



Pension Contributions – The Missing Asset

by

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Pension contributions tend to be viewed correctly as a cost or penalty due to pension assets underperforming pension liability \$ growth (shortfall or deficit). Contributions are the balancing item that brings the pension to a fully funded position over time. Contributions are calculated annually by the plan actuary and can be greater than the budgeted contribution expense of the plan sponsor. For many public pensions, the contribution cost has risen more than 10x the fiscal 1999 level. Noticeably, contributions usually play no role in the asset allocation strategy of most pensions. Given the size of contributions today, it is critical that contributions are viewed as a projected asset and a major consideration in the asset allocation strategy. This research paper explores the calculation and role that contributions should play in asset allocation as well as the management of a pension.

The Contribution Calculation (Single Employer)

The contribution calculation is made to fund any pension shortfall (\$ deficit) such that $B + E = C + I$. **It's all about cash flows!** Contributions + the return on assets (ROA) in \$ must fund liabilities (projected benefits + expenses). Funding shortfall (deficit) is determined by the Funded Status as measured by the present value of pension assets minus the present value of liabilities. Pension liabilities are valued based on interest rates or the discount rates allowed under FASB or GASB funding requirements to determine the present value of liabilities. There are basically two methodologies allowed:

- (1) **ASC 715 (FASB) spot rates** = a yield curve of current *hypothetical* AA corporate zero-coupon bonds rates.
- (2) **ROA (GASB)** – the projected or assumed rate of return on pension assets.

Pension assets can be valued under two methodologies:

- (1) **Market value of assets**
- (2) **Actuarial value of assets** = Smoothing or moving average of the market value of assets usually smoothed over 3 - 5 years.

The contribution calculation is based on the projected funding shortfall. Contributions must fund the annual shortfall (funded status annual \$ deficit). For public plans, the ROA is both the growth rate for assets and liabilities. This is hard to believe since liabilities behave and are priced as zero-coupon bonds. This leads to much confusion and asset allocation being misdirected to the wrong focus or objective. Simple math can prove this assertion as shown in exhibit 1 where pension assets achieved the ROA growth target of 7%. Liabilities are assumed to have the same 7% growth rate or discount rate. With assets of \$60 and liabilities of \$100, simple math tells us that given the same 7% growth rate, the higher \$ valuation has a higher \$ growth. As a result, the Funded Ratio stays stable at 60% but the Funded Status \$ deficit *increases by 50.0%* (\$40 to \$60 deficit) in just 6 years which would increase contribution costs accordingly. In order for the \$ deficit and



contribution costs to remain *stable* (although high), assets would have to grow at **11.67% ROA in year 1 trailing down to a 9.79% in year 6**. Another view is if you wanted to reach full funding in 30-years, contributions would have to be increased until the 18th year while asset growth would have to grow at a **constant 8.84%**:

Exhibit 1
Funded Ratio = 60%
Funded Status = \$40 Deficit
Assets and Liabilities grow at ROA = 7%

Year	Assets		Liabilities		Funded Status		ROA
	Begin	End	Begin	End	\$ Deficit	Funded Ratio	Needed
1	\$60.00	\$64.20	\$100.00	\$107.00	\$42.80	60%	11.67%
2	64.20	68.69	107.00	114.49	45.80	60%	11.18%
3	68.69	73.50	114.49	122.50	49.00	60%	10.76%
4	73.50	78.65	122.50	131.08	52.43	60%	10.39%
5	78.65	84.15	131.07	140.26	56.11	60%	10.07%
6	84.15	90.04	140.26	150.07	60.03	60%	9.79%

Requires ROA = 11.67% to *not* increase Contribution costs (year 1)
Asset growth > Liability growth by 4.67% = Level Contribution in year 1

Asset Allocation

Asset allocation is the single most important asset decision because it controls the risk/reward behavior of 100% of the pension assets. Since it will greatly affect the Funded Ratio (PV of assets / liabilities) and Funded Status (PV of assets - liabilities) ... it affects the Contribution cost. The asset allocation decision and strategy should be based on the Funded Status. Logically, a large deficit status should have a much more aggressive asset allocation strategy than a pension with a surplus status. Unfortunately, the Funded Status tends to play little or no role in the asset allocation strategy. Most often the asset allocation focus is on achieving the return on asset (ROA) assumption. History has proven that achieving the ROA does not mean you have achieved a fully funded plan or even enhanced the Funded Status such that the \$ deficit has been reduced as Exhibit 1 proves. In truth, given a higher \$ deficit requires a higher \$ minimum required contribution. Moreover, **in order for contributions to be reduced, pension assets must outgrow pension liabilities in dollars!**

The true objective of asset allocation should be to secure benefits and enhance the Funded Status such that contribution costs remain low and stable over the life of the pension. In sharp contrast to this objective, since 1999 pensions have been hard hit with both the *volatility* and the *spiking* \$ cost of contributions that has plagued so much of pension America. To this end, **pension assets must outgrow liabilities in \$** to reach a fully funded position! Asset allocation needs to be focused and redirected on what excess growth or return (liability Alpha) versus liability growth is needed to reach a fully funded position over a time horizon no longer than the average life (duration) of liabilities... usually 10-15 years.

For most pensions, the term *liability Alpha* is a new concept. With a liability objective Alpha needs to be redefined as the excess asset \$ growth above liability \$ growth. In our exhibit 1, assets



would have to grow by more than 11.67% in year 1 to earn liability Alpha and outgrow liabilities in \$ growth. In order to calculate this **target liability Alpha** an accurate and frequent assessment of the Funded Status is required. The Funded Status deficit divided by the duration of liabilities divided by the Funded Ratio provides a sense of the annual target liability Alpha needed to reach a fully funded position over a time horizon equal to the duration of liabilities. For example, a 70% Funded Ratio with a 10-year duration would suggest that the annual target liability Alpha is 4.29% $((30/10) / 70)$. If asset growth exceeds liability growth by 4.29% annually for 10 years, the plan should reach a fully funded status. Naturally, such liability Alpha is never a certainty and is sure to be a volatile calculation. As a result, the calculation of the target liability Alpha needs to be updated as part of the *tactical or responsive* asset allocation process.

Noticeably, the Funded Ratio should be viewed from both a gross and net (after contributions) calculation. Such information is only provided annually months after end of fiscal year as presented in the actuarial report or not at all (i.e., annual projected contribution schedule for net 30 years and duration of liabilities is seldom provided). Given that the main focus of a pension is its Funded Ratio and Funded Status, you would think that they are updated frequently and certainly presented at every investment review meeting to keep score that the plan is on track to reach a fully funded status. Imagine a scoreboard in sports that is only updated after the game is over... too late to change your strategy. Indeed, the scoreboard regulates how the game is played. If you are way behind, you change your strategy and get more aggressive to catch up... or vice versa.

The Role of Contributions in Asset Allocation

Contributions are a *future asset* and, as such, *enhance the Funded Ratio and Funded Status*. Contributions are made in the form of annual cash injections and are initially **used to pay the current liabilities due that year**. Should there be any annual contributions greater than the annual liability payments it would usually remain in cash to pay next year's liabilities. Since contributions fund the liability payments (benefits + expenses) and are usually not invested, they reduce liabilities thereby enhancing the Funded Ratio and Funded Status. This ***net Funded Ratio and Funded Status*** should then become the focus of asset allocation and not the gross liability or gross Funded Ratio. In truth, current assets fund net liabilities not gross liabilities. The *net Funded Ratio/Status* after contributions is *never calculated* in actuarial reports. Seldom has contributions ever been presented or used in this manner. Yet, this is the normal role of contributions... to fund current liabilities.

As emphasized earlier, **asset allocation models need to focus on enhancing the Funded Ratio and Funded Status by achieving the annual target liability Alpha**. If the net Funded Ratio (after contributions) improves to 80% from 60% in our above example, the annual target liability Alpha improves to 2.50% annually which may adjust the asset allocation strategy. If liabilities had a weighted average market yield to maturity of 3%, this would suggest that a 5.50% asset growth rate is sufficient to reach a fully funded status in time. Such a low growth rate target might suggest a rebalancing of the asset allocation to a more conservative strategy that has more certainty, less asset management cost and less risk in achieving this target liability Alpha asset growth rate hurdle.

Our research and evidence support that it is the *net Funded Ratio and Funded Status* (after contributions) that needs to be enhanced. Please note that the projected contributions used to



calculate the net Funded Ratio is usually recalculated by the actuary every year and becomes a constant monitoring event which could alter the asset allocation process.

As a result, asset allocation needs to be **responsive** to this ever-changing net Funded Ratio/Funded Status. This is commonly called *tactical* or *dynamic* asset allocation although we feel the word **responsive** is more indicative of what the process should be. Asset allocation needs to recognize and respond to the net Funded Ratio/Funded Status. As it reaches a fully funded position, asset allocation needs to get more conservative along the way with more of an allocation to an asset/liability matching strategy (cash flow matching) as the **core portfolio**. This will help secure this enhanced funded status position and allow contribution costs to remain low and stable.

Custom Liability Index (CLI)

Although funding liabilities is the true objective of any pension, liabilities tend to be missing in action in asset allocation, asset management and performance measurement. The reason for this contradiction or disconnect is the absence of a Custom Liability Index (CLI) that best represents the size, shape and risk/reward behavior of liabilities. Once a CLI is installed as the **proper benchmark**, then and only then can the asset side function effectively on asset allocation, asset management and performance measurement.

Liabilities are like snowflakes... you will never find two alike. Pension liabilities are unique to each plan sponsor since they each have a different labor force with a different salary structure, mortality and plan amendments than any other pension. As a result, only a *Custom Liability Index* could ever accurately represent or measure the unique liabilities of any pension. A CLI should be calculated accurately and frequently so the plan sponsor and its pension consultant can be informed with timely data that can support the asset allocation decision. A CLI should provide both a gross and net liability valuation based on all of the discount rate requirements (ASC 715, ROA, PPA rates). Moreover, the CLI should provide a monthly calculation of the liability growth rate so performance measurement of total assets vs. total liabilities can be assessed.

The Performance Measurement Model

Assets need to be monitored versus their bogey or index objective on a frequent basis. In harmony with the true pension objective they also need to be measured vs. the risk/reward behavior of liabilities (as measured by the CLI). This should be the true test of asset allocation... **total asset growth must outperform total liability growth** for the Funded Ratio and Funded Status to be enhanced. Without a CLI, such a measurement would be difficult and not timely. Total asset growth should certainly be measured and monitored vs. total liability growth at each investment review meeting. Each asset manager should also be monitored vs. liabilities as well. A simple warning is applicable here:

If you outperform the S&P 500 but lose to liability growth... the client loses!

Obviously, there is no victory or liability Alpha earned here although traditional performance measurements would suggest otherwise. All asset functions need to be in sync with the true objective of enhancing the Funded Ratio, the Funded Status and reducing contribution costs.



Conclusion

Traditional asset allocation models are focused on achieving the ROA assumption. This is not the true objective. Until a Custom Liability Index (CLI) is installed as the proper pension benchmark, asset allocation will be disconnected to the true liability objective. Contributions should be a major consideration in the asset allocation process since they are a sizeable future asset. Contributions are used to pay the current liabilities due each year thereby reducing the current assets needed to fund net liabilities. Current assets need to know what they are funding... net liabilities after contributions. This *net liability* needs to be calculated by the CLI on a frequent basis.

Since full funding is the goal, asset allocation needs to know the annual liability Alpha needed to reach this funding status. The CLI will provide such information to calculate the **annual target liability Alpha. This replaces the ROA as the target return for assets.** Performance measurement then needs to monitor asset vs. liability growth to verify that the pension plan is on track. This requires total asset growth compared to total liability growth. The asset allocation process requires a CLI which calculates a net liability growth (after contributions) in order to be effective and in harmony with the true objective of any pension plan. To achieve the pension objective of funding liabilities at the lowest and least volatile contribution costs, asset allocation needs to focus on the Funded Ratio and Funded Status net of contributions. This requires the CLI to provide a frequent liability valuation which includes projected contributions. Asset allocation is a process based on asset/liability management (ALM) and valuations. All assets must be considered. The pension contribution, over time, may be one of the largest asset classes. It should be included in any and all asset decisions.

Ronald J. Ryan, CFA: Awards and Recognition



*William F. Sharpe
Index Lifetime Achievement Award
and ETF Product of the Year Award*



Lifetime Achievement Award



*Bernstein Fabozzi/Jacobs Levy Award
Research Paper of the Year*



Most Innovative ETF of the Year Award