Rethinking Pension Liabilities and Asset Allocation

A pension crisis looms.

Ronald J. Ryan and Frank J. Fabozzi

The objective of a defined-benefit pension fund is to fully fund accrued pension liabilities at the lowest cost to the plan sponsor, subject to sensible risk. This should be the function of the pension assets rather than pension contributions (added costs) coming from the employer and employees, or, in the case of public funds, current or future taxpayers. In "best case" scenarios, pension holidays may be achieved by growing the asset portfolio in excess of the liability portfolio (pension surplus).

Plan sponsors run the risk of higher contributions if the asset portfolio is not constructed to match both the present value of liabilities (cash flows) and the volatile interest rate behavior of liabilities. Fluctuations in the present value of assets versus liabilities (funding ratios) represent high financial risk for all plan sponsors.[1]

Yet, because of actuarial and accounting smoothing of financial statements, most plan sponsors are unaware of this danger. Plan sponsors become focused instead on the return on assets (ROA) assumption rather than assets versus liabilities. And, in establishing asset allocations across major asset classes and in setting forth investment guidelines and objectives for in-house and external money managers, the liability structure is typically ignored.

The purpose of this article is threefold. First, we discuss the recent performance of defined-benefit corporate pension plans (in 2000 and 2001) and the implications for future corporate earnings. Second, we address the issues associated with measuring pension liabilities. Finally, we suggest solutions for dealing with the problem of measuring pension liabilities.

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RECENT PERFORMANCE

We can estimate the performance of defined-benefit corporate pension plans in recent years by looking at the asset allocation of the typical pension fund and the liability structure of a typical pension fund. Consider first the typical asset structure.

Pensions & Investments surveys the 200 top defined-benefit plans and reports their asset allocation. The asset classes included in the survey and their benchmarks for 1990-2001 are shown in Exhibit 1. We use these annual survey results for our allocation.

Panel A of Exhibit 2 shows the allocations used for each year from 1990 through 2001. Panel B of Exhibit 2 shows the annual return for each benchmark from 1990 through 2001. Panel C shows the computed returns on the asset portfolio using the weights in Panel A.

Now for the other side of the equation: the liabilities. Ryan Labs has developed a liability index to serve as a proxy for liabilities. The liability index has a 15.5 average duration, based on Financial Accounting Standard 87 and industry trends. FAS 87 requires the use of a high-quality zero-coupon yield curve to discount liabilities. The Ryan Labs liability index uses the Treasury STRIPS curve since it is the only continuous high-quality yield curve of the same issuer.[2]

Without a specific plan sponsor's liabilities, the Ryan Labs liability index uses an equal-weighted STRIPS curve. According to industry trends, an average 15.5 duration should be close to the median or average duration of the pension industry.

We use this liability index in assessing the performance of pension funds. Since the liabilities are valued as the present value of future liabilities, the change in the value of the liability index changes as interest rates change. So, as interest rates change, a "liability return" (growth rate) can be calculated.

The difference between the asset portfolio return and the liability index return is the dominant influence on pension surpluses or deficits, depending on funding ratios of assets to liabilities. The return difference is shown in the last line of Panel C, Exhibit 2. Several observations are worth noting.

From January 1, 2000, through December 31, 2001, the underperformance has been about 33%. Calendar year 2000 was the worst pension year in history; assets underperformed liabilities by more than twice the previous worst year of 1995 (–25.37% versus –12.46%).

One might argue that the poor performance of the equity market was the reason for the performance in 2000. It was, but consider that even if 100% of the pension assets had been allocated to the best asset class at the beginning of 2000, pension assets would have still underperformed pension liabilities (11.63% for bonds versus 25.96% for the liability index).

Note also that, despite the outstanding absolute returns for all asset classes shown in 1995, it was a terrible year for pension funds. Even if a pension fund had allocated 100% of pension assets to the best-performing asset class, domestic common stock, pension assets would have underperformed pension liabilities (37.57% versus 41.16%).

EXHIBIT 1
Defined-Benefit Plan Asset Classes

Asset Class	Years in Survey	Index
Cash	All years	Ryan Labs Cash Index
All Equities (U.S. and International)	1990-2001	S&P 500
U.S. Equities Only	1998-2001	S&P 500
International Equities	1998-2001	Morgan Stanley EAFE Index
All Bonds (U.S. and International)	1990-2001	Lehman U.S. Aggregate Bond Index
U.S. Bonds Only	1998-2001	Lehman U.S. Aggregate Bond Index
International Bonds	1998-2001	Lehman Global Bond Index
Real Estate	All years	PPR Private Equity Index*
Mortgages	All years	Lehman Mortgage Index
Private Equity	1997-2001	Thomas Financial *Venture Economics*
GICs and Annuities	1990-2001	Ryan 5-Year GIC Master Index

**Index is constructed by Property & Portfolio Research (PPR), which publishes several indexes for the real estate sector. According to George Pappadopoulos of PPR, many pension funds invest only in the private equity sector if they invest in real estate.*

EXHIBIT 2
Pension Performance 1990-2001

Panel A: Asset Allocation (%)												
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Cash	0.08	0.05	0.04	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.02
Bonds	0.40	0.39	0.40	0.38	0.36	0.35	0.34	0.31	0.31	0.27	0.27	0.30
Equity	0.44	0.49	0.49	0.52	0.55	0.58	0.58	0.61	0.46	0.48	0.48	0.43
Real Estate	0.05	0.04	0.04	0.03	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.04
International Stocks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.14	0.14	0.13
International Bonds	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02
Mortgages	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
GICs and Annuities	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private Equity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.03	0.04	0.04
Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Panel B: Asset Class Returns (%)												
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Cash	8.73	7.42	4.12	3.51	3.94	7.11	5.59	5.72	5.48	4.24	6.49	4.97
Bonds	8.96	16	7.4	9.75	–2.92	18.47	3.63	9.65	8.69	–0.82	11.63	8.44
Equity	–3.15	30.45	7.64	10.07	1.29	37.57	22.93	33.34	28.55	21.03	–9.09	–11.86
Real Estate	1.3	–4.4	–2.6	0.5	3.7	7.8	8.6	10.9	12	12.3	14.2	4.7
International Stocks	–23.32	12.48	–11.85	32.95	8.06	11.56	6.37	2.08	20.24	27.32	–13.87	–21.11
International Bonds	12.7	15.35	4.5	12.31	1.56	20.18	5.12	1.04	15.33	–5.24	1.43	–1.37
Mortgages and Annuities	10.72	15.72	6.96	6.84	–1.61	16.8	5.35	9.49	6.96	1.86	11.16	8.22
GICs and Annuities	9.12	8.91	8.7	8.15	7.52	7.19	6.73	6.58	6.57	6.57	6.56	6.61
Private Equity								24.1	19.8	11.7	79.4	–3.4
Panel C: Portfolio Return and Net Return after Liabilities (%)												
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Portfolio Return	3.23	21.78	6.98	9.31	–0.02	28.70	15.13	24.24	19.69	14.42	0.59	–5.26
Liability Return	3.23	19.26	7.87	22.46	–12.60	41.16	–3.70	19.63	16.23	–12.70	25.96	3.08
Net Return	0.00	2.52	–0.89	–13.15	12.58	–12.46	18.83	4.61	3.46	27.12	–25.37	–8.34

Finally, note that since January 1990 the annual total return difference of pension assets minus liabilities is only 136 basis points.[3] This difference is based on index performance and does not take into account management fees or custodial fees. It is difficult to believe that an asset allocation heavily skewed to equities (which enjoyed the greatest bull market in American history) could not significantly outperform a low-yielding, high-quality, liability portfolio over 12 years.

Perhaps traditional asset allocation models and asset management strategies need rethinking.

EVALUATION OF RETURN ON LIABILITY INDEX

This analysis of pension fund performance is based on two assumptions on the liability side. First, we assume that the liability index is representative of the liability structure of a typical pension fund. Consultants have used the Ryan Labs custom index successfully to accurately support the asset allocation and performance measurement functions. The second assumption is that the value of the liability index has been properly calculated. It is the second assumption that we address here.

The Financial Accounting Standards Board (FASB) governs conventions for the financial accounting reports of corporations. On the public funds side, the reporting requirements are set forth by the Government Accounting Standards Board, GASB, which tends to follow FASB. FASB is quite clear on how pension liabilities are to be priced and hence behave: Each liability is required to be priced as a high-quality zero-coupon bond whose par value matches the liability payment amount, and whose maturity matches the liability payment date.[4]

This should not be anything new to institutional investors, as defeasance, dedication, and immunization strategies have always considered liabilities equal to a bond portfolio in that the best liability-matching asset is a bond portfolio with the same or very similar cash flows. Investors have used defeasance, dedication, and immunization strategies for decades to construct bond portfolios that offset their liability exposure. The portfolios are constructed to match the projected liabilities by cash flow, term structure, and duration. There is ample support that the appropriate discount rates should be that of zero-coupon Treasury securities (i.e., Treasury STRIPS).

As a result of the discounting process, the economic present value of pension liabilities is extremely interest rate-sensitive, especially for long-duration plans (i.e., younger plans). Since interest rates in recent years have registered some of the lowest levels in modern history, the growth in the present value of liabilities has been enormous. According to FASB and all asset/liability calculations, it is the present value of assets versus the present value of liabilities that is being measured, compared, and amortized in financial statements.

In practice, however, accountants have used a loose interpretation of FASB with respect to the appropriate discount rate, construing high-quality bonds as corporate bonds rated at least double-A. FASB also specifies that the discount rate be based on zero-coupon bonds. The only zero-coupon bonds we have as a yield curve are Treasuries and agencies. Even agencies are a problem here since we do not have a liquid or consistent issuer of zero-coupon bonds. Resolution Funding Corporation bonds are the most plentiful but they do not have a maturity longer than 27 years.

Accountants employ Moody's long-maturity corporate Aa rate to price liabilities, but this is a poor index to use for this purpose. It is only one maturity point on the yield curve. It is a 20-year bond portfolio. Where is the yield curve?

Moreover, there is a spread between agencies to deal with. To understand the dollar magnitude of this problem, one can multiply the yield spread by the average duration of the liabilities. For example, suppose that the average duration of the liabilities is 15 and the yield spread between agencies and Treasuries is 50 basis points. The difference in the present value of the liabilities using the higher discount rate (i.e., the agency rate) is then 7.5%. Unfortunately, the yield difference is well over 100 basis points when using the Moody's long corporate Aa rate instead of a Treasury zero-coupon yield curve, translating into a possible 15% undervaluation of the present value of liabilities.

If the corporation cannot defease the liability with the yield pricing used, an incorrect price for the liabilities is computed—one that benefits the plan sponsor's financial statements and costs (contribution) but may endanger the solvency of the plan.

Another issue fraught with danger is the return on asset (ROA) assumption used by accountants and actuaries. Instead of marking the assets to market, this ROA forecast is used, and then supposedly corrected later through a smoothing technique over the life of the plan.

This issue regarding the ROA assumptions was noted by Warren Buffett in a speech at the end of 2001 and reported in *Fortune* (see Loomis [2001]):

> Unfortunately, the subject of pension assumptions, critically important though it is, almost never comes up in corporate board meetings. (I myself have been on 19 boards, and I've never heard a serious discussion of this subject.) And now, of course, the need for discussion is paramount because these assumptions that are being made, with all eyes looking backward at the glories of the 1990s, are so extreme. I invite you to ask the CFO of a company having a large defined-benefit pension fund what adjustment would need to be made to the company's earnings if its pension assumption [were] lowered to 6.5%. And then, if you want to be mean, ask what the company's assumptions were back in 1975 when both stocks and bonds had far higher prospective returns than they do now.
>
> With 2001 annual reports soon to arrive, it will be interesting to see whether companies have reduced their assumptions about future pension returns. Considering how poor returns have been recently and the reprises that probably lie ahead, I think that anyone choosing not to lower assumptions—CEOs, auditors, and actuaries all—is risking litigation for misleading investors. And directors who don't question the optimism thus displayed simply won't be doing their job.

IMPLICATIONS OF PENSION UNDERPERFORMANCE

Our analysis indicates that over the two-year period 2000-2001, average pension fund assets underperformed pension liabilities by about 37%. If the funding ratio for

most plans declines by 37%, several undesirable financial accounting consequences will occur: 1) reduced earnings; 2) earnings drag from underperformance of assets versus liabilities; 3) higher Pension Benefit Guaranty Corporation insurance premiums; 4) higher contributions; and 5) poorer credit ratings. All these consequences impact the financial health of pensions in America.

Reduced Earnings Due to Loss of FAS 87 Transition Amortization

When FAS 87 was enacted, corporate pension funds were allowed to amortize (straight-line) their current surplus or deficit over the remaining service period of employees or 15 years, whichever was longer, starting between November 1, 1985, and November 1, 1987. For example, suppose that the fair value of the pension assets exceeds the present value of the liabilities by $15 million. A corporation would amortize the surplus over 15 years. This annual amortization, $1 million in our example, is referred to as a transition asset. This transition asset would then be used to reduce annual pension costs for the next 15 years, thereby increasing corporate earnings accordingly.

In the mid-1980s, most corporations had a pension surplus, because liabilities had much higher market discount rates, plus equities had performed well. The resulting transition asset has helped corporate earnings since the mid-1980s.

FAS 87 requires that if the present value of the liabilities exceeds the fair value of the pension assets, the deficit must be amortized (straight-line) over 15 years. The annual amortization of the deficit in this instance is called a transition liability, and results in an increase in pension costs for the next 15 years.

The year 2000 financials saw the end of this transition asset for many companies. This suggests that 2001 earnings and beyond would suffer accordingly, due to the loss of the earnings support provided by the transition asset.

Earnings Drag from Underperformance of Assets versus Liabilities

The average company in the S&P 500 has enjoyed a 7%-10% increase in earnings due to pension income (lower pension expense) for several years; the aerospace industry has shown as much as a 35% increase. According to a pension and other retirement income accounting study by McConnell, Pegg, and Zion [2001], this will now shift to pension expense, and become a drag on earnings. How much is difficult to estimate and is certainly unique to each company. We believe that this may be a significant and recurring annual expense going forward, due to smoothing and amortization techniques.

Pensions affect corporate earnings as a cost factor or expense item. A reduction in this expense boosts earnings and vice versa. Items that constitute the pension cost and expense calculation include:

- *Interest.* The interest cost of pension benefit obligation liabilities, based upon discount rate used times beginning present value of liabilities.
- *Service Cost.* The present value of benefits earned (accrued) during the year.
- *Benefit Payments.* Benefit payments made during the year.
- *Plan Amendments.* Changes to benefits from new plan amendments.
- *Prior Service Cost.* Present value of unrecognized benefits assigned to employees for their service before a given date (usually due to mergers).[5]
- *Actuarial Gain/Loss.* Actuaries forecast a year in advance the growth in pension assets and liabilities. The actual growth is then compared to this forecast. The difference, to the extent that it exceeds certain specified limits, is amortized over the average life of the pension (at 15 years).

Let's focus on the actuarial gain/loss component. Exhibit 3 tries to depict what may have happened throughout pension America. The first row shows assets of $1.3 billion and liabilities of $1.0 billion as of December 31, 1999. The actuarial assumed growth rates are 9% for assets and 7% for liabilities).[6]

Compared to the actual growth rates of assets and liabilities (column titled "current impact"), the analysis indicates an actuarial loss amortization of $22,607,000 as of December 31, 2000, and an additional $8,876,000 loss as of December 31, 2001, creating a cumulative amortization and earnings drag of $31,483,000 for 2001 and the next 14 years. This is modified by each year's change to this amortization.

Notice that the asset/liability ratio started at 130% and ended at 92%. Note also that the amortization represents an extra cost of $31.5 million per year for the next 14 years.

Unfortunately, this may be typical of most traditional defined-benefit plans in America. Warren Buffett provides another example (see Loomis [2001]):

Are we talking big numbers here? Let's take a look at General Electric, the country's most valuable and most admired company. I'm a huge admirer myself. GE has run its pension fund extraordinarily well for decades, and its assumptions about returns are typical of the crowd. I use the company as an example simply because of its prominence.

If we may retreat to 1982 again, GE recorded a pension charge of $570 million. That amount cost the company 20% of its pretax earnings. In 2000, GE recorded a $1.74 billion pension credit. That was 9% of the company's pretax earnings. And it was 2 1/2 times the appliance division's profit of $684 million. A $1.74 billion credit is simply a lot of money. Reduce that pension assumption enough and you wipe out most of the credit.

GE's pension credit, and that of many another corporation, owes its existence to a rule of the Financial Accounting Standards Board that went into effect in 1987. From that point on, companies equipped with the right assumptions and getting the fund performance they needed could start crediting pension income to their income statements. Last year, according to Goldman Sachs, 35 companies in the S&P 500 got more than 10% of their earnings from pension credits, even as, in many cases, the value of their pension investments shrank.

Several other illustrations summarize the financial impacts we have been discussing. Changes in assets and liabilities are treated as deviations from expected returns (growth)—typically about 9.0% for assets and 7.0% for liabilities. These deviations are amortized into earnings over the average life of the pension plan (at 15 years) as actuarial gains or losses. Hence, in addition to 2001 earnings, the legacy of the last two calendar years (2000 and 2001) will dampen earnings for the next 14 years.

Exhibit 3 shows, per $1 million of pension liability and a beginning funding ratio of 130%, how the double whammy of lower market rates and falling equity prices combined to create an 8% deficit (92% funding ratio). Even the one-year amortization (based on 2000 results) of 2.2607% ($22,607 per million) of pension liabilities can loom large for companies with high ratios of pension liabilities to earnings.

The illustration in Exhibit 4 shows the total growth in liabilities using the Moody's Aa bond rate starting at 7.90% on December 31, 1999, and moving to 7.41%

EXHIBIT 3
Sample Pension Fund Calculation of Actuarial Gain/Loss: 1999–2001

	Asset/Liability Actual versus Assumed Performance				$ Surplus	% Funding	Change in Actuarial Amortization	15-Year Amortization	
	Assets		Liabilities					Current Impact	Deferred Impact
12/31/99	1,300,000		1,000,000		300,000	130%			
Actual	–32,500	–2.5%	259,600	25.96%	–292,100				
Assumed	117,000	9.0%	70,000	7.00%	47,000				
Difference	–149,500	–11.5%	189,600	18.96%	–339,100		–339,100	–22,607	–316,493
12/31/00	1,267,500		1,259,600		7,900	101%			
Actual	–68,445	–5.4%	38,796	3.08%	–107,241				
Assumed	114,075	9.0%	88,172	7.00%	25,903				
Difference	–182,520	–14.4%	–49,376	–3.92%	–133,144		–133,144	–8,876	–124,267
12/31/01	1,199,055		1,298,396		–99,341	92%			
Total Period	–100,945	–7.8%	298,396	29.8%	–399,341		As a % of Liability	–31,483 2.4%	–418,154 32.2%

Corporate return on asset assumption = 9% (per $1 million of pension liabilities, duration at 15).

EXHIBIT 4
Impact of Pension Fund Asset/Liability Performance on Earnings

Date	Moody's Aa	Rate Change	Duration	Liability % Change
12/99	7.90%			
12/00	7.41%	0.49%	15	12.25%
12/01	7.08%	0.33%	15	12.36%

Assuming liabilities are discounted at Moody's Aa long-maturity rate.

EXHIBIT 5
IRS Discount Rates (based on 30-year Treasury rates)

		IRS Discount Rate		
Year	Treasury	Weighted Rate	@90%	@105%
12/31/01	5.47	5.63	5.08	5.92
12/31/00	5.46	5.74	5.17	6.03
12/31/99	6.48	5.97	5.37	6.27
12/31/98	5.09	5.75	5.18	6.04
12/31/97	5.93	6.33	5.70	6.65

Source: Ryan Labs Risk/Reward Monitor.

(December 31, 2000) and 7.08% (December 31, 2001). This rate is popular with many plan sponsors since it is higher than the Treasury yield curve, although it is only a spot rate for long corporates. Over the 24-month period under review, using the Moody's Aa rate would have produced a growth in liabilities of 23.78% or 11.26% annualized (absent new service costs), well above the estimated growth of pension assets.

It is noteworthy that shareholders of five major companies have recently decided to mount a proxy battle soliciting investor votes for a resolution separating executive compensation from earnings that have been boosted by pension credits.

Extra PBGC Premiums

The Pension Benefit Guaranty Corporation (PBGC) was established in 1974 as a quasi-governmental insurance agency to provide pension benefits in case the corporation could not (such as in bankruptcy). The PBGC charges a flat rate insurance premium per employee to provide this insurance coverage. These premiums have risen significantly over the years, but have stabilized since 1991. In addition, the PBGC charges a variable premium for underfunded plans.

A plan is underfunded when the actuarially smoothed value of the assets falls below the present value of the current liability discounted at 85% of the 30-year Treasury rate. Since the 30-year Treasury is at a historically low rate, and since pension equity assets have performed so poorly, many pension plans would be labeled underfunded by this definition. Extra premiums are 9/10 of 1% (90 basis points) on the underfunded pension benefit amount. For every $100 million of underfunded liabilities, an annual charge of $900,000 will be applied. This charge represents an additional annual cost to the plan sponsor, and it is neither recoverable nor amortizable.

Higher Contributions

IRS Rule 404(a) governs pension contributions. The rules are focused on calculation of the "current liability"—the present value of all accumulated plan benefits using current service and current salary. This calculation uses the 30-year Treasury as its discount rate on a moving average basis.

Under the Retirement Protection Act of 1994, the calculation is based on a weighted average of the last four years of 30-year Treasury rates using a *corridor range* of 90% to 105% of this weighted rate. Specifically, the weights are as follows: 40% of last year-end; 30% of one year ago; 20% of two years ago; and 10% of three years ago. The rates on 30-year Treasury bonds for 2001, the four years prior to 2001, and the corridor range of 90% to 105% are shown in Exhibit 5.

If current assets are below 90% of this current liability calculation, a higher contribution must be paid to bring the liability in line. This discount rate is slightly lower in 2001 than in 2000 (5.63% versus 5.74%). With pension asset growth lagging liability growth by about 8.34% for 2001 (*see Exhibit 2*), a higher contribution is more likely for 2002.

Many pension holidays (requiring no contribution) should also be coming to an end with the lower discount rates and lower asset values in 2000 and 2001. Interest rates have to go above 5.11% by December 31, 2002, on the 30-year Treasury (last auctioned issue) for the current liability discount rate to increase.

Impairment of Credit Rating

Pension deficits will impair the credit rating of a firm or municipality. In the case of both TWA and Bethlehem Steel, this was the major reason behind bankruptcy. A pen-

sion deficit means that firms have to put up additional funds, affecting their balance sheets.

But try to find pension liabilities on a balance sheet. The SEC will have to enforce tighter control and effect more transparent disclosure.

SOLUTIONS

Corporations and public funds would like to avoid volatility or added costs in their budgets and on their financial statements. Since FASB, the IRS, and the PBGC all require the pricing of liabilities as a high-quality bond portfolio, it is fitting that a bond portfolio matched to liabilities provides the least volatile solution. The question then is cost.

Many practitioners fail to appreciate that the pension game is an annual calculation. Although smoothing techniques are used, such amortizations are still part of the annual analysis. Investments that severely underperform and do not behave like liability growth usually result in higher cost.

A prudent strategy is to avoid serious underperformance and mismatching of assets versus liabilities every year. Accordingly, we recommend a course of action as follows.

First, it is difficult to believe that the asset side can function without clear and frequent information on how liabilities are shaped and how they behave on a risk/reward basis. Asset allocation, asset management, and performance measurement are all dependent on the true objective (i.e., funding liabilities) to function properly. A custom liability index based on the actuarial benefit schedule is critical for the asset side to perform.

A customized index should be decomposed to measure both liability growth (return) by term structure (short, intermediate, and long) and total liabilities. A proper strategy should include a liability index for *retired lives*, *active lives*, and *total liabilities*.

Then, the proper strategy for the components of the liability index will depend on their characteristics. Retired lives liabilities are rather certain and fixed. Because they are the shortest and the most imminent liabilities, they become the most critical to fund. As a result, a bond portfolio properly matched by term structure (a liability index fund) would provide the least volatility and risk to the financial statement and budget. This strategy should produce a predictable contribution budget with no added costs due to underperformance.

Liabilities for active lives are less certain and more volatile due to inflation and labor sensitivity (future values), as well as high interest rate sensitivity (present values), since these are the longest pension liabilities. To formulate a strategy for this component of liabilities, more dynamic asset classes are needed that can match or outperform long liabilities. Long zero-coupon bonds, Treasury Inflation Protected Securities, structured notes, and equity are likely candidates, but so too are alternative investments and unconventional assets (e.g., timber, real estate). A proactive asset allocation strategy is recommended.

Because active lives are the most volatile area of pension liabilities, they also require consistent monitoring. If there is a significant deficit or surplus, it first must be known (through use of a custom liability index) and then corrected or rebalanced.

Finally, surplus should be the reward for effective asset/liability management. Retired lives will produce limited value-added, since its objective is a pure matching strategy to reduce volatility and costs (a liability index fund as the anchor or core portfolio). Active lives are the expected area of value-added.

A dynamic asset allocation strategy is the methodology to achieve surplus growth. If the fund has a surplus, this should be isolated, and treated as a separate portfolio with a distinct objective and policy constraints. Liabilities will not be funded here, one would hope. Time horizons could be of any length. Investment restrictions could be the most relaxed. New and exciting investment ideas could be tried here rather than on an asset/liability frontier where failure would be costly. Asset allocation could be the most adventuresome, depending on the plan's style and culture.

Indeed, surplus optimization may best come from the surplus portfolio, as the asset/liability portfolios are structured to perform annually so as not to cause drain on the surplus portfolio, or volatility and added cost for company financials.

ENDNOTES

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[1]For example, to reduce pension risk, one U.K. firm, Boots, switched from 75% equities to 100% bonds in 2000 to minimize volatility in pension contributions and financial statement earnings drag. See Payne [2001].

[2]The agency zero-coupon yield curve is not consistent, and requires the use of numerous issuers to complete or buy, especially for any sizable plan.

[3]This value is based on compounding annual returns for assets and liabilities individually and comparing the composites (11.09% versus 9.73%).

[4]Paragraph 199 of FAS 87 states: "Interest rates vary depending on the duration of the investments; for example, US Treasury bills, 7-year bonds, and 30-year bonds have different interest rates….The disclosures required by this Statement regarding components of pension benefit obligation will be more representationally faithful if individual discount rates to various benefit deferral periods are selected." Furthermore, Paragraph 44 states: "In making those estimates, employers may also look to rates of return on high-quality fixed income investments currently available and expected to be available during the period to maturity of the pension benefits."

The selection of discount rates is explained in Paragraph 186 of FAS 106 (December 15, 1990) as follows: "The objective of selecting assumed discount rates is to measure the single amount that, if invested at the measurement date in a portfolio of high-quality debt instruments, would provide the necessary future cash flows to pay the accumulated benefits when due. Notionally, that single amount, the accumulated post-retirement benefit obligation, would equal the current market value of a portfolio of high-quality zero coupon bonds whose maturity dates and amounts would be the same as the timing and amount of the expected future benefit payments."

In a June 1993 letter to corporations, the Securities and Exchange Commission Guidelines on FAS 87 were set forth as follows: "The SEC staff believes that the guidance that is provided in paragraph 186 of FASB 106, for selecting discount rates to measure the post-retirement benefit obligation, also is appropriate guidance for measuring the pension benefit obligation." The letter states further that: "Rates that cannot be justified or are just too high will be passed on to the SEC's enforcement division for further action. The enforcement division could require restatement of the company's financial statements, as well as seek to impose civil or criminal penalties."

[5]According to FAS 87, prior service cost "represents the systematic recognition over several periods of an increase (decrease) in the benefit obligation resulting from a change in the amount of the retirement benefit expected to be paid to employees based on services they have already performed."

[6]These figures are from McConnell, Pegg, and Zion [2001].

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