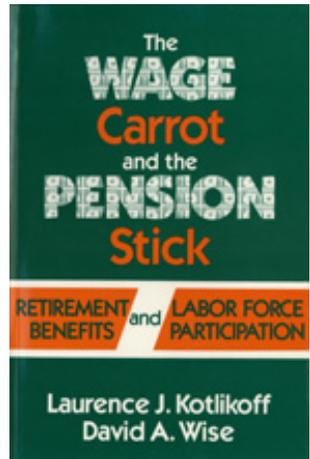

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Introduction

Laurence J. Kotlikoff
Boston University

David A. Wise
Harvard University



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Laurence J. Kotlikoff, David A. Wise

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Introduction

Private pensions are playing an increasingly important role in the U.S. economy. Almost half of the U.S. workforce is currently participating in a private, state, or local pension plan, and almost a third of current retirees are recipients of pension benefits. Pension funds hold over 10 percent of U.S. financial assets, and pension liabilities represent a major source of business debt.

Much of the growth in private pensions has occurred in the last three decades. During this period, and especially in the last decade, the labor force participation of older workers had declined dramatically. While much of this trend may be due to higher incomes coupled with a desire for increased leisure, it appears that the retirement incentives of private pensions may also be inducing widespread retirement. For older workers covered by private pensions, pension accrual is typically substantial prior to specific ages and then becomes significantly negative after these ages. Such accrual profiles provide very substantial incentives to retire. Such incentives are the primary focus of this monograph.

Analysis of pension accrual can also provide insight into the structure of the labor market. Many economists view the labor market as primarily a spot market in which a worker is paid each year for work done that year; others view employers and workers as entering into long-term contractual arrangements which may be implicit as well as explicit. Under such arrangements, compensation for work done in the present may be paid in the future. Information on pension accrual can provide information on the empirical relevance of the contract versus spot market views of the labor market.

A third important reason for studying pension accrual concerns government policy towards "pension backloading." Pension backloading refers to pension plans that provide very little pension accrual up to a specific age and substantial pension accrual after a

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specific age. This feature of pension plans typically means that pension benefits are much smaller for employees who change jobs than for those who don't, holding earnings constant. Much of the regulation of vesting rules contained in ERISA, the Employees Retirement Income Security Act of 1974, and in subsequent legislation reflects an effort to limit pension backloading. Despite these and related efforts, backloading remains a feature of a large fraction of defined benefit pension plans. The backloading under current plans is due to quite typical age-related and service-related provisions of normal and early retirement benefit formulae.

Other reasons for studying pension accrual include worker mobility, sex and age discrimination, firm valuation, and proper disclosure to workers of pension benefit information. Clearly, if the labor market is best characterized as a long-term contractual arrangement between workers and firms, then the future path of pension accrual is an important element of that contract. If future pension accrual is substantial, workers may be effectively "locked in" to their present firm. Thus, workers approaching the age of full vesting or of substantial pension accrual may delay switching jobs until they have exhausted pension accrual on their current jobs. Others may change jobs without fully appreciating the loss in potential pension accrual that such change entails.

Since defined benefit pension formulae are sex blind and since women typically live longer than men, the pension cost of employing women may exceed that for men in many firms. If firms are unable to pay women a smaller nonpension compensation, the total labor cost of hiring women will exceed that of hiring men and may mitigate against employment of women. Pension accrual also differs due to the age of the worker. If newly hired older workers accrue pension benefits at a faster rate than newly hired younger workers, and if firms cannot pay older workers less than younger workers, then firms may be less willing to hire older workers. Knowledge of vested pension accrual is of obvious importance to the proper valuation of firms since accrued vested benefits are a financial liability. While the accountants and actuaries of major U.S. corporations and unincorporated businesses calculate aggregate accrued vested liabili-

ties, the accounting procedures vary widely. In addition, knowledge of a firm's overall liability is different from knowledge of the pension accrual of its particular workers. The complexity of pension benefit formulae calls into question whether employers and personnel managers fully understand the nature of pension compensation. The complexity also suggests that workers may not understand the extent of pension accrual. If workers are overvaluing their pension benefits, they may be accepting too little in the form of nonpension compensation. Alternatively, they may undervalue their pension benefits and seek too much in nonpension compensation. The complexity of pension accrual suggests the need for annual statements indicating each worker's accrued benefit and providing projections about future accrual.

This monograph examines pension accruals, both their size and their incentive effects, particularly with respect to retirement behavior. It combines (in parts of chapters 2, 3 and 4 and appendices I and II) the results of our previous research (Kotlikoff and Wise 1985 and 1987) on pension accrual in U.S. firms, with new findings (reported in chapters 5 and 6 and appendix III) on pension accrual and retirement behavior in one very large U.S. firm. The analysis relies primarily on two sources of data. The first is the Bureau of Labor Statistics' 1979 Level of Benefits Survey (BLS-LOB). This survey of 1469 establishments with 3,386,121 pension participants, provides extremely detailed information concerning pension benefits, vesting, and early retirement formulae, all of which are crucial inputs to the calculation of pension accruals. The second data set, denoted here as FIRM, contains the complete work histories of over 122,000 employees who were working at some time during the period 1981–1984 for a large Fortune 500 company. While the name of this company cannot be revealed, the company is in the service industry.

The BLS-LOB data are useful for exhibiting typical patterns of pension accrual as well as indicating variations across pension plans in accrual patterns. The FIRM data can be used to study the retirement response to age-pension-accrual profiles.

The monograph is organized as follows. The remainder of this introduction discusses more fully three key issues motivating the

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analysis of pension accrual. The first is the trend toward early retirement; the second is the question of pension backloading; and the third is the spot versus contract views of the labor market. Chapter 2 explains pension benefit accrual and illustrates age-pension-accrual profiles arising under typical pension plan provisions. The third chapter first describes the BLS-LOB data. Next it uses the Retirement History Survey (RHS) and the Current Population Survey (CPS) to calculate representative age-earnings profiles by age, sex, occupation, and industry. These age-earnings profiles are then used to study typical as well as unusual age-pension-accrual profiles among the universe of U.S. defined benefit plans. Chapter 4 uses the same data and procedures as chapter 3, but focuses on the pension costs of job mobility and differences by age, sex, industry and occupation in pension accrual. Chapter 5 begins with a presentation of the FIRM's data. Next it describes the FIRM's benefit formula in close detail. From the FIRM's accrual profile it is clear that most of the FIRM's employees have a very strong incentive to retire at the FIRM's early retirement age, age 55. Chapter 6 examines the retirement response to the FIRM's accrual profile. The final chapter summarizes the main findings of this study.

The principal conclusions of this monograph are:

- (1) The age-accrual profiles of typical pension plans exhibit sharp discontinuities at the ages of vesting, early retirement and normal retirement.
- (2) In most firms with defined benefit plans, pension accrual gives workers a very substantial incentive to leave the firm after the age of early retirement and an even greater incentive to leave after normal retirement age.
- (3) The old age work disincentives of private pension plans typically are very large and exceed social security old age work disincentives.
- (4) Government vesting and related legislation notwithstanding, sizeable pension backloading remains an important feature of a significant fraction of defined benefit plans.
- (5) There is a very wide variation across pension plans in pension accrual profiles and, consequently, in retirement incentives.

- (6) For younger workers in some firms the expected loss in pension benefits due to job change is quite substantial.
- (7) For middle age and older male and female workers earning the same nonpension wage, there is a roughly 10 percent male-female difference in pension benefit accrual assuming average male and female mortality probabilities.
- (8) Analysis of the retirement behavior in the FIRM indicates a very significant retirement response to the pattern of pension accrual.
- (9) Over 50 percent of 50-year-old employees of the FIRM leave before age 60, and 90 percent leave before age 65. The jumps in departure rates at specific ages coincide precisely with the discontinuities (kink points) in pension and social security accrual.
- (10) The FIRM's pension accrual increases the probability of workers age 55 leaving the FIRM before age 60 by approximately 30 percent, from 14 percent to 44 percent.
- (11) The pattern of pension accrual with age is strongly at odds with a spot market view of the labor market.

The Trend Toward Early Retirement

The trend toward early retirement dates from the beginning of this century (Ransom and Sutch 1986). In 1900, the labor force participation rate of males 65 and older was 58.4 percent. By 1930, this rate had declined to 53.9 percent. The decline over the next 30 years, beginning essentially at the inception of social security, was substantial; the 1960 participation rate of older men was 33.1 percent. But an even bigger percentage decline has occurred since 1960; the most recent statistics record a 1986 labor force participation rate of older men of only 17.5 percent.

The trend toward early retirement has occurred despite an increase in life expectancy. The expected length of life for 20-year-olds at the turn of the century was roughly 45 years; the current figure is 50. At 65, life expectancy is now 16.8 years; at the turn of the century it was only 11.9 years. The trend toward early retirement has also occurred despite major increases in wage compensation; on average,

annual real wage payments to workers have risen almost fourfold since 1900. A common explanation for the retirement trend is the increased demand for leisure associated with higher incomes. Like average annual real wage payments, real per capita income has increased enormously since 1900. The current figure measured in constant dollars is over four times the corresponding figure for 1900.

The acceleration in the rate of early retirement since 1960 appears to be due to factors other than increases in real income levels of the elderly, however. Many researchers have pointed to increases in social security benefits as a possible explanation (e.g., Hurd and Boskin 1984; Hausman and Wise 1985; Burtless 1986). Boskin (1977) stressed that social security's earnings test, which taxes back the social security benefits of workers whose earnings exceed rather small "exempt" amounts, may be an important cause of reduction in the labor force participation of older workers. Kotlikoff (1978) showed that many social security recipients adjust their labor supply to earn just under social security's exempt amounts.

Other researchers, particularly Blinder, Gordon, and Wise (1981), have cast doubt on the notion that social security induces early retirement, at least prior to age 65. They pointed out that between ages 62 (social security's early retirement age) and 65 (social security's normal retirement age) workers do not lose any social security benefits in present expected value if they continue to work, because by foregoing benefits between 62 and 65, the age 65 benefit is actuarially increased. These researchers also pointed out that there are recomputation features of social security's benefit calculation that constitute implicit subsidies to labor supply prior to age 65. After age 65, however, social security benefits are typically not increased enough if retirement is postponed to compensate for the reduced number of years that they will be received.

One may question whether social security beneficiaries are aware of and correctly understand provisions such as actuarial increases and benefit recomputations. In addition, it may well be that many social security beneficiaries are liquidity-constrained, in which case they may well need to start collecting social security benefits prior to age 65, and, once they become social security recipients they fall

under the earnings test. Hurd and Boskin (1984) stress liquidity constraints and social security's income effects as important factors in inducing early retirement. They use the Retirement History Survey (RHS) data and report that "any way the data were analyzed we found a positive association between retirement probabilities and social security wealth." They conclude that most of the substantial decline in labor force participation of the young elderly that occurred between 1968 and 1973 can be traced to increases in social security benefits.

Blinder and Gordon (1980) and Burtless (1986) base their analyses of retirement behavior on the same data as Hurd and Boskin, but their conclusions about social security's impact on retirement differ. Blinder and Gordon find that "pension plans . . . provide powerful incentives to retire at the age of eligibility for the pension . . . (but) Social Security has a much weaker effect, if any, on retirement decisions." Burtless states that "Social Security is found to have a precisely measured, but small overall effect on retirement." According to Burtless "rising Social Security benefits in the 1970s played only a small role in the decline in the average male retirement age." Hausman and Wise (1984) reach a similar conclusion in their analysis of the RHS data. They report that social security has an important effect on retirement, but that social security benefit increases in the early 1970s provide only a partial explanation for the reduced labor force participation over that period.

The study of Burtless and Moffitt (1984) is also based on the RHS, but it differs from Burtless (1986) in that it considers both retirement age and postretirement choice of hours of work. The conclusion from this analysis is also that social security has a statistically significant, but small effect on the age of retirement and that its effects operate through the level of social security benefits and the age at which benefits become available, rather than through social security's earnings test. Other analyses by Burkhauser and Quinn (1983); Fields and Mitchell (1984a, b); and Diamond and Hausman (1984) also report small social security effects.

Gustman and Steinmeier's (1983, 1985, 1986a, 1986b) analyses of retirement include the possibility of partial retirement at a reduced

wage. Their studies, also based on the Retirement History Survey, suggest an important role of both social security and pensions in retirement decisions; indeed in their (1983) paper they report that “. . . the combined effects of Social Security and pension benefits and mandatory retirement is to cause the percentage of individuals working full-time at age 66 to fall by 18.9 percentage points.”

While increases in social security benefits and the work disincentive from social security's earnings test may help explain reductions in labor force participation after age 62, these factors cannot explain increased retirement between ages 55 and 61. Since 1960, the labor force participation rate of males in this age range has declined significantly. As demonstrated in this monograph, private pensions appear to be playing an important role in inducing retirement at these ages as well as at age 62 and beyond; the work disincentives at specific ages arising under many defined benefit pension plans are quite substantial; indeed, they are often larger than those arising from social security (even ignoring issues of actuarial increases and benefit recomputation).

Indeed the effect on retirement that has been attributed to social security may largely reflect a failure to control for private pension plan provisions. Like social security, most private pension plans provide a very large penalty for working after 65; but none of the studies summarized above were able to control for the precise provisions of private plans.

Despite the potential importance of private pensions in inducing early retirement, there have been very few studies relating retirement to pension incentives. The reason is simply the limited available data detailing employee work histories together with the specific details of the employer's pension plan. There is an excellent Department of Labor data set detailing both work histories and pension plan provision for a representative sample of U.S. pension plans, but these data have not been made available to the public because of confidentiality concerns. Some limited analysis for the Department of Labor of these data by Gary Fields and Olivia Mitchell (1984a) indicates a significant retirement response to pension incentives.

Pension Backloading

Prior to ERISA, companies often required as many as 25 years of service for pension vesting. To protect workers from being dismissed, falling ill, or leaving their employment for other reasons immediately prior to becoming vested, ERISA mandated 100 percent vesting within 10 years of initial participation in a pension plan. The 10-year vesting rule was reduced to 5 years in the 1986 Tax Reform Act.

The intent of the vesting provisions of ERISA and the 1986 Tax Reform Act was surely to limit the extent of backloading of vested pension accrual. While it is true that delaying vesting is a mechanism for delaying the vested accrual of pension benefits, it is only one such mechanism. As this monograph makes clear, there are numerous other pension plan provisions determining the age pattern of vested accrual. These include numerous basic benefit formulae, provisions formulae determining supplemental benefits, rates of early retirement benefit reduction, and social security offset provisions. For a significant proportion of defined benefit pension plans, these and related features lead to very substantial backloading of accrued vested pension benefits. The FIRM's pension plan discussed in chapter 5 is a case in point. In this plan there is modest accrual of vested benefits prior to the plan's early retirement age and substantial pension accrual at the early retirement age. As a consequence, a worker who leaves the FIRM just prior to its early retirement age will receive a rather limited pension when compared to the pension of a worker who stays through the age of early retirement. The impact of these provisions is thus quite similar to those that would arise under a very long service requirement for vesting.

We are not suggesting that employers are deliberately designing defined benefit plans to circumvent the will of Congress; indeed, employers as well as workers may be unaware of the extent of backloading of pension accrual. (In the case of our FIRM, the extent of backloading was a surprise to several of the plan administrators.) What we are suggesting is that such backloading of vested pension accrual appears contrary to the intent of the vesting legislation and merits careful study by Congress.

Spot Versus Contract Theories of the Labor Market and the Use of Pension Accruals to Test these Theories

Under the spot market view of the labor market, the sum of annual nonpension compensation and annual pension accrual should equal the worker's annual output. If the worker's annual output is, for example, constant independent of age, any increases (decreases) with age in pension accrual should be offset dollar for dollar by decreases (increases) at the corresponding ages in nonpension compensation. While only one worker's output may change with age, it is unlikely to change precipitously from one age to another. In contrast, pension accrual can change dramatically with age, requiring offsetting dramatic changes in nonpension compensation according to the spot market view.

Understanding the extent of contractual arrangements between workers and firms is important for a host of economic issues ranging from the degree of wage flexibility over the business cycle to the availability of human capital insurance within the firm. Discriminating between "spot" and "long-term contract" views of the labor market is also critical for evaluating numerous questions specific to private pensions. One such question is whether workers and employers fully appreciate how complex pension plan provisions alter a firm's total compensation package. Evidence that labor markets closely accord with the predictions of a spot market would suggest rather small information problems. Equally productive workers, in this case, receive identical total annual remuneration regardless of their current employer or the specifics of the employer's pension plan.

A second question involves proper disclosure and valuation of a pension plan's net financial liabilities. In a spot market setting, an employer's net liability corresponds simply to the accrued value of vested pension benefits. Additional pension liabilities projected to arise from future employment, in such a setting, are matched dollar for dollar by future projected revenues associated with the worker's continued employment. The excess of projected over accrued liabilities should not, therefore, affect a firm's valuation and suggests no case for estimating and disclosing projected pension liabilities. Un-

der a long-term contract arrangement, on the other hand, revenue from continued employment need not match the accrual of future pension liabilities, plus the payment of wages, and the disclosure of projected rather than accrued liabilities is potentially more relevant for firm financial valuation.

A third question is the effect of pensions on labor mobility and hiring practices. In a spot market environment, the particular and quite peculiar rates of pension benefit accrual with age described in this monograph would have no consequences for labor mobility, since offsetting increases or reductions in direct wage compensation would leave the worker indifferent between staying on the current job or switching to another job offering an identical amount of total compensation. A spot market would also entail flexibility in wage compensation sufficient to permit hiring equally productive old and young, black and white, male and female workers, despite differences in their accrual of vested pension benefits reflecting age, race, and sex-specific mortality probabilities. Long-term contractual agreements, in contrast, may leave less flexibility to accommodate differences in individual circumstances.

Given knowledge of a worker's current and previous level of earnings, and the benefit and retirement provisions of his pension plan, one could, in principle, directly test the spot market hypothesis by checking whether, in each year, the sum of the increment to a worker's accrued vested pension benefits plus his wage compensation equalled his marginal product.¹ Unfortunately, a worker's marginal product is unobservable and difficult to estimate. This data limitation restricts, but, by no means precludes, inferences about spot versus contractual labor market arrangements.

As stated, the sum of the assumed age-earnings profile, measured in constant dollars, and the associated real pension accrual profile equals, under the spot market assumption, the age-marginal productivity profile. Hypothetical age-marginal productivity profiles derived in this manner exhibit quite sharp or implausible discontinuities at two critical ages, the age of full vesting, for plans with cliff vesting, and the early retirement age, for plans permitting early retirement on better than actuarially fair terms.² Making reasonable

assumptions concerning age-earnings profiles and interest rates, we find sizeable discontinuities (often as large as 40 percent) in hypothetical age-marginal productivity profiles for a large fraction of firms with defined benefit plans. An alternative statement of these findings is that for smoothly shaped age-marginal product schedules, wage compensation must potentially fall or rise by roughly 40 percent of the wage at critical ages to satisfy conditions of spot market equilibrium. These figures appear sufficiently large to rule out the hypothesis of annual spot clearing for a large segment of the U.S. labor market.

As Lazear's (1983) insightful study points out, the present expected value of accrued pension benefits represents a form of severance pay for workers who choose to separate from the firm. Such severance pay would naturally arise in contractual settings in which workers are paid (in wages) less than their marginal products. As the worker ages, the average value of this "severance pay" rises until the age of normal retirement, according to our findings. In a contractual setting, the implication of our finding of positive average pension accrual at all ages prior to normal retirement is that average real wages represent a lower bound for the average marginal product of workers covered by our sample of plans, up to the age of normal retirement. But after that age, accrual is typically negative, suggesting that the wage exceeds marginal product at some age. It is important to emphasize, however, that we find large deviations from the average, with large negative accruals after the age of early retirement in many plans. And for other plans with positive pension accruals between early and normal retirement, the decline in pension accrual from a large positive number to a small positive number in this age interval is, itself, a significant retirement incentive.

Finally, an additional implication of these findings is that compensating differential studies of the tradeoff between wages and pension benefits, if they are to be meaningful, cannot be based on cross-section evidence at a point of time. To understand the relationship between compensation in the form of wages versus pension benefits, one must consider the receipt of both over a long period of employment.