions</u>						
ECONTRREQ (1=EE contr. req., 0=not)						
Entire sample	0.78	0.01	0.12	0.01	0.20	0.00
Those with DB Plans	0.78	0.01	0.12	0.01	0.18	0.00
Those with DC plans	0.79	0.02	0.13	0.02	0.29	0.00
ECONTRPAY (1=EE contr. % of pay, 0=not)						
Entire sample	0.95	0.07	0.04	0.06	0.03	0.02
Those with DB plans	0.96	0.08	0.03	0.06	0.03	0.02
Those with DC plans	0.94	0.04	0.09	0.02	0.08	0.03
<u>II. VARIABLES CREATED FOR DC PLANS ONLY</u> (Employer Contribution Variables)						
RCONT (1=ER contrib., 0=not)	0.48	0.00	0.42	0.00	0.91	0.00
RCONTPAY (1=ER contrib. % of pay, 0=not)	0.29	0.16	0.03	0.16	0.58	0.00
<u>III. VARIABLES CREATED FOR DB PLANS ONLY</u> (Retirement Variables)						
<u>A. Early Retirement:</u>						
EARLYPOS (1=Early ret. poss., 0=not)	0.77	0.17	0.77	0.17	0.98	0.00
EARLYREQ (Yrs of age, service or both req. for early?)	0.32	0.39	11.16	0.39	16.77	0.00
EARLYAGE (Early ret. age)	0.29	0.30	43.41	0.30	52.79	0.00
<u>B. Normal Retirement:</u>						
NORMREQ (What age, serv. or both req. @ normal retirement?)	0.68	0.01	8.56	0.01	8.38	0.00
NORMAGE (Normal ret. age)	0.57	0.00	60.67	0.00	61.55	0.00

Table 2.
Models of Disagreement Over Pension Provision Variables:
Two Way Logit Models With No Missing Data^{a/b/}

Pension Type	Pension Contribution Information					Retirement Provision Information				
	Ee Contrib Req	Er Contrib % of Pay	Ee Contrib % of Pay	Er Contrib % of Pay	Early Ret Poss	Early Ret Req	Early Ret Age	Norm Ret Req	Norm Ret Age	NORMAGE
TYPE	ECONTREQ	ERCONTPAY	EECONTPAY	ERCONT	EARLYPOS	EARLYREQ	EARLYAGE	NORMREQ		
UNION	-0.49** (0.22)	0.23 (0.23)	0.49 (0.39)	1.05 (0.75)	1.32 (1.13)	-0.39 (0.25)	-0.09 (0.26)	0.12 (0.25)	-0.32* (0.18)	-0.07 (0.20)
PRODTOT	0.61 (0.45)	-0.55 (0.43)	0.74 (0.98)	-0.71 (1.08)	-0.10 (1.77)	0.45 (0.60)	0.56 (0.61)	-0.75 (0.59)	0.31 (0.38)	-0.23 (0.41)
ROI	-0.001 (0.02)	0.01 (0.02)	-0.03 (0.04)	-0.03 (0.05)	0.08 (0.06)	-0.06** (0.03)	-0.04 (0.03)	-0.02 (0.03)	0.01 (0.02)	-0.06** (0.02)
FSIZE (*10 ⁻²)	-0.29 (0.22)	-0.64** (0.26)	-1.00** (0.57)	0.35 (0.51)	1.00 (0.73)	0.20 (0.22)	0.06 (0.25)	-0.03 (0.23)	-0.08 (0.18)	-0.07 (0.18)
EDUC	0.02 (0.05)	0.06 (0.05)	0.09 (0.08)	-0.15 (0.09)	-0.01 (0.10)	-0.20** (0.05)	0.01 (0.06)	-0.10* (0.06)	-0.03 (0.04)	-0.01 (0.04)
TENURE (*10 ⁻²)	-0.79 (0.01)	-0.11 (0.01)	0.53 (0.02)	-0.03 (0.02)	-0.13 (0.03)	-0.02 (0.01)	0.01 (0.01)	-0.02** (0.01)	-0.01 (0.07)	0.37 (0.92)
GRFAMINC (*10 ⁻⁵)	-0.07 (0.31)	-0.04 (0.35)	0.22 (0.38)	0.43 (0.33)	0.44 (0.53)	-0.11 (0.58)	-0.36 (0.54)	-0.72 (0.48)	0.82** (0.30)	1.00** (0.39)
FEMALE	-0.08 (0.21)	-0.18 (0.22)	-1.70** (0.55)	0.66 (0.43)	0.45 (0.51)	-0.46* (0.26)	-0.26 (0.26)	-0.07 (0.26)	-0.13 (0.17)	-0.14 (0.20)
NONWHITE	0.57* (0.31)	-0.49 (0.36)	-0.36 (0.64)	1.00 (0.75)	-0.36 (0.76)	0.56 (0.35)	0.07 (0.36)	0.69* (0.42)	0.13 (0.26)	-0.41 (0.29)
Cases	519	633	605	113	94	444	332	390	639	539
LogL ^{c/}	-318.85	-307.95	-126.15	-70.72	-51.54	-227.39	-201.35	-221.54	-427.91	-354.34
Log2	-326.78	-315.92	-139.23	-78.21	-56.37	-241.69	-205.61	-231.06	-437.25	-364.09
X ² (d.f.) ^{d/}	15.9(9)	15.9(9)	26.2(9)	15.0(9)	9.7(9)	28.6(9)	8.5(9)	19.1(9)	18.7(9)	19.5(9)

Notes to Table 2:

- ^{a/}The dependent variable is equal to 1 if the employer's and employee's answer disagree, and 2 otherwise. See text for interpretation of coefficients.
^{b/}Standard errors appear in parentheses. A t statistic ≥ 1.96 is signified with **, $t \geq 1.65$ (<1.96) is signified with *.
^{c/}LogL is the likelihood value for the equation given; Log2 restricts all coefficients but the constant to zero.

Table 3.

Models of Disagreement and Lack of Information
on Pension Provision Variables:
Three Wage Logit Models Including Missing Data^{a/b/}

	Pension Type		Retirement Provision Information							
	Information		CONTRIBUTION		EARLY POS		EARLY REQ		EARLY AGE	
	TYPE	TYPE	ECONTPAY	EARLYPOS	EARLYREQ	EARLYAGE	EARLYREQ	EARLYAGE	EARLYREQ	EARLYAGE
UNION	-0.29 (0.24)	-0.46** (0.22)	0.93** (0.40)	0.09 (0.26)	-0.37 (0.25)	0.04 (0.27)	0.09 (0.26)	-0.10 (0.29)	-0.17 (0.26)	
F _{SIZE} (*10 ⁻²)	0.01 (0.22)	-0.29 (0.22)	-0.01 (0.35)	0.003 (0.25)	0.18 (0.22)	-0.44* (0.26)	0.04 (0.24)	0.12 (0.26)	-0.01 (0.24)	
ROI	0.003 (0.02)	-0.01 (0.02)	0.04 (0.04)	0.03 (0.03)	-0.06** (0.03)	-0.02 (0.03)	-0.04 (0.03)	0.01 (0.03)	-0.02 (0.03)	
PRODTOT	0.17 (0.48)	0.67 (0.47)	0.53 (0.88)	-0.04 (0.49)	0.57 (0.63)	-0.66 (0.53)	0.41 (0.58)	-1.11* (0.62)	-0.77 (0.59)	
EDUC	-0.03 (0.05)	0.02 (0.04)	0.11 (0.08)	0.002 (0.06)	-0.20** (0.05)	0.10* (0.06)	0.01 (0.06)	-0.10* (0.06)	-0.12** (0.06)	
TENURE (*10 ⁻²)	-0.02* (0.01)	-0.01 (0.01)	0.03** (0.01)	-0.03** (0.01)	-0.01 (0.01)	0.03* (0.01)	0.01* (0.01)	-0.03** (0.01)	-0.03** (0.01)	
GRFAMING (*10 ⁻⁵)	0.08 (0.26)	-0.05 (0.25)	-0.06 (0.46)	0.24 (0.48)	-0.003 (0.56)	-0.82 (0.47)	-0.30 (0.46)	-0.85* (0.51)	-0.62 (0.43)	
FEMALE	0.15 (0.23)	-0.08 (0.20)	0.03 (0.38)	0.01 (0.25)	-0.43* (0.26)	-0.07 (0.26)	-0.30 (0.26)	0.17 (0.28)	-0.08 (0.25)	
NONWHITE	0.64** (0.32)	0.50 (0.30)	-0.09 (0.56)	0.55 (0.35)	0.60* (0.34)	-0.41 (0.39)	-0.08 (0.36)	0.15 (0.47)	0.70* (0.42)	
Case ₂ /	640	640	640	541	541	541	541	541	541	
Log ₁ /	-625.30	-256.44	-256.44	-475.91	-475.91	-551.40	-551.40	-536.50	-536.50	
Log ₂	-637.09	-274.97	-274.97	-496.13	-496.13	-566.49	-566.49	-551.40	-551.40	
X ² (d.f.) ^{d/}	23.6(18)	37.1(8)	37.1(8)	40.4(18)	40.4(18)	30.2(18)	30.2(18)	29.8(18)	29.8(18)	

Notes to Table 3:

a/ The dependent variable is equal to 1 if the employee provides no answer to the survey question (missing data); 2 if the employer's and employee's answer disagree, and 3 if they agree. See text for interpretation of coefficients.

b/ Standard errors appear in parentheses. A t statistic ≥ 1.96 is signified with **; $t \geq 1.65$ (< 1.96) is signified with *.

c/ Log₁ is the likelihood value for the equation given; Log₂ restricts all coefficients but the constant to zero.

d/ Critical values for X²(18) are 26.0 at 10% and 28.9 at 5%.

Appendix Table
Variable Definitions and Descriptive Statistics

Mean Values
(standard deviations)

	All Covered <u>Workers</u>	Workers with <u>DB Plans</u>	Workers with <u>DC Plans</u>
FEMALE (%)	0.36 (0.48)	0.34 (0.47)	0.45 (0.50)
NONWHITE (%)	0.11 (0.32)	0.12 (0.32)	0.11 (0.31)
EDUCATION (yrs)	13.08 (2.43)	12.98 (2.43)	13.59 (2.37)
TENURE (yrs)	12.08 (10.23)	12.45 (10.26)	10.02 (9.85)
INCOME (000\$)	32.76 (41.83)	29.73 (26.54)	45.72 (80.12)
UNION (%)	0.39 (0.49)	0.45 (0.50)	0.11 (0.31)
FSIZE (#)	55.34 (50.11)	58.54 (51.31)	40.55 (42.76)
ROI (%)	9.62 (4.60)	9.33 (4.53)	10.84 (4.56)
PRODTOT (%)	0.88 (0.22)	0.87 (0.23)	0.91 (0.20)

Variable Definitions and Sources:

FEMALE	1=yes, 0=no Source: SCF Respondent File
NONWHITE	1=yes, 0=no Source: SCF Respondent File
EDUCATION	Years completed Source: SCF Respondent File
TENURE	Years with current employer Source: SCF Respondent File
INCOME	Family income (000\$) Source: SCF Respondent File
UNION	1=yes, 0=no Source: SCF Respondent File
FSIZE	Number of employees per firm by industry Source: US Bureau of the Census. <u>County Business Patterns, 1982</u> . Table 1a. Washington, D.C.: USGPO, 1984.
ROI	Return on investment by industry Source: Leo Troy. <u>Almanac of Business and Industrial Financial Ratios</u> . Englewood Cliffs, NJ: Prentice-Hall, 1984.
PRODTOT	Proportion of production employees per firm by industry. Source: <u>Statistical Abstract</u> . Table 661. Washington, D.C.: USGPO, 1985.