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THE PENSION COST OF CHANGING JOBS

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ABSTRACT

Workers covered by defined benefit pension plans receive lower benefits at retirement if they leave their current job before reaching retirement age. This study estimates the magnitude of this pension loss for workers in the May 1983 supplement of the Current Population Survey, using pension formula estimates from the 1983 Employee Benefit Survey. The pension loss is generally greatest between the ages of 35 and 54 and represents roughly half of a year's earnings for that age group. The loss tends to be quite high in the declining mining and manufacturing sectors. This probably resulted in lower voluntary attrition at a time of massive layoffs and plant closings.

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## I. Introduction

Employer pensions represent a significant proportion of total compensation in many companies. Since pension provisions contain a variety of work incentives for employees, management can use pensions to achieve certain personnel objectives. Providing a portion of total compensation in the form of a promise of future retirement benefits can alter worker behavior and result in greater overall work effort, lower turnover, and earlier retirement. The economic effects of pensions have been a topic of discussion since the 1950s; however, it is only recently that economists have attempted to explicitly model specific pension characteristics and to empirically test the effect of these pension provisions on worker behavior.

While numerous studies have examined the retirement incentives of pensions, there has been relatively little research examining the link between the use of pensions as a form of compensation and employee turnover. In a recent research project for the Department of Labor, we examined the theoretical effects of pensions on turnover and then developed and tested an empirical model of this relationship.<sup>1</sup> In this paper, we focus on the reduction in the lifetime value of pension benefits associated with job changes. We report the magnitudes of this pension loss across different industries and occupations, as derived from pension formulas in the 1983 Employee Benefit Survey and applied to a representative sample of workers in the May 1983 Current Population Survey. These values show the cost to workers of changing jobs at various ages.

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<sup>1</sup>Steven Allen, Robert Clark and Ann McDermid, "Job Mobility, Older Workers and the Role of Pensions." Final Report for U.S. Department of Labor Contract No. J-9-M-5-0049, November 1986.

## II. Why Do Pensions Alter Turnover Rates?

Workers covered by pensions have greater job tenure and lower turnover rates than similar workers who are not covered by an employer pension. The impact of pensions and other personal and job characteristics on job duration can be illustrated using the Pension Supplements to the May 1979 and 1983 Current Population Survey (CPS). In a recent paper, we calculated that the mean job duration for workers employed by firms providing pensions was over 8 years in both of these samples compared to a mean job duration of only 4 years for workers on jobs without pensions.<sup>2</sup> These data were also used to derive retention rates -- the percentage of persons who were still at their 1979 job in 1983. Among those with 30 years or less of service in 1979 the retention rate for workers whose employers provided pensions was 61 percent as compared to 41 percent for workers whose employer did not provide pensions. Regression analysis which holds worker and firm characteristics constant further supports the hypothesis that workers covered by pensions are much less likely to leave their jobs than other workers. This study showed that pension coverage was one of the most important factors in explaining job duration.

Why are workers covered by a pension more likely to have greater job tenure and lower turnover rates? A primary factor limiting mobility of pension participants is the loss in lifetime pension benefits associated with job

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<sup>2</sup>Steven Allen, Robert Clark, and Ann McDermed, "Pensions and Lifetime Jobs: The New Industrial Feudalism Revisited," North Carolina State University, Faculty Working Paper No. 116, January 1988.

changes.<sup>3</sup> Most people are aware that job changers have lower lifetime benefits than persons who remain with a company for their entire career. A simple example can illustrate this point. Consider a worker who works for a single firm for 40 years. For the first 20 years, the worker is paid \$20,000 and for the last 20 years he is paid \$40,000.

He is covered by an earnings based, defined benefit plan which has the following benefit formula

$$B = (.015) (T) (E)$$

where B is the annual pension benefit at retirement, T is the years of service, and E is the average final earnings used to calculate the benefit. The formula indicates that the worker receives 1.5 percent of average final earnings for each year of work. In this example, let final earnings be based on the final 5 years of earnings. The worker's benefit at retirement is then \$24,000 per year  $[(.015) (40) (40,000)]$ .

This benefit can be compared to that of a worker with the same lifetime earnings who changes employers after 20 years. Assume that both employers have the same pension as shown above so that the worker will receive 2 pensions at retirement. The sum of the two benefits will be less than the one benefit

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<sup>3</sup>Pensions may also help firms distinguish among workers who are likely to remain with the company from those that are more likely to quit after a shorter tenure. This sorting of workers is accomplished by offering deferred compensation which is payable only to those workers who remain with the company. Pensions may also lower turnover if they are provided by firms that offer higher total compensation. Workers will be less likely to quit if their firm pays above market compensation. The impact of pay levels on layoffs is more difficult to predict.

received by the one job worker. This can be shown by calculating the two benefits.

$$B_1 = (.015) (20) (20,000) = 6,000$$

$$B_2 = (.015) (20) (40,000) = 12,000$$

The two job worker will receive two pensions which total only \$18,000 or \$6,000 less than the single job worker. One method of explaining this difference is to note that the first 20 years of employment for the single job worker produced the equivalent of a pension of \$12,000 while the same 20 years for the worker who switched jobs generated only \$6,000. The difference is due to the final earnings used to calculate the retirement benefits (\$20,000 for the job changer as compared to \$40,000 for the single job worker). The present value of the \$6,000 reduction in annual retirement benefits is the pension loss associated with job changes.

More generally, the pension loss reflects the difference between pension wealth based on earnings at retirement and pension wealth based on earnings to date. Consider the case of a employee who starts to work for a firm and expects to remain with that company for his entire career. Based on this expectation, he accepts reduced earnings sufficient to fund a retirement

benefit based on his expected earnings just prior to retirement.<sup>4</sup> The formula for his expected future annual benefit is

$$B(E) = a T W_R$$

where  $a$  is the generosity parameter of the pension plan and  $W_R$  is the average of final earnings at retirement. His expected pension wealth (PWE) is the present value of receiving  $B(E)$  each year from retirement until death. The change in pension wealth from an additional year of work represents his pension compensation which he pays for in the form of a reduction in earnings of an equal amount.

If he decides to leave at some point in his career prior to retirement, his actual pension benefit ( $B(A)$ ) will not be the expected benefit based on earnings at retirement that he has paid for but instead will be the vested benefit based on his current earnings. The formula for benefits that he will actually receive at retirement is

$$B(A) = a T W_A$$

where  $W_A$  is the average of earnings to date. The loss in pension wealth occurs because the worker has paid for PWE but only receives PWA, the pension wealth

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<sup>4</sup>This model of pension loss assumes that the worker is covered by an implicit, long-term contract. While there is some disagreement among economists concerning the nature of the pension contract, the available evidence on age-earnings profiles post-retirement increases in benefits, and quit rates indicates that pensions are part of an implicit contract and workers and firms act according to the terms of the implied contract.

associated with receiving an annual benefit of  $B(A)$ .<sup>5</sup> Therefore, pension loss is defined to be  $PWE - PWA$ .

The concept of pension loss can be illustrated by a simulation model of lifetime compensation. Consider a worker who is initially hired at age 25 and receives total compensation of \$20,000 which is divided into earnings and pension compensation. Total compensation grows at a rate of 5.5 percent per year. The worker is covered by a defined benefit pension with a normal retirement age of 65 and a benefit formula of .015 times average earnings in the last five years times years of service. The market interest rate is set at 6 percent. Table 1 shows the compensation for the worker at various ages along with the implied pension loss that the worker would incur if he quit his job.

The simulation shows that pension loss is relatively low during the early working years when pension wealth is small because workers have little tenure and relatively low earnings. With continued employment, pension wealth rises and so does pension loss. In this example, pension loss peaks at age 55 at a value of \$105,082 which represents 115 percent of annual earnings. For a worker who continues on the same job, pension loss declines as the worker approaches retirement age. The loss will be zero at retirement.

The magnitude of the loss is a function of specific pension plan and personal characteristics, as well as certain economic conditions. Pension loss is a concept that relates only to defined benefit plans. In defined contribution plans, the worker typically has a direct claim on the pension fund and there will be no loss to the worker associated with leaving. The loss is most notable in the earnings based formulas which are the most frequently used

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<sup>5</sup>For a detailed description of the concept of pension loss, see Richard Ippolito, Pensions, Economics and Public Policy, Homewood: Dow Jones-Irwin, 1986.



formula types for defined benefit plans; however, other benefit formulas can also impose losses on departing workers. Faster growth in nominal earnings increases the loss from leaving a pension-covered job because it increases the difference between  $W_R$  and  $W_A$ . The larger the pension loss, the greater the incentive for the worker not to leave the firm. We expect to observe the greatest effect on mobility among workers aged 40 to 54 because the ratio of the capital loss to earnings is greatest in those years. The prospect of substantial losses in pension wealth may be sufficient to deter many older workers from leaving their jobs despite the lack of growth in their industrial sector. Concern about the reputation of the firm in the labor market also will keep most firms from laying off workers, even though such layoffs would provide the firm with a capital gain. Therefore, firms that provide pensions could very well have fewer layoffs. Of course, firms that go into bankruptcy or face substantial reductions in the demand for their product may decide that they have little reputation to lose by laying off workers.

#### Construction of Pension Loss

In general, data do not exist that give the magnitude of the pension loss associated with turnover.<sup>6</sup> Instead pension loss must be calculated from the individual pension and worker characteristics. The most careful previous study of this question was done by Kotlikoff and Wise, who estimated pension loss

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<sup>6</sup>The Survey of Consumer Finances (SCF) does include data on pension provisions as well as individual work history. We have examined these data and our results for pension wealth are reported in Ann McDermed, Robert Clark and Steven Allen, "Pension Wealth, Age-Wealth Profiles, and the Distribution of Net Worth," in Robert Lipsey and Helen Stone Tice (Eds.), The Measurement of Savings, Investment, and Wealth, forthcoming. The implied capital losses in the SCF are somewhat larger than for the CPS sample.

across a sample of over 2,000 pension plans for a set of hypothetical worker characteristics.<sup>7</sup> For this study, we apply pension data from the 1983 Employee Benefit Survey (EBS) to workers in the May 1983 CPS Supplements. Plans in the EBS are sorted into eight industry and three occupational classifications. Within each industry-occupation cell there are as many as five different types of defined benefit pension formulas (e.g., simple earnings-based or dollar per year of service). The formula type which covered the largest proportion of participants within each cell is assumed to apply to all participants in that cell. The mean parameter values for that formula type are used as the estimate of the benefit formula. For earnings-based formulas, the key parameters are the generosity factor (percentage of average earnings) and the length of the salary averaging period. Age and service requirements for normal retirement are assumed to be equal to the cell means of all plans in the cell regardless of formula type. The estimates of pension loss assume that expected retirement age is the normal retirement age as specified in the plan.<sup>8</sup>

These pension formulas from the EBS are assumed to represent the pensions covering workers in the May Supplement of the 1983 CPS. Using personal data on service at their current jobs and earnings reported by the respondents, we calculate for each individual the pension wealth based on expected earnings at retirement and the actual pension wealth that the worker will receive upon leaving the firm. Age specific mortality rates that prevailed in 1983 are used in these calculations. The interest rate is assumed to be 9 percent. The

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<sup>7</sup>Laurence J. Kotlikoff and David A. Wise, "The Incentive Effects of Private Pension Plans," in Zvi Bodie, John Shoven, and David A. Wise (eds.), Issues in Pension Economics, Chicago: University of Chicago Press, 1987, pp. 283-336.

<sup>8</sup>A complete discussion of this methodology is found in Allen, Clark, and McDermed, 1986.

pension loss is then determined for all persons covered by a pension in their 1983 job.

#### Pension Loss in 1983

The effect of pensions on industry-specific turnover rates depends on the fraction of persons covered by pensions and the magnitude of the pension loss. Pension coverage rates for persons working more than 35 hours per week in 1983 are shown in Table 2. These rates include persons covered by defined contribution plans, which tend to be found most often in trade, finance, services and mining.<sup>9</sup> The data show that coverage varies considerably across industrial categories, with very high rates found in manufacturing and mining. Between 1980 and 1986 employment declined in mining by 10 percent and manufacturing by 4 percent. In contrast, low coverage rates are found in the trade, financial, and service sectors which have been growing relatively rapidly. Employment in these sectors increased from 13 to 19 percent from 1980 to 1986.<sup>10</sup> Thus the potential for pensions reducing turnover is greatest in the sectors of the economy which have been declining in employment.

Table 3 presents the mean pension loss for all workers covered by a pension in the various age-industry categories. The dollar values show the loss in pension wealth incurred if workers change jobs. For example, workers aged 35 to 54 in manufacturing face a pension loss of about \$12,000 to \$14,000

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<sup>9</sup>Laurence J. Kotlikoff and Daniel E. Smith, Pensions in the American Economy, Chicago: University of Chicago Press, 1983, pp. 169-170.

<sup>10</sup>U.S. Bureau of The Census, Statistical Abstract of the United States 1987 (108th edition), Washington: USGPO, 1987, p. 379.

if they change jobs. This represents about one half of a year's earnings for these workers. Absolute and relative losses are much lower for workers in the service sector.

Even within an industry, benefit formulas vary considerably across occupational groups. To allow for these differences, we determined the magnitude of pension loss by occupation within the various industries. Tables 4 to 6 show the mean pension loss for three occupational groups. Some industries are not shown in these tables due to small sample sizes. Among professional workers the dollar value of the loss is much higher in the manufacturing and financial sectors than in the service sector. The loss is also higher as a proportion of a year's earnings for these professional workers.

As expected, the age pattern of the pension loss indicates that the cost of leaving is relatively low early in one's worklife when total pension wealth is small. The loss associated with job change then increases with continued work until around age 50 when the loss peaks. The pension loss then declines until it reaches zero near the normal retirement age. This pattern is similar to that shown in Table 1 for the simulation analysis.

In summary, these numbers show that the average worker between the ages of 35 and 54 must forfeit approximately one half of a year's earnings to change jobs. This cost is in addition to any other search and moving costs the individual incurs when switching employers. A larger fraction of the workers in manufacturing and mining face these costs and these costs tend to be larger in those industries. Thus, the pension barriers to mobility are quite high in the two major industrial sectors which have been declining in employment through 1986.

### Sensitivity of Job Change to Pension Loss

In an earlier paper, we estimated the impact of pension loss on the likelihood of changing employers between 1975 and 1982 for respondents in the Panel Study of Income Dynamics (PSID). Among these respondents, a \$1,000 increase in the capital loss resulted in a 3.7 percentage point decrease in the probability of leaving one's 1975 job by 1982. Restricting the estimates to only workers aged 45 to 54, a \$1,000 increase in the pension loss results in a 7.6 percentage point decrease in the turnover rates. For respondents in the PSID, the pension loss associated with a change in jobs accounted for a significant share of the difference in turnover between workers covered by a pension and those who did not have a pension on their current job.<sup>11</sup>

If these estimates are generalizable to the labor force, we can conclude that pensions play an important role in reducing mobility among older workers. The data shown in Tables 2 to 6 indicate that much of this reduction will be in the manufacturing and mining sectors of the economy due to their higher coverage rates and relatively high mean pension loss. These are sectors that have been declining in relative size. As a result, lower exit rates among older workers increases the personnel adjustments which firms in these industries must make.

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<sup>11</sup>Similar results were obtained using the National Longitudinal Survey of older men for job changes between 1971 and 1976. For a detailed discussion of these results, see Allen, Clark and McDermed 1988.

### Pensions, Public Policy and Job Change

Can changes in public policy reduce the effects of pensions on turnover rates? Recently, a series of proposals have been offered to increase worker mobility by altering pension regulations. These suggestions include lowering the vesting standards and requiring lump-sum distributions of pension wealth at the time of job termination. The Tax Reform Act of 1986 reduced vesting standards so that in the future participants must be fully vested after five years instead of the current 10 year standard.<sup>12</sup> Lowering vesting standards will increase the pension of job changers by a small amount. This occurs because workers who previously had zero pension wealth if they left now will be entitled to a pension. The increase accrues only to workers with between 5 and 10 years of job service; however, and for most of these workers the gain in pension wealth will be relatively small.

This change will lower slightly the cost of job changes primarily for younger workers and as a result will produce a modest increase in mobility. Mandatory lump-sum distributions as called for in the Pension Portability Act or by Choate and Linger will have virtually no effect on the pension loss associated with job changes and thus will not increase mobility.<sup>13</sup> If mobility is retarded by the pension loss, only policies that significantly reduce this

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<sup>12</sup>Existing pension regulation allows for several vesting options which include partial vesting after as little as five years. The 1986 legislation also allows for partial vesting after only three years. Currently, most firms have selected 100 percent vesting after 10 years and we expect that most firms will adopt five year-100 percent vesting.

<sup>13</sup>Pat Choate and J.K. Linger, The High-Flex Society, New York: Knopf, 1986. If job changers can earn a higher rate of return on the funds they receive than the interest rate used to determine the cash out value, then the pension loss associated with job change is reduced somewhat.

barrier to job changes, such as mandatory portability of service credits or indexation of vested benefits, will increase labor market mobility.<sup>14</sup>

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<sup>14</sup>For a more detailed assessment of the effect of these proposals on pension wealth, see Robert Clark and Ann McDermed, "Pension Wealth and Job Changes: The Effects of Vesting, Portability, and Lump-sum Distributions," The Gerontologist, August 1988, pp. 524-32.

Table 1. Employee Compensation and Pension Loss

Age	Tenure	Earnings	Pension Comp.	Pension Wealth	Capital Loss
25	0	\$ 18,670	\$ 1,330	\$ 1,330	\$ 1,330
30	5	24,353	1,786	10,717	9,272
35	10	31,762	2,401	26,414	21,346
40	15	41,415	3,234	51,752	38,399
45	20	53,982	4,373	91,835	60,452
50	25	70,303	5,964	155,076	85,357
55	30	91,432	8,247	255,654	105,082
60	35	118,664	11,612	418,048	96,610
64	39	145,802	15,587	623,494	31,700
65				690,677	0

Source: Data are based on a simulation of compensation for a male worker who remains with a firm throughout his worklife. He is assumed to have been hired at age 25 with total annual compensation (earnings plus pension compensation) equal to \$20,000. Total compensation grows at 5.5 percent per year. The worker is covered by a pension with a normal retirement age of 65 and a benefit formula of 0.15 times average earnings in last five years times years of service. The market interest rate is 6 percent.



Table 2. Pension Coverage Rates of Workers, by Age and Industry

Age	Industry							
	Mining	Const.	Durable Man.	NonDurable Man.	Trans.; Comm.; Utilities	Trade	Fin.; Ins.; Real Estate	Services
25-34	62	30	65	60	63	36	57	35
35-44	83	46	80	64	72	40	64	41
45-54	68	42	80	71	82	39	63	44
55-64	78	48	81	71	72	46	58	42

Source: May Supplement, 1983 Current Population Survey.

Table 3. Pension Loss for Workers Covered by a Pension in 1983, by Age and Industry<sup>a</sup>

Age	Industry							
	Mining	Const.	Durable Man.	NonDurable Man.	Trans.; Comm.; Utilities	Trade	Fin.; Ins.; Real Estate	Services
25-34	\$11,034 (.42)	\$ 3,403 (.13)	\$ 6,048 (.29)	\$ 5,891 (.30)	\$11,501 (.49)	\$ 5,249 (.26)	\$ 6,358 (.33)	\$ 4,029 (.21)
35-44	19,572 (.65)	6,625 (.23)	13,947 (.54)	11,751 (.51)	18,529 (.72)	10,682 (.47)	14,886 (.60)	9,341 (.35)
45-54	13,490 (.49)	7,869 (.28)	13,112 (.53)	11,852 (.59)	10,630 (.40)	12,215 (.54)	19,828 (.79)	10,744 (.44)
55-64	9,808 (.25)	4,384 (.17)	6,944 (.33)	6,069 (.33)	5,452 (.21)	8,855 (.44)	10,638 (.50)	9,721 (.39)

<sup>a</sup>Values in parentheses indicate the mean of the pension loss divided by annual earnings.

Table 4. Pension Loss for Professional Workers in 1983, by Age and Industry<sup>a</sup>

Age	Industry				
	Durable Manufacturing	NonDurable Manufacturing	Transportation; Communication; Utilities	Finance; Ins.; Real Estate	Services
25-34	\$11,592 (.40)	\$ 9,564 (.35)	\$10,739 (.32)	\$ 8,055 (.34)	\$ 4,918 (.24)
35-44	24,628 (.69)	20,420 (.63)	17,680 (.47)	16,833 (.61)	11,301 (.40)
45-54	25,816 (.68)	26,028 (.66)	*	25,419 (.74)	14,968 (.57)
55-64	11,727 (.32)	9,934 (.28)	*	*	13,741 (.50)

\*30 or less observations.

<sup>a</sup>Values in parentheses indicate the mean of the pension loss divided by annual earnings.

Table 5. Pension Loss for Technical and Clerical Workers in 1983, by Age and Industry<sup>a</sup>

Age	Industry				
	Durable Manufacturing	NonDurable Manufacturing	Transportation; Communication; Utilities	Wholesale; Retail Trade	Finance; Ins.; Real Estate
25-34	\$ 8,533 (.44)	\$ 9,254 (.43)	\$11,789 (.56)	\$ 5,271 (.27)	\$ 5,552 (.33)
35-44	15,531 (.61)	12,893 (.55)	17,277 (.76)	10,215 (.45)	13,932 (.60)
45-54	10,496 (.48)	10,235 (.56)	11,755 (.48)	12,492 (.56)	17,853 (.83)
55-64	5,437 (.31)	3,153 (.17)	*	9,935 (.50)	8,663 (.49)

\*30 or less observations.

<sup>a</sup>Values in parentheses indicate the mean of the pension loss divided by annual earnings.

Table 6. Pension Loss for Production Workers in 1983, by Age and Industry<sup>a</sup>

Age	Industry					
	Const.	Durable Manufacturing	NonDurable Manufacturing	Transportation; Communication; Utilities	Wholesale; Retail Trade	Services
25-34	\$ 3,877 (.14)	\$ 3,693 (.20)	\$ 3,659 (.24)	\$11,538 (.50)	\$ 4,118 (.23)	\$ 2,209 (.15)
35-44	6,551 (.23)	9,365 (.46)	7,453 (.44)	19,431 (.77)	8,181 (.47)	3,947 (.23)
45-54	7,601 (.27)	8,424 (.48)	8,301 (.57)	11,282 (.43)	7,790 (.43)	3,919 (.24)
55-64	3,317 (.14)	5,739 (.33)	5,768 (.40)	5,685 (.22)	5,875 (.37)	3,254 (.22)

<sup>a</sup>Values in parentheses indicate the mean of the pension loss divided by annual earnings.