
Economic Surplus and Pension Asset Management

Richard O. Michaud, Ph.D.
Vice President and Manager
Equity Analytics Group
Merrill Lynch Capital Markets

The popularity of the "surplus" framework for pension plan asset management¹ reflects an understanding that the level and nature of the firm's pension liabilities should be an integral part of the investment decision. However, the value of the approach depends on whether economically meaningful liabilities are being employed. Surplus management is misleading and often dangerous if based on an incomplete or irrelevant understanding of pension liabilities.

In most cases actuarial or accounting liabilities are used to define the surplus. While such information is convenient and of value for some purposes, the investment decision is unlikely to be one of them. Accounting based definitions of pension liabilities are designed to provide information concerning implications of the funding status of the plan on the financial health of the firm. Actuarial liabilities are essentially an intermediate computation to rationalize the orderly funding of pension benefits over time. Only by chance will accounting and actuarial objectives be of much value for the asset allocation decision.

Another issue that has severely limited the value of surplus management is that it is usually associated with hedging or minimizing the risk of funding plan liabilities without regard to return. As a result, plan managers are often presented with proposals to match the duration of their liabilities or insure the surplus. Plan sponsors may be poorly advised by such proposals. Except for special situations, such as plan termination, the investment decision should depend on both total risk and return.

A new approach to asset allocation, based on Markowitz mean-variance efficiency,² called "benchmark optimization," generalizes the surplus framework within the context of economic pension liabilities.³ Hedged asset allocations emerge only as a single point among the efficient alternatives available to the sponsor.

The Pension Liability Spectrum

The pension liability that is of primary investment interest to the plan sponsor will often depend on the funding status of the plan and the risk characteristics and strategic objectives of the firm. The two basic alternatives that span the benefit valuation spectrum are the termination and total liability.

Termination liability is the present value of all accumulated benefits for inactives, retirees and the current workforce. Termination liability can be characterized as a fixed liability because, at a point in time, the promised benefits are actually highly predictable cash flows. Note, however, that while the benefits are fixed over a given period, the present value may vary depending on changes in the level of interest rates used to discount the cash flows.

While other factors matter, the basic underlying financial risk of pension plan expense is essentially the operating risk of the firm and its ability to grow and compete over time.

Economic total liability or total benefit obligation (TBO) is the present value of all expected benefits. It includes not only accumulated but future benefits based on anticipated changes in the workforce and salary. TBO is equal to the termination liability plus a variable benefits component that depends on economic and financial factors. The variable component of TBO changes in value not only because of changes in the discount rate but also because of factors that change the level of benefits.

Risk Characteristics of Pension Liabilities

Termination Liability:

The risk characteristics of the fixed or termination liability depend on the distribution pattern of benefit cash flows and interest rate risk. A dedicated or immunized portfolio of fixed income securities can be constructed to hedge the termination liability risk.

Total Liability:

TBO risk characteristics depend on the relative importance of fixed and variable benefit components. In mature industries, the fixed component of total liabilities may be great. In contrast, for new or growth oriented companies, variable liabilities may dominate. Since a properly constructed portfolio of fixed income securities can virtually eliminate the fixed liability component of TBO risk, it will be convenient to assume that this risk has been eliminated or can be ignored in order to focus on the variable liability.

The risk characteristics of variable benefit pension liabilities are identifiable with the business risks of the firm. They will grow and change as a reflection of changes in the firm. Pension plan expense is deferred compensation that is part of the ongoing cost of doing business. The variable pension benefits expense depends on the growth prospects of the firm, its strategic objectives and the ability to attract and retain human capital. While other factors matter, such as plan specifics and workforce maturity, the basic underlying financial risk of pension plan expense is essentially the operating risk of the firm and its ability to grow and compete over time.

Financial Planning and Actuarial Liabilities

Actuarial valuation is a financial planning process for the purpose of orderly funding of pension benefits. The value of future benefits and assets are estimated and discounted based on a constant rate of return that is assumed to reflect a (minimum) long term rate of return on the plan's financial assets. Lags associated with recognizing gains and losses from investment and actuarial valuation experience are designed to provide for the relatively predictable funding of emerging plan benefits.

For the firm where pension plan termination is not an important consideration, accounting liabilities are not sufficiently comprehensive.

Actuarial Liabilities and Investment Management

The actuarial valuation procedure has investment value to the extent that the total actuarial liability may be a reasonable benchmark for evaluating the economic funding status of the plan. Its value depends, of course, on the long term economic realism of forecasts of investment return and projections of changes in salary and workforce census.

However, plan liabilities are estimated using a static return on assets rate, which implies that they are independent of the economic and financial environment over the planning horizon. This lack of economic realism in the actuarial valuation procedure, accompanied by the smoothing of experienced gains and losses, imply that the economic risk characteristics of plan liabilities, critically essential to optimal asset management, are completely ignored. Consequently, the actuarial process is often an irrelevant, if not misleading, foundation for many investment decisions.³

Accounting Liabilities

Under FASB 87,⁴ there are two pension accounting liabilities that are required to appear in the firm's annual financial statement: the Accumulated Benefit Obligation (ABO) and the Projected Benefit Obligation (PBO). The purpose of both accounting liabilities is to provide information to the investing public concerning the effect of the funding status of the plan on the financial status of the firm.

The ABO corresponds to the pension plan's termination liability. The PBO corresponds to the pension liability of an ongoing firm assuming that benefits are based on salary projections at retirement or withdrawal for the current workforce, years of service and benefit levels.

Accounting Liabilities and Investment Management

If the plan is not well funded with respect to the ABO, if the plan termination option is a serious consideration, or for firms with short planning horizons, the termination liability may be of primary economic interest to the firm. Valid investment options may include immunizing or insuring the ABO defined surplus.

However, for the firm where pension plan termination is not an important consideration, accounting liabilities may be of marginal investment interest simply because they are not sufficiently comprehensive. For many plans, variable liability is a very significant proportion of TBO.⁵ Consequently, funding status can be seriously overstated by the accounting liability. More importantly, the risk characteristics of variable liabilities will usually differ substantially from termination liabilities. As a result, the ABO surplus will often have little economic interest.

To the extent variable liabilities are important, interest rate sensitivity considerations and duration based investment strategies have limited value.

An Example

The following example illustrates how actuarial and accounting liabilities can be misleading for pension plan investment management. Consider the variable pension liability of an institutional brokerage firm. The brokerage industry is cyclical and immature; payroll and workforce are generally strongly dependent on the behavior of financial markets and the economic health of the economy. Now consider two cases:

1) Equity Market Rises

Variable pension liability benefits are likely to increase. This is because of the likely increase of current and future salary and workforce levels due to plans for expansion and contention for current and future human capital.

2) Equity Market Falls

Variable pension liability benefits are likely to fall for inverse reasons to those given above.

Therefore, in this case, changes in variable liability benefits are highly correlated with equity market returns.

Investment Implications of Total Pension Liability Funding

The example has been chosen to illustrate some important, not well understood, principles of the financial management of pension plans.

Equity as a hedge asset:

Due to their relatively high volatility, equities are seldom viewed as a hedge asset. Yet variable pension benefits often have equity risk characteristics. As the example demonstrates, an equity portfolio matched to the risk characteristics of the variable total liability can be the low risk asset allocation of choice.

The role of interest rates:

The example demonstrates that the effect of interest rates and equity markets on variable benefit liabilities are separable issues. If interest rates decline at the same time that equity market rise then variable benefit liabilities may increase due to both a decrease in discount rates and an increase in benefit levels. Conversely, if expected inflation increases at the same time that equity markets rise the effect on variable benefit liabilities is ambiguous.

The role of duration:

The example shows that, to the extent variable liabilities are an important component of total liabilities, interest rate sensitivity considerations and duration based investment strategies are likely to have relatively limited value.

An economic surplus framework does not require using long term arguments to justify equity, or any other investment; if an asset class is valuable long term, it is valuable short term as well.

Actuarial vs. economic surplus management:

Due to the static and conservative character of many of the assumptions used in forecasting pension benefits, recognition of actuarial experience gains and losses is likely to lag recognition of investment experience with an equity asset mix. Consequently a volatile actuarial surplus and stream of required contributions is likely to result. As the example shows, the volatility of the surplus and contribution stream can be a pure artifact of the actuarial process.

Unfortunately, attending to the actuarial process may lead to inappropriate investment decisions and unnecessary financial burdens to the firm. Noting the volatility relationship of the actuarially estimated surplus and contribution stream, a pension officer may recommend an inappropriately low risk/return asset allocation. As the example shows, a low risk/return asset mix can lead to volatility of the variable benefit economic surplus. Assuming that the benefits that are to be paid over the lifetime of the plan do not change, the price the firm may have to pay for allowing the actuarial process to dominate investment decisions is a lower than required earnings rate on financial assets and consequently a higher overall level of pension contributions that ultimately must be borne by shareholders.

Short vs. long term investment:

Actuaries have long understood the relationship of asset volatility with volatility in the actuarial surplus and contribution stream. In order to justify equity investment, actuaries have required recourse to long term arguments; i.e., the consequences of equity volatility eventually cancel out over time leading to higher average returns and ultimately lower required contributions to the plan.

It is worth noting that an economic surplus framework does not require using long term arguments to justify equity, or any other investment; if an asset class is valuable long term, it is valuable short term as well. The example demonstrates that the reason why equities are of actuarial value long term is that they are of economic value short term. The long term arguments required by actuaries are imposed by the static character of many of their assumptions.

Accounting vs. economic surplus management:

Except for cases where plan termination is an option of significant economic value to the firm, ABO or PBO surplus will generally inadequately reflect plan funding status and the risk characteristics of the economic surplus. As the example shows, investment decisions that are narrowly focused on the accounting surplus can overly emphasize interest rate risk issues and ignore the total risk characteristics of plan liabilities. The consequences of such badly advised investment decisions can lead to serious and unnecessary underfunding as variable economic liabilities eventually are recognized as accounting liabilities over time.

Opportunity costs, including possible benefit improvements and lower contributions, are among the substantive financial implications that are ignored by hedging strategies.

The Limitations of Hedged Surplus Management

Surplus management has generally been associated with asset allocations that hedge surplus risk. However, the surplus management framework is far more general and can be used for a wide variety of investment objectives. Opportunity costs, including possible benefit improvements, maintaining a standard of living for retirees and lower contributions, are among the substantive financial implications that are ignored by hedging strategies. What is required is a technology that does not unnecessarily limit the spectrum of investment opportunities available to the sponsor.

Benchmark Asset Allocation—Optimal Risk Management

A new approach to asset allocation, called "benchmark optimization," provides a convenient framework for optimal risk management of the economic surplus." This procedure, a generalization of mean-variance efficient frontier analysis, provides a range of efficient asset mixes depending on the level of risk consistent with the plan's investment objectives. Hedged asset allocations generally appear as the minimum risk point on the surplus efficient frontier.

If opportunity costs or other objectives are of importance to the plan sponsor, a minimum risk asset allocation may not be appropriate even when funding termination liabilities. More comprehensive pension liabilities serve only to reinforce the likely value of higher risk/return efficient asset mixes.

Conclusion

Surplus management, conceptually, makes sense. It is implicit in the actuarial valuation process that has been part of pension funding considerations for many years. However, the value of surplus management for investment decisions depends almost entirely on whether the pension liability used in the definition of the surplus makes economic sense. Unfortunately, the actuarial and accounting process is of limited value for this purpose. In many cases, plan surplus based on actuarial and accounting valuation can lead to suboptimal investment decisions.

Surplus management is also heir to hedging solutions that may be inappropriate for the firm's investment objectives. Too often, surplus management minimizes risk without regard to return. This can lead to opportunity costs that may have important financial consequences for the firm.

**The value of surplus management
for investment decisions depends
almost entirely on whether the pen-
sion liability used in the definition of
the surplus makes economic sense.**

Benchmark asset allocation is proposed as a convenient tool for optimal risk management in the economic surplus framework. It requires a meaningful definition of the economic pension liabilities of the firm. Used with care, it can avoid many of the serious shortcomings of accounting or actuarial based pension surplus and can improve the level of benefits that are supported by the plan's assets and the ability of the firm to fund the plan over time.

Footnotes

- ¹ Surplus management refers to an investment management focus on plan funding status (assets minus liabilities) and the matching of assets to liabilities as a basis for optimal asset allocation.
- ² Markowitz, H., *Portfolio Selection: Efficient Diversification of Investments*, Wiley, New York, 1959.
- ³ Michaud, R., "Pension Policy and Benchmark Optimization," *Investment Management Review*, March/April 1989; also, *PER*, July 1988.
- ⁴ For an ongoing firm, it assumes an open workforce and a payroll affected by economic growth and financial markets as well as inflation, withdrawal and mortality rates.
- ⁵ From a practical point of view, for U.S. plan sponsors, the above views need to be modified. The recently enacted OBRA (Omnibus Budget Reconciliation Act of 1987) proscribes funding for plans with termination funding ratios higher than 150%. As a result, for many plans, OBRA seriously limits the ability of sponsors to fully fund economic pension liabilities. OBRA does not invalidate the value of asset allocation decisions based on the economic surplus. However, it is likely to mandate inappropriate contribution holidays or less than required contribution levels in many cases. Unless the economic consequences of the law are recognized by Congress and changes enacted, it is likely that funding ratios will erode over time and the risk of underfunding even current liabilities will increase unacceptably for many sponsors.
- ⁶ Financial Accounting Standards Board Statement No. 87.
- ⁷ Based on unpublished simulations provided by D. Skovron, Kwasha Lipton, NY, for a typical final average pay plan, the TBO is approximately twice as large as the ABO.
- ⁸ Michaud, *op. cit.*