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AND PANEL DATA: ANALYSIS WITH
EMPLOYER PROVIDED PLAN DESCRIPTIONS

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ABSTRACT

This study analyzes changes in the value of defined benefit (DB) pension plans over time. It uses summary plan descriptions provided by the employers of respondents to the Survey of Consumer Finances (SCF) in 1983 and in 1989, applying them to similar earnings histories. Pension changes between 1990 and 1995 are also analyzed, using employer plan descriptions for large firms published by the Watson Wyatt Company.

Substantial changes are found in pension values and pension accruals between the two SCF cross-sections. For example, the median value of DB plans at age 55 is 40 percent higher in 1989 than in 1983. Also, early retirement age falls over the time period.

Because there are important changes in the composition of the pensions in each cross-section, those who are covered by the same plan in both years experience smaller changes than are suggested by comparing cross-section data from two different time periods. Nevertheless, those who are continuously covered by the same pension also experience important pension changes over the period. For example, a fifth of those continuously covered by a defined benefit plan experiences a substantial change in early retirement date and early retirement benefits. In addition, subgroups of continuously covered workers experience pension changes in opposite directions. These changes will have a substantial influence on retirement behavior, but are dampened when comparing the differences over time in the means and medians of plan features and plan values.

Using the data from Watson Wyatt on the pensions offered by thirty-nine of the fifty largest companies, we also find similar evidence of important changes over the period 1990 to 1995. Again a sizable minority of firms experience very large changes in their plans.

These findings suggest that changes in successive cross-sections of pensions will exaggerate the changes in continuing plans. Nevertheless, substantial errors will be introduced into retirement studies if pension incentives and pension values are estimated from a single cross-section under the assumption that pension plans remain stable over time.

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I. Introduction

Pensions account for a major share of household wealth.¹ They exert a significant influence on retirement behavior (Gustman and Steinmeier, 1986). Pensions also appear to influence total savings (Gustman and Steinmeier, forthcoming).

Nevertheless, pension values are not often counted as part of total wealth, especially in studies of the wealth of those who are below retirement age. Moreover, studies of retirement often do not adequately measure the effects of pension accrual on retirement. These omissions may cause us to misunderstand savings and retirement behavior and to recommend misguided policies.

Pension wealth and pension incentives are not widely measured because of the extraordinary effort that is required to obtain reliable measures, especially for those who are still employed and covered by defined benefit (DB) pensions -- plans that determine benefits based on earnings history and job tenure according to a specified formula. Although one can ask survey respondents about how their plan determines benefits, their answers are not always complete or accurate.²

There is an emerging strategy for evaluating pensions, and in particular for evaluating DB pensions. A few surveys have collected pension plan descriptions after obtaining the names and

¹ In the Health and Retirement Study, pensions account for 23 percent of the wealth of Americans on the verge of retirement (Gustman, Mitchell, Samwick and Steinmeier, forthcoming).

² For example, respondents often misidentify plan type, i.e., whether the pension is defined benefit or defined contribution (Gustman and Steinmeier, 1989). Yet in the leading surveys, the sequence of questions that the respondent is asked about the pension is keyed on their answer to plan type.

addresses of employers from survey respondents. Pensions are evaluated by translating the plan descriptions into formulas that are then applied to the respondent's reported work history. Three panel data sets have asked respondents for the name of their employer, collected Summary Plan Descriptions (SPDs), which are detailed descriptions of pension plan rules that the employer must provide to covered workers by law, and have mathematically represented the features of these pension plans so they could be used to value pension wealth and measure retirement incentives. In two of the surveys, the Health and Retirement Study (HRS) and the National Longitudinal Study of Mature Women (NLS-MW), pension plan descriptions have been obtained only in a single cross-section. (The HRS will soon collect another round of plan descriptions for respondents who continue to work.) The Survey of Consumer Finances (SCF) has collected employer provided pension plan descriptions at more than one point in time, both in 1983 and 1989.³ In the near future a fourth survey, the Panel Study on Income Dynamics (PSID), is also planning to collect pension plan descriptions.

An important question is whether it is sufficient to collect pension plan descriptions in a single cross-section, or whether pension plan descriptions need to be collected periodically. If pension formulas change very slowly over time, then a single cross-section will provide a reliable indication of pension values and pension incentives for current workers, even by the time they retire. This is especially so if, as with the HRS or NLS-MW, at the time of the survey respondents are approaching retirement age, so there are only a few years over which the pensions might change.

³ Although the SCF is primarily a study of independent cross-sections, the 1989 interview did contain a group of individuals who had previously been interviewed in 1983.

A second possibility is that aggregates don't change very much over time, but some respondent's pensions are gaining value, while others are losing them. In that circumstance, a single cross-section will be a reliable indicator of population values, not only at the time of the survey, but as of the age of retirement and beyond. However, if individual plans are changing over time, then even if the changes are offsetting, an analysis that attempts to explain individual behavior based on a single cross-section of pension plan descriptions may provide misleading results. In the case of retirement behavior, it is crucial for estimating structural models to pinpoint the location and size of the spike in the pension accrual profile. If that changes from the time of the survey until the time the individual retires, there will be substantial errors in the parameters estimated for retirement models.⁴ Indeed, if the spike in a pension accrual profile is mislocated, parameter estimates for a structural model of retirement may not converge on anything near the population parameter values. For example, assume that in some firms, the age of eligibility for early retirement benefits has been declining over time, so that by the time of retirement, the spike in the pension accrual profile is mislocated at too high an age. If in fact respondents retire just after becoming eligible for an early retirement benefit, but the measured data from the single cross-section (incorrectly) suggest that respondents are not eligible for an early retirement bonus in the year they are observed to retire, the measured data will suggest that respondents are not responsive to economic incentives, and are primarily driven by idiosyncratic preferences.

A third possibility is that changes in pension cross-sections reflect changes in the composition of the covered population as well as changes in the plans of continuously covered

⁴ That is, if plans are changing over time, then by the time they retire, survey respondents will face different incentives for retirement than are suggested by the plan descriptions collected a number of years before retirement.

workers. In that case, changes in the cross-section will be influenced by the composition of pension losers and gainers.

This paper investigates how defined benefit plans have changed in cross-section data, and in a small panel of plans.⁵ The differences between measured changes in cross-section and panel data suggest whether pension changes observed in cross-section data reflect changes in continuing plans, or changes in the composition of plans covering worker over time. We also analyze changes at the individual level to determine whether some plans change in offsetting directions, so that changes that are not evident in the aggregate must nevertheless be considered at the micro-level, e.g., to understand retirement behavior.

II. Pension Changes in Sequential Cross-Sections of the Survey of Consumer Finances

In this section, we consider a comparison of the DB pensions over the period between two Surveys of Consumer Finance, 1983 and 1989. We evaluate the pensions for both years over a uniform population, eliminating changes in plan values which are due to changes in the earnings or age structure of the covered population, and consider only those changes in values and features which are the result of changes in the pensions themselves. The sample population we use to evaluate the pensions is the group of respondents in the 1989 SCF who indicated that they had a pension in their current job. The sample is further restricted to full-time private sector workers who were 30 to 55 years old at the time of the survey, and who were covered by DB plans.⁶

⁵ Available evidence suggests that pensions have changed significantly over time so as to encourage earlier retirement. Ippolito (1990) and Mitchell (1992).

⁶ There were 4262 households in the SCF sample in 1983, and 3143 households in 1989. Pensions are counted as defined benefit if they include a defined benefit component. If a worker is covered by two or more pensions in a single job, the values of those pensions are aggregated to a single pension value for the worker. In these cases, a worker's pension is considered to be defined

For each respondent in the sample population, we calculate the date and age at which they started the current job. From the wage the respondent reports at the time of the survey, we impute a path of past and potential future wages using the tenure and experience coefficients from a standard wage regression. The resulting date of hire and path of wages allows us to calculate the value of any pension that might be associated with this individual. In addition, we determine the value of several variables that are necessary to match pensions to this individual. These variables are gender, union status, two categories of firm size, four industry categories, three occupation categories, and ten wage categories.

The next step is to look at a particular group of pension summary plan descriptions, such as those from the 1983 SCF. For those summary plan descriptions, we determine the gender, union status, firm size, industry, occupation, and wage level of the respondent who had that pension in 1983. This is necessary because these variables were not coded in the computer record describing the summary plan descriptions. The pensions are then grouped according to these variables. This provides the set of 1983 pensions that applies to workers with any particular combination of characteristics. For instance, there may be three 1983 plans covering female, nonunion, large firm, white collar manufacturing workers with a wage rate in the fourth decile.

The final step is to match the individuals in the respondent sample with defined benefit plans and to evaluate the plans. For each individual in the respondent sample, we used the six variables described above to find the 1983 pensions which had covered workers in similar circumstances. This procedure, for instance, prevents a 1983 pension covering a \$125,000 executive from being applied to a \$30,000 manual laborer. If there is only one 1983 pension

benefit if any of the aggregated plans contains a defined benefit component.

matching these variables, it is evaluated and the figures are reported. If there is more than one matching pension, each pension is evaluated and weighted according to the weights of the individuals who had each pension. If there were no 1983 pensions matching all the categories, variables are aggregated until a match is found. The same process is repeated for the pension summary plan descriptions from the 1989 SCF.⁷

Between the plans collected in 1983 and those collected in 1989, the early retirement age fell by about a year, from age 55.0 to 54.3. The normal retirement age stayed about the same between the two sets of plans, at age 61.7. Table 1 reports the median values of the 1983 pensions, as applied to the reference sample of respondents, and compares them to the values of the 1989 pensions. These values are the present discounted value of the pension on the assumption that the individual separates from the firm at the indicated age. At age 55, roughly the mean early retirement age in the sample, pension wealth increased by 43 percent over the 1983-89 period.⁸ At any given age, the 1989 defined benefit plans appear to have been roughly 40% more valuable than the 1983 plans. This figure is consistent with earlier work using the SCF, which suggests that pension values have changed a great deal over the six year period.⁹

⁷ Although it would have been possible to match the pensions exactly, since the respondent sample was also from the 1989 survey, we used the matching procedure described for the 1983 pensions for this group of pensions as well. This facilitates comparability in the results and eliminates any question that the results might be caused by using a matching procedure in one year and not the other.

⁸ Note that the increase in defined benefit plan values does not occur because the 1989 plans are evaluated at higher levels of years of service or at higher wages, since both sets of plans were applied to the same individuals, using the actual dates of hire and wage profiles for these individuals. Nor can it be attributed to specified dollar amounts in the 1983 plans, since all dollar amounts in the 1983 plans are scaled up to 1989 levels using an index of average weekly wages.

⁹ Samwick (1993) and Anderson, Gustman and Steinmeier (forthcoming).

Table 2 reports on the median accruals of the DB pensions in the two cross-section groups. The top part of the table gives the accruals by specific years of age. The accruals are strongly positive at ages 50 and 55, which is at or before the early retirement age in most pension plans. By age 60, after most of the pensions have made participants eligible for early retirement but not for normal retirement, the median accrual is relatively close to zero. At age 62, many plans offer normal retirement, and the accrual turns negative. At age 65, almost all of the plans offer normal retirement, and the median accrual is even more negative. Note that ages 50, 55 and 62, the absolute magnitude of the accruals is larger for the 1989 than for the 1983 pensions. The increases, between 1983 and 1989, in the accruals at ages 50 and 55, are roughly proportional to the increase in values of these plans, as indicated in Table 2.

The bottom part of the table looks at the accruals from a different perspective. The columns of this part of the table correspond to where the individual is in relation to the early and/or normal retirement ages. More specifically, the first column in the table looks at the three years before the early retirement age. For each pension, the accrual is averaged over these three years. The figure in the table reports the median of these averages. Thus, the first entry in the table indicates that the median 1983 pension had an average annual accrual of \$3,400 in the three years prior to eligibility for early retirement. By 1989, the median accrual before early retirement had grown to \$4,300, which again indicates that this accrual had grown roughly in proportion with the growth in the value of the pensions.

The next three columns pertain only to those pensions which permit early retirement at some age prior to the eligibility for full retirement benefits. Most plans are in this category. The first of these columns, which is the second column in the table, indicates the median accrual in the

year the individual attains eligibility for early retirement. In both 1983 and 1989, this accrual is considerably higher than the accrual in the years before attaining eligibility, reflecting the fact that many pensions have provisions which effectively give a bonus to employees who stay at least until the early retirement age. Moreover, this accrual is almost 50% higher in 1989 than in 1983, suggesting that these kinds of provisions are becoming more common and more generous.

The third column of the table reports on the accrual between the early retirement age and the normal retirement age, again only for those pensions for which the two retirement ages are distinct. These accruals are little changed between 1983 and 1989. The fourth column gives the median accrual in the year the participant became eligible for normal retirement. Unlike the case at early retirement, the normal retirement accruals have declined between 1983 and 1989. The fifth column pertains only to the relatively small number of plans which do not have early retirement provisions, or for which the calculated early retirement age coincides with the calculated normal retirement age. This column reports median accruals in the year that participants in these plans attain the normal retirement age. The median accrual in this single year is very large in 1983, at \$33,500, and it almost doubled between 1983 and 1989.

The last column indicates the median accruals in the three years following eligibility for full retirement benefits. The absolute magnitude of the accrual losses does not seem to have increased between 1983 and 1989.

Summarizing this section, we find that the median value of defined benefit plans increased sharply between 1983 and 1989. There also is some evidence that accrual rates in the median plans are providing increased incentives for participants to remain at least until becoming eligible for early retirement. After the early retirement age is reached, however, the accrual rates in these

plans in 1989 are almost the same as in 1983, despite the fact that the median values of the plans increased considerably.

III. Explaining the Changes

The increase in the median values of defined benefit plans between the 1983 and 1989 cross-sections can be explained in two ways. One explanation is that the generosity of individual plans increased over time. An alternative explanation is that employment shifted so as to raise the value of the average plan observed in the cross-section. To distinguish between these two explanations, we now examine changes in the 72 plans that have covered the same individuals in the same jobs over the six year period, using the hire dates and wage paths of the respondents who were actually covered by these pensions.

The average early retirement age in these plans fell by about a year, from age 54.2 in 1983 to age 53.1 in 1989. This reduction is similar to the reduction found for the cross-sections. The average normal retirement age, however, unexpectedly rose from age 61.0 in 1983 to age 62.3 in 1989. Table 3 summarizes changes in pension values for these plans. At age 55, median plan values increased about 20 percent over the period, or about half the increase observed in cross-section data. At older ages the changes are much smaller in the panel than between the cross-sections.

Results in Table 3 also suggest that an important minority of respondents experienced a large change in pension wealth over the period. Thus while median changes are small, mean change in plan values are much larger, increasingly so at higher ages. Increases in the values of plans that grew more generous more than offset declines in the values of the plans that grew less generous. Nor are the changes in the means the result of only a few plans whose changes were

extreme outliers. The next two lines in Table 3 report that the first and third quartiles of the changes are considerably different from zero, suggesting that at least a quarter of the plans lost a significant part of their value between 1983 and 1989, and another quarter of the plans gained an even larger part of their value over that period.

The impression that there were a fair number of plans whose value changed considerably in both directions is reinforced by the seventh line of the table, which indicates that the standard deviation of the changes is quite large. It should be noted that the standard deviation is more susceptible to outliers than are the other measures that we have been considering.

The overall conclusion from the top part of Table 3 is that the median changes of continuing plans between 1983 to 1989 are considerably less than the 30 to 40 percent increases suggested by comparing cross-section data collected in 1983 and 1989, but that there is a great deal of heterogeneity. Table 4 reports on the pension accruals for the continuing defined benefit plans. In the cross-section results, between 1983 and 1989, the accrual in the year the participant becomes eligible for early retirement increases by almost \$5,000. Among the continuous pensions, however, there is certainly no evidence of this increased premium; if anything, the calculations indicate that the accrual was almost \$5,000 lower in 1989 than in 1983.

IV. Findings for the 1990's

Each year the Watson Wyatt Company provides detailed information on the pensions offered by the largest fifty firms. We construct a panel by combining the data for the thirty-nine firms evaluated in both 1990 and 1995.¹⁰ Heterogeneity is the hall mark of the pension changes

¹⁰ One firm in the Wyatt reports began its plan in the late 1970's and only credited years of service after that date. This led to substantially higher pensions in 1995 than in 1990 for similar individuals, even though the plan had changed very little. To prevent this firm from skewing the

observed in this sample. Watson Wyatt evaluates pensions for a standardized set of covered workers, and relates yearly pensions to final salary. This is in contrast to the calculations of present value in the preceding sections. At age 55 with 30 years service, for eighty percent of the firm pension plans, changes in the ratio of benefits to final pay are five percent or less. For the other fifth, the changes are larger than five percent in absolute terms, ranging from -18 percent to +36 percent. When changes in the ratio of normal retirement benefits to final pay are examined at age 60 with 30 years service, again 80 percent of the plans exhibit changes over five years that are within five percent of the base. But twenty percent of the plans exhibit changes larger than five percent, ranging from 27 percent to 47 percent.

We also did some comparisons of differences in treatment between newly hired workers and those who had been at the firm for a number of years. These differences are likely to be due to changes in the pension plan somewhere in the firm's history, where the changes applied to new hires and the older workers fell under the old plan. In 1990, about 85 percent of the companies treated old and new hires roughly the same. In the remaining five companies, the discrepancies were quite large. For the annual retirement benefit at 65 years of age and 35 years of service, old workers had benefits that were about twice as high relative to their final wage as did new ones. This shows considerable change in the pensions over time at each firm, although workers approaching retirement age would fall under the old worker category. By 1995, the gap decreased for all groups, but the old workers still received pensions worth fifty percent or more than the pensions of new workers.

results, we have excluded it from the analysis.

As we found with the SCF, changes in the Wyatt data are large enough to suggest that the 1990 plan descriptions are misleading when applied to describe retirement incentives in 1995, at least for an important minority of firms.

V. Conclusion

This study has analyzed changes in the value of defined benefit (DB) pension plans over time, using summary plan descriptions provided by the employers of respondents to the Survey of Consumer Finances in 1983 and in 1989, applying them to similar earnings histories. It used summary plan descriptions provided by the employers of respondents to the Survey of Consumer Finances (SCF) in 1983 and in 1989, applying them to similar earnings histories. Pension changes between 1990 and 1995 were also analyzed, using employer plan descriptions for large firms published by the Watson Wyatt Company.

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Using the data from Watson Wyatt on the pensions offered by thirty-nine of the fifty largest companies, we also find similar evidence of important changes over the period 1990 to 1995. Again a sizable minority of firms experience very large changes in their plans.

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Table 1: Median DB Pension Values in SCF Cross-sections (in thousands of 1989 dollars)					
Value of:	By Age				
	50	55	60	65	70
	1983 Plans	28	61	87	97
1989 Plans	39	87	119	132	115

Value of:	Value At Retirement Age Specified in Plan	
	Early Retirement Age	Normal Retirement Age
1983 Plans	70	100
1989 Plans	90	128

Source: Author's calculations.

Table 2: Median Pension Accruals in SCF Cross-sections Defined Benefit Plans Only (in thousands of 1989 dollars)						
Accrual of:	By Age					
	50	55	60	62	65	
	1983 Plans	2.8	2.7	0.8	-2.0	-5.9
1989 Plans	3.9	3.7	0.8	-2.5	-5.8	
By Pension Eligibility Status						
	All Plans	Plans With Early Retirement			Plans Without Early Retirement	All Plans
	Before Early or Normal Retirement Age	At Early Retirement Age	Between Early and Normal Retirement Ages	At Normal Retirement Age	At Normal Retirement Age	After Normal Retirement Age
Accrual of:						
1983 Plans	3.4	9.8	2.7	2.0	33.5	-2.8
1989 Plans	4.3	14.6	2.9	0.6	65.5	-2.8

Source: See Table 1.

Table 3: Median Pension Values of Continuing Pensions in the SCF (in thousands of 1989 dollars)					
	By Age				
	50	55	60	65	70
Value of:					
1983 Plans	31	69	122	131	110
1989 Plans	40	82	125	135	127
Median Change	2	1	1	5	12
Mean Change	10	12	22	30	39
Quartiles of Change					
First	-7	-12	-13	-17	-10
Third	18	19	44	65	59
Standard Deviation of Change	47	64	72	85	101

Source: Author's calculations based on 72 observations with defined benefit plans from the same employer in both 1983 and 1989.

Table 4: Median Pension Accruals of Continuing SCF Pensions Defined Benefit Plans Only (in thousands of 1989 dollars)							
By Age							
Accrual of:	50	55	60	62	65		
	1983 Plans	2.5	4.1	0.6	-3.4	-9.6	
	1989 Plans	2.8	5.1	2.3	-4.6	-8.3	
By Pension Eligibility Status							
	All Plans	Plans With Early Retirement			Plans Without Early Retirement	All Plans	
	Before Early Retirement Age	At Early Retirement Age	Between Early and Normal Retirement Ages	At Normal Retirement Age	At Normal Retirement Age	After Normal Retirement Age	
Accrual of:							
1983 Plans	3.6	14.0	1.8	-1.1	21.0	-4.1	
1989 Plans	3.5	9.1	1.3	-0.8	39.8	-4.9	

Source: See Table 3.