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CAPITAL CONSERVATION STRATEGIES IN PENSION FUND INVESTMENT POLICY

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One objective many corporate pension plan sponsors pursue is maximization of total rate of return. To do this, they invest in risky asset classes that they hope will outperform their future liabilities. Such a strategy is intended to enrich the future benefits promised; in fact, it may lower the probability that objectives are met at all. Such sponsors are inadvertently transmuted their plan from a defined benefits to a defined contributions objective.

The appropriate objective is simply to focus on meeting the promised benefits. For a fully funded plan, the optimal strategy is then to invest in low-risk asset classes that have a high probability of fulfilling the promised benefits with a smaller probability of outperforming them.

For defined-benefit plans, recent accounting and tax legislation make it increasingly apparent that a low-risk investment strategy, which focuses primarily on ensuring that the promised benefits are fulfilled, is clearly in the best interest both of the sponsoring corporation and the beneficiaries of the plan.

The strategy we suggest for fully funded defined-benefit plans is to break the fund into retired lives and active lives components. The retired lives component has a well-defined liability schedule and therefore can be hedged with a horizon-matched bond portfolio having the same duration. For the active lives component, we suggest an asset allocation heavily weighted in bonds.

The same strategy would apply to overfunded plans as well. The surplus assets in overfunded plans are then protected for cost of living adjustments or can be used as a cushion for reduced corporate funding in the future.

Underfunded plans of financially distressed corpo-

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rations may take a different approach. They have a special incentive to maximize returns through active management. The Pension Benefit Guaranty Corporation guarantees the minimum subscriber benefits should the plan become insolvent. With this guarantee in mind, the plan sponsor might invest all its capital in risky strategies, in hopes of becoming fully funded by maximizing the expected rate of return.

EFFECTS OF ACCOUNTING AND TAX REGULATIONS

Recent accounting and tax regulations have sharply increased the emphasis that defined-benefit plans should place on low-risk conservation of capital strategies. These rules define what liabilities the sponsor is legally responsible for, limit the size of plan surpluses, and, most important, set limits on the sponsor's claim to full ownership and control of any fund surplus.

Financial Accounting Standard 1987 (FAS 1987) defines the benefits that plan sponsors are responsible for as the amount to be paid to retirees and current employees, assuming immediate termination of the plan. These benefits are those that have already been earned, based on past service and current wage and salary levels, which means they are not inflation-linked. The present value of these liabilities is the Accumulated Benefits Obligation (ABO), which is the only amount that the sponsor is guaranteeing from an accounting point of view.

If the market value of the funds in the plan exceeds the ABO, there is a surplus, although the sponsor cannot list this surplus as an asset on the corporate balance sheet. If the market value of the fund is less than the ABO, there is a shortfall, which in this case must appear on the balance sheet as a liability.

The Omnibus Reconciliation Act of 1987 (OBRA 1987) reinforces FAS 1987 by making plan sponsors legally responsible for the present value of all benefits already earned (i.e., the ABO). OBRA 1987 also limits tax-advantaged plan contributions to 150% of the ABO.

Before 1987, corporations had been overfunding their plans because all contributions were tax-deductible; once in the plan, moreover, all interest and dividends earned are tax-free. Sponsors viewed these surpluses as a cushion, providing for either increased employee benefits or decreased contributions in the future. Many sponsors saw their surpluses as a contingency fund on which the corporation could draw to cover unforeseen future hardships.

In fact, according to this line of thinking, the surpluses in overfunded plans were fully owned by the plan sponsors, not the plan beneficiaries. Congress put an end to this assumption with OBRA 1990, which discouraged sponsors from terminating overfunded plans by putting a 50% excise tax on all surplus reverting to the sponsor unless a number of restrictive revisions were met.

The consequence of these rulings is that the plan sponsor is responsible for the ABO from both a legal and accounting standpoint. If the plan's funds fall below the ABO, this shortfall is a liability that must be recognized on the balance sheet. Overfunding of plans has, as a practical matter, been limited to 150% of the ABO. The plan surplus cannot be recognized as an asset on the balance sheet; 50% of the surplus at most can revert to the sponsor through plan termination.

SURPLUS VERSUS SHORTFALL RISK

Current accounting and tax regulations have two major implications for pension fund investment policy. First, the focus of pension management should be on providing beneficiaries with the minimum benefit guarantee as represented by the ABO. Given that the ABO is based on benefits already earned, the minimum benefit guarantee is not inflation-indexed and is measured in nominal dollars. Investment policy, therefore, should not be unduly influenced by inflationary expectations. Providing for projected benefits based on future service is not the primary goal.

Second, plan sponsors, and in turn the shareholders of the corporation, take 100% of the shortfall risk in the investment management process. Risk refers to the probability that the plan's assets will fall under the ABO. Any surplus in the plan, whether from overfunding or superior market performance of the plan's assets, however, does not belong 100% to the shareholders.

The asymmetry between shortfall risk and surplus reward makes it evident that from the standpoint of increasing shareholder wealth the optimal policy for fully funded plans is to follow low-risk conservation of capital strategies. These strategies allocate the fund's capital to asset classes that hedge the liabilities of the plan and, by so doing, ensure the minimum benefit guarantee and reduce the probability of shortfall risk.

Table 1 shows the one-year expected return and standard deviations for four major asset classes as well as for an immunized bond portfolio. The standard deviation, widely used as a measure of market risk, is based on

TABLE 1 ■ Expected Return Versus Risk

Asset Class	Expected Return (%)	Standard Deviation	Adjusted For Liability Returns	
			Expected Return (%)	Standard Deviation
Equity - Large Cap	11.5	18.0	3.7	8.5
Equity - Small Cap	13.5	31.0	5.7	10.5
Bonds	8.5	9.5	0.7	3.1
Cash	5.5	3.5	(2.3)	7.1
Immunized Bond Portfolio	8.2	9.3	0.4	1.1

the historical returns of each asset class. We define risk here not as the standard deviation of the historical returns of an individual asset, but rather as the standard deviation of the difference between returns of the asset class and the plan's liabilities, which is the measure of interest for a sponsor aiming to meet the minimum benefit guarantee.

Of all the asset classes, bonds have the smallest expected return and the lowest risk when adjusted for liability returns. Future liabilities of a plan most resemble the cash flows of bonds, and the market values of both are affected similarly by fluctuations in interest rates. In fact, the risk-free asset when adjusted for liability returns is an immunized bond portfolio duration-matched to the liability stream. As the market values of the liabilities and the immunized bond portfolio are equally affected by changes in interest rates, the risk or standard deviation of the immunized portfolio returns adjusted for the liability returns should be small.

The relationship between interest rates and equity returns is less certain than that for bonds. It is difficult, therefore, to construct an equity portfolio that will have the same price/interest rate sensitivity as the liability stream. As a result, the risk or standard deviation of equities adjusted for the liability returns will always be higher than the risk of bonds.

Interestingly, the risk or standard deviation of cash when adjusted for liability returns is surprisingly high. This is because cash or Treasury bills have a very low duration, while the liabilities of the plan, extending far into the future, have a relatively high duration. A pension plan that invests in cash as its primary asset class would be taking an unhedged position with an implicit view as to the direction of interest rates.

If interest rates increase, the present value of the liabilities (i.e., the ABO) would decline in value relative to the cash assets. If rates decline, the ABO would increase in value relative to the plan's assets. Because the relationship between equity returns and interest rates is

less certain, an all-cash position is almost as risky relative to the liability returns as an all-equity position.

The asset class allocation decision should be based on the risk of the asset adjusted for the liability return (Table 2). A fully funded plan should seek to preserve its status by hedging its liabilities with the risk-free asset (i.e., an immunized bond portfolio).

A plan with surplus funding, however, can invest in riskier asset classes, provided the minimum benefit guarantee will be met. The surplus fund could first hedge its liabilities with an immunized bond portfolio, and then invest the remainder in risky asset classes. An alternative approach is to invest in risky asset classes without immunizing, provided there is enough of a cushion to absorb the increased shortfall risk. This latter approach, however, requires a sizable cushion.

Leibowitz, Kogelman, and Bader [1991], for example, demonstrate how a 100% equity portfolio could require a 21% surplus just to assure a 90% probability of meeting the minimum benefit guarantee. Similarly, the traditional 60% equity/40% bond allocation could require a 12% surplus. A portfolio consisting entirely of the risk-free asset (i.e., the immunized bond portfolio), however, would require no surplus cushion whatsoever.

INVESTMENT POLICY

From an investment policy standpoint, the pension plan is similar to any corporate operating division in that it requires contributions of capital. The corporation's operating units and the pension fund both compete for

TABLE 2 ■ Asset Allocation Adjusted for Liability Returns

	% Eq LC	% Eq SC	% Bonds	% Cash	Expected Return
1	0.00	0.00	94.71	5.29	0.54
2	1.88	0.00	98.12	0.00	0.76
3	20.85	0.00	79.15	0.00	1.33
4	36.74	0.00	63.26	0.00	1.80
5	46.84	2.82	50.34	0.00	2.25
6	55.80	6.35	37.85	0.00	2.69
7	64.81	9.90	25.29	0.00	3.14
8	73.82	13.45	12.73	0.00	3.59
9	66.16	33.84	0.00	0.00	4.38
10	0.00	100.00	0.00	0.00	5.70

Recommended Allocation

Asset Class	%
Equity - Large Cap	21
Bonds	79

capital from the same pool of corporate cash. Therefore, it is optimal for the corporate sponsor to select asset allocation and diversification strategies that lower shortfall risk and thereby keep funding costs at a minimum.

The first phase in such a strategy is to compare the plan's assets to the plan's liabilities. In doing this, it is necessary to separate the total liabilities into two groups: retired lives and active lives. Retired lives liabilities consist of those benefits earmarked for retirees and active employees nearing retirement. As most of these benefits have already been earned, the retired lives liabilities are part of the ABO. The relatively stable and highly predictable nature of retired lives benefits projections makes the use of fixed-income cash flow matching and immunization techniques ideal for their funding.

The active lives liabilities consist of those benefits earmarked for active employees who will retire in the future. Part of these benefits have already been earned based on past service and current salary and wage levels. This part of the active lives liability is included in the ABO.

Another part of active lives benefits, however, is based on projected increases in current salary and wage levels by the time of each worker's retirement. This part of the active lives liability is the PBO (i.e., Projected Benefits Obligation). The PBO component of the active lives liabilities is less certain because of changes in benefit provisions, actuarial assumptions, the age and composition of the workforce, and the rate of wage inflation.

The plan sponsor is legally responsible for providing the minimum benefit guarantee, which includes all the retired lives liabilities and all active lives liabilities that are part of the ABO. A fully funded plan with a conservation of capital investment policy should therefore immunize the entire retired lives and the ABO component of the active lives liabilities with a fixed-income portfolio. The sponsor will then have hedged the ABO liabilities and protected the plan against shortfall risk.

If the return on the bond portfolio equals or exceeds the growth in the ABO, no additional contributions will be necessary to fulfill the minimum benefit guarantee. With each passing year, however, an annual contribution will be necessary as an additional year of service accrues.

Overfunded plans following this strategy, having once hedged their ABO, could then implement asset allocation strategies with a variety of assets that reflect their level of risk tolerance. Table 3 and the Figure illustrate a capital conservation allocation strategy for a typical defined-benefit plan with total assets of \$90.4 million.

TABLE 3 ■ Asset/Liability Analysis for Typical Defined-Benefit Plan

	Value (\$000)	Percent of Total
Present Value Retired Lives*	\$25,600	28.3
Present Value Active Lives*	\$55,324	61.2
Surplus	<u>\$ 9,468</u>	<u>10.5</u>
Total Market Value of Plan Assets	\$90,392	100

*Liabilities discounted at 9% annual rate

The retired lives liabilities have a present value of \$25.6 million, and the active lives liabilities have a present value of \$55.3 million. The plan is overfunded with a \$9.5 million surplus. The retired lives liabilities are immunized with a duration-matched portfolio having a market value of \$25.6 million (i.e., equal to the present value of the liabilities).

A significant portion of the active lives, 47% in this example, consists of benefits already earned that are part of the ABO. This portion of the active lives liabilities (i.e., \$26 million) is immunized with a duration-matched portfolio having a market value of \$26 million. Thus the entire ABO (i.e., retired lives plus the benefits in the active lives already earned) is immunized with duration-matched bond portfolios.

The amount prefunding the PBO liabilities (i.e., \$29.3 million) is invested in a low-risk combination of bonds and equities (Table 2). The allocation between bonds and stocks provides management the opportunity to maximize returns for a given level of risk.

Although not required to do so, the plan sponsor hopes to use the surplus assets (i.e., \$9.5 million) to enrich benefits by providing a cost of living adjustment over and above the minimum benefit guarantee. As the ABO and the PBO portions of the assets have been conservatively invested, the plan's fully funded status is protected. The surplus is then invested in equities with the objective of maximizing return and providing the funds for cost-of-living adjustments in the future.

Overall, therefore, \$51.6 million of the plan's assets are invested in immunized bond portfolios duration-matched to the ABO, \$29.3 million in a low-risk asset allocation of bonds and equities to prefund the

PBO, and \$9.5 million in an all-equity portfolio to enrich future benefits.

CONCLUSION

The Omnibus Reconciliation Act of 1987 limits the amount of plan overfunding, thereby reducing the size of plan surpluses in the future. With smaller surpluses to work with, plan sponsors will become more sensitive

to shortfall risk and begin emphasizing conservation of capital policies with a greater asset allocation to bonds.

We recommend that the ABO liabilities be entirely immunized to reduce the probability of shortfall risk. The assets intended to fund the PBO should be invested in a low-risk asset allocation heavily weighted in bonds. The surplus in overfunded plans can then be allocated to equities and, if successfully invested, used to provide enriched benefits to retirees in the future.

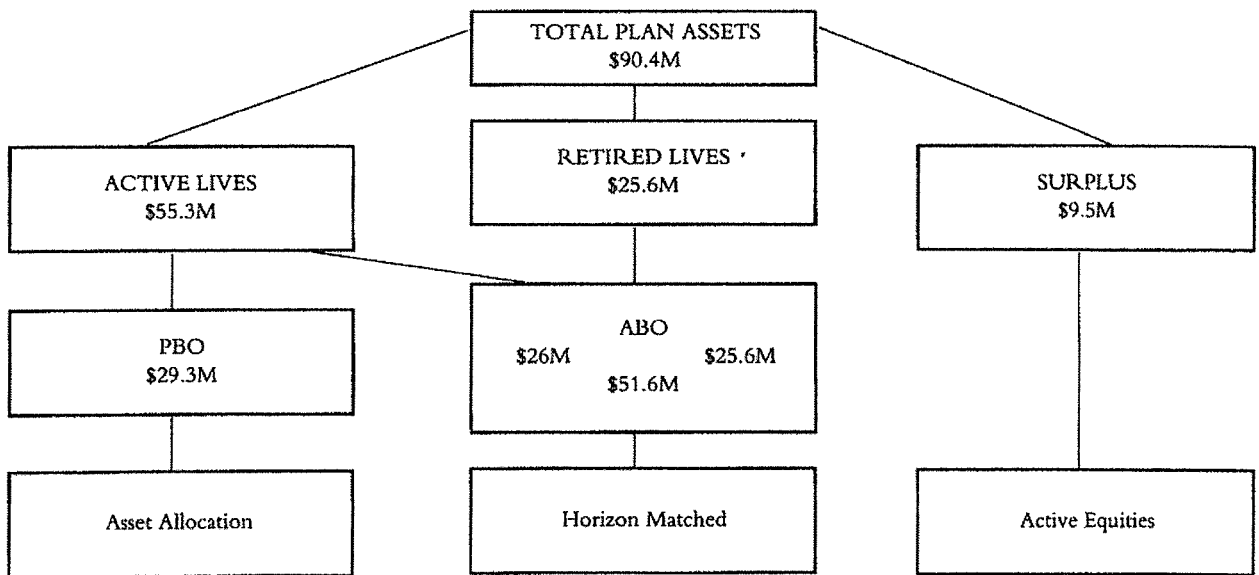
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FIGURE ■ Capital Conservation Strategy for Typical Defined-Benefits Plan



- Conserve Capital
 - low-risk combination of bonds and equities
- Provides management opportunity to maximize returns for a given level of risk

- Hedge—Liability
 - cash match near term
 - duration match entire liability stream
- Provides management flexibility to generate surplus

- Maximize Rate of Return
 - maximize returns with all-equity portfolio
- Provides management flexibility to make cost-of-living adjustments for plan beneficiaries