
Conventional wisdom holds that because stocks are expected to earn higher returns than bonds over the long haul, and pension liabilities have long lives, corporate pension funds should be invested primarily in stocks. Consistent with this logic, the pension plan assets of Boots, the U.K. pharmaceutical retailer, were made up of 75% stocks and 25% bonds at year-end 1999. But between the spring of 2000 and July 2001, the company's pension plan sold all its equities and invested the proceeds in duration-matched bonds.

Security analysts, accountants, and actuaries were critical of Boots's new strategy. The lower expected returns from bonds, they charged, would force Boots to increase its contributions to the plan in future years, thereby reducing expected future earnings and presumably firm value. According to financial economists, however, the step taken by Boots would actually increase shareholder value by lowering taxes while, at the same time, fortifying the security of plan participants.

With actuaries and "earnings-fixated" security analysts predicting higher pension expenses, lower earnings, and lower stock valuation, and finance theorists predicting greater plan security and higher stock valuation, the U.K. capital markets fought to a temporary draw, with little immediate impact on Boots's stock price. Thus, it appears that the markets were able to penetrate the complexities of pension fund accounting, while perhaps reserving judgment on any permanent value creation. Over the course of the next several years, as pension accounting becomes more value-oriented and transparent, the increased shareholder value should become manifest. Meanwhile, Boots has estimated that, in disposing of its equities and establishing a portfolio consisting entirely of long bonds, it reduced its annual fund management costs from £10 million to £0.3 million.

In this article, we argue that taxable corporate sponsors of defined benefit plans should invest their pension assets entirely in debt instruments (that match the expected payout structure of the fund's liabilities) for two reasons: (1) to capture the full tax benefits of pre-funding their pension obligations and (2) to improve a company's overall risk profile by converting stock market risk (where corporate management has no comparative advantage) into firm-specific operating risk (where it should). By failing to consider their consolidated tax picture, pension fund sponsors have sacrificed hundreds of billions of dollars in shareholder value. These foregone tax savings are augmented by additional billions in unnecessary fees paid to fund managers, actuaries, and accountants, all of whom have a vested interest in the status quo. The Pension Benefit Guaranty Corporation picks up billions of dollars of shortfalls when companies with underfunded plans fail, forcing shareholders of strong companies to pay for the pension mistakes of the weak. And current accounting standards only encourage this situation.

It's a bumpy ride, mainly benefiting fund managers and advisors. By reducing pension fund risk, companies can create shareholder value and express a vote of confidence in their own operations.

In the pages that follow, we discuss why investment in bonds makes sense, how the present predicament arose, why it is perpetuated, and what the effects of a widespread shift to bonds would be.

1. For example, the U.K.'s new Financial Reporting Standard 17 eliminates the smoothing features prevalent in U.S. GAAP pension accounting.
FIRST PRINCIPLES

Much of the case for investing pension assets in stocks rests on the accounting treatment of pension assets and liabilities under U.S. GAAP. Even though volatility in financial markets is a fact of life, managers prefer to suppress volatility in reported earnings because they fear its effects on equity values. During the 1980s, when defined benefit plan accounting (FAS 87) was developed, the “long-term nature” of defined benefit plans was invoked to justify provisions for smoothing, averaging, deferring, and amortizing. Benefit improvements that immediately and irrevocably increase liabilities are spread over future periods. Actual asset returns are replaced by expected asset returns, with any differences also spread out over future periods. FAS 87 thus conveniently allows corporations whose pension plans are invested in equities to take advance credit for higher anticipated earnings without conceding that they bear any additional risk—tantamount to allowing risky mutual funds to report what they expect to earn on average, instead of what they actually earn each year. By allowing the use of the higher expected returns from stocks to reduce a company’s current pension expense and so increase reported earnings, these provisions give managers considerable latitude to manage the bottom line; they also introduce a substantial bias in favor of risky investments. In this way, pension accounting mixes compensation costs, which are operating expenses, with investment results, which are properly regarded as strictly financial in nature.

To see why going to 100% bonds is the value-maximizing pension fund strategy, the reader must recognize two economic realities that are obscured by these accounting conventions. The first is that pension fund assets and liabilities, although not included on corporate balance sheets, are arguably corporate assets and liabilities.² Although plan assets are held in trust for the plan beneficiaries, gains or losses on the portfolio flow through to the shareholders of the sponsoring company in the form of larger or smaller contributions to fund the defined benefit obligations. In other words, although the sponsor does not own the plan assets, it does own (or owe) any residual. When plan assets are insufficient, the corporation must increase its contributions; when plan assets are more than adequate, the corporation can decrease its contributions or, in extreme situations, extract money from the plan (although this can trigger onerous excise taxes). In short, the plan is a financial subsidiary of the corporation. As a result, it makes sense to consolidate the corporation and its pension plan subsidiary for analytical purposes.

The second economic reality is that in well-functioning, competitive markets (where investors continually reassess the optimal allocation between stocks and bonds), the higher expected return on stocks reflects their greater risk in such a way that the risk-adjusted expected returns of stocks and bonds are equal. This means that, despite the higher returns promised by stocks, the present value of $1 invested in bonds at any given time is equal to the present value of $1 invested in stocks. Setting aside the effect of taxes and the question of optimal risk-bearing that we take up later, a company’s shareholders should be largely indifferent as to whether the firm funds its pension liabilities with stocks or bonds. If the pension plan shifts its assets from stocks to bonds, the risk-adjusted present value of corporate contributions to the plan will remain unchanged, the risk of the firm will go down, and any change in earnings will be offset by a change in its P/E multiple. Consequently, the firm’s value will remain unchanged.³ By allowing the use of the higher expected (as opposed to actual) returns from stocks to reduce a company’s current pension expenses, the accounting treatment conflicts with some very basic principles of modern finance theory and conceals systematic biases in the actuarial analysis.

THE TAX ARBITRAGE

Having established that a company’s pension plan should be viewed as part of the consolidated entity and that a dollar of bonds is worth a dollar of stocks, let’s now see what happens when we consider the effect of taxes. Perhaps the easiest way to see the tax advantage of holding bonds in a corporate pension plan is to start with the case of an individual investor who has money in both a taxable brokerage account and a tax-sheltered IRA. Having decided to invest half in stocks and half in bonds, the investor must determine the following: which assets, stocks or bonds, should be held in the tax-sheltered

---


³ Confirming the logic of this argument, instruments like stock index futures that swap fixed returns for equity returns have a market value of zero at inception.
Because a dollar of pension contributions is deductible, the corporation’s net investment in every pension dollar is reduced by the corporate tax rate. It makes sense, then, to take advantage of the tax-exempt status of the pension plan.

account? It seems fairly obvious that the more highly taxed investment should be held in the tax-sheltered IRA, with the lower-taxed investment held in the brokerage account, and indeed this is what we observe many investors doing.

This same argument applies to corporations and their pension plans. If a tax-exempt pension plan invests in equities and its corporate sponsor invests in bonds, shareholder value would clearly go up if those holdings were switched to avoid tax on the bonds while paying tax at much lower equity rates on the stock holdings. Of course, this particular example is unrealistic in that companies don’t usually hold bonds or equities on their own balance sheets. Shareholders rightly prefer investing in financial assets on their own and having corporate managers focus on investing in real operating assets. Rather than investing in stocks and bonds, then, companies generally issue bonds and equity to finance their operations.

And yet the tax argument still holds. Because a dollar of pension contributions is deductible, the corporation’s net investment in every pension dollar is reduced by the corporate tax rate. A dollar of earnings inside the plan drives out a dollar of deductible contributions and thus is worth 65¢ to the corporation after taxes. The full pre-tax rate of return on plan assets is delivered to the corporation after payment of corporate taxes. Shareholders then receive the plan rate of return after payment of their equity rate of tax, regardless of whether plan assets are stocks or bonds. Equities held by the plan are thus tax-neutral from the point of view of the shareholder, while bonds held by the plan are taxed at the shareholder rate, rather than at the higher bond rate. It makes sense, then, to take advantage of the tax-exempt status of the pension plan. The key is to switch the holdings in the pension plan while retaining the same level of aggregate risk exposure for the consolidated entity.

The next two sections explain this generalization. In the first we show how a straight swap of equities for bonds in the pension plan adds value if shareholders adjust their own portfolios. This is called Tepper’s arbitrage. But as we show in the second section, it is not necessary to assume that shareholders will make the required adjustments—the same pension plan swap, followed by a restructuring of the sponsor’s balance sheet, can add value without any shareholder action at all. This is called Black’s arbitrage, developed by Fischer Black in 1980.

To analyze both types of arbitrage, we will use the following tax rates:

- Tax rate in pension plan: 0%
- Federal corporate income tax rate (tc): 35%
- Federal personal income tax rate on bonds (tpb): 40%
- Federal personal income tax rate on stocks (tps): 15%

In Table 1, we see what happens when a corporate pension plan shifts $1 of plan assets from equities into bonds while the shareholders shift $(1 – tc) from bonds to equities in their personal portfolios.

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>THE TEPPER ARBITRAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The plan gains the actual return on bonds ($r_b$) but gives up the actual return on equities ($r_e$): ( r_b - r_e )</td>
<td></td>
</tr>
<tr>
<td>2. The amount in (1) is reduced by corporate taxes: ( (1 - tc)(r_b - r_e) )</td>
<td></td>
</tr>
<tr>
<td>3. The return to shareholders is reduced by personal equity taxes: ( (1 - tps)(1 - tc)(r_b - r_e) )</td>
<td></td>
</tr>
<tr>
<td>4. Shareholders earn additional personal equity returns: ( (1 - tps)r_e ) and give up personal bond returns: ( (1 - tps)(1 - tc)r_b ) which after personal taxes equals: ( (1 - tps)(1 - tc)(r_b - r_e) = (1 - tps)(1 - tc)(r_b - r_e) - (1 - tps)(1 - tc)r_b )</td>
<td></td>
</tr>
<tr>
<td>5. Combined with (3), the net gain to shareholders is: ( (1 - tps)r_e - (1 - tps)(1 - tc)r_b )</td>
<td></td>
</tr>
</tbody>
</table>


6. This is conservative—we could justify a blend of a 15% rate on dividends and a lower rate on capital gains to allow for deferral.
Because the personal bond tax rate is much greater than the personal equity tax rate, the Table 1 value is always positive over the life of the bonds. And because the return on equities ($r_e$) does not appear in the final result, the shareholder's equity exposure remains unchanged by the entire transaction. In short, we have executed a riskless tax arbitrage. To generalize, at any time and no matter how stocks perform relative to bonds, the tax arbitrage strategy will be value-adding.

Based on the rates assumed earlier, this after-tax value gain equals 16% of the total bond return each year in perpetuity. Discounting this stream at the after-tax rate of return on bonds, we obtain an after-tax risk free gain in present value terms of $0.27 for every dollar of pension plan assets switched from equities to bonds.

**Achieving the Same Gains without Involving the Shareholder**

Of course, the Tepper tax arbitrage relies on corporate transparency and an astute shareholder. But in 1980, Fischer Black presented a variation that can be executed by the corporation to deliver value regardless of the portfolio strategies of individual shareholders. The Black approach (as shown in Table 2) exchanges stocks for bonds in the pension plan and bonds for stocks on the corporate balance sheet. With our assumed rates, the after-tax gain equals 19% of the total bond return each year with a perpetuity value of $0.32 for each dollar switched from stocks to bonds within the pension plan. The increase of $0.05 over the Tepper version is attributable to gains from leverage at the corporate level. A dollar earned by the pension plan is worth only $0.65 after taxes to the shareholder ($1 - t_p$) and thus the switch of a dollar adds about 50% to its value to shareholders. In other words, two dollars in bonds inside a pension plan provides as much value to shareholders as three dollars held in equities! Savings on the cost of actively managing equities could easily increase shareholder value by another 5% of plan assets.

The simplest way to capture this value is to exchange equities for bonds in the pension plan, and simultaneously exchange bonds for stocks on the corporate balance sheet by issuing debt and retiring stock. How much debt should the company issue? The answer depends on the company’s tax status and how far away it is from its optimal capital structure. A fully taxable, underleveraged company should issue as much as 65% of plan equities sold, as in our example above, in what amounts to a leveraged recapitalization. Nonetheless, after noting that pension plan leverage has been moved to the balance sheet so that diversified equity has been replaced by the firm’s own equity, Black points out—and Tepper agrees—that the value gain occurs when the assets are swapped inside the pension plan. The additional actions on the corporate balance sheet are designed merely to highlight the captured value for investors, who may not penetrate the opaque accounting and actuarial fog.

An additional source of value, but one less easily quantified, is the tightening in focus from general stock market risk to corporate operating risk. The swap of equities for bonds in the pension plan represents a decision to increase the capacity for risk-bearing on the operating side of the business. Management teams will agree that this is where they have a comparative advantage. Investors will welcome such a move as a signal of management’s confidence in its ability to create more value by managing productive assets—rather than by speculating on relative financial asset performance.

**WHY DID IT TAKE SO LONG FOR A LEADER TO EMERGE AND WHERE ARE THE FOLLOWERS?**

Twenty years went by between the Tepper-Black proposals and the Boots implementation. Why? Most consultants and actuaries argue that,

---

**TABLE 2 ■ THE BLACK VARIATION**

1. The plan sells $1 of stock and buys $1 of bonds, with no tax effect:
   -0-
2. The corporation issues $1(1 - t_p)$ of new bonds and repurchases an equal amount of its outstanding stock, reducing corporate taxes by:
   
   \[ t_p(1 - t_p)r_b \]
   
   \[ (1 - t_p)t_e(1 - t_e)r_b \]
   
   \[ (1 - t_p)t_e(1 - t_e)/(1 - t_pb) \]
3. The shareholder benefit is:
4. Valued in perpetuity, the gain is:
Two dollars in bonds inside a pension plan provides as much value to shareholders as three dollars held in equities. Savings on the cost of actively managing equities could easily increase shareholder value by another 5% of plan assets.

because equities are expected to outperform bonds over long periods, corporations benefit when their pension plans—with their long-dated liabilities—invest in equities. But this argument crucially ignores the notion that the higher expected returns on equities derive from the higher risk associated with those returns. For much the same reason that a swap of bond returns for equity returns has a market value of zero, shareholders should attach no economic value to equity investments financed by pension liabilities. Until now, however, misleading accounting has obscured this truth. Actuarial assumptions make the worthless swap look very valuable indeed.

Given a nominal liability to pay a fixed amount at a future date, it is possible to offset that liability by buying a zero-coupon bond of appropriate face value and term. A plan consisting of this matching asset-liability pair would be expected to have a present value of zero because, no matter what happens, the net cash flow at each point in time will be zero. However, the actuarial argument implies that value is created by acquiring the asset-liability pair, selling the zero-coupon bond, and investing the proceeds in equities. This suggests that a $100 position in equities financed with $100 of bonds has positive value, even on a risk-adjusted basis. Such a position is identical to a long swap (or futures) position that pays off the difference between equity returns and the borrowing rate, and is always worth exactly zero ex ante. Even though long futures positions (and equity holdings in defined benefit plans) are expected to be profitable, the value of these expected profits is precisely counterbalanced by the value of the risk that they do not materialize.

When confronted with such arguments, actuaries often respond in one of two ways. They argue either that pension plans have longer time horizons than the average investor, or that the price of the long futures position is wrong. Neither assertion is accurate. Because shareholders own the residual interest in defined benefit plans, it makes no sense to impute anything other than shareholder risk preferences onto the plan’s asset allocation. If equity values do not reflect shareholders’ trade-offs, then whose trade-offs do they reflect? And if the futures position is offered at a price other than zero, it is easy to show that arbitrage profits are available, which would be traded away by astute investors. It is very clear that in the world of finance, owning $100 and owing $100 leaves you with zero net holdings.

We agree that equities generally outperform bonds over the long run. Nonetheless, and regardless of which period we look at, the average company would have been better off accessing these higher returns by holding bonds in the pension plan and redeeming its own stock (which also outperforms bonds), in accordance with the arbitrage strategy.

The Matching Argument

Defenders of the traditional actuarial view have also advanced the argument that equities are better than bonds as a hedge against salary inflation and thus against increases in pension liabilities. But there is little or no evidence that this is in fact the case. It is also difficult to see why benefit increases resulting from expected salary increases constitute a liability for a sponsor or its pension plan, when the future salary increases themselves do not. Most corporate expenses, from the costs of raw materials to office rentals, are expected to increase over time, but the expected increases do not generate a current liability. And even if we treat future salary increases as current liabilities, the relationship between unanticipated inflation and equity returns is generally negative, making equities a poor hedge.

The actuarial preoccupation with future salary increases is the source of much muddled thinking about defined benefit plan liabilities. To be sure, actuarial methods cause pension expenses to depend heavily on assumptions about wage growth. Yet until a company has granted a salary increase, it has no liability to pay an increased benefit. Conversely, when a company grants a salary increase, the cost of the resulting benefit increase does not depend upon how much the company has “reserved” at the date of the increase.

One reason for the mistaken tendency to provide for expected salary inflation derives from a feature of “final average salary” defined benefit plans. Such plans seem to promise each year an additional percentage of final average salary—a promise that is hollow when the future salary itself is not yet established. But actuaries leap into the gap with a great willingness to estimate what that future promise might entail. This means that part of the total cost of any subsequent pay increase has already been built into pension expenses. In addition to inventing liabilities that are neither legally binding nor representative of good financial reporting, this
process constitutes poor compensation management. For example, a pay increase at the expected rate will have the same accounting impact for two employees with different lengths of service but who are otherwise identical, which is a gross misrepresentation. Salary increases for older, longer-service employees are genuinely and significantly more costly than for younger, shorter-service employees. This is a feature of the benefit design and is not changed by reserving methods that anticipate increases. The time to account for increases in previously accrued benefits that depend on future salaries is when the salaries are actually increased, not before.

CHANGE ACCOUNTING AND VALUATION

Until recently, executives could, with a penstroke, change their numbers by changing the expected return on pension assets. Firms shifting to bonds will give up this “privilege” and take a hit to EPS. No wonder managers are loath to do the right thing, particularly if their incentive compensation is linked to earnings or EPS. Just last year, several prominent corporations, including IBM, GE, and Verizon, encouraged shareholders to defeat proposals to decouple executive compensation and pension income.7 But in 2003, with many firms seeing their FAS 87 “income” turn to expense for the first time in many years, managements appear to have “discovered” the integrity inherent in excluding pension investment returns in the calculation of their paychecks. For example, General Electric announced that it will no longer tie executive compensation to pension earnings.8 And the instinct for self-preservation will arise in other quarters—defined benefit fund management is an enormous industry, so we should expect investment managers and consultants to spurn an all-bond strategy.

ERISA’s “prudent man rule” requires a fiduciary to discharge his or her duties “with the care, skill, prudence, and diligence...that a prudent man...familiar with such matters would use [and]...by diversifying the investments of the plan so as to minimize the risk of large losses, unless under the circumstances it is clearly prudent not to do so.” This requirement is sometimes interpreted as requiring that a plan diversify across asset classes or invest as other plans do. Either interpretation could explain the resistance to the all-bond approach. Although the “strength in numbers” rationale provides something of a comfort zone for copycat investing, a better interpretation of the rule and of Congressional intent is that plans should endeavor to ensure that full benefits will be paid. An all-bond strategy that hedges liabilities is entirely consistent with this goal, provided the bond portfolio is diversified with regard to industry and firm-specific risks.

Changing the accounting standards will help to dismantle the obstacles to change. First, reporting assets and liabilities and changes thereto at market values will eliminate many of the distortions discussed so far. A second step would be to separate financing results from operations. The value of benefits earned in the current period is a compensation expense. After adjusting for cash contributions and benefit payments, other changes in the market values of assets and liabilities represent financing adjustments, which should be treated separately so as to present a clearer picture of true pension costs. Finally, liabilities should be valued without reference to future salary increases—that is, on an accumulated benefit obligation (ABO) basis.

These accounting changes would underscore the fundamental truth that the economic cost of providing benefits is defined by the promised benefit cash flows—contributions and changes in reserves are irrelevant. The cost of benefits is determined by benefit eligibility, benefit formulas, length of service, and salaries. True benefit cost is virtually independent of funding and benefit policy. Finally, benefit measures that depend on future salary increases do not constitute a present liability or economic cost any more than do the future salary increases themselves.

The U.K.’s new Financial Reporting Standard 17 eliminates the smoothing features prevalent in U.S. GAAP accounting. This is a certainly a positive development, and it will be interesting to see how U.K. firms react to the volatility that will become apparent in their earnings. Nonetheless, the new standard still uses the wrong measure for liabilities, does not go nearly as far as it should in separating the operating and financing elements of the pension plan, and anticipates a risk premium in the income statement.9

---

9. FRS 17 mismeasures liabilities by including estimated future salary increases and by discounting future benefits using a AA corporate index instead of a term structure based on the plan’s creditworthiness.
EFFECTS OF A WIDESPREAD SWITCH TO BONDS

Looking at the situation today, we see substantial equity cross-ownership attributable to pension plan investments. In the aggregate, these cancel out. The nominal equity market portfolio is thus overstated compared to corporate assets held net of debt. A widespread switch to bonds in defined benefit plans would unwind the equity cross-ownership, substituting a form of cross-lending represented by defined benefit plans that borrow from the sponsors' employees in order to lend to other corporate borrowers. The new equilibrium would be characterized by increased leverage on corporate balance sheets—the bonds have to come from somewhere.

To compensate for the sale of equities in the pension plan, each company or its stockholders would seek to increase their equity holdings and decrease their debt holdings by up to 65% (or one minus the corporate tax rate) of the amount shifted within the sponsored pension plan. The new equilibrium would have to reconcile the downward price pressure on equities and interest rates. We may expect to see some of the missing 35% in the form of equilibrium leverage that is greater than today. For every dollar of corporate assets in the economy, there will be greater borrowing than there is today. For every dollar shifted to bonds in the pension plan, there will be an increase in corporate debt of somewhere in the $0.65 to $1.00 range.

The increase in corporate debt issuance suggests increased exposure to market discipline—the same effect as a leveraged recapitalization, but without the increased economic leverage. In other words, we should see the benefits of improved managerial incentives traditionally associated with a recapitalization, but generally without the financial distress costs associated with higher leverage. And, as suggested earlier, this should represent a value-increasing change in corporate risk profiles insofar as companies are choosing to substitute firm-specific operating risks for general stock market risk. Of course, rating agencies will need to develop a comprehensive understanding of the new corporate and pension structure.

By not taking advantage of the tax-exempt status of pension funds, corporations and their shareholders have paid more taxes than necessary. From a national accounts perspective, widespread switching to bonds might have to be offset by increases in other taxes. On the other hand, the lower risk in the defined benefit pension plans would lead to fewer calls on the Pension Benefit Guarantee Corporation to pay defaulted claims. For the time being, however, each company that ignores the strategy leaves riskless money on the table.

CONCLUSION

Today, corporate defined benefit funds own a trillion dollars of equities—more than 10% of U.S. stock market capitalization. They are without doubt the giants of the special purpose entities. Pension funds are typically one-half to two-thirds invested in equities because equities are expected to outperform other financial assets over the long term, and the quintessentially long-term nature of pension fund liabilities seems well suited to absorbing any short-term return volatility.

But a simple tax arbitrage argument suggests a startlingly different approach. Plan sponsors with taxable income should invest pension assets solely in debt instruments in order to capture the full tax benefits of pre-funding their pension obligations, thereby taking better advantage of legitimate tax deductions. What's more, the debt instruments should match the maturity and payout structure of the fund's accrued liabilities to reduce risk at the pension fund level. From a corporate governance perspective, the status quo represents stunning malpractice. By failing to consider their consolidated tax picture, pension fund sponsors have sacrificed hundreds of billions of dollars in shareholder value. And the stock market's lackluster performance over the past several years has left pension plans badly underfunded.

By investing pension plan funds only in bonds, corporate managers would increase shareholder value and shore up fund quality, while at the same time improving plan management efficiency, corporate governance, risk management, and financial transparency. The primary obstacles to an all-bond approach are the confusion arising from current accounting rules, the incentive problems created by linking compensation to EPS, and the predictable resistance of vested interests, which include accountants, actuaries, and fund managers. But by transferring risk from the pension fund to the corporate balance sheet, companies will be operating less like mutual funds and expressing a vote of confidence in their ability to operate more like the stand-alone, “pure play” businesses that their investors want.