
The Evolution of Asset/Liability Management (a summary)

Ronald J. Ryan, CFA

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Summary prepared by Ronald J. Ryan, CFA

The objective of most US institutions with assets to invest is to fund some sort of liability, as is the case with banks, insurance companies, pension funds, and so forth. As a result, asset/liability management (ALM) should be the investment focus and the basis for selecting the core portfolio.

Insurance companies may be the birthplace of ALM and certainly have been the model of ALM discipline, thanks to the heavy regulations imposed on them. IAIS Standard No. 13 (International Association of Insurance Supervisors 2006) defines asset/liability management as the practice of managing a business so that decisions and actions taken with respect to assets and liabilities are coordinated. Therein lies the essence of proper ALM: It should be an orchestrated event based on enhancing the funded ratio (assets/liabilities). It should not have any other objective or interference, such as generic market indices, peer group comparisons, or inflation. In short, ALM can be defined as the process that deals with interest rate risk management.

Banks and insurance companies have practiced ALM since their inception. Their ALM approach centers on the interest rate risk management of assets versus liabilities such that their risk/reward behavior is similar or matched. Financial theory offers no good reason for making a distinction between ALM as practiced by banks, insurance companies, or pensions. So, the time has come to stop treating pensions as anything different or special. In this sense, all liabilities are similar or have the same systematic risk—namely, interest rate risk. Therefore, ALM as practiced by banks and insurance companies should apply to pensions as well.

The focus of this literature review is the evolution of ALM for pensions. One noticeable feature of pensions is that they have no regulations requiring asset/liability management or the matching of assets to liabilities. This lack of regulation may be the most important cause of the ballooning pension deficits of the past 13 years.

In the Beginning: Dedication

The history of formal ALM for pensions (sometimes referred to as liability-driven investing, or LDI) is littered with false starts. Dedication was the earliest form of ALM for pensions. It was in vogue during the historically high

interest rate environment of the late 1970s and early 1980s. And because it required the exact matching of a stream of cash inflows (assets) to a stream of cash outflows (liabilities), dedication was referred to as “cash matching.”

The dedication model required a sophisticated computer program to perform the many iterations necessary to achieve efficient cash flow matching by leaving the least amount of cash flow uninvested or unmatched. The model assumed a 100% bond portfolio held to maturity or to the liability payment dates (termination dates). The quest was thus to find the least expensive collection of bonds to perform this future-value matching.

Dedication had several distinct advantages:

1. Certain or predictable cash flows (when held to maturity).
2. Risk reduction (market, reinvestment, inflation, default, and liquidity).
3. Specificity (asset cash flows must match liability cash flows).
4. Simple asset allocation (100% bonds).
5. Passive asset management (more certain returns with lower fees).

Dedication also had several disadvantages, which, in time, may have led to its failure as the core strategy for pension plans:

1. The model is not easy to construct. At the time, sophisticated computer models were expensive and intellectually challenging. These models thus became the domain of broker/dealers, who eliminated many asset managers or competitors.
2. The complicated mathematical models are hard for many pension plan sponsors to understand.
3. The model is dependent on accurate projected liability benefit payments (cash outflows). This problem introduced a strain, or risk factor, for actuaries and uncertainty with regard to model inputs.
4. The model is designed to match future values, not present values. This issue creates potential volatility for funded ratios (which are based on present values or market values) if asset market values do not behave in sync with liability market values.
5. The model reduces—or even eliminates—the role of active bond managers for asset management and the role of pension consultants for asset allocation.
6. The transaction cost of dedication was highly interest rate sensitive (inversely correlated), so as the secular trend to lower rates continued from 1982 onward, dedication became increasingly more expensive to execute.

Immunization Replaces Dedication as an ALM Strategy

Future-value matching of liabilities (dedication) is most beneficial for accounting purposes when there is a certain, or guaranteed, match of assets to liabilities. To execute a certain match of liabilities requires zero-coupon bonds matched to the liability payment dates and amounts. But because zero-coupon bonds were not available until 1985 (with the introduction of Treasury STRIPS), it was mathematically difficult for dedication models using coupon bonds to be a certain, or guaranteed, match of liabilities because of reinvestment risk, call risk, or anything that would alter the cash flows.

Dedication thus gave way to immunization, which was designed to consistently match the present value growth behavior of liabilities because that is how the accounting rules (Statement of Financial Accounting Standards Nos. 87 and 158) measure the funded ratio of a plan. This approach also reduced the volatility of contribution costs, which are based on the funded ratio.

Immunization focused on matching the interest rate sensitivity of liabilities in present value dollars. As a result, it focused on duration (or modified duration) in harmony with horizon analysis. Duration measures the average life of a security (asset or liability) in present value dollars. When it is modified (Negative of duration/ $1 + \text{Yield to maturity}$), duration is a fair proxy for price return movement given an interest rate movement. Although duration is an old concept (from 1938), it never got much attention until ALM under immunization came in vogue in the late 1970s and early 1980s, when academic papers on immunization, duration, and dedication began to appear in increasing numbers.

As interest rates rose in a long secular trend from 1974 to 1982, the financial industry began to pay more and more attention to duration. Realizing that the high interest rates would allow them to lock in unprecedented rates of return, defined benefit pension fund managers embraced the concepts of dedication and then immunization. Wall Street broker/dealers—especially Salomon Brothers, with Martin Leibowitz as its intellectual leader—provided the complicated software models to execute dedication and immunization effectively. Many papers promoting and critiquing immunization strategies were written by quantitative scholars during this time.

Things were good for the broker/dealers who could execute very large dedication and immunization portfolios. Perhaps the largest bond trades ever recorded were those done for dedication and immunization as single, very large orders. Things were not so good, however, for the many active bond managers and pension consultants who saw their clients' need for active bond managers and asset allocation models dwindling.

As interest rates began to fall in early 1982, call risk began to surface as a serious impediment to immunization and dedication models, especially for those who ventured into mortgage-backed securities. This prepayment and

call risk altered cash flows and maturity structures, which damaged the integrity of immunization and dedication models dependent on these certain cash flows and maturity dates.

As a solution to the problems with immunization, Salomon Brothers offered a new financial theory it called “contingent immunization.” Salomon declared contingent immunization to be a form of active management. (It was actually a blend of active and passive management.) The procedure allowed for the pursuit of active bond management within a framework that provided a minimum return, even under adverse experience.

This minimum return was achieved through a procedural safety net based on the techniques of bond immunization. The portfolio stayed in active management mode as long as the portfolio’s asset value placed it above this safety net, and it entered the immunization or passive management mode only when absolutely necessary to ensure a promised minimum return. Contingent immunization seemed to offer the best of both worlds—the pursuit of maximum returns through active management and the limitation of downside risk through immunization.

Accounting Rules Redirect Pension Asset Management

When the Financial Accounting Standards Board (FASB) issued its Statement of Financial Accounting Standards No. 87 (FAS 87) in 1985, effective December 1986, it created both a good and a bad moment in the evolution of asset/liability management. It clarified that the discount rate methodology used for liabilities should be based on a high-quality bond yield curve that settles the liabilities. Because immunization strategies focused on matching the present values, a major consideration became what discount rates to use to calculate the present value of liabilities. FAS 87 helped those using immunization strategies understand how to price and match the present value of liabilities. Notably, FAS 87 allowed corporations to use the return on asset (ROA) assumption to offset pension expense. As a result, if the dollar growth in pension assets based on the ROA rate exceeded the pension expense amount, then pension expense would become pension income (or credit), which would directly enhance earnings. Because corporations are earnings per share (EPS) driven and not liability driven, the ROA—instead of matching and funding liabilities—soon became the hurdle rate or objective return of pension assets.

When interest rates went below the ROA assumption rate (roughly 8%) in the late 1980s, dedication and immunization strategies fell out of vogue because they supposedly would have locked in a return that was not sufficient to neutralize or overcome pension expense, thereby causing an EPS drain. As a result, dedication and immunization were largely replaced by surplus optimization strategies, which aimed for the growth of pension assets to outpace

liability growth, thus creating a pension surplus that would reduce or even eliminate contribution costs.

Contribution requirements are a function of the funded ratio (the ratio of plan assets to liabilities, in present value terms). The size or present value of the liability is sensitive to the discount rate used to reduce future benefit payments to a present value. (Specific methods for determining the discount rate are discussed later.) The sponsor is thus required to make contributions such that the plan will be fully funded over a time horizon specified by law.¹

The late 1980s and the decade of the 1990s were good times for pensions. By switching to a surplus optimization strategy, asset allocation models favored equities over bonds because the ROA was now the bogey or growth benchmark. This asset allocation decision worked out well during this period: Equities enjoyed several good years of double-digit returns, resulting in pension surpluses, which enhanced EPS (returns above the ROA were an “actuarial gain” line item that increased EPS) and reduced or eliminated contribution costs. ALM thus became a hard sell given the level of interest rates, the historical return track record of equities, and the resulting financial statement benefits of an ROA hurdle rate. But this focus on absolute return (ROA) rather than relative and volatile liability growth would soon haunt the pension industry and prove fatal to some (i.e., bankruptcy).

The equity correction of 2000–2002 became a pension tsunami that hit financial statements with an unexpected and damaging force. The equity decline was quite deep, and pension asset growth underperformed liability growth by as much as 75% cumulative in those three years. This event led to spiraling contribution costs because of crashing funded ratios. It also caused an EPS drain because the pension assets underperformed the ROA, which was labeled as an actuarial loss. The financial damage led to credit downgrades and even solvency issues, with several companies filing for bankruptcy (e.g., airlines) because pensions tended to be the largest liability of many firms.

Corporations were begging for relief from the spiking pension contribution costs, and Congress responded with the Pension Protection Act (US Congress 2006). In the end, PPA legislation relaxed the contribution cost calculation by offering two ways to discount liabilities: (1) a 24-month moving average of a three-segment yield curve or (2) a current spot-rate yield curve. In both options, the yield curve is based on high-quality corporate bonds rather than the 30-year Treasury rate. In effect, the PPA raised discount rates and lowered the apparent present value of liabilities, thereby enhancing the apparent funded ratio, which lowered contribution requirements.

The FASB was also concerned that existing standards did not clearly communicate the funded status on balance sheets, so it issued Statement of

¹Note that this time horizon has changed a number of times in recent history.

Financial Accounting Standards No. 158: Employers' Accounting for Defined Benefit Pension and Other Postretirement Plans (Financial Accounting Standards Board 2006), effective 2007. FAS 158 clarified that the discount rates used should equal the current market value of a portfolio of high-quality zero-coupon bonds whose maturity dates and amounts matched the expected future benefit payments. This accounting standard also introduced OPEB (other postemployment benefits) liabilities onto the balance sheets as one of the largest liabilities facing US institutions.

ALM Strategies Reborn as LDI

After the 2000–03 equity correction, the stage was set to return to the basic concept of asset/liability management because of deteriorating funded ratios, large actuarial losses, and spiking contribution costs. At this time, ALM was more frequently referred to as LDI to suggest a new, enhanced approach. Some argued that there was no incentive to overfund a pension plan. Moreover, they proclaimed that there was no place for equities in a pension asset allocation. Sooner or later, they suggested, equity-based investment strategies lead to large funding shortfalls and the inability of most plan sponsors to close them.

Because of the continuing secular trend toward lower rates and the ROA accounting methodology for pension expense, however, corporations continued to pursue an asset allocation away from bonds, but this time with less equity concentration. This environment opened the asset allocation door to many new asset classes and strategies (hedge funds, alternative investments, 130–30, and so on) and new LDI strategies.

The Society of Actuaries (SOA) noticed this asset/liability disparity resulting from accounting rules and issued a research paper draft (2004) warning that accounting measures distort economic reality and produce reports inconsistent with economic results. The SOA stated further that entities that focus on economic value tend to achieve their financial objectives more consistently in the long run. In other words, the SOA promoted ALM as the proper asset management style on an economic basis (i.e., market value) and not an accounting basis.

Several prominent financial authors have advocated for the concept of “economic” values instead of accounting and actuarial valuations. Some conclude that the first element needed to manage a defined benefit plan is an “economic” view of the liability. They believe that (1) the only risks that can be hedged through investing the assets are those that are market related and (2) accounting values are not hedgeable because they are smoothed. These authors recommend that corporations align at least some of their pension assets to liabilities as the core portfolio and then add a layer of alpha on top of that. Furthermore, because the capital asset pricing model (CAPM) incorporates “economic liabilities,” it

thus reveals a new risk-free asset—the liability-matching asset portfolio. Many key pension experts thus promote the obvious conclusion that every corporate pension fund should be entirely in fixed-dollar investments.

A major consideration for pension assets should be the proper benchmark—one that best represents the client objective. And because the client objective is liability driven, a liability index seems to be the appropriate bogey. Each pension’s liability payments are unique, so it follows that the only proper benchmark for pension assets and ALM is a custom liability index that measures the risk/reward behavior of each pension’s liability schedule. Until a custom liability index is installed as the proper benchmark, all asset allocation, budget, and contribution decisions are in jeopardy.

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The complete literature review, which contains 47 annotated citations on the relevant research, can be found at <http://www.cfapubs.org/toc/rflr/2013/9/2>.

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