

NBER WORKING PAPER SERIES

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DEFINED BENEFIT PENSION PLAN

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Working Paper No. 924

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge MA 02138

July 1982

Presented at the NBER Conference on Pensions, Amelia Island Plantation, Florida, March 25-26, 1982. We thank the participants of the conference for their comments, especially our discussant Jerry Green. The research reported here is part of the NBER's research program in Pensions. Any opinions expressed are those of the authors and not those of the National Bureau of Economic Research.

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ABSTRACT

The liability to employees in a defined benefit pension plan is the present value of vested benefits, the present value of the benefits that employees would receive on the immediate termination of the pension plan. This is the literal and simple definition of the liability. Although it leads to an understanding of the economics of the promise of a pension, several common provisions of pension plans make it necessary to expand the definition. Anomalies such as vesting, early retirement benefits, lump sum provisions, and ad hoc increases in benefits for retired employees indicate that employees accrue benefits that exceed their benefits on a termination of the plan. These anomalies, however, can be explained by requiring that employees as a group possess specific human capital. Although losing one or a few employees from the group would be a small loss, losing the group of employees would be a great loss. In this group model, employees bargain with the stockholders over the compensation of the entire group; they allocate their compensation according to marginal product, returns from previous equity investments in the human capital of the group, and to purchases and sales of claims on this capital. The model explains the anomalies as a natural outgrowth of the transactions of members within the group. In addition, the model explains the use of defined benefit pension plans, and how employees could have claims, in excess of vested benefits, on the assets in the pension plan.

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I. Introduction

Who owns the assets in the defined benefit pension plans of corporations? Some may feel that this question is easy to answer; pension funds are legal entities separate from the corporation. This distinction has been made more explicit with the enactment of the Employees Retirement Income Security Act of 1974 (ERISA). The provisions of the act regulate the funding and the investments of the fund as well as the benefits to employees. In addition, the Pension Benefit Guarantee Corporation (PBGC), which guarantees a level of benefits for employees, has the power to tax the corporation to secure the payment of pension benefits. The firm contributes to the pension plan; the administrators of the plan have responsibilities as other fiduciaries, and the employees receive benefits from the pension plan during their years in retirement. Although, prior to the Act, employers have had easier access to the assets of the fund, greater control over the funding and investing decisions, and could use the assets for corporate purposes, the provisions of the Act closed many routes to the assets of the fund.

Pension plans are too large and are growing too fast, however, for economists to be stopped by the literal description of the pension plan or for them not to try to strip away the legal form and to reveal the economics of

defined benefit pension plans. As explained in Bulow et al. (1982), there have been significant changes in the economics of the defined benefit pension fund subsequent to the passage of ERISA. Currently, pension assets in all plans exceed \$600 billion, while the assets in non-insured private pension plans exceed \$300 billion. In recent years, pension contributions for Fortune 500 companies have averaged approximately 12 percent of pretax profits. These funds represent a large pool of assets: to define ownership to these assets is an important task.

Understanding the ownership of defined benefit pension funds, however, is a difficult task. Early papers in the area by Treynor (1972), Treynor et. al. (1978), and Sharpe (1976) considered that the pension trust was essentially an asset of the corporation. The liabilities to the employees were classified as essentially corporate obligations. Black (1976) argued that most of the risk of holding assets in a defined benefit pension plan is borne by corporate stockholders. Bulow (1981) has argued that the pension promise is comparable to a discount bond: the current reduction in salary is the present value of the bond, and the future promise is the face amount of the bond. As a first approximation, the value of the corporate pension liability would then be only the accrued benefits, benefits that must be paid if the plan were terminated immediately.

Sharpe (1976), assuming a no tax world, argued that it made little difference to the stockholders or the pension beneficiaries as to how the assets of the pension fund were allocated between bond and stock investments. With rational expectations neither group would expect to fool the other group. Black (1980), Tepper (1981) and Feldstein & Seligman (1981) assume that retirement promises to employees are corporate liabilities, with little

risk, and most important, promises that are independent of the pension fund, in concluding that there were tax advantages to corporate stockholders of investing the assets of pension funds in bonds.

There are, however, several cracks in this armor on various fronts, including the tax front. Sharpe and Harrison (1982) argue that with insurance provided by the PBGC and with taxation, the policy of the fund may shift toward either all stocks or all bonds within the fund. Miller and Scholes (1981) and Bulow (1982) argued that the pension claims of the employees were not independent of the value of the assets of the fund; some groups of employees consider that the assets in the defined benefit plan belong to them, just as if the plan were a defined contribution plan. Depending upon the question to be answered, economists have assumed that different parties owned the pension fund.

In the last several years, however, many financial economists have come to the view that the pension plan of large corporations is a corporate asset, and that the obligation to pay employees during retirement is a corporate liability. This argument seems reasonable, since beneficiaries of a defined benefit pension plan receive a pension based, in part, upon a percentage of their final salary with the firm, or receive a pension based on a fixed dollar amount multiplied by up to a maximum number of years of service with the firm. Although, as a legal entity, the pension fund may be separated from the firm, employees look to the firm to pay their retirement benefits. These payments, therefore, have been assumed to be obligations of the corporation, promises to pay benefits to employees, similar in economic effect to promises to its other creditors. If benefits received by the employees are independent of the performance of the fund, or its assets, then the assets of

the firm include the assets of the pension plan: both are the security for the pension claim. Tepper (1981) assumes this independence by treating the assets and liabilities of the pension fund no differently than assets and liabilities held on corporate account in constructing an augmented balance sheet of a corporation.

We want to contribute to the discussion of the issues in several ways. In the first section we discuss the implications of interpreting literally the provisions of a defined benefit pension plan. Doing so, leads to some implausible conclusions even if the method used to account for pension benefits is the most consistent with accounting for other forms of employee compensation. These inconsistencies imply, that when valuing the employee's claims on the pension fund, it is necessary to look beyond the literal description of the compensation agreement.

In the second section of the paper, we explore what can be learned from the form of the pension contract as to the nature of compensation to the group of employees within the firm. The traditional view that stockholders set up forms of "implicit contracts" is rejected for the view that employees, within the salaried pension plan, should be looked at not as individuals but as a group. The group negotiates with the stockholders of the firm (the board of directors of the firm or its management representatives) over the division of the profits earned by the firm.

By considering the workers as members of a group, many of the anomalies considered in the first part of the paper disappear. We conclude that viewing the pension fund and the corporate assets of a firm as a single consolidated account is too simplistic.

II. Who Owns the Pension Fund? A dogmatic view of the pension covenants

At the start, we will consider only defined benefit pension plans for salaried employees. Such plans are almost always well funded: if the plan were to terminate today, assets would be more than sufficient to assure all of the accrued vested benefits of the employees in the plan. As employees leave the firm, their pension wealth in the plan could be calculated easily by taking the present value of their vested benefits. As Bulow (1982) shows, the present value of vested benefits is the correct measure of pension wealth under either of two models of labor compensation: (1) a "marginal product model", and (2) an "orthogonal model".

In a "marginal product model", an employee's total compensation each period is equal to marginal product, making little difference if the employee leaves or stays with the firm. It would be extremely tenuous to argue that the present value of the employees' vested benefits is not the correct measure of the employer's liability: future benefit accumulation is part of future compensation, and is paid for by providing future services to the firm.

In an "orthogonal model", the form of the pension plan is assumed to be independent of any deviations between employee compensation and their marginal product. Some recent work (e.g. Medoff and Abraham (1981)) indicates that after correcting for differences in marginal product, older workers may be paid more than younger workers. This does not mean, however, that these differences need be related in any way to the form of the pension plan. Stanford, for example, has a defined contribution pension plan yet may be as "paternalistic" as Sunstrand Corporation, with its defined benefit plan. In both organizations, the young workers may be underpaid and the old workers

might be overpaid. No one, however, would suggest that Stanford calculate a "projected liability" representing the amount of compensation the school will have to pay in excess of the present value of the future output of the employee, (even though under the tenure system those liabilities are more explicit than those of a private firm).

For firms with defined benefit pension plans, it does not make sense to calculate an implicit pension liability using projections of future salary scales and termination rates. In computing the liability of the firm to the beneficiaries of the plan, the liability should be no greater than the liability on terminating the pension fund. The liability should be unrelated to the form of the pension plan, whether the plan is of the defined benefit or the defined contribution type. Furthermore, since pension benefits represent less than ten percent of total labor compensation, the calculation of a liability for implicit compensation by only using pension data would be subject to large errors in measurement.

Using these arguments, actuaries are justified in setting the value of the employees' pension equal to the present value of vested benefits, the benefits they retain on immediately leaving the firm. These are exactly the same benefits that employees would receive on the termination of a well-funded pension plan.

Anomalies in the Accrued Benefit Method of Accounting for Pension Liabilities

We have found several ways, however, where accounting for pension wealth in this manner, fails to reflect the present value of an employee's pension wealth. These anomalies make it difficult to accept the accrued benefit method, in total, and without question or adjustments.

The anomalies that we have found that are most interesting include the following problems.

Vesting occurs on discrete dates. Until employees vest, they have no pension wealth; on "vesting day", however, their entire accrued benefits become part of their pension wealth. Under ERISA, in the most extreme form of vesting, if employees leave the firm with less than ten years of service, they have no pension; however, after ten years they are fully vested. No one would believe that employees accumulate their entire ten years of pension wealth on the final day before vesting. Although this appears to be a serious deficiency, it is not as important as it might seem: the present value of the benefit is generally less than one half a month's pay for a newly vested employee who is about 40 years old. If need be, the firm could pay salary that was fractionally less during the last year before vesting, knowing that the employee will consider loss of pension in deciding whether to stay with the firm.

Although the employee may receive salary that is independent of the day of vesting, this bonus is too small to invalidate using vested benefits as a proxy for pension wealth. We have better candidates to challenge the vested benefit approach to valuing the pension benefit.

Early Retirement Benefits. Employees receive large lump sum benefits by remaining with the firm until the first date of early retirement. Many plans allow employees to retire early with benefits that are too high relative to the benefits received on remaining with the firm until normal retirement. For example, a plan may have the following provisions: (1) If the employee leaves

before the early retirement date, (e. g., age 55), the employee is eligible for a vested pension with benefits beginning at age 65; (2) If the employee stays until the early retirement date, the employee is eligible for perhaps 70 percent of a full pension, starting immediately, and (3) By staying until the early retirement date, the employee may become eligible for extended health benefits and periodic upward adjustments in pension benefits, which are lost by those employees leaving the firm prior to the early retirement date. The employee's incentive to stay with the firm until the early retirement date may exceed one full year's salary.

Staying until early retirement has a dramatic effect on the employee's pension wealth. Looking strictly at vested benefits as a measure of pension wealth fails to account for the large jump on that one day. Employees may receive quite a few lump sum benefits during their careers but none comparable to the gain, achievable by staying with the firm until the date of early retirement. Clearly, those employees, soon to become eligible for early retirement, have substantial equity beyond their vested benefits.

To preserve comparability to the manner in which we account for other items, we still might choose to account for early retirement as a one time windfall, that is realized on reaching the date of retirement. For example, some employees at universities receive tuition benefits for children attending college; that item is expensed and not accrued throughout employment. Employees, however, do not de facto have such large lump sums payments as part of their compensation.

Possibly, early retirement provisions are substitutes, in part, for

severance pay. That is, employees that are fired before the date of early retirement might have a more generous severance arrangement than those of their colleagues. The early retirement date would still serve as a significant milestone; after that date, the employee, on retiring voluntarily, would receive severance pay through pension in lieu of severance. (Lazear (1982) has worked on a closely related question.)

Lump Sum Distributions. Lump sum distributions from pension plans have a significant effect on pension wealth. Numerous pension plans permit some or all retirees to take their pensions in a lump sum, with promised benefits that are discounted at low rates of interest. According to a recent survey, 90 of the 546 companies surveyed, offered lump sum payment options while only assuming rates of interest that averaged around 6 percent. (New York Times, April 5, 1981.)

By using low rates of interest, the lump sum distribution has greater present value than receiving the pension through time; therefore, accrued benefits, at all dates prior to retirement, would be the present value of the lump sum. This has an interesting side effect: if the firm also uses a low rate of interest in valuing pension liabilities, then its book liability equals its literal valuation liability. There are, however, two major problems with this approach.

First, firms have a large degree of flexibility in changing the interest rate used in determining the lump sum. It may seem implausible that a firm could unilaterally reduce the present value of its pension liabilities by as much as 25 percent by changing its assumption on interest rates from 6 percent

to 9 percent. Texaco, American Airlines and RCA Corporation are among corporations that have raised the interest rate in recent years, to the consternation of retiring employees. (Pensions and Investment Age, May 10, 1982.)

Second, firms have the power to decide whether a specific employee will be permitted to receive a lump sum benefit. For example, some plans may make it easier for high level executives, deemed to possess more financial acumen, to receive lump sums. At this stage of the analysis, however, it is puzzling that employees would give to the firm as much discretion over the present value of their benefits. The vested benefit method of valuation does not allow for discretion of this type.

Ad hoc Increases in Benefits. Ad hoc increases in the benefits of pensioners are a corporate give away. The vested benefit method of valuation of pension benefits requires that future promises be known. Firms, however, grant ad hoc increases in benefits to already retired employees. These grants, at random times during retirement, do not fit the vested benefit approach to defining pension wealth.

Claims on Pension Assets. The stockholders have an equity position in the pension fund at least equal to the market value of the assets in the pension fund minus the present value of the liabilities of the fund. In addition, if the right to put the liabilities to the PBGC, the "pension put", has value, the stockholders have a more valuable claim. On the other hand, if the "pension put" has no value, a well-funded plan, then the stockholders are the sole gainers (losers) from increases (decreases) in the market value of

the pension fund. The stockholders, not the employees, are concerned with the "wasting" of excess assets in a well-funded pension plan.

Recent events, however, imply that this separation of the claims on the assets in the plan is incorrect. For example, retirees of Grumman Corporation, not the stockholders, sued the trustees of the pension plan for wasting the assets of the pension fund, by buying stock at a premium, presumably, to prevent a takeover by LTV. With a vastly overfunded pension plan, it appears that the retirees were not injured; only the stockholders were hurt if they missed an opportunity to sell their stock at a higher price, and if paying the premium was a waste of the excess assets of the plan. The benefits of retirees were still safe and active workers may have been better off because their own pensions remained intact and their jobs may have become safer because of the anti-takeover activity.

Under ERISA, the assets of the plan are to be managed for the sole benefit of the beneficiaries of the plan. The courts appear to follow this interpretation in defining the claimants to the assets of the plan. The Grumman case points to the difficulty in using the excess assets in the plan for corporate business purposes.

In another case, the A. & P. Corporation terminated its pension plan. After negotiating with the union, and although no contract specified a division of the surplus, the surplus in the pension fund was split into two parts, one half to the firm and the other half to the employees through increased benefits.

These anomalies lead us to conclude that the vested benefit method for valuation of pension benefits does not give a complete picture. In actuality, employees have complex employment contracts with the firm, and the pension plan is only part of total compensation. To understand pension compensation, in addition to direct salary, we must also understand the various other aspects of the compensation package.

In the next section of the paper we discuss a model of compensation that tries to explain how a firm could offer a compensation package that includes lumpy payments, such as the large bonus for staying until the date of early retirement. This analysis, we believe, gives us an insight into the nature of the claims of both the employees and the stockholders against the pension fund.

III. A Model of Labor Contracts

In the last section we showed that anomalies arise if we value pension benefits as termination benefits. In this section, we present an alternative model of the labor contract that reconciles many of these anomalies.

We eschew the standard "implicit contract" approach to labor relations, an approach where young workers are paid less than marginal product and old workers are paid more than marginal product because of some unwritten pact between the firm and the workers. Although some of the implicit contract models explaining the upward sloping wage/tenure profile have been ingenious, such as the work by Harris and Holmstrom (1982), they typically depend upon the firm honoring a non-contractual obligation to the employees. In a model

such as Harris and Holmstrom, it must be in the interest of the firm to renege on its implicit liabilities at some point, unless those liabilities can grow indefinitely by at least the interest rate, (a possible Ponzi scheme). Although we present a model in which we expect to observe an upward sloping wage/tenure profile there is no reliance on an implicit labor contract.

In this model we study firms that earn economic rents, that, in part, go to the labor force. The labor force is able to extract some rents because the employees develop some human capital specific to the firm. The firm cannot earn its rents without employing the workers, who have experience with the firm and who educate new and inexperienced workers. Each generation of workers is willing to take a low wage when young to gain experience and to become part of the group that negotiates a larger total wage bill. The older workers are essentially equity holders in the firm, and they sell their equity to the young workers. The sale takes place through differential wage rates: it cannot occur through sale to stockholders. There is no claim that can be sold in the market.

No generation of employees gets what is ex ante better than a fair deal; there is no queue for employment with the firm. Individual employees, however, accept low salaries because they are buying equity from other employees--not because of an implicit contract with the firm. The senior members of the organization, who at any moment possess the rents accruing to the labor force, are able to do as well via high salaries when old, as they would if they could suddenly disembody the rents of the labor force and sell all future rents for their present value.

We distinguish three types of human capital. First, is fully transferable human capital, such as the knowledge gained on earning an M.B.A. degree. Second, is human capital specific to the individual; for example, an administrator who knows a tremendous amount about a particular company, with some of these skills not easily or at least quickly replicated at the firm. Third, is firm specific human capital, not unique to a particular individual, and, therefore, shadow priced at the margin at zero. Although, if one employee leaves the firm, there is no loss in that the employee's marginal product is as high inside the firm as outside the firm, if a whole group of such employees left the firm, all at once, there would be a loss to the firm. It is this third type of group human capital that we use in the model. Empirically, if we could observe the marginal product of these employees individually, it would be low. The marginal product of the group, however, is high. If employees negotiate their compensation as a group, either explicitly through union negotiations or implicitly through a management team, they may be able to garner part of the "quasi"-rents that are earned because of the firm-specific human capital of the group.

In another paper, Bulow and Scholes (1982), present a complete model of this concept and its implications for contracting among members of the group. To illustrate the ideas and the concepts, we use a simple model and a numerical example. This will serve as a lead into our discussion of the ownership of the assets of the pension plan.

Assume that a firm is created that will last exactly for four periods and that the production function each period is as follows:

$$f (q_I, q_E) = 120 q_E^{1/2} + 40 q_I^{3/4} - 192$$

where q_E = quantity of experienced employees
 q_I = quantity of inexperienced employees

Assume that these employees only develop firm specific human capital. The opportunity cost of working for the firm is of the same amount regardless of the experience of the employee. For the purposes of the model assume that, in each period, W , the opportunity cost of each worker, is 15.

Assume that no individual employee can be employed for more than two periods--one when inexperienced and one when experienced. In the first period there are no workers with experience. Finally, assume that the rate of interest, $r = 100$ percent.

It can be shown that optimal employment would involve hiring 16 inexperienced employees in the first period; employing 16 experienced and 16 inexperienced employees in each of periods 2, 3, and 4. Under those circumstances, the marginal product of both experienced and inexperienced employees will be 15 (the market wage) in each period. The net present value of the project will be zero.

If individual employees acted as price takers, then all employees could receive a wage of 15 in every period. If the employees, however, are able to negotiate their salaries as a group, they will be in a bilateral bargaining

position with the stockholders of the firm, (presumably through the Board of Directors or their representatives), and the experienced employees may be able to negotiate a higher level of compensation in periods one, two or three.

For example, in period four, the total income produced by the firm would be $120 (16)^{1/2} + 40 (16)^{3/4} - 192 = 608$. From this amount, each inexperienced employee would have to be paid 15 in a competitive labor market. The experienced employees, however, conceivably could negotiate any amount of salary between 15, at which level they would be indifferent to staying with the firm, and 23, at which level the stockholders would be indifferent to shutting down the firm.

Any assumption can be made as to the expectations of the employees as to how the bilateral negotiations for salary will be resolved in periods two, three, and four. We can then calculate the expected total compensation of employees in each future period, the distribution of total compensation between experienced and inexperienced employees in each future period, and the salary that will have to be paid in the first period. For example, assume that everyone expects that in each period the employees will negotiate a compensation package under which they receive 25 percent of the rents earned by the firm. In each period, the opportunity cost of the 32 employees is 480, and the firm has gross income of 608; therefore, we assume that all parties expect the total compensation of the employees in the last 3 periods will be $480 + .25 (608 - 480)$ or 512.

In period four, inexperienced employees will command a wage of 15 each. Therefore, the experienced employees will each receive $(512 - 16 \times 15) / 16 =$

17. In period three, the inexperienced employees, expecting that they will receive 17 when old, will settle for a wage of 14 when young: the present value of their compensation will be the same as with a wage of 15 each year. Continuing backwards, we can compute a table, as in Table 1, of the expected salaries of the experienced and the inexperienced employees.

Table 1

Expected Salaries of Experienced and Inexperienced Employees		
Period	Experienced	Inexperienced
2	18.50	13.50
3	18.00	14.00
4	17.00	15.00

Since young employees expect to earn 18.50 in period 2 when they acquire experience, they will settle for 13.25 in period 1, which is 1.75 below the market salary. Given the wage in period 1, and the expected wage bill in periods two, three, and four, the firm regards the investment as as a zero net present value project. Instead, if in each period, the firm were to pay

market salaries to all of its employees, it would have cash flows of -112, +128, +128, and +128. Because the stockholders must bargain with the employees in periods one, two and three, their expected share of the cash flows falls to +96, (75% of 128). Naturally, the lower salary that the employees accept in the start-up phase of the enterprise reduces the initial cash outflow in that period from 112 to 84.

Essentially, in period one, the inexperienced employees make an investment that is equal to 25 percent of the equity of the firm. At the end of the start-up phase of the enterprise, the firm will have a market value equal to only three quarters of what it would be if the employees had no equity participation, (loosely speaking, "Tobin's q" would be less than one).

The inexperienced employees settle for a salary of 13.25, which is 1.74 below the market salary, because they expect to earn an extra 3.50 the following period. Of this extra amount, 2.00 comes from the 32.00 in rents that are split among the 16 experienced employees; 1.50 comes from selling the present value of the their future share of the rents of the firm to the new, young employees.

In the context of this model, representatives of the stockholders negotiate a total salary bill with the employee group. There are no implicit labor contracts--management and the employees are expected to negotiate as hard in each and in every period. Nevertheless, there are some employees, generally the young and inexperienced, whose salaries are less than their marginal product, and some employees, generally the more senior and experienced, whose salaries are greater than their marginal product.

The model assumes that the employee group acquires an equity position within the firm, and the model assumes that they can sell these property rights only to new employees entering the firm. In the start-up phase of the firm, both the stockholders and the employee group might have provided the investment capital--the stockholders with direct investments; the employee group with reduced salaries. The firm earns rents that are shared over time through higher "dividends" to the employee group.

In this model of group compensation, we could observe large lumps of salary to selected members of the employee group at particular times, such as staying with the firm until early retirement day, or such as receiving tuition for children attending college. As long as the total compensation bill is in line with previous negotiations, the stockholders do not object to paying a disproportionate amount to any one employee. Individual employees, therefore, need not worry about the stockholders trying to reduce their salaries at times when they become eligible to receive significant employee benefits.

While this model does not in itself explain why compensation should be parcelled out in any particular form--it is hard to justify tuition benefits at universities, without considering that in part, these benefits are tax-exempt income--the model does open the door for individual compensation not equal to marginal product at each point in time.

In the next section, we discuss the implications of the model to answering the question of who owns the assets of a pension plan. Important is the notion that the employee group has an equity share in the firm, a share that is sold to younger employees through a salary reduction plan.

III. Who Owns The Assets In Defined Benefit Pension Fund?

In the model above, the employees of the firm negotiate with the employer for a total compensation package, and allocate compensation among members of the group according to marginal product, returns from previous equity investments, and purchases and sales of claims on the equity of the firm.

There are three important implications of this model for the ownership of the assets of the pension fund. First, the model appears to justify using defined benefit pension plans. Under these plans, the present value of the pension accruals of the experienced, older employees, are far greater than the accruals of the inexperienced, younger employees. If younger employees are buying the equity rights of older employees, a pension plan that skews pension savings to older employees might be preferred by both groups of employees. Under a defined contribution plan, however, employers are constrained to tie pension compensation to salary, and not to make it directly dependent on age. The defined benefit plan allows the younger employees to pay for equity shares at a slower rate, which they might prefer, and allows the older employees to defer, at the before tax rate, the returns on the equity shares in the firm. Second, employers can aggregate over the many employees in the plan, to compute the liability of the firm, even if the estimates of the individuals of their own pension wealth do not aggregate to these totals. That is, the labor model does not require that individual employees be paid anything close to marginal product each period. The University of Chicago accounts, and reasonably at that, for the cost of its tuition benefit program by expensing the cash outlay each year. Individual employees, however, may include, and rightly so, some accrued tuition benefit wealth on their own personal balance

sheets. To reconcile this seeming inconsistency, consider that the employee group owns part of the surplus generated by the university; employees, with children approaching college age, know that when their children become undergraduates, the university, acting as the agent, will give them a disproportionate share of the employee surplus. This allocation would be entirely consistent with how the employee group had determined to allocate the surplus among themselves. Similarly, in the pension area, that an employee will be eligible for early retirement next year, and therefore will have sharply increased vested benefits means that the employee will estimate pension wealth at being greatly in excess of current vested benefits. This employee is in line to receive, in the next year, a disproportionate share of the equity claim of the employee group, just as the employee whose child is about to enter college. Third, the group model of compensation implies that the surplus in the pension fund--plan assets less the present value of accrued benefits--is owned, in part, by the firm, and, in part, by the employees.

The employees trade-off current compensation for future compensation when receiving a promise of a pension. In our model, compensation is not as well defined: employees may be buying and selling equity rights as well as receiving the value of their marginal products. In a simple model of compensation, employees are just price takers, without any need to acquire experience with the firm. The tradeoffs between current salary and a pension can be explained by using a defined contribution pension plan. In this plan, the employee gives up a dollar of current salary (before tax); this dollar is invested in a fund, such as a mutual fund (a CREF or a TIAA account). The retirement benefits of employees are uncertain to the extent of the risk they

take in their investment account and up to changes in their marginal tax rate in the pre and post retirement period. The firm acts as an agent, dividing salary between a check for the employee and a check for the retirement account; for the firm's tax purposes, the division of salary is irrelevant. Employees make their own funding and plan choices based on current and future consumption trade-offs, as well as the desire to assume risk. There is ample evidence that employees desire some risk in their pension accounts: university professors, presumably a representative group, albeit more risk averse, have placed approximately half of their defined contribution account money in common stocks, (CREF), and the remainder in risky bonds and in risky mortgages, (TIAA). For university professors, these pension accounts may represent the largest fraction of their savings in the form of stocks or bonds, and as explained in Miller and Scholes (1978), the contribution limits are so generous, professors may not need to hold common stock for retirement other than in their CREF account.

In early work, it was assumed that pension promise was a bond contract, a nominal but definite promise to the employees of the firm. If there were some probability of defaulting on the bonds of the firm, the pension claim was of equal priority to these bonds. This assumption is not correct for several important reasons. On a strict termination basis, bondholders have a higher priority on the assets outside the fund; employees on the assets inside the fund. Assets in the fund increase the security of the pension claims of the employees. If to some extent, prior to ERISA, employers could use the assets in the pension fund for their own purposes, the provisions of ERISA made it more difficult for the firm's stockholders to obtain the surplus of the fund

upon its termination. Furthermore, in our model, the employees own part of the surplus of the fund--group negotiations and ERISA give them increased bargaining power to obtain part of the surplus of the pension fund with and without plan termination. By analogy, just as bondholders seldom receive what their covenants entitle them to in bankruptcy, stockholders seldom receive what their covenants entitle them to in a plan termination.

The pension fund is not a savings account of the stockholders of the firm. Most corporate pension funds invest in bonds and in stocks. Approximately, 60 percent of the assets of pension funds are invested in common stock. Black (1980) and Tepper (1981), however, suggest that investing pension fund assets in bonds dominates these current investment policies. They assume that the pension fund and the pension promise are separate: the fund is an asset of the firm, the promise is a liability of the firm. Given this assumption, the stockholders are better off if the pension fund invests in bonds: (1) in the Black model, because, the firm can keep its equity risk the same by substituting bonds for stocks in the fund, and by leveraging by buying back common stock with newly issued bonds on corporate account--the bonds in the fund earn at the before tax rate, while the offsetting bonds on corporate account require payments at the after-tax rate; (2) in the Tepper model, individual investors offset, on their own account, the change in the risk of their equity that results from substituting bonds for stocks in the pension fund--assuming the Miller (1977) model, with equilibrium marginal after-tax rates of corporations equal to after-tax rates of individuals. Miller and Scholes (1981), and Bulow (1982) examine the crucial assumption of the independence of the assets in the pension plan from the promise of pension

benefits to employees.

The tax models assume that employees do not make claims on the assets of the pension fund. If, in the extreme case, the bondholders and the stockholders of the firm believed that the entire pension fund was owned by the employees, there would be no tax advantage to the firm to funding in bonds. The collateral security for the loan is bad. With partial claims on the assets of the pension fund, the collateral security is tainted. The equity model implies that the collateral security, if not bad is at least tainted. With complicated equity claims on the assets of the pension fund, it might be difficult to write bond contracts that allow bondholders to extract the surplus in the pension plan to pay-off debt claims.

As in Bulow, Scholes and Menell (1982), the Employees Retirement Income Security Act and the establishment of the Pension Benefit Guarantee Corporation changed the economics of the defined benefit pension plan. If there were opportunities prior to ERISA to move assets from the pension account to corporate account or to overfund the pension fund to obtain tax advantages, ERISA has reduced these opportunities. Since employees, with claims of the assets of the pension fund, do not have redeemable claims, the PBGC serves to monitor the actions of corporate stockholders to preserve the rights of the pension beneficiaries. These property rights, coupled with the power of the PBGC, to enforce them, makes it difficult and uncertain as to how to use the assets of the fund as collateral security on a loan. Even employees in retirement look to the PBGC to secure rights to the assets of the fund.

Since it is possible to change the level of funding in the pension plan, to some extent, as long as it is done slowly or without large changes, there is still a tax advantage to overfunding the pension plan. On the other hand, this implies that with large unanticipated changes in the circumstances of the firm, or with changes in the ERISA rules, the collateral security of the pension fund may be claimed by other than the bondholders of the firm.

That employee share an equity ownership in the firm, may explain some of the other anomalies. Group negotiations prevent unilateral changes in interest rate assumptions that can change the value of lump sum distributions. By thinking of the employees negotiating as a group, we can understand and interpret the anomalous provisions of retirement plans, such as the early retirement and the lump sum payout provisions.

IV. Conclusion

The assets of the pension fund are not necessarily the assets of the firm. This makes the question "Who owns the assets in a defined benefit pension plan" more uncertain than if the assets were assets of the firm or if the fund were a defined contribution plan and the assets belonged to the employees. In the augmented balance sheet model of pension finance, the stockholders own the assets in the pension plan. In the group model, the employees and the stockholders share ownership of these assets.

The employees, managing and running the firm, negotiate with the stockholders for a wage package; the wage package is distributed among the employees as current salary and as future pension (and other benefits). In part, the total wage is used by some members of the group to buy equity and to make investments from other members of the group.

To some extent, the stockholders of the firm may be able to overfund the pension fund to capture some tax advantages. By changing funding assumptions, employers adjust their contributions into the pension fund. It is unlikely, however, that the PBGC will allow large changes in the fund or in the company without notification; it is unlikely that pension beneficiaries will allow large changes (at least downward) in the value of the pension trust. In recent years, many companies, trying to change pension or corporate benefit policies, have been challenged by pension beneficiaries.

To actually use the pension trust as collateral for a loan is difficult for all but the most secure companies. No contract can be drafted; the claim must be a general obligation of the firm. The firm could change its policies at any time; pension beneficiaries and the PBGC could step in between the bondholders and the assets of the fund. The collateral security of the fund is bad or tainted. The stockholders would find it difficult to borrow on the assets on which others have a partial claim, namely, the pension beneficiaries.

With modern corporations, outside stockholders are risk takers, and expect to be compensated for assuming capital risk. As Fama (1980) has argued, the internal management team, or employee group, is separate from the

stockholders, other than through the board of directors of the firm. As long as stockholders earn a competitive rate of return on their holdings within the firm, and the correct share of any new rents through investment, the shareholders are indifferent as to how employees monitor each other within the firm. In the context of the large corporation, the pension plan could not be used as a device to monitor the actions of employees; in particular, for the young employee, the pension plan is of little, if any value.

The vast majority of large pension funds contain assets far in excess of the accrued benefits of the plan beneficiaries. A literal interpretation of pension covenants implies that the entire surplus within the fund belongs to the stockholders. We have seen, however, that if employees can negotiate as a group and if the provisions of ERISA are ambiguous as to whether the employees or the stockholders own the surplus, we cannot give a unique answer to the question: who owns the assets in the pension plan.

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