NBER WORKING PAPER SERIES

WHY DO PENSIONS REDUCE MOBILITY?

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Working Paper No. 2509

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
February 1988

This paper was presented at the Fortieth Annual Meeting of the Industrial Relations Research Association. The Department of Labor supported this research under contract no. J-9-M-5-0049. Linda Shumaker, Myra Ragland, and Fred Gale provided research assistance. The research reported here is part of the NBER's research program in Labor Studies. Any opinions expressed are those of the authors and not those of the National Bureau of Economic Research.

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ABSTRACT

Previous studies have found that workers who are covered by pensions are much less likely than other workers to leave their jobs, but the evidence on how specific pension characteristics affect turnover is inconclusive. This paper examines how mobility is affected by vesting standards, the compensation level, and the capital loss of pension wealth for job changers. In two different data sets, we find that the capital loss is strongly associated with lower turnover rates, whereas vesting and the compensation level have relatively little impact. Large capital losses are mainly associated with lower layoff rates rather than lower quit rates.

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Academics and practitioners in the industrial relations field have long known that workers who are covered by defined benefit pension plans are less likely to leave their employer than those who are not covered. Most discussions have attributed this to vesting provisions, which prevent workers from collecting a pension if they leave the firm before meeting certain age and years of service criteria. Previous econometric studies of the relationship between pensions and mobility have found much lower mobility among workers covered by pensions, but the evidence on the role of vesting is inconclusive.[1] In addition previous studies have not allowed for the possibility that even among vested workers, defined benefit pension formulas penalize job changing. In this paper we estimate a proportional hazards model over two different data sets to determine how vesting and benefit formulas affect mobility among workers covered by pensions.

Pension characteristics and mobility

A person who leaves a job before becoming vested will not receive any pension benefits from that employer upon retirement. This creates an obvious incentive to stay on the job until vesting.

Pension benefits for most persons covered by defined benefit plans are determined by formulas which pay a percentage of final earnings for each year of service. As long as earnings rise over time, the use of final earnings (or the average of earnings in the final years with the employer) in the formula penalizes those who leave the firm, even if they are fully vested.

To see this, consider a worker who earns $40,000 after 20 years in the labor market and $80,000 after 40 years. Assume that all employers pay an

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[1]Mitchell (1982) examines the overall effect of pensions on mobility; Schiller and Weiss (1979) and Wolf and Levy (1984) focus on the impact of vesting provisions.

annual pension equal to 1.5 percent of final earnings for each year of service with that firm when one reaches age 65. If a worker stays with a single employer throughout this period, the pension will be $48,000 (.015 x 40 x $80,000). Suppose instead that this person leaves his employer after the 20th year and moves to another firm with an identical pension plan. Assuming lifetime earnings remain the same, the total pension payments received from both employers amount to only $36,000, of which $12,000 (.015 x 20 x $40,000) comes from the first job and $24,000 comes from the second job (.015 x 20 x $80,000). Anticipating this loss of pension benefits, workers become much less likely to move to another job when they are covered by pensions with this type of benefit formula.

These explanations of the impact of vesting and benefit formulas on mobility highlight the key forces at work in the relationship between pensions and mobility, but they are misleadingly simple because they ignore the question of how much earnings have been reduced to pay for the worker's pension. Suppose that after 20 years the worker has paid for a pension benefit of $24,000 upon retirement (half of the ultimate $48,000 benefit he would get if he stayed for 40 years), but is legally entitled to a benefit of only $12,000 if he leaves after 20 years. In this situation the worker faces a capital loss of pension benefits if a job change occurs. On the other hand, if after 20 years with the firm the earnings reductions are just large enough to fund a benefit upon retirement of $12,000, then the worker has nothing to lose by moving to another firm.[2]

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[2]If the worker had stayed at his original job, then the remaining $36,000 of annual pension benefits would have been paid for during the last 20 years with the firm under this assumption.

The key issue is whether the pension is part of a series of short term (e.g., one year) labor contracts or part of a lifetime contract with a bonding mechanism to penalize mobility. In the former case, which is discussed in Bulow (1982), a worker pays only for the benefits to which he is legally entitled, namely those based on his earnings of $40,000 (which would be his final earnings with the firm if he left after 20 years). In the latter case, which is analyzed in Ippolito (1985, 1987), the worker pays for benefits based on expected final salary ($80,000), but stands to collect a benefit based only on his current salary if he leaves the firm before the end of the contract. The difference between these two benefits represents a capital loss to the worker if he leaves his employer before retirement, which should discourage voluntary quits.

In addition, large capital losses could be associated with lower layoff rates. Lazear (1979) has argued that firms can increase productivity by adopting payment schemes which pay workers less than the value of their output at the beginning of the employment relationship and more than the value of their output toward the end. This scheme is part of a long term contract between the worker and the firm, under which the firm promises the worker a long term job as long as the worker's performance is adequate. Those with inadequate performance forfeit the option to receive the delayed payments, which would include a capital loss of pension wealth. Although firms have an incentive to fire workers and collect a capital gain on their pensions, concern about labor market reputation and the ability to write similar productivity-enhancing contracts in the future can prevent this from happening. As a result, layoff rates could also be inversely related to the size of the capital loss.

The impact of vesting rules on mobility also hinges on the nature of the pension contract. Under the strict legal interpretation, firms do not owe workers any pension benefits until they are vested. If the pension is part of a short term labor contract, then workers will not pay for pension benefits until vesting and vesting per se should have no effect on the incentives for mobility. If unvested workers have lifetime contracts under which their salaries are reduced to pay for possible future benefits, then the guarantee of benefits at vesting will reduce the capital loss by a modest amount and make turnover more likely immediately after vesting than before.

A final possibility is that the lower turnover rates observed for workers covered by pensions merely reflect a higher overall level of compensation. All previous studies of the impact of pensions on mobility have included wage rates or earnings among the exogenous variables. Holding wages constant, workers with pensions receive more total compensation than other workers and are less likely to quit. The overall impact of pay levels on mobility is ambiguous, however, because layoff probabilities could very well be higher for more highly paid workers.

Methodology

We have outlined three mechanisms through which pensions can reduce mobility: capital losses, vesting provisions, and higher pay levels. To estimate the impact of each of these variables on mobility, we estimate a proportional hazards model.[3] Let $f_i(t)$ be the probability that person i will leave his employer at time t, $F_i(t)$ be the cumulative probability that person i

[3]For an introductory discussion of duration analysis and the proportional hazards model, see Allison (1984) and Kiefer (1987).

will have left at or before time t, and 1 - $F_i(t)$ be the probability that person i will still be with his employer at time t. Then the hazard rate for person i is defined as $H_i(t) = f_i(t)/[1 - F_i(t)]$. Increases in the hazard rate are associated with a greater likelihood that a person will leave his employer.

In the proportional hazards model proposed by Cox (1972), $H_i(t)$ is specified as the product of an arbitrary function of time H(t) which is the same for everyone and another function containing variables X_i with unknown coefficients β. Generally this latter function is specified as $\exp(X_i\beta)$, giving us

(1) $$H_i(t) = H(t)\exp(X_i\beta).$$

This specification has two convenient properties. First, $d\ln H_i(t)/dX_i = \beta$, meaning that β indicates the relative change in the hazard in response to a one unit change in X_i. Second, by not specifying a functional form for H(t), there is less concern about the sensitivity of the results to distributional assumptions. The estimates depend on only the rank order of the times workers are observed leaving their employers. We estimate (1) with the unsupported SAS supplementary procedure PHGLM, written by Frank Harrell of the Duke Medical Center.

Included among the variables in X_i are an indicator of whether or not the worker was vested, an estimate of average hourly compensation which includes pension compensation, and an estimate of the capital loss for each worker if he leaves the job held at the beginning of the sample period. By estimating (1) over a sample of workers covered by pensions, we will be able to determine which, if any, of these three mechanisms is associated with lower turnover.

Data

Our estimates of (1) are obtained from the 1975-1982 Panel Survey of Income Dynamics (PSID) and the 1971-1981 National Longitudinal Survey of Mature Men (NLS). The samples are restricted to those covered by pensions. The hazard rate estimates are based on the year in which workers leave the firm with which they were employed at the beginning of the sample. Observations where the worker is still at the same firm at the end of the sample period are called right-censored, which simply means that the year in which they leave their job is not observed in the data. Our main concern is with how pensions affect quits and layoffs, but workers also leave their employers to retire or for other reasons. To prevent factors associated with retirement decisions from contaminating the results, we restrict the PSID sample to heads of household under age 55 and treat the workers in the NLS sample who retire as right-censored observations.

In addition to examining overall turnover rates, we also estimate separate proportional hazard models for quits and layoffs. In the quit model, cases where the respondent left the job for any other reason (such as a layoff or disability) are right-censored. The same type of adjustment is made in the layoff model as well.

The NLS and the PSID both report pension coverage, but the PSID does not report vesting status and neither data set reports the capital loss. In our analysis of the PSID, we assume that all workers become fully vested in their tenth year with their employer. To estimate the impact of vesting on turnover, we include a dummy variable equal to one if the worker was vested in 1975 and another dummy equal to one if the worker was vested by 1980. If turnover is greater for workers who were vested or for those who became vested during the

sample period, this would indicate that vesting provisions are an important factor generating lower turnover among workers covered by pensions.

The capital loss equals the difference between the pension income the worker would receive if he stayed with his original employer and the pension income he would receive if he left that firm and took another job with an identical pension plan. A detailed discussion of how the capital loss was estimated appears in Allen, Clark, and McDermed (1988). Here we focus on data sources and key assumptions.

Estimates of the pension benefit formula for each worker are derived from the 1983 Employee Benefit Survey (EBS). Plans in the EBS were sorted into eight industry and three occupational classifications. Within each industry-occupation cell there are as many as five different types of 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 was 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 all PSID and NLS respondents in a given industry-occupation category. 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 in the EBS were assumed to be equal to cell means, based on all plans in the cell regardless of formula type.

Given the benefit formula, it is straightforward to calculate the capital loss with information on age, earnings history and years of service given by PSID and NLS respondents. The value of a life annuity was calculated beginning at the normal retirement age but discounted to the current age. The discount

factors used were 7 percent for the NLS and 9 percent for the PSID; these values correspond to long term top-grade bond rates at the beginning of the sample period. These rates were also used to make assumptions about nominal salary growth, following Ippolito (1985).

The benefit formula estimates are also used to calculate how much additional pension wealth legally accrues to the worker if he stays on his job an extra year. This amount, which is called pension compensation, represents the additional pay that workers covered by pensions receive. It is based on years of service and, in most cases, current and past salaries. To control for the total amount of compensation received by workers with pensions, we include a variable equal to the sum of the wage rate (or average hourly earnings) and average hourly pension compensation. If the lower turnover rates observed for workers covered by pensions are mainly attributable to higher overall levels of compensation, then this variable should be inversely related to turnover and the vesting and capital loss variables should be unrelated to turnover.

Other independent variables included in the proportional hazards model include union membership, years of service and its square, age, education, race, marital status, number of children, industry, occupation, and location. These come directly from the NLS and PSID at the beginning of the sample period.

Results

The coefficient estimates of the proportional hazards models in Table 1 indicate the impact of each variable on the log of the hazard rate $H_i(t)$. In the PSID a $1000 increase in the capital loss is associated with a 6.2 percent

reduction in the hazard for turnover (6.2 = exp(-.064) - 1). The mean capital loss for persons covered by pensions in the PSID is $5,024. Our estimates indicate that if this were reduced to zero, the hazard would increase by 37.9 percent. Although estimated with less precision, the results for the NLS are very comparable. For these older workers, a $1000 increase in the capital loss is associated with a 2.8 percent reduction in turnover. Because many older workers were not vested in 1971 and entitled to no benefits if they left their jobs, the average capital loss in this sample is much larger ($12,922) than in the PSID. Reducing this capital loss to zero would increase the hazard by 45.4 percent.

The capital loss is much more strongly associated with reductions in the layoff hazard than the quit hazard in both the NLS and PSID. In terms of the theories outlined above, this may indicate that capital losses influence mobility mainly through being part of an underpay-early/overpay-later compensation scheme. Another possibility is that it is very difficult to distinguish between quits and layoffs in questionnaires where the worker is asked what happened to a job that was held a year ago.

The vesting variables are unrelated to turnover in the PSID. In the NLS vested workers are much less likely to leave their jobs than unvested workers, controlling for years of service with the 1971 employer. This is exactly the opposite of what one would expect if vesting were the key pension characteristic responsible for lower turnover.

Higher overall compensation levels are associated with higher hazard rates for turnover, quits, and layoffs in the NLS. This contradictory finding is probably attributable to either a correlation between wages and some unobserved variable (such as mobility costs or general human capital) or the

limited age range of the NLS sample, in which everyone was 50 to 64 in 1971. Nonetheless, it is very difficult to use this evidence to claim that the higher compensation level resulting from pension coverage is responsible for lower turnover. In the PSID, the turnover hazard is unrelated to compensation levels.

As for the key control variables included in the model, there is no correlation between years of service at the beginning of the sample period and mobility in either the PSID or NLS. Except for a lower quit probability for union members in the PSID, there is no relationship between union membership and mobility.

Implications

This paper has examined whether the lower turnover rates observed for persons who are covered by pensions are attributable to capital losses, vesting provisions, or compensation levels. The evidence indicates that the capital loss is strongly associated with lower turnover rates, whereas vesting and compensation levels have relatively little impact. Further, large capital losses are mainly associated with lower layoff hazards rather than lower quit hazards. Unless this is an anomaly resulting from mismeasurement of the causes of separations, this evidence indicates either that deferred compensation schemes increase productivity (and thus reduce layoffs) or that employers are sufficiently concerned about labor market reputation and the ability to offer deferred compensation schemes in the future to prevent them from laying off workers and collecting a capital gain on their pensions.

Another important mechanism through which pensions can reduce mobility is by influencing the type of employee which the firm is able to attract. If

some workers are inherently more prone to turnover than other workers, then firms with pensions are more likely to attract those with low odds of turnover. Because the data sets used here are restricted to workers covered by pensions, this study has not been able to gauge the importance of this factor. In the labor force, most turnover is concentrated among workers with two or fewer years of service, a group for which the capital loss is quite small and the results of this study may be of limited applicability.

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Table 1. Coefficient estimates for proportional hazards models of turnover, quits, and layoffs from 1975-82 PSID and 1971-1981 NLS.

	PSID			NLS		
	Turnover	Quits	Layoffs	Turnover	Quits	Layoffs
Capital Loss	-.064	-.032	-.107	-.029	.034	-.058
	(.026)	(.031)	(.043)	(.020)	(.032)	(.028)
Vested	-.222	-.540	.012	-1.021	-.716	-1.170
	(.489)	(.658)	(.789)	(.324)	(.558)	(.417)
Became vested	-.014	-.144	.153			
	(.248)	(.330)	(.404)			
Average hourly compensation	-.022	-.019	-.020	.113	.163	.022
	(.032)	(.040)	(.052)	(.044)	(.059)	(.090)
Years of service	-.027	-.006	-.001	-.005	-.115	.030
	(.064)	(.084)	(.103)	(.048)	(.085)	(.061)
Years of service squared	.002	.001	.001	-.001	-.0002	-.001
	(.001)	(.002)	(.002)	(.001)	(.0024)	(.002)
Union	-.193	-.419	.122	.301	.250	.464
	(.144)	(.198)	(.226)	(.305)	(.590)	(.384)
Sample size	774	774	774	764	764	764
Uncensored observations	304	175	118	91	30	58

Note: Standard errors are reported in parentheses. Each equation also contains age, race, schooling, marital status, number of children, industry, occupation, and location as control variables. Sex is also included as a control in the PSID; labor force size and local unemployment rates are included in the NLS. The samples are restricted to persons covered by pensions. Turnover consists of quits, layoffs, and separations caused by other factors such as strikes or the end of a temporary job.