INSTITUTIONAL ADVISORY & SOLUTIONS

ASSET ALLOCATION FOR "END-STATE" PORTFOLIOS

Executive Summary

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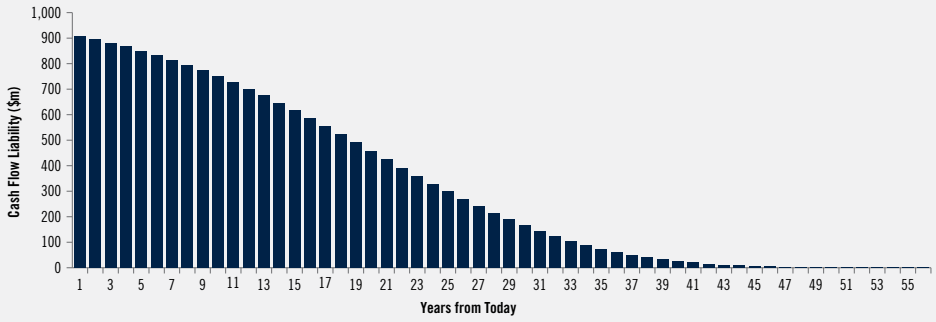
In recent years, following the trend of transitioning from Defined Benefit (DB) to Defined Contribution (DC) plans, many US corporate pension plans have closed to new entrants. Even though remaining benefit payments may stretch for decades, these plans are on a path to irrelevance and have entered their "end-state." End-state portfolios typically have a heavy and increasing percentage of retirees and the liabilities are (or, soon will be) in a "run-off" mode. Figure 1 below shows a cash flow profile of a hypothetical end-state DB plan. As end-state corporate DB plans have become more prevalent, their special portfolio management challenges, including asset allocation, have gained attention.

Figure 1: End-State Cash Flow Liability Schedule
(Hypothetical Retiree-Only End-State DB Plan)



Note: The figure illustrates hypothetical yearly liability cash flow obligations for an end-state portfolio for the entire life of the pension plan. This is representative of a typical end-state portfolio of pure retiree cash flows. We focus on accounting liabilities in this paper.

Source: PGIM IAS. Example shown for illustrative purposes only.

Pure immunization with public fixed income assets ("hibernation") is a possible investment management strategy to try to minimize funding ratio variability. But this may not be sufficient for all end-state plans. For example, mortality risk could cause the actual cash liabilities to deviate from the estimated cash liabilities. This risk may argue for the inclusion of return-seeking assets. In addition, some plans have had good performance experience with their illiquid private assets (*e.g.,* real estate, private equity, and private credit funds). How can a CIO evaluate the potential of these private assets remaining in their end-state portfolio?

The findings shown are derived from statistical models. Reasonable people may disagree about the appropriate model and assumptions. Models should not be relied upon to make predictions of actual future account performance. See additional disclosures.

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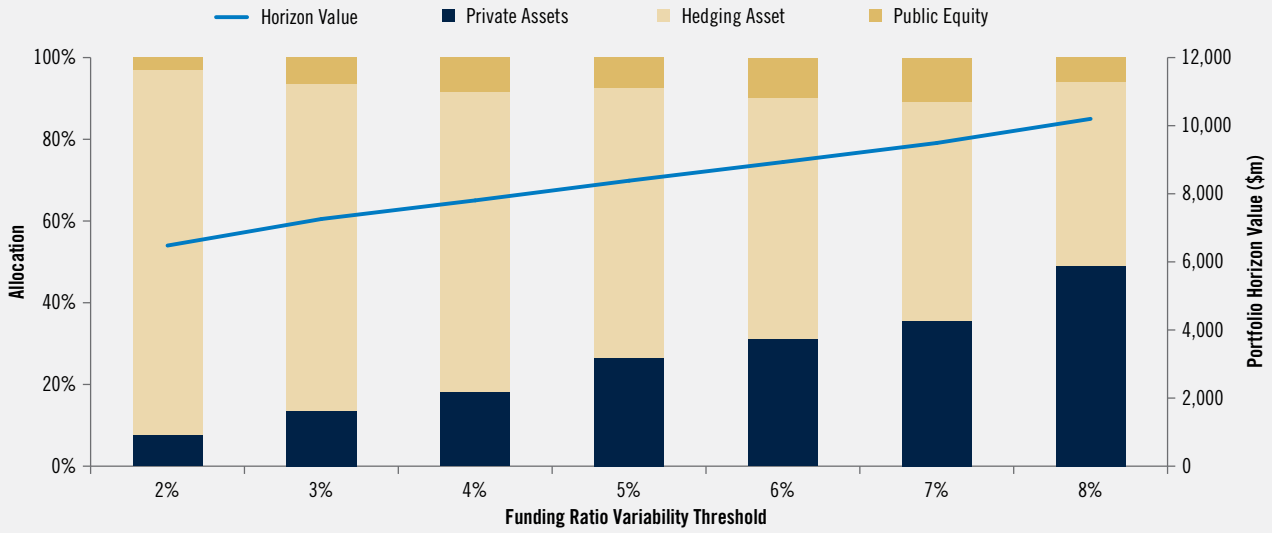
We use our asset allocation framework (OASIS™ – **O**ptimal **A**sset Allocation with **I**lliquid Asset**s**) to solve for optimal end-state asset allocation solutions that include both public and private assets. An optimal asset allocation solution seeks to maximize the end-state portfolio's expected horizon value while meeting all future cash obligations at a very high confidence level (*i.e.,* 99% and above) and also keeping the funded status sufficiently stable over the investment horizon.

OASIS can help CIOs measure the tradeoff between the funding ratio variability threshold and expected portfolio performance. Figure 2 below illustrates how the optimal asset allocation and the corresponding portfolio horizon value change with the threshold. Starting from a relatively high funding ratio variability threshold (*e.g.,* 6%), as the threshold decreases (*i.e.,* the constraint becomes tighter), the total allocation to private assets decreases and the allocation to the hedging asset increases. For example, moving from a 6% to a 2% funding ratio variability threshold, the allocation to private assets decreases from 31% to 8%, while the allocation to the hedging asset increases from 59% to 89%. This shift to the hedging asset decreases the expected portfolio horizon value by 27%, from $8,932m to $6,479m. The decline in the portfolio's horizon value as the funded status variability threshold tightens captures the "cost of constraints" which a CIO needs to know to make the best decision for their plan.

Figure 2: Tradeoff between Funding Ratio Variability Threshold and Portfolio Performance



Note: We assume the plan has an initial AUM of $10,000m and the present value of future benefit payments is $11,772m (based on a flat 3.9% discount rate) which gives an initial 85% funding ratio. There are five assets in the investment opportunity set: two public assets (a "low-risk" asset and a "high-risk" equity asset (*i.e.,* S&P 500)) and three private assets (LP buyout private equity, mezzanine debt and real estate funds). The public low-risk asset is a fixed-income "hedging asset" meant to proxy a plan's hedging portfolio constructed to track the change of the plan's present value of liabilities, with full flexibility to dynamically select and adjust individual underlying securities. The confidence level of meeting future cash obligations is 99%.

Source: PGIM IAS. Provided for illustrative purposes only.

OASIS also allows CIOs to conduct "What-if" analyses to address their special concerns. For example, a CIO considering a Pension Risk Transfer (PRT) transaction may impose a constraint on the maximum allocation to illiquid private assets. Under a 6% funding ratio variability threshold, a 20% cap produces a large reduction in initial private asset allocation to ensure that even after significant growth private assets will not exceed 20%. As another "What-if" example, a CIO may wish to express views on future private asset performance relative to public markets or their fund-selection skill. Optimal asset allocation will be sensitive to these views.

We show that private assets can play an important role in helping end-state portfolios achieve their return objectives while meeting their liquidity and funded status stability requirements. Even with the most restrictive constraints on both liquidity and funded status stability, there can be a meaningful allocation to private assets. Making asset allocation constraints more restrictive typically implies a less risky portfolio, with a lower allocation to private assets. But, what is the portfolio's performance cost of these constraints? OASIS helps CIOs quantify this tradeoff between performance and constraints, allowing them to make more informed asset allocation decisions.

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