

EFFECTS OF PENSIONS ON LABOR MARKETS  
AND RETIREMENT

by

Robert L. Clark  
College of Management  
North Carolina State University

and

Joseph F. Quinn  
Department of Economics  
Boston College

presented at

ERISA After 25 Years: A Framework for Evaluation Pension Reform

A Conference Sponsored by  
The Brookings Institution  
Washington, DC  
September 1999

## **HUMAN RESOURCE MANAGEMENT, COMPENSATION, AND THE ROLE OF PENSIONS**

Employer-provided pensions represent an important part of labor compensation at many firms.<sup>1</sup> From 1950 until the enactment of the Employee Retirement Income Security Act (ERISA) in 1974, pension coverage and the generosity of pension plans increased throughout the American economy. Pension coverage rose from approximately 25 percent of the private workforce to about 50 percent with most workers participating in defined benefit plans. Since 1974, coverage has remained at about half the labor force and there has been a dramatic shift away from the use of defined benefit plans and towards increased utilization of defined contribution plans.<sup>2</sup>

The primary objective of this paper is to examine the effect of pension plans in the labor market; in particular, on labor productivity and mobility during working years and on the timing and nature of retirement.<sup>3</sup> We begin by asking why workers desire employer-provided retirement plans and why firms offer them. These preferences lie behind the structure of pension plans and the incentives they create to affect worker behavior. The core of this analysis is to describe how pension plans are expected to alter labor market outcomes and to assess the findings of empirical studies on the significance of these effects.

### **Employee Preferences for Pension Compensation**

Economic theory suggests that firms are willing to pay workers compensation equal to the value of their productivity. Compensation can take many forms, with the total cost being the most important issue to the employer. From this perspective, firms could be viewed as neutral sellers of employee benefits, willing to provide whatever combination of cash payments and benefits workers desire. Workers prefer a portion of their total compensation to be paid in the form of pension benefits because their net compensation is enhanced by the favorable tax treatment of pensions.

Since the 1920s, the federal income tax code has contained provisions granting favorable treatment for pensions. For example, qualified pension contributions and the

earnings of pension trusts are not subject to current taxation. Instead, benefits are taxed when received in retirement. The deferment of income tax liability enables workers to accumulate larger retirement funds through employer-provided pension plans than they could with equivalent dollars paid as current earnings.<sup>4</sup> Since its inception in 1935, Social Security has been financed by payroll taxes paid only on cash earnings. Thus, employee compensation via pension plans is not subject to the payroll tax which also allows workers to accumulate larger retirement accounts than if they received all compensation in cash, paid payroll taxes, and then saved for retirement on their own.<sup>5</sup>

### **Employer Incentives to Offer Pension Plans**

Firms offer pension plans because they can help the company attract, retain, and eventually retire quality workers. If deferred compensation yields greater total value to workers, firms with pension plans will find it easier to employ quality workers. If pensions impose financial penalties on workers who leave “too early,” firms may be able to achieve a lower quit rate by offering pension coverage.<sup>6</sup> Pension plans can also be structured to provide strong incentives for workers to alter the timing of retirement in accordance with the firm’s human resource needs. Thus, pension plans can be used as part of the company’s strategic plan for human resource management.<sup>7</sup>

The human resource needs and objectives of companies differ. Employing high quality workers is more important to some firms than others. Firms that face large up-front costs of hiring and training workers will want to have low turnover rates and can institute compensation policies to achieve this result. Companies that are concerned about an aging workforce may institute policies that encourage retirement at early ages. Pension plans can play an important role in achieving these objectives.

### **Pensions, Company HR Policies, and Government Policies**

Pension plans are developed within the economic environment facing a firm and under government policies that affect employer costs and the labor market choices of workers. Government policies influencing the decision by a firm to offer a pension as well as the

structure of the plan include tax policies, regulatory standards, mandatory retirement, Social Security, and Medicare. We have already noted the impact of tax policies on workers' and firms' desire for pensions. Thus, major changes in tax policy could alter the likelihood that a firm will offer a pension. Lower marginal tax rates or the shift to a consumption tax would reduce or eliminate the tax incentive to have employer-provided pensions. Tax increases in the post-World War II era may have stimulated increased pension coverage (Ippolito, 1986) while federal income tax reductions in the 1980s may be one cause of the recent stability of the coverage rate.

Amendments to the Age Discrimination in Employment Act that outlawed mandatory retirement in most jobs eliminated an important human resource tool for many firms. The inability to terminate employment or reduce wages without cause at a specified age encouraged firms to seek other means of inducing retirement, such as the use of defined benefit plans with age-specific retirement incentives (Luzadis and Mitchell, 1991). Changes in Social Security and Medicare alter retirement incentives and may affect company retirement policies. Many firms have linked their pensions and retiree health plans to characteristics of Social Security and Medicare. Changes in these plans might result in workers seeking to retire at later ages. An important issue is whether companies will attempt to offset the incentives resulting from changes in these government programs by modifying their own private retirement and health insurance programs.

### **Overview of Paper**

The preferential income tax status for pension compensation provides an incentive for some workers to seek out firms that provide pension plans and to alter their work behavior to remain with these firms. As we will see, these same retirement plans often provide a strong incentive for workers to leave the firm at particular ages. Alternatively, some workers may have a higher preference for current income over future retirement benefits and thus tend to avoid companies with pension plans (Curme and Even, 1995; Ippolito, 1997). Considerable

research suggests that pensions have the desired effects -- that workers behave as though they understand and respond to the financial incentives imbedded in many pension plans.

This paper presents an overview of the economic and policy research on the effect of pensions on labor mobility and retirement. We attempt to identify what is known, what is in debate, and what are the key gaps in our knowledge concerning how pensions alter worker and firm decisions.

### **BENEFIT ACCRUALS BY TYPE OF PENSION**

The central mechanism by which pension plans affect individual decisions is annual pension accrual. A defined benefit pension plan promises a stream of future income which can be summarized by its present discounted value. The asset equivalent of this income flow is called pension wealth.<sup>8</sup> The present value of a worker's expected future benefits changes each year that a pension plan participant remains on the job. Prior to eligibility for retirement benefits, future benefits, and therefore pension wealth, tend to rise with each additional year of work. The change in pension wealth is the pension accrual from working that year. In defined contribution plans, employer and employee contributions represent the increase in pension wealth or the benefit accrual from continued employment.

The lifetime pattern of benefit accrual differs substantially between defined benefit and defined contribution plans. Benefit accruals in defined benefit plans typically provide incentives for workers to remain with a company throughout most of their careers and then to retire at particular ages. Accruals in defined contribution plans are less sensitive to mobility decisions and tend to be age neutral with respect to the timing of retirement. The remainder of this section presents a brief overview of benefit accruals in the two types of pension plans and provides the framework for the analysis of mobility and retirement in subsequent sections.

Understanding the effects of pensions on mobility and retirement requires that pensions be viewed from a lifetime perspective. The gain or loss in pension wealth from staying on the job can only be seen by evaluating the present value of future benefits. Key

insights into the appropriate methods of evaluating pension benefits were developed by Burkhauser (1979, 1980) and Ippolito (1985) and their insights provided much of the structure for subsequent studies of mobility and retirement.

### **Benefit Accruals in Defined Benefit Plans**

Defined benefit plans promise retirement benefits to workers who meet certain age and service requirements. The most common benefit formula is a specified percent of final average salary per year of service.<sup>9</sup> Once an individual becomes vested in a pension, future benefits grow with additional years of service and with annual earnings. Currently, ERISA requires that workers be fully vested in their pension benefit after five years of service.<sup>10</sup>

In a typical defined benefit plan, accruals are zero until the individual achieves vesting. At this point, there is an accrual spike representing the value of all prior years of work in determining future pension benefits. From this point on, annual benefit accruals increase steadily until the worker is eligible to retire and start receiving a pension benefit.<sup>11</sup> It is the prospect of these back-loaded benefits that discourages mobility.<sup>12</sup> It is easily shown that workers who change jobs, even those moving among companies with identical defined benefit pension plans, will have lower total retirement benefits than workers who spend their entire career with a single company (Clark and McDermed, 1988). The larger the potential loss in pension benefits associated with job changes, the lower the expected turnover rate will be.<sup>13</sup> Firms influence the size of the loss in pension wealth associated with changing jobs by selecting pension parameters that determine pension benefits.<sup>14</sup>

There are generally large spikes in benefit accruals when the worker satisfies the age and service requirements for early and normal retirement benefits. After the initial age of eligibility has been attained, accrual calculations become more complex, because one must weigh higher benefits in the future derived from continued employment against benefits foregone while the employee continues working. Typically, benefit accruals begin to decline after the age of initial eligibility and can eventually become negative if the individual remains with the firm at older ages. In these cases, the worker loses pension wealth and suffers a

reduction in total compensation by working too long. This decline in pension wealth provides an incentive for the worker to leave the firm. By selecting the ages for early and normal retirement and by introducing maximum benefit provisions, the firm can alter the size of these retirement incentives and thus, encourage workers to retire at specific ages.<sup>15</sup>

### **Benefit Accruals in Defined Contribution Plans**

In defined contribution plans, workers and firms make periodic contributions to a worker's retirement account; typically, a specified percentage of salary which does not vary with age or service.<sup>16</sup> Future retirement benefits depend on size of the annual contributions and the rate of return achieved on the accumulated assets. In most cases, the funds are quickly, if not immediately, vested, and the worker owns his or her individual retirement account. Annual pension accruals in defined contribution plans tend to be more uniform across years of service.<sup>17</sup> Firms cannot reduce pension wealth if a worker stays on "too long" as they can in defined benefit plans.

Given the early vesting and the ownership of the retirement account, workers in defined contribution plans who change jobs tend not to suffer losses in their pension wealth. Individuals are typically able to withdraw their funds from their prior employer's pension plan and can roll these funds into their own individual retirement account (IRA) or some other qualified pension account. Thus, the mobility of participants in defined contribution plans should not be impeded in the same manner as that of participants in defined benefit plans and these retirement plans should be age neutral in their effect on the timing of retirement.

## **PENSION COVERAGE**

The enactment of ERISA in 1974 was a watershed event for pension provision in the United States. First, the mid-1970s marked the end of the growth in the proportion of the labor force covered by pension plans. Second, the emergence of defined contribution pensions and the decline in the use of defined benefit plans began and has continued through the 1990s.<sup>18</sup> Prior to World War II, the proportion of the labor force covered by an

employer-provided pension plan was approximately 15 percent. The coverage rate increased to about 25 percent in 1950 and further to around 50 percent in the mid-1970s (Munnell, 1982; U.S. Department of Labor, 1992). In the past 25 years, the coverage rate has been relatively stable declining somewhat from the mid-1970s to the mid-1980s and then increasing slightly (EBRI, 1994, 1997).

Coverage rates have increased for women and declined slightly for men, especially for young men. Even and Macpherson (1994) examined the 1979 and 1988 May Current Population Surveys and concluded that the percentage of all male workers aged 21 to 35 who are enrolled in a pension plan declined from 56 percent in 1979 to 49 percent in 1988 while the proportion of men aged 36 to 55 declined from 71 percent to 69 percent over the same period. The decline in the rate of men enrolled in pensions is partially due to the drop in the percentage of men participating in pensions when they are offered by their employer.<sup>19</sup>

Numerous studies have estimated pension coverage as a function of worker and firm characteristics. In general, coverage increases with annual earnings, age, job tenure, and firm size. Unionized workers are more likely to have pension benefits than nonunion workers and substantial variation in coverage rates exists across industries and occupations. Relatively few studies have attempted to explain the choice of a pension plan by individual workers. In most cases, companies offer one primary pension plan, either a defined benefit or a defined contribution plan, and the worker is enrolled in that plan. Thus, the choice of a pension is directly tied to the choice of a job.<sup>20</sup>

Data also reveal a dramatic increase in the relative importance of coverage by defined contribution plans, perhaps driven by the increased regulation and administrative costs associated with ERISA and its subsequent amendments along with tax policy changes that permitted the establishment of 401(k) plans (Clark and McDermed, 1990; Papke, 1999). The increased administrative costs have put a greater burden on smaller firms (Hustead, 1998) and as a result, the drop in the proportion of firms offering defined benefit plans has been greater among small companies. Changes in the industrial structure of the economy and the

composition of the labor force have also contributed to the increased proportion of the labor force covered by defined contribution plans (Gustman and Steinmeier, 1992; Kruse, 1995; Ippolito 1995).<sup>21</sup>

## **PENSIONS AND MOBILITY**

The link between pension participation and mobility is complex. Firms offer pensions as part of their compensation packages to attract, retain, and retire quality workers. The value of pension coverage to workers and the cost to firms depends on whether worker productivity is increased by pension coverage, via longer tenure and perhaps greater investment in human capital. In addition, the cost and value of pensions depend on whether earnings or other benefits are reduced when pensions are provided. Since turnover is affected by each of these relationships, our discussion of mobility begins with an examination of the empirical estimates of the effect of pensions on wages and productivity and then concludes with an assessment of the direct evidence on mobility.

### **Pensions and the Level of Wages**

The theory of compensating wage differentials, a key element in labor economics, states that holding total compensation constant, increases in one type of compensation should be matched by decreases in other forms. The implication is that firms that offer pensions should pay lower wages to identical workers than comparable firms without pensions.

Empirical evidence supporting compensating differentials is inconclusive. For example, Smith (1981) and Clark and McDermed (1986) find evidence of significant compensating differentials associated with certain pension characteristics while Ehrenberg (1980) and Schiller and Weiss (1980) report mixed results. No evidence of a wage-pension trade-off is found by Smith and Ehrenberg (1983) or by Mitchell and Pozzebon (1986). Finally, a positive relationship between pensions and the wage rate is reported by Even and Macpherson (1990). Gunderson, Hyatt, and Pesando (1992) provide a recent summary of these and other studies that attempt to estimate the compensating wage differential for

pensions. They conclude that "Overall, the results are mixed. They certainly do not clearly support the notion of a trade-off between wages and pension benefits."<sup>22</sup>

Problems in estimating the wage compensating differential for firm expenditures on pensions include the failure to account for the technical relationship tying earnings to benefit determination, the inability to calculate accurately the cost to the employer of providing pension benefits, the inability to include the total cost of other benefits and employer costs in the analysis, and the lack of data on other factors that might determine wage rates. Finally, in the presence of unmeasured differences in worker productivity, high quality workers may be found to have higher wages and benefits, thus masking the compensating differential. In the face of these data shortcomings, it is not surprising that it is difficult to estimate true compensating differentials. It is also possible that the compensating differential is less than dollar for dollar due to the productivity enhancing aspects of pensions that reduce other labor costs.

### **Pensions and Productivity**

Companies may adopt pensions in an effort to enhance labor productivity. Theories of firm-specific human capital suggest that firms will invest more in workers who are likely to remain with the firm for longer periods of time. The use of deferred payments that depend on longer job tenure can result in more investment in human capital and therefore higher productivity (Oi, 1962; Becker, 1964). Such compensation schemes might also reduce shirking on the job (Becker and Stigler, 1974; Lazear 1979) and promote more efficient job matches between firms who will benefit from low turnover rates and workers with low turnover probabilities.

There have been relatively few empirical studies that have attempted to estimate directly the effect of pensions on firm productivity.<sup>23</sup> In a series of studies, Dorsey and his colleagues have assessed the impact of pensions on labor productivity by reviewing the literature and contributing new research. Dorsey (1995) reviews a wide range of studies on the effect of pension coverage on productivity, and concludes that "on balance, the literature

supports the view that incentives established by nonportable benefits do enhance productivity." His conclusion is based on the observation that a productivity enhancing effect is plausible given existing models of the labor market and that substantial indirect evidence is consistent with a positive productivity effect.

In a subsequent paper, Dorsey and Macpherson (1997) find a strong positive relationship between pension coverage and training on the job, providing a further link between the use of pensions as a form of compensation and employee productivity. In their book on pensions and productivity, Dorsey, Cornwell, and Macpherson (1998) estimate a series of productivity models and conclude that labor appears to be more productive in firms that offer defined benefit pension plans.

The estimation of direct productivity effects of pension coverage remains a difficult process. Severe data limitations restrict econometric studies of this relationship. Thus, assessments of the pension effect on labor productivity can only be described as tentative. On balance, the assessment of limited direct and other indirect evidence seems to suggest that pension coverage is associated with somewhat higher productivity and that this effect is higher in some industries than others and more prominent in defined benefit plans.

### **Pensions and Turnover**

If workers who change jobs tend to lose pension wealth, then we should observe a negative relationship between mobility and coverage. Empirical studies using a variety of data sets and specifications do find this negative relationship. An early study by Mitchell (1982) estimated that pension participants were less likely to change jobs during a four year period than workers not covered by an employer-provided pension.<sup>24</sup> In the past decade, numerous studies have attempted to measure the link between pensions and job changes. Allen, Clark, and McDermed (1993) estimate quit and layoff probabilities using the Panel Survey of Income Dynamics between 1975 and 1982. They find that the pension wealth loss from changing jobs lowers turnover rates and that the capital loss effect on turnover is larger with respect to layoffs than quits. Cornwell, Dorsey, and Mehrzad (1991) also conclude that

workers covered by pension plans are less likely to be laid off than those without a pension. Lazear and Moore (1988) define the option value associated with pension coverage as the difference between the present value of the pension at the optimal retirement age and its current value. They find a strong pension effect on turnover and conclude that eliminating the average worker's pension would double the turnover rate.

Using the Pension Benefit Amounts Survey of 1978, Ippolito (1991) estimates the impact of the potential loss in pension wealth for participants in defined benefit plans on the tenure of workers at retirement. He finds that a pension plan that poses quit costs equal to one year's earnings at mid-career results in an increase in tenure at age 55 of 20 percent, and that imposing losses in pension wealth has a much greater affect on turnover than tilting the tenure/earnings profile so that new workers are underpaid and senior workers are overpaid. Ippolito concludes that "pensions are important tools to obtain long-term commitments to the firm." In another study, Ippolito (1987) concludes that the low quit rate among federal workers is attributable to the unusually large quit penalties in the civil service pension.

Even and Macpherson (1996) estimate the difference in turnover rates by employer size and the role of pensions in influencing mobility. They find that pension coverage causes a greater reduction in turnover in large firms than in small firms and that this result persists when the type of pension is controlled for in the regression equation. In addition, they report that there is almost no association between firm size and turnover among workers who are not pension participants.

A conflicting assessment, provided by Gustman and Steinmeier (1993, 1995), is that pensions do not deter mobility. Instead, they argue that firms that offer pensions also tend to pay higher wages and it is these wage premia that actually reduce turnover. They find that both defined benefit and defined contribution pension plans are associated with these wage premiums and that workers covered by both types of plan have lower turnover rates than workers without retirement plans. If it were the pension penalties that produced lower

turnover, one would expect a larger pension effect among participants in defined-benefit plans.

In response, Ippolito (1994) argues that the wage premium models fail to consider the supply conditions faced by firms whose workers attain longer tenure. He finds that firms pay a price for attracting workers who plan to remain with the firm -- an indenture premium -- and that it is this premium that attracts workers with low quit propensities rather than an efficiency wage that affects turnover.

### **Summary**

Key questions concerning the role of pensions in the market place relate to how pensions alter employee wages, worker productivity and turnover. Considerable information on workers and firms is needed to address each of these questions. To date, researchers have been limited by a lack of data needed to estimate compensating wage differentials and the effect of pensions on productivity and labor mobility. Our assessment of the state of knowledge in these areas is made with these limitations in mind.

First, economic theory indicates that if employers provide increased compensation in one area they will reduce other forms of compensation unless other labor costs are reduced or there is an increase in productivity. Estimates of compensating differentials is mixed and no strong statements can be made concerning the pension-wage tradeoff based on econometric estimates.

Second, few direct estimates of the effect of pensions on workers productivity have been attempted. Limited direct and indirect evidence indicates that workers who are covered by pension plans are more likely to engage in training and have somewhat higher productivity, although this effect may be concentrated in certain industries. Finally, it seems clear that pension participants have lower turnover rates and greater job tenure. Access to better information should facilitate empirical studies of the labor market effects of pensions. In particular, information on coverage by type of pension and the characteristics of pension plans

linked to detailed individual characteristics should stimulate new research in each of these areas.

## PENSIONS AND RETIREMENT

There is a rich literature on the influence of pension incentives on individual retirement decisions. Extensive research along two separate tracks has shown that age-specific financial incentives to leave specific firms exist, that their magnitude can be large, and that workers seem to respond to them, often leaving the firm when the incentives dictate.

Until recently, data limitations have forced researchers to take one of two approaches in this literature.<sup>25</sup> Some have delved deep into the details of specific employer pension plans, using administrative records and plan provisions. The advantage here is that the researcher can calculate exactly what the pension incentives are for workers in this firm; for example, exactly how pension wealth would change if an employee with a given earnings history worked for another year. The disadvantages are that these data sets typically contain only the most rudimentary demographic information about the workers and usually do not have important variables such as health, wealth, and family characteristics. In addition, the workers in these plans are not a representative sample of all workers covered by pensions.

The alternative approach has been to utilize one of the large micro data sets available, such as the Retirement History Study from the 1970s, the Panel Survey of Income Dynamics, and the National Longitudinal Survey of Older Men. These are nationally representative surveys which contain extensive information about workers and their families. Their primary shortcoming is that they contain little information about the rules and regulations of the individuals' pension plans. Because of this, researchers must rely on industry-wide averages to estimate key pension parameters. Since actual pension plans are many and varied, these broad averages do not accurately describe the incentives faced by any particular worker. Much of the variation in pension plan provisions is lost in the imputation process.

These data deficiencies in the different types of surveys have been an impediment to retirement research. Fortunately, the new Health and Retirement Survey appends detailed pension data obtained from employers as well as the individuals' earnings records from the Social Security Administration to a wide array of individual and family demographic information. During the next decade, this survey will be a valuable resource for retirement research and should help analysts identify more clearly the role of pensions on individual retirement decisions.

### **Pension Incentives**

Researchers have established that workers can lose significant pension wealth by staying with a firm too long. Burkhauser (1979) estimated that UAW workers who remained on the job from the earliest age of pension eligibility until age 65 lost over half of their pension wealth by doing so -- a strong incentive to leave the firm and claim retirement benefits as soon as possible. Fields and Mitchell (1984) described defined benefit plans in which pension wealth declined by 20 to 40 percent for those who continued working from age 60 to age 65. Kotlikoff and Wise (1987; 1989b) studied the retirement incentives in over 2,300 employer pension plans in the BLS Level of Benefits Survey. They found a wide variety of incentives, sometimes encouraging retention and sometimes departure, and report significant discontinuities in pension accrual, usually at the age of vesting and the ages of eligibility for early and normal retirement benefits.<sup>26</sup> They conclude that “(t)ypical plan provisions provide a strong incentive for retirement after the age of plan-normal retirement, and several plan types provide a strong incentive for retirement after the age of early retirement... It would not be unusual for the reduction in pension benefit accrual after the age of early retirement to be equivalent to a 30% reduction in wage earnings” (Kotlikoff and Wise 1987: 330-332).

In recent years, a number of papers have emerged from the National Bureau of Economic Research project on the economics of aging. Authors have analyzed the incentives in the defined benefit plans in some Fortune 500 firms, and have found strong age-specific incentives which can vary dramatically depending on the details of an individual's

employment history with the firm. When pension benefits depend on years of service, workers of the same age who are eligible for benefits can face very different incentives depending on when they were hired.<sup>27</sup> Knowing only that a person is eligible to receive a pension benefit (the type of information that is often available in the large microeconomic datasets) reveals very little about the specific financial incentives that the worker is facing.

Stock and Wise (1990a, 1990b) added Social Security accruals to the analysis, and estimated total annual compensation (earnings, plus or minus pension and Social Security accrual) for a cohort of workers in a single firm, for every age in the future.<sup>28</sup> They find some workers whose net compensation is nearly zero at age 62 or 63; i.e., the declines in pension and Social Security wealth completely offset the worker's salary, with no net gain for a year's work. This would be a significant disincentive to work, to say the least.

In summary, researchers have established that many defined benefit pension plans penalize workers who remain with the firm too long. A separate question is whether these incentives influence retirement behavior. Do actual retirement patterns suggest that workers understand and respond to these incentives? The evidence suggests that these incentives do work and that their influence is large -- probably larger than that of any other single factor for those who face them.

### **Pension Incentives and Retirement Behavior**

Empirical evidence concerning the effect of pensions on the timing of retirement is of two types, and both are persuasive. The first type of findings is based on simple comparisons of retirement patterns with pension incentives by age. People do tend to retire when their pension incentives dictate. But coincidence does not imply causation. Other factors are at work, some of which may coincide with the pension incentives. The second type of evidence is based on more sophisticated econometric research that estimates how retirement decisions depend on various economic, demographic and health-related factors simultaneously.

As an example of the first type of evidence, Kotlikoff and Wise (1989a; 1989b) compared the retirement rates of employees working for a Fortune 500 firm with the

retirement incentives they faced. They calculated retirement rates (the proportion of those employed at the beginning of the year who left the firm by the end of the year) by age and by years of service, and found dramatic changes in behavior at precisely the ages at which the retirement incentives change, but only for those workers vested in the plan.

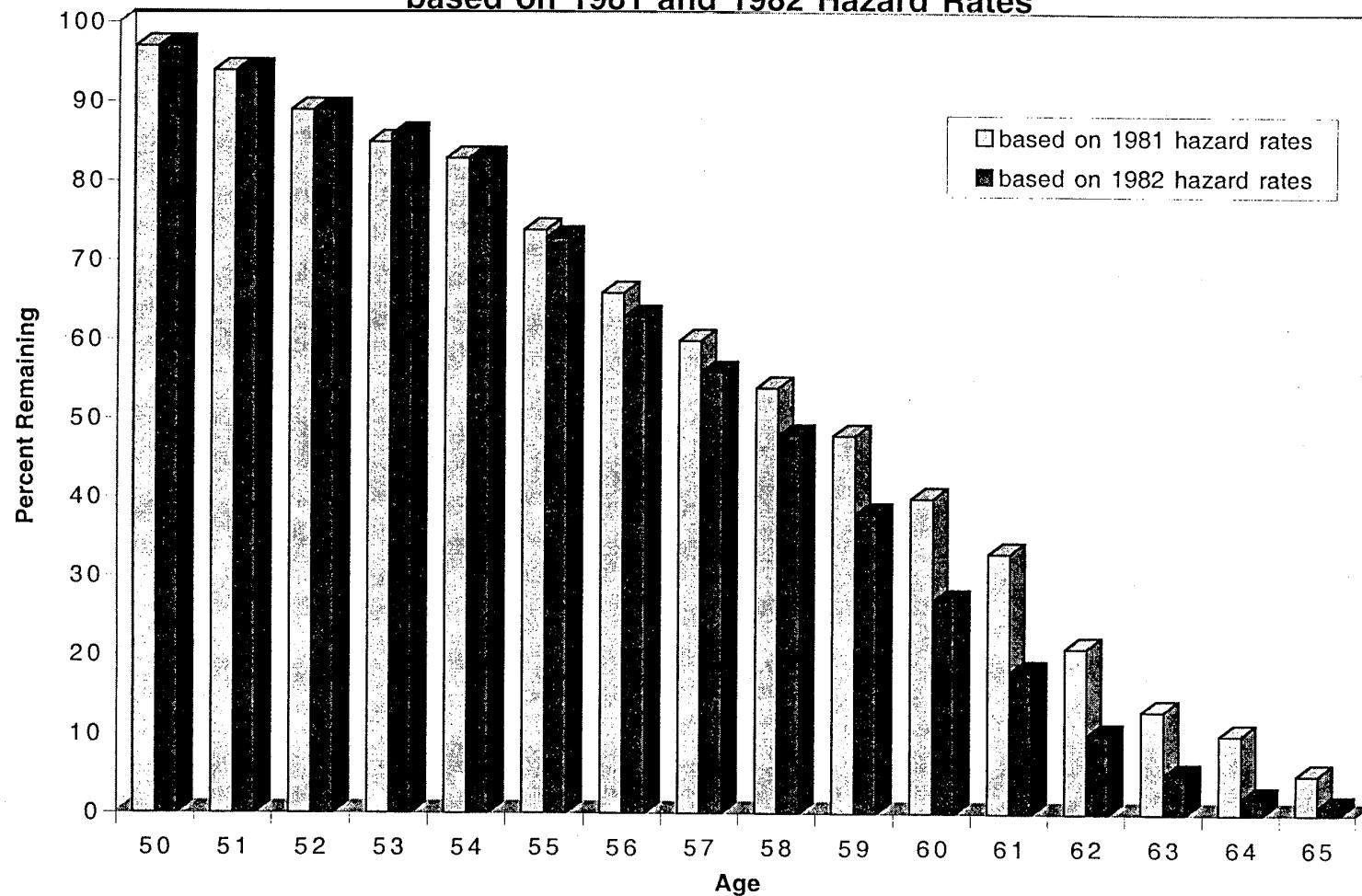
For example, experienced workers with sufficient years of service with this firm became eligible for a special supplemental retirement benefit at age 55. As expected, almost no experienced workers left the firm at ages 50 to 54, although many workers this age who were not vested in the pension plan did leave (Kotlikoff and Wise 1989a: table 10.11). At age 55, however, the retirement rates jumped significantly, but only for those vested in the plan. At age 60, when pension accruals turned negative for those with 30 years or more of service, the hazard rate for senior (30 years or more) workers jumped again, and almost one-third of those still remaining at age 60, and again at age 61, left during that year. The increases in retirement rates at ages 60 and 61 were only about half as large for those who were vested but had fewer than 30 years on the job; they were still accumulating service years and enjoying positive pension accruals. At age 62, when workers became eligible for Social Security benefits, the rate for senior workers increased to one-half, and remained near there through age 65.<sup>29</sup>

**Figure 1** shows the cumulative effect of these departure rates -- the proportion of those vested at age 50 who would still be employed at later ages, given the age-specific retirement rates calculated for 1981.<sup>30</sup> One can see the large declines at ages 55, 60, 62 and 65. By age 60, only 40 percent of those who were employed at age 50 remain. This drops in half by age 62, to 21 percent, and then to only 5 percent by age 65.

Figure 1 also shows the impact of a special early retirement program which was in effect in 1982 for those vested and age 55 or older, but which did not exist in either 1981 or 1983. The implementation of this early retirement plan increased the retirement rates at all ages beyond 55 in 1982, but not at ages below 55, as expected. As seen in the right hand bars at each age, the declines are much more precipitous after age 55 -- by age 60, only about one in four remain at the 1982 retirement rates, by 62, only 1 in 10, and by age 65, only 1 in 100.

**Figure 1**

**Cumulative Retention Rates, by Age  
Those Employed and Vested at Age 50,  
based on 1981 and 1982 Hazard Rates**



Source: Kotlikoff and Wise 1989a: table 10.12

Kotlikoff and Wise make clear that pensions can encourage or discourage retirement late in life. Ruhm (1996) has made this same point, and questioned the generally held view that pensions decrease labor supply late in life. Using a sample from the Retirement History Study, he estimates that pension coverage increases the probability of remaining employed at ages 58 through 61 (by an average of about 7 percentage points), decreases it modestly for those aged 62 to 64 (by about 4 points), and then decreases it dramatically for those 65 through 68, by an average of about 11 percentage points, “resulting in a more complicated and ambiguous labor supply impact than is frequently realized” (Ruhm, 1996: 172).

Ippolito (1987) has studied quit and retirement rates in the federal government and in the private sector. He emphasizes the role of defined benefit pensions as implicit contracts, in which workers forego a portion of current wages in exchange for pension benefits after they leave the firm. The value of these pension rights is maximized if the worker chooses to retire during a particular age window. If the workers retires too soon or too late, some of the pension wealth is forfeited.

Ippolito analyzed the retirement incentives faced by a sample of nearly 3,400 federal government employees in 1987, and concluded that there were large penalties for retiring before 30 years of service (the number of years required for full pension benefits), and smaller penalties for working more than 30 years. He found that actual retirement behavior mirrored these incentives. Workers over age 45 who were not yet eligible for full benefits had a probability of leaving the government of only 2 percent, while those attaining eligibility for full benefits had a separation rate of 23 percent (Ippolito, 1987).

In recent articles, Lumsdaine, Stock and Wise (1994, 1997) have analyzed the retirement incentives and retirement behavior in another large firm, and have emphasized how other important factors can interact with pension incentives. They also compared the retirement patterns of men and women. These articles are important not for the specific retirement rates estimated, since they apply only to this specific example, but because they show that these incentives, when they exist, strongly influence behavior.

In this firm, retirement patterns reflected the incentives specific to that pension plan. At age 60, when workers with 30 years of service become eligible for full benefits, the retirement rate jumped from 5 to 15 percent (Lumsdaine, Stock and Wise 1994: figure 6.3). As seen in **Figure 2**, disaggregation of the sample by years of service shows that this 15 percent rate is actually the average of a much larger and more abrupt increase among those with 30 years or more of service (to about 20 percent departure per year), a much smaller and more gradual increase among those with 10 to 29 years on the job, and no discernible effect among those with fewer than 10 years of service with the firm, and therefore not yet vested in the pension. The departure rates in figure 2 also show almost no difference in the retirement behavior of men and women in this firm.<sup>31</sup>

Figure 2 also suggests an interaction between the pension plan and Social Security. Departure rates increase dramatically at age 62, to about 30 percent per year, but only for those vested in the pension. At age 65, when strong Social Security incentives to retire also applied, between 40 and 80 percent (depending on years of service) of those remaining left the firm. Many of those who ignored the financial incentives up through age 65 continued to do so, and keep working, after this age. This undoubtedly reflects difference in tastes or attitudes toward work.

In a later paper based on data from the same firm, Lumsdaine, Stock and Wise (1997) simulate the impact of some possible changes in pension and Social Security rules on the retirement behavior of the employees in this firm. The results suggest that changes in pension policy would have much larger effects than changes in Social Security policy, and that coordinated changes in both would have the most impact of all.

The authors estimate the difference in annual and cumulative departure rates at each age from 50 to 65, for several potential policy changes. For example, if the pension plan offered positive pension accruals after 30 years of service, experienced workers would be encouraged to stay. They estimate that by age 61, for example, 35 percent of those working at age 50 would have left the firm, as opposed to 51 percent without the policy change -- a

Figure 2

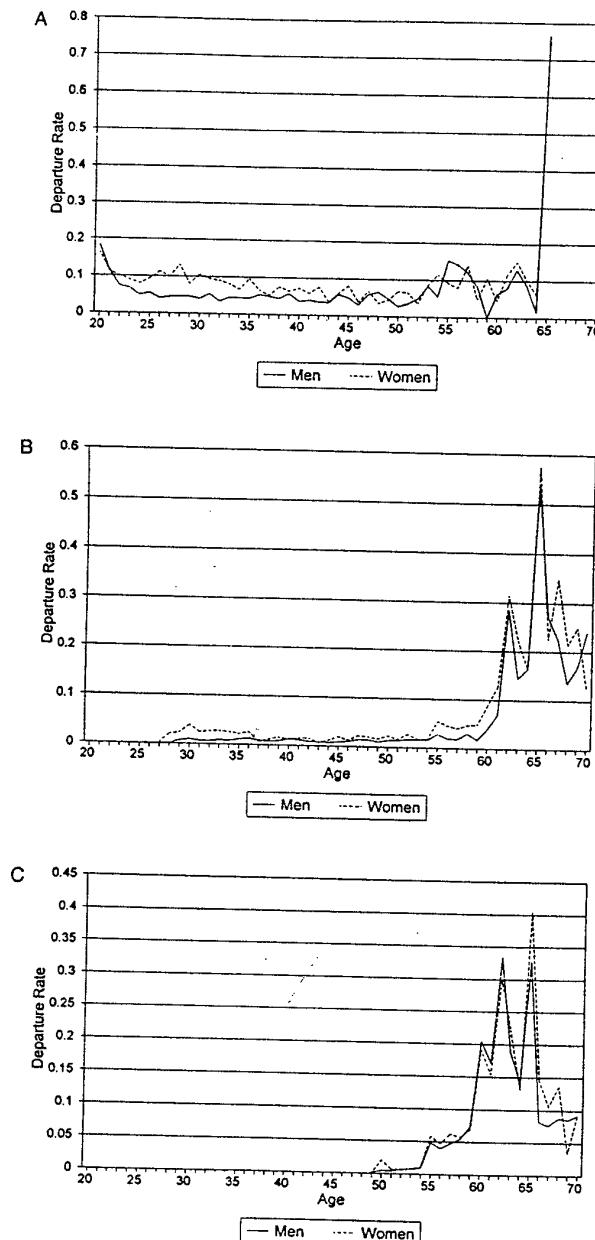


Fig. 6.4 Departure rates by age: men and women (A) with less than 10 YOS, (B) with 10-29 YOS, and (C) with 30 or more YOS

Source: Lumsdaine, Stock and Wise (1994)

difference of 16 percentage points. If the firm did not offer early retirement benefits until ages 60 or age 62, instead of the current age of 55, cumulative retirement rates by age 61 would drop by 17 and 43 points, respectively.<sup>32</sup>

In contrast, Social Security changes that have already been legislated, such as an actuarially fair delayed retirement credit after age 65 (already underway), an increase in the normal retirement (or “full benefit”) age from 65 to 67 (beginning in 2003), or both of the above, would change the cumulative retirement rate of these workers at age 61 by 0 to 2 percentage points. Given the powerful pension incentives these particular workers face, even eliminating Social Security entirely would only change the cumulative departure rate at age 65 by 20 points. The effect could be much larger, of course, for those relying exclusively on Social Security in retirement.

Finally, the authors demonstrate how financial incentives can render another policy, mandatory retirement, nearly meaningless.<sup>33</sup> In their base case, over 86 percent of the employees of this firm have left by age 65. Even forcing all the rest to leave via mandatory retirement would only increase the departure rate at age 65 by 14 percentage points.<sup>34</sup>

Samwick (1998) has extended the analysis above to a broader sample, by combining the demographic, employment and wealth data on older households in the 1983 and 1986 Surveys of Current Finances (SCF) with detailed pension information provided by employers in a special SCF supplement.<sup>35</sup> With some imputed wage histories, based on age-earnings profiles by sex, race and occupation, he estimated pension and Social Security wealth in 1983, and how each of these changed with additional years on the job. With this information, he then calculated year-to-year accruals as well as the difference between current Social Security or pension wealth and its value when maximized (the option value of working).

In equations explaining individuals’ separations from their firms between 1983 and 1986, Samwick finds that retirement wealth accruals are more important than retirement wealth levels, and that both one-year retirement wealth accrual and the more sophisticated “option

value” are statistically significant explanatory variables. When Social Security and pension accruals are entered separately, the pension coefficient is nearly 50 percent larger and is significant; the Social Security coefficient has the expected sign but is insignificant.<sup>36</sup> Using some simulations of the Social Security and pension effects, Samwick concludes that “changes in Social Security that are typical of past and proposed legislation are simulated to have modest impacts on labor force participation of about 1 percentage point...There is better evidence that the growth in pension coverage during the early postwar period contributed to the decline in labor force participation.” He estimates that about one-quarter of the decline in labor force participation of older men between 1955 and 1975 was due to expanded pension coverage.

Anderson, Gustman and Steinmeier (1999) estimate that changes in the incentive structures of employer pensions and Social Security together account for about one-quarter of the trend toward earlier retirement observed for men in their early 60s between 1969 and 1989. During this time, employers with defined benefit plans introduced earlier ages of eligibility and smaller actuarial adjustments for early retirement, as well as earlier ages of eligibility for full benefits, although these changes were somewhat offset by the movement from defined benefit to defined contribution plans (Anderson, Gustman and Steinmeier, 1999: table 2).

The authors apply the parameters of a structural retirement model estimated earlier to a sample of men from the 1989 Survey of Consumer Finance. They simulate retirement behavior using the pension and Social Security rules in place in 1969, 1983 and 1989, and estimate how much of the actual change in behavior can be attributed to these changing rules. Both Social Security and pension changes were important for men in their early 60s, Social Security slightly more so at age 60, and pensions slightly more so at age 62 (Anderson, Gustman and Steinmeier, 1999: table 4). At age 65, pension and Social Security changes would have predicted delayed retirement, rather than the earlier retirement actually observed.<sup>37</sup> This fact, and the fact that three-quarters of the change among those in their 60s remains

unexplained, leads the authors to deduce that other factors (such as rising wealth, changes in disability insurance and changes in taste) were important as well.

Coile and Gruber (1999) are among the first to use the new augmented Health and Retirement Survey (HRS) to analyze the importance of Social Security and employer pensions on retirement decisions in the 1990s. They utilize the individual Social Security earnings records attached to the HRS, as well as pension information that permits them to estimate what benefits (and retirement wealth) for a sample of employed men would be at various ages of retirement. They focus on Social Security and pension accruals, and emphasize the importance of estimating the entire future pattern of accruals, the option value method, not just the one-year accrual between time  $t$  and  $t+1$ .<sup>38</sup>

A number of important conclusions emerge from their work. They find stronger Social Security effects when they use the option value method to describe the Social Security incentives facing a worker than they do with either Social Security wealth or simple year-to-year accruals. Although changes in Social Security rules generally affect both the lifetime wealth of individuals and their net compensation for additional work (via accruals), the impact of the latter (the substitution effect) dominates that of the former (the income effect.) This leads to at least one counterintuitive conclusion -- that an immediate increase in the normal retirement age from 65 to 67 (which is equivalent to an across-the-board benefit cut) might increase the retirement rates of 62 and 63-year-olds. The reason is that the same law also decreases the reward for delaying receipt at those ages from the current 6.67 percent to only 5 percent per year, lowering net compensation.<sup>39</sup> The effect of lowering net wages through the accrual process, which encourages retirement, outweighs the loss in Social Security wealth, which encourages it. The effects of these policy changes are more complicated than they first appear.

Coile and Gruber estimate that workers over age 62 are more responsive to retirement incentives than those under 62, which suggests that some workers face a liquidity problem before they are old enough to receive Social Security benefits. Finally, the authors find that

the magnitude of the Social Security effects decline when pensions are also incorporated into the analysis, suggesting an important interaction between the two.

### **Summary**

Two decades of research has established that many defined benefit pension plans contain strong incentives to leave the firm at specific ages and that these incentives influence the labor supply behavior of older workers. This conclusion emerges both from studies with detailed information on specific pension plans, but only limited data on the demographics of the employees, and from studies with extensive demographic, economic and family data on large representative samples, but little information on the pension rules of those covered by a plan. The consensus is that defined benefit pension incentives are stronger than Social Security incentives, although there is considerable debate on the exact magnitude of both. The new Health and Retirement Survey contains excellent information on both, and will soon permit more precise estimates of the relative importance of public (Social Security) and private (employer) retirement incentives.

## **BRIDGE JOBS -- HOW WE RETIRE**

Pension research has tended to emphasize departure from the firm as the labor market variable of interest, since pension incentives influence that decision but generally do not penalize work with other firms thereafter. Social Security research, on the other hand, is more likely to study departure from the labor market, since all earnings, on career or subsequent jobs, are treated alike in the Social Security regulations. For some, these two views of retirement are identical, since many older Americans leave a career job and the labor market at the same time, and retire unambiguously in one move.

Considerable research, however, has established that this is not the case for many other workers, who withdraw from the labor market more gradually, utilizing "bridge jobs" between full-time career employment and complete labor force withdrawal. Early contributors to this literature include Gustman and Steinmeier (1984), Honig and Hanoch (1985), Ruhm

(1990a, 1990b), and Quinn, Burkhauser and Myers (1990). For many Americans, retirement is a process, not a single event. It is less important to define at what point along this exit route one is labeled “retired” than it is to understand the process by which people leave their career jobs and the labor market.<sup>40</sup>

Quinn (1999a, 1999b) has defined a career job as a full-time job held for at least 10 years. A bridge job, then, could be a part-time job of any duration, or a full-time job held for fewer than ten years. With this definition and those respondents who appear in the first three waves of the Health and Retirement Survey, he finds that nearly one-half of the men and women who have left a career job moved to a bridge job rather than directly out of the labor force. The precise percentage depends on the definition of a career job (e.g., how many years of tenure are required?) and will change as those in HRS sample who are still working leave their career jobs, but the qualitative conclusion will remain -- bridge jobs are an important part of the exit process in America today.<sup>41</sup>

Whether a worker moves to a new job or stops working after leaving a career job depends on many factors, some of which we can measure. Quinn (1999b) shows that workers in poor health, defined in several ways, are more likely to leave the labor market entirely when they leave their career jobs, as are older workers.<sup>42</sup> Those who have health insurance coverage on their career jobs and would maintain health coverage if they left (through any of a number of sources, including retiree health coverage from the firm or inclusion on the spouse’s policy) are less likely to move to a bridge job than those with coverage who would lose it or those with no coverage to lose. There is some evidence that workers at both ends of the socio-economics scale (measured in this case by the hourly wage rate on the career job) are more likely to utilize bridge jobs in the way out. Some keep working due to economic necessity, lacking the resources to retire completely, while others remain in the labor force because they want to remain employed.<sup>43</sup>

Concerning pensions, respondents were disaggregated according to whether their primary coverage was defined benefit or defined contribution, and by whether they are eligible

to receive benefits by 1996. Most of the results were as expected -- those participating in a pension but not yet eligible for benefits were the most likely to stay on the job, and those who were eligible by 1996 were the most likely to stop working by then. Defined benefit pensions had stronger effects on labor supply decisions than defined contribution plans did.

Eligibility for pension benefits decreased the probability of moving to a bridge job for both men and women, even though bridge job employment rarely has any effect on pension receipt. It turns out to be more difficult to predict who moves to a bridge job than who moves out of employment altogether. More sophisticated work is needed in this area of research.

## SUMMARY

Employer-provided pensions have become an integral component of labor compensation in America. Many workers prefer to have a portion of their compensation paid in the form of pension benefits because of the tax advantages associated with pensions and the ease of saving for retirement. Firms provide pensions because they can be used to attract, retain, and retire workers. In order to qualify for preferential tax status, pensions must meet a wide array of standards and regulations. While the tax status of pensions has been part of the tax code for over 75 years, detailed regulations concerning vesting, discrimination, integration, funding, and insurance were instituted by the enactment of the Employee Retirement Income Security Act in 1974. The twenty-fifth anniversary of this landmark legislation is an appropriate time to evaluate the employer pensions and their role in the labor market.

Our review and analysis of the economics and policy literature provides some clear conclusions and some unanswered questions.

1. Pension coverage grew rapidly after 1940, and about half of the labor force was covered by a pension when ERISA was passed in 1974. However, since then, the coverage rate has been virtually unchanged. An unanswered question is whether the enactment of this pension regulation ended the expansion of pension coverage or merely coincided with the stabilizing of coverage.

2. Prior to 1974, most pension participants were in defined benefit plans. Defined contribution plans were used by small firms or as supplemental plans in larger firms. Since the mid-1970s, however, there has been a large and continuing movement towards greater use of defined contribution plans. Evidence suggests that the increased cost associated with pension regulation played a substantial role in this shift in type of pension plan coverage.

3. Economic theory suggests that when firms allocate money to pension contributions they will allocate less to other forms of compensation. Empirical studies have produced a wide range of estimates of the compensating wage differential for pensions, including positive as well as negative estimates. Are these mixed findings the result of inadequate data or is the theory of compensating wage differentials flawed?

4. Firms could make contributions to pension plans without reducing wages or other forms of compensation if there are other cost savings associated with pension coverage, such as greater productivity or increased training of pension participants. Limited direct and indirect evidence provides weak support that labor is more productive in firms with pension plans.

5. Another potential offset to the costs of pension contributions is lower turnover. Numerous empirical studies support the finding that pension participants have longer tenure than employees not covered by a pension. Pension participants are less likely to quit and are less likely to be laid off than other workers. This longer tenure should lower turnover and training costs and helps explain why firms might provide pension contributions without reducing wages dollar for dollar. As expected from economic theory, these effects are more frequently found for workers covered by defined benefit plans.

6. Defined benefit pension plans provide strong financial incentives for workers to retire at specific ages and workers respond to these incentives. Firms can select pension provisions so that workers who remain with the firm past certain ages such as the early and normal retirement ages suffer a sharp decline in expected lifetime pension compensation. A

quarter century of economic research has consistently shown that pensions alter worker's decisions to remain with their career employers.

7. Not all workers move directly from full time employment on a career job to complete labor force withdrawal. Many individuals leave their career employer and take on a bridge job. This bridge job can be part-time or full-time. Employer pensions influence the timing of departure and the wealth effect of pensions also plays a significant role in whether the person continues to work at all. Additional research is needed to examine the transition from full-time work and how pensions affect these choices. For example, to what extent is phased retirement or part-time work influenced by pension rules and regulations?

In summary, the evidence is clear that pensions are an important component of compensation and that incentives associated with pension plans alter worker behavior. In general, pension participants are less likely to quit, more likely to have longer job tenure, and more likely to retire at specific ages related to their pension plans.

---

<sup>1</sup> Employer cost for retirement and savings plans average 4.0 percent of compensation costs for all civilian workers. Retirement plans tend to be more generous and more prevalent in the public sector and as a result, employer costs in the public sector averaged 7.5 percent compared to only 3.1 percent of compensation in private industry. In the private sector, employer costs as a percent of compensation ranged from 1.3 percent in retail trade to 4.9 percent in construction. These costs were greater in collectively bargained situations and for larger companies (Employee Benefit Research Institute, 1997).

<sup>2</sup> See Munnell, 1982 and EBRI, 1994, 1997. Detailed studies of trends in pension coverage are presented in papers in U.S. Department of Labor (1992, 1994).

<sup>3</sup> Earlier reviews of the role of pensions in determining labor market outcomes include Gustman, Mitchell, and Steinmeier (1994) and Dorsey (1995).

<sup>4</sup> Prior to ERISA, the primary objective of pension tax policy was to prevent discrimination in favor of highly compensated workers and to protect federal revenues against unjustified tax deductions. See McGill, et al. (1996) for a detailed discussion of the development of U.S. tax policy towards pensions.

<sup>5</sup> The gain in lifetime wealth associated with pension coverage under current tax policy is neatly described in Ippolito (1986). The tax status of pensions suggests that variation in current tax rates across workers should explain some of the differences in pension coverage rates by worker characteristics. Studies by Woodbury and Huang (1991), Long and Scott (1982), and Montgomery, et al. (1992) report dramatically different tax elasticities for the demand for pension compensation.

<sup>6</sup> This rationale for the use of pensions by firms fits nicely within the framework of the earlier work by Oi (1962) and Becker (1964) emphasizing specific human capital as well as the later theory of long-term contracts espoused by Lazear (1979).

<sup>7</sup> If providing a portion of compensation in the form of pension payments reduces other labor costs, companies may be willing to allocate a dollar to pension contributions without reducing earnings by a full dollar.

<sup>8</sup> Burkhauser (1979) was among the first in the economics literature to discuss the concept of pension wealth instead of annual pension benefits. He argued that a defined benefit pension promised an income stream over time and that the magnitude of this promise was best summarized not by the monthly or annual benefit amount, but by the present discounted value of the entire future benefit stream. He used the same concept to calculate the value of future Social Security benefits and called the present value of these benefits Social Security wealth (Burkhauser, 1980).

<sup>9</sup> Final average salary is typically calculated over the last three or five years of service. Other benefit formulas used in defined benefit plans include career average earnings formulas and dollar per year of service formulas which are used in collectively bargained plans. U.S. Bureau of Labor Statistics (1998) provides details on the use of benefit formulas in defined benefit plans offered by medium and large private establishments.

<sup>10</sup> Initially ERISA legislation allowed for 10 year vesting; however, this was reduced to 5 years in 1988. Current regulations also permit graded vesting with the worker achieving 20 percent vesting after 3 years and 100 percent vesting after 7 years.

---

<sup>11</sup> Kotlikoff and Wise (1985) provide a comprehensive development of sample profiles of benefit accruals. Also see McGill et al. (1996) and Gustman and Steinmeier (1995) for calculations of benefit accruals and the concept of backloading.

<sup>12</sup> Compensation that is conditional on remaining with the firm for many years also can be used to sort workers based on their own perceived probability of changing jobs. Movers will be less likely to accept employment at firms that provide a large component of compensation that is contingent on staying with the company (Salop and Salop, 1976; Allen, Clark, and McDermed, 1993).

<sup>13</sup> Ippolito (1985) provided the theoretical basis for examining this magnitude of the pension loss by calculating the present value of a pension benefit based on projected final earnings assuming the worker remained with the firm until retirement and compared this value to the pension benefit the worker would receive if he quit today. The present value of the difference in these two pension values represented the loss the worker incurs upon termination.

<sup>14</sup> Estimates of the size of pension loss as a function of age, tenure, and industry are presented in Allen, Clark, and McDermed (1988, 1993) and Gustman and Steinmeier (1995).

<sup>15</sup> Maximum benefit provisions place an upper limit on the number of years of service that can be included in the benefit calculation. For example, if the plan caps service at 30 years, the benefit accrual will be much lower for workers who have more than 30 years of tenure compared to those with less than 30 years of service.

<sup>16</sup> In voluntary retirement savings plans, such as many 401(k) plans, workers may alter their contributions over time. Older workers tend to contribute larger percentages of their salaries than younger workers do. However, the rules under which these contribution decisions are made tend to be age-neutral.

<sup>17</sup> Of course, the investment returns to these accounts fluctuate over time and across individuals.

<sup>18</sup> These two trends are documented in studies that have examined Current Population Surveys, the 5500 tax reporting forms, the Employee Benefit Survey, and other surveys that include information on pension coverage.

<sup>19</sup> Similar findings concerning the changes in pension coverage rates are reported by Bloom and Freeman (1994) and Doescher (1994).

<sup>20</sup> Clark and Pitts (1999) estimated the choice of a pension plan among the faculty at North Carolina State University who have a choice between the state defined benefit plan or several defined contribution plans. This study indicated that over time new faculty have become more likely to select the defined contribution plan. The older new hires were, the more likely they were to opt for the defined benefit plan, and faculty who were more likely to leave North Carolina State were more likely to have chosen the defined contribution plan. These latter two findings are consistent with the mobility incentives described above.

<sup>21</sup> In most cases, defined benefit plans provide universal participation for all qualified workers. In contrast, many defined contribution plans require that workers decide whether to participate in the plan by making voluntary contributions. Thus, one effect of the trend

---

towards greater defined contribution coverage may be a decline in participation among workers employed by firms that offer a pension.

<sup>22</sup> Similar inconclusive findings are reported for health insurance (Currie and Madrian, 1998) and for benefits in general (Brown, 1980).

<sup>23</sup> One example of this literature is Allen and Clark (1987), who estimated a productivity equation across three-digit industries in which the log of value added per worker was regressed against firm and worker characteristics, including the percentage of industry workers covered by a pension. They found no consistent evidence that industries with higher pension coverage rates had higher productivity; however, their results did indicate that pension coverage was related to higher productivity in certain industries. Positive productivity effects were found in industries with low union membership, younger age composition, and a lower hiring rate.

<sup>24</sup> Also see Bartel and Borjas (1977) and McCormick and Hughes (1984) for early studies reporting that workers covered by pensions have lower turnover rates.

<sup>25</sup> An early exception to these data problems was the 1983 Survey of Consumer Finances, which linked detailed pension data to a comprehensive national survey. Unfortunately, the number of older workers was quite small, limiting the usefulness of this survey for the study of retirement.

<sup>26</sup> Kotlikoff and Wise (1987: 288) show that pension features can have a major impact on accrual patterns. If a firm credits only 25 years of service, for example, accrual rates drop significantly after the 25th year. Maximum pension amounts or Social Security integration provisions can also have large impacts on accrual patterns over time.

<sup>27</sup> In one specific example, an employee's pension accrual for working from age 54 to age 55 equaled 150 percent of his salary. By age 60, accrual (still positive) had declined to about 10 percent of the annual wage, and then turned sharply negative. At age 61, when this worker attained 30 years of service, the maximum tenure credited in the plan, the loss in pension wealth suffered by working until age 62 was about 14 percent of earnings, and by age 65, the loss was the equivalent of a 21 percent pay cut (Kotlikoff and Wise 1989a: table 10.1).

<sup>28</sup> Stock and Wise (1990a, 1990b) introduced the concept of the "option value" of continued work. Continuing to work now provides the worker with the "option" of retiring later, at a time when the value of the combined earnings, pension and Social Security streams is larger. The value of this option is the difference between the value of these streams when their sum is maximized, and the value if the person retires now.

<sup>29</sup> For those with less than 10 years service at age 62, only 12 percent leave the firm, compared to half of those with 30 years of service, and therefore negative pension accruals.

<sup>30</sup> The pattern is almost identical when based on rates calculated for 1983, but not, as we will see, when 1982 retirement rates are used.

<sup>31</sup> Coile (1999) and Quinn (1999a), both using the new Health and Retirement Study, report similarities in the behavior of older men and women -- Coile regarding their responses to retirement incentives, and Quinn regarding the patterns of labor market exit (the use of bridge jobs between full time employment and complete labor force withdrawal) of men and women who have had a long-duration career job.

---

<sup>32</sup> At age 61, the estimated cumulative departure rate following a change in the early retirement age to 62 drops from 51 to 8 percent, a decline of 43 points. The differential for this change is maximized at age 61, since that is the last year that potential retirees are unable to receive benefits. At age 62, when they could get benefits under either scenario, the differential drops to 32 percent, and by age 65, it declines to 12 percentage points (Lumsdaine, Stock and Wise 1997: figure 11.7A.)

<sup>33</sup> Luzadis and Mitchell (1991) suggest that firms may have increased the financial incentives in their defined benefit pensions plans in response to changes in the regulatory environment; in particular, to the delay and then elimination of mandatory retirement provisions.

<sup>34</sup> Burkhauser and Quinn (1983) came to a similar conclusion using a sample from the Retirement History Study. They estimated that at least half of what looked like a mandatory retirement effect was actually due to the financial incentives built into employer pension plans and Social Security. Even this was undoubtedly an underestimate, since the authors only had industry-wide averages for pension details, rather than the real age-by-age retirement incentives that workers actually faced.

<sup>35</sup> Samwick (1998) included those respondents who appeared in both the 1983 and 1986 waves of the SCF, who were aged 50 to 69 and working full time (but not self-employed) in 1983. He eliminated about 100 observations who reported being covered by a pension, but who lacked usable pension data from their pension provider. His final sample is 525 individuals, observed twice, in 1983 and 1986. This is a small sample size and a short panel; on the other hand, he does have good demographic information and good pension data, whereas previous researchers had only one or the other.

<sup>36</sup> This comparison suffers from the fact that the Social Security variables are derived from imputed wage profiles, and as such, lose much of the true variation that exists. Because of this measurement error problem, the coefficients are probably biased toward zero. As an experiment, Samwick (1998) substituted a simple dichotomous pension coverage variable (which is all that some researchers have) for the accrual and wealth level variables he was able to calculate. This coefficient was insignificantly different from zero, and the sign suggested that pension coverage discouraged retirement. Of course, this is true for some workers and not for others, depending on the sign of the individual's pension accrual. The experiment confirms the fact that simple coverage or even eligibility status variables do not capture the subtleties of the pension incentives that workers actually face.

<sup>37</sup> During this period, employers were forced to continue crediting service after age 65 (unless the worker had reached a maximum number of years), and Social Security introduced the delayed retirement credit, a reward for workers who delayed receipt of benefits after age 65. Both of these changes should have encouraged more work, not earlier retirement, but they were offset by more powerful factors, according to Anderson, Gustman and Steinmeier (1999).

<sup>38</sup> Calculating future Social Security or employer pension accruals requires assumptions about future earnings. Coile and Gruber (1999) assume that real earnings grow at a rate of 1 percent per year. They use a 3 percent real discount rate, and age and gender specific survival probabilities. The authors estimate that median Social Security accruals are positive through age 64 (i.e., the impacts of the recalculation of average earnings and the reward for delaying Social Security receipt outweigh the benefits foregone by working another year), but then turn negative at age 65, and continue to grow more negative with age. At every age,

---

however, there is a wide dispersion of accruals around the median.

<sup>39</sup> Under current rules, recipients who claim benefits at age 62 receive 80 percent of a full “age 65” benefit, a penalty of  $20/3 = .0667$  percent per year. Under the 1983 legislation increasing the normal retirement age to 67 early next century, the reward at ages 62 and 63 would be only 5 percent, rising to 6.67 percent at ages 64 through 67 (Social Security Administration, 1998: table 2A20).

<sup>40</sup> Some researchers have defined retirement as complete labor force withdrawal, while others would consider as retired someone who was still working, but who had cut back on hours worked late in life. Others base retirement status on the receipt of Social Security or employer pension benefits, regardless of hours worked, and still others allow survey respondents to define them themselves as retired or not. For some retirement patterns, all these definitions would coincide on the same event, but for many others, they would not.

<sup>41</sup> Quinn (1999a: table 3) estimated that the extent of bridge job activity declines by about 5 percent when only 8 years of tenure are required, and by about 20 percent when the definition is dropped to only 5 years.

<sup>42</sup> The same conclusions are consistent across three different definitions of health available in the Health and Retirement Survey -- whether or not the respondent reports a health condition that limits the type or amount of work that he or she can do; a subjective health assessment (a 5-way scale from excellent to poor); and information on the number of specific activities of daily living with which the respondent reports a lot of difficulty (Quinn 1999b: table 5).

<sup>43</sup> In a recent survey by the Employee Benefit Research Institute, about 60 percent of current workers surveyed said that they thought that they would work for pay after retirement. About one third of them suggested that they had to, to make ends meet, while about one half cited “quality of life” issues as the main motivation (Quinn 1999b).

## BIBLIOGRAPHY

- Allen, Steven and Robert Clark. 1987. "Pensions and Firm Performance." In Morris Kleiner, et al. (eds.), Human Resources and the Performance of the Firm. Madison, Wisconsin: Industrial Relations Research Association, pp. 195-242.
- Allen, Steven, Robert Clark, and Ann McDermed. 1988. "The Pension Cost of Changing Jobs." Research on Aging 10: 459-471.
- Allen, Steven, Robert Clark, and Ann McDermed. 1993. "Pension Bonding and Lifetime Jobs." Journal of Human Resources 28(3): 463-481.
- Anderson, Patricia M, Alan L. Gustman and Thomas L. Steinmeier. 1999. "Trends in Male Labor Force Participation And Retirement: Some Evidence On The Role Of Pensions And Social Security In The 1970s and 1980s." Journal of Labor Economics, October, forthcoming.
- Bartel, Ann and George Borjas. 1977. "Middle-Age Job Mobility: Its Determinants and Consequences." In Seymour Wolfbein (ed.), Men in Their Preretirement Years. Philadelphia: Temple University.
- Becker, Gary. 1964. Human Capital: A Theoretical and Empirical Analysis. New York: Columbia University Press.
- Becker, Gary and George Stigler. 1974. "Law Enforcement, Malfeasance, and Compensation of Officers." Journal of Legal Studies 3(1): 1-18.
- Bloom, David and Richard Freeman. 1994. "The Fall in Private Pension Coverage in the U.S." In U.S. Department of Labor, Pension Coverage Issues for the 1990s. Washington: USGPO, pp. 53-60.
- Brown, Charles. 1980. "Equalizing Differences in the Labor Market." Quarterly Journal of Economics 94: 113-133.
- Burkhauser, Richard V. 1979. "The Pension Acceptance Decision of Older Workers." Journal of Human Resources 14(1): 63-75.
- Burkhauser, Richard V. 1980. "The Early Acceptance of Social Security: An Asset Maximization Approach." Industrial and Labor Relations Review 33(1): 484-492.
- Burkhauser, Richard V. and Joseph F. Quinn. 1983. "Is Mandatory Retirement Overrated? Evidence from the 1970s." Journal of Human Resources 18(3): 337-358.
- Clark, Robert and Ann McDermed. 1986. "Earnings and Pension Compensation: The Effect of Eligibility." Quarterly Journal of Economics 101: 341-361.
- Clark, Robert and Ann McDermed. 1988. "Pension Wealth and Job Changes: The Effects of Vesting, Portability, and Lump-sum Distributions." The Gerontologist 28: 524-532.
- Clark, Robert and Ann McDermed. 1990. The Choice of Pension Plans in a Changing Regulatory Environment. Washington: American Enterprise Institute.

- Clark, Robert and Melinda Pitts. 1999. "Faculty Choice of a Pension Plan: Defined Benefit versus Defined Contribution." Industrial Relations 38(1): 18-45.
- Coile, Courtney. 1999. "Social Security, Pensions and the Retirement Decisions of Couples." MIT, mimeo, April.
- Coile, Courtney and Jonathan Gruber. 1999. "Social Security, Private Pensions and Retirement." MIT, mimeo, April.
- Cornwell, Christopher, Stuart Dorsey, and Nasser Mehrzad. 1991. "Opportunistic Behavior of Firms in Implicit Pension Contracts." Journal of Human Resources 26(4): 704-725.
- Curme, Michael and William Even. 1995. "Pension Coverage and Borrowing Constraints." Journal of Human Resources 30(4): 701-712.
- Currie, Janet and Brigitte Madrian. 1998. "Health, Health Insurance, and The Labor Market." In David Card and Orley Ashenfelter (eds.), Handbook of Labor Economics. Amsterdam: Elsevier Science.
- Doescher, Tabitha. 1994. "Are Pension Coverage Rates Declining." In U. S. Department of Labor, Pension Coverage Issues for the 1990s. Washington: USGPO, pp. 7-38.
- Dorsey, Stuart. 1995. "Pension Portability and Labor Market Efficiency: A Survey of the Literature." Industrial and Labor Relations Review 48(2): 276-292.
- Dorsey, Stuart, Christopher Cornwell, and David Macpherson. 1998. Pensions and Productivity. Kalamazoo, MI: Upjohn Institute for Employment Research.
- Dorsey, Stuart and David Macpherson. 1997. "Pensions and Training." Industrial Relations 36(1): 81-96.
- Ehrenberg, Ronald. 1980. "Retirement System Characteristics and Compensating Wage Differentials in the Public Sector." Industrial and Labor Relations Review 33: 470-483.
- Employee Benefit Research Institute. 1994. Employment Based Retirement Income Benefits: Analysis of the April 1993 CPS. Issue Brief No. 153, Washington: EBRI.
- Employee Benefit Research Institute. 1997. EBRI Databook on Employee Benefits. Washington: EBRI.
- Even, William and David Macpherson. 1990. "The Gender Gap in Pensions and Wages." Review of Economics and Statistics 72(2): 259-265.
- Even, William and David Macpherson. 1994. "Why Did Male Pension Coverage Decline in the 1980s?" Industrial and Labor Relations Review 47(3): 439-453.
- Even, William and David Macpherson. 1996. "Employer Size and Labor Turnover: The Role of Pensions." Industrial and Labor Relations Review 49(4): 707-728.
- Fields, Gary S. and Olivia S Mitchell. 1984. Retirement, Pensions and Social Security. Cambridge MA: MIT Press.
- Gunderson, Morley, Douglas Hyatt, and James Pesando. 1992. "Wage-Pension Trade-offs in Collective Agreements." Industrial and Labor Relations Review 46(1): 146-160.

- Gustman, Alan L. and Olivia S. Mitchell. 1992. "Pensions and Labor Market Activity: Behavior and Data Requirements." In Pensions and the Economy, edited by Zvi Bodie and Alicia Munnell. Philadelphia: Pension Research Council and the University of Pennsylvania Press, pp. 39-87.
- Gustman, Alan L., Olivia S. Mitchell and Thomas L. Steinmeier. 1994. "The Role of Pensions in the Labor Market: A Survey of the Literature." Industrial and Labor Relations Review 47(3): 417-438.
- Gustman, Alan L. and Thomas L. Steinmeier. 1984. "Partial Retirement and the Analysis of Retirement Behavior." Industrial and Labor Relations Review 37(3): 403-415.
- Gustman, Alan L. and Thomas L. Steinmeier. 1992. "The Stampede Toward Defined Contribution Pension Plans: Fact or Fiction?" Industrial Relations 31(2): 361-369.
- Gustman, Alan L. and Thomas L. Steinmeier. 1993. "Pension Portability and Labor Mobility: Evidence from the Survey of Income and Program Participation." Journal of Public Economics 50: 299-323.
- Gustman, Alan L. and Thomas L. Steinmeier. 1995. Pension Incentives and Job Mobility. Kalamazoo, MI: Upjohn Institute.
- Honig, Marjorie and Giora Hanoch. 1985. "Partial Retirement as a Separate Mode of Retirement Behavior." Journal of Human Resources 20(1):21-46.
- Hustead, Edwin. 1998. "Trends in Retirement Income Plan Administrative Expenses." In Olivia Mitchell (ed.), Living with Defined Contribution Pensions. Philadelphia: University of Pennsylvania Press, pp. 166-177.
- Ippolito, Richard. 1985. The Labor Contract and True Economic Pension Liabilities." American Economic Review 75(5): 1031-1043.
- Ippolito, Richard. 1986. Pensions, Economics, and Public Policy. Homewood, IL: Dow Jones-Irwin.
- Ippolito, Richard. 1987. "Why Federal Workers Don't Quit." Journal of Human Resources 22: 281-99.
- Ippolito, Richard. 1991. "Encouraging Long-Term Tenure: Wage Tilt or Pensions?" Industrial and Labor Relations Review 44(3): 520-535.
- Ippolito, Richard. 1994. "Pensions and Indenture Premia." Journal of Human Resources 29(3): 795-812.
- Ippolito, Richard. 1995. "Towards Explaining the Growth of Defined Contribution Plans." Industrial Relations 34(1): 1-20.
- Ippolito, Richard A. 1997. Pension Plans and Employee Performance. Chicago: University of Chicago Press.
- Kotlikoff, Laurence and David Wise. 1985. 'Labor Compensation and the Structure of Private Pension Plans: Evidence for Contractual vs. Spot Labor Markets.' In David

- Wise (ed.), Pensions, Labor, and Individual Choice. Chicago: University of Chicago Press, pp. 55-85.
- Kotlikoff, Laurence J. and David A. Wise. 1987. "The Incentive Effects of Private Pension Plans." In Zvi Bodie, John B. Shoven and David A. Wise (eds.), Issues in Pension Economics. Chicago: University of Chicago Press, pp. 283-336.
- Kotlikoff, Laurence J. and David A. Wise. 1989a. "Employee Retirement and a Firm's Pension Plan." In David A. Wise (ed.), The Economics of Aging. Chicago: University of Chicago Press, pp. 279-330.
- Kotlikoff, Laurence J. and David A. Wise. 1989b. The Wage Carrot and the Pension Stick. Kalamazoo: The W. E. Upjohn Institute for Employment Research.
- Kruse, Douglas. 1995. "Pension Substitution in the 1980s: Why the Shift Toward Defined Contribution Pension Plans?" Industrial Relations 34(2): 218-241.
- Lazear, Edward. 1979. "Why Is There Mandatory Retirement?" Journal of Political Economy 87(6): 1261-1284.
- Lazear, Edward and Robert Moore. 1988. 'Pensions and Turnover.' In Zvi Bodie, John Shoven, and David Wise (eds.), Pensions in the U.S. Economy. Chicago: University of Chicago Press, pp. 163-188.
- Long, James and Frank Scott. 1982. "The Income Tax and Nonwage Compensation." Review of Economics and Statistics 64(2): 211-219.
- Lumsdaine, Robin L., James H. Stock and David A. Wise. 1994. "Pension Plan Provisions and Retirement: Men and Women, Medicare and Models." In David Wise (ed.), Studies in the Economics of Aging. Chicago: University of Chicago Press, pp. 183-208.
- Lumsdaine, Robin L., James H. Stock and David A. Wise. 1997. "Retirement Incentives: The Interaction Between Employer-Provided Pensions, Social Security, and Retiree Health Benefits." In Michael D. Hurd and Naohiro Yashiro (eds.), The Economic Effects of Aging in the United States and Japan. Chicago: University of Chicago Press, pp. 261-293.
- Luzadis, Rebecca and Olivia S. Mitchell. 1991. "Explaining Pension Dynamics." Journal of Human Resources 26: 679-703.
- McCormick, Barry and Gordon Hughes. 1984. "The Influence of Pensions on Job Mobility." Journal of Public Economics 23: 183-206.
- McGill, Dan, Kyle Brown, John Haley, and Sylvester Schieber. 1996. Fundamentals of Private Pensions. Philadelphia: University of Pennsylvania Press.
- Mitchell, Olivia. 1982. "Fringe Benefits and Labor Mobility." Journal of Human Resources 17(2): 286-298.
- Mitchell, Olivia S. and Rebecca Luzadis. 1988. "Changes in Pension Incentives over Time." Industrial and Labor Relations Review 42(1): 100-108.

- Mitchell, Olivia and Silvana Pozzebon. 1986. "Wages, Pensions, and Wage Pension Tradeoffs." In Olivia Mitchell (ed.), Explaining Patterns in Old-Age Pensions. Washington: National Institute on Aging.
- Montgomery, Edward, Kathryn Shaw, and Mary Ellen Benedict. 1992. "Pensions and Wages: An Hedonic Price Theory Approach." International Economic Review 33(1): 111-128.
- Munnell, Alicia. 1982. The Economics of Private Pensions. Washington: The Brookings Institution.
- Oi, Walter. 1962. "Labor as a Quasi-Fixed Factor." Journal of Political Economy 70(6): 538-555.
- Papke, Leslie. 1999. "Are 401(k) Plans Replacing Other Employer-Provided Pensions?" Journal of Human Resources 34(2): 311-325.
- Quinn, Joseph F. 1999a. "New Paths to Retirement." In Brett Hammond, Olivia Mitchell and Anna Rappaport (eds.), Forecasting Retirement Needs and Retirement Wealth. Philadelphia, PA: University of Pennsylvania Press, 1999 (forthcoming).
- Quinn, Joseph F. 1999b. Retirement Patterns and Bridge Jobs in the 1990s. Employee Benefit Research Institute Issue Brief #206. Washington DC: EBRI, February.
- Quinn, Joseph F., Richard V. Burkhauser and Daniel A Myers. 1990. Passing the Torch: The Influence of Economic Incentives on Work and Retirement. Kalamazoo: The W. E. Upjohn Institute for Employment Research.
- Ruhm, Christopher J. 1990a. "Bridge Jobs and Partial Retirement." Journal of Labor Economics 8(4): 482-501.
- Ruhm, Christopher J. 1990b. "Career Jobs, Bridge Employment, and Retirement." In Peter B. Doeringer (ed.), Bridges to Retirement; Older Workers in a Changing Labor Market. NY: ILR Press, pp. 92-107.
- Ruhm, Christopher J. 1996. "Do pensions increase the labor supply of older men?" Journal of Public Economics 59(1): 157-175.
- Salop, Joanne and Steven Salop. 1976. "Self Selection and Turnover in the Labor Market." Quarterly Journal of Economics 90: 619-627.
- Samwick, Andrew A. 1998. "New Evidence on Pensions, Social Security and the Timing of Retirement." Journal of Public Economics 70(2): 207-236.
- Schiller, Bradley and Randall Weiss. 1980. "Pension and Wages: A Test for Equalizing Differences." Review of Economics and Statistics 63: 529-538.
- Smith, Robert. 1981. "Compensating Differentials for Pension and Underfunding in the Public Sector." Review of Economics and Statistics 63: 463-467.
- Smith, Robert and Ronald Ehrenberg. 1983. "Estimating Wage-Fringe Tradeoffs: Some Data Problems." In Jack Triplett (ed.), Measurement of Labor Cost. Chicago: University of Chicago Press.

- Social Security Administration. 1998. Annual Statistical Supplement to the Social Security Bulletin. Washington, DC: Social Security Administration.
- Stock, James H. and David A. Wise. 1990a. "The Pension Incentive to Retire: An Option Value Analysis." In David A. Wise (ed.), Issues in the Economics of Aging. Chicago: University of Chicago Press, pp. 205-224
- Stock, James H. and David A. Wise. 1990b. "Pensions, the Option Value of Work, and Retirement." Econometrica 58(5): 1151-1180
- U.S. Bureau of Labor Statistics. 1998. Employee Benefits in Medium and Large Private Establishments. Washington: USGPO.
- U.S. Department of Labor. 1992. Trends in Pensions 1992. Washington: USGPO.
- U.S. Department of Labor. 1994. Pension Coverage Issues for the 1990s. Washington: USGPO.
- Woodbury, Stephen and Wei-Jang Huang. 1991. The Tax Treatment of Fringe Benefits. Kalamazoo, MI: Upjohn Institute.