

Pension Investing – Next Generation of Glide Paths

Pension plan sponsors, especially those with frozen pension plans, have spent significant time deciding on the most appropriate balance between growth (return seeking/equities) and hedging (liability matching/long-term bonds) assets to meet their objectives. For most, the ideal goal is to fully fund the pension plan through a balance of investment performance, cash contributions and a rising interest rate environment while not subjecting themselves to higher than desired funded status risk.

To aid plan sponsors in their decision making and to improve governance, the pension industry introduced the concept of glide paths about a decade ago. The idea of a glide path is to pre-determine the changes one would make to the asset allocation based on future outcomes. Typically, these glide paths are based on a plan's future funded status and call for reductions in the growth portfolio and additions to the hedging portfolio as the funded status improves. This approach decreases risk as a plan gets closer to the funding target. For example, if a plan is 80% funded, the asset allocation may be 50% growth and 50% hedging assets, but if that same plan becomes 95% funded the allocation may change to 30% growth and 70% hedging. Changes most likely occur for every few percentage points of funded status improvement, and would continue to change until the end goal was reached (105%-110% funded on an accounting basis). Each point of change in the asset allocation is referred to as a trigger. Below you will find an example of a sample of a "traditional" glide path.

Glide paths have been successful in the last decade, especially those that are monitored on a daily basis. Many plan sponsors, given the equity bull market, have seen their funded status improve and have crossed at least one trigger during that time. For instance, September of 2013 was a particularly beneficial time, as both equity markets and the interest rates used to measure pension liabilities were positive, causing most plans to cross a de-risking trigger.

But, as experience with these glide paths has increased, there is more recognition of areas of concern. The first concern is that, while hitting a trigger lowers portfolio risk by moving assets from growth to hedging, it doesn't help to protect the amount of assets still in the growth portfolio from a market downturn. Thus a large percentage of a plan's portfolio can decline as markets fall, leaving fewer growth oriented assets to help drive an increase in the funded status later. Second, at the later stages of a glide path (higher funded status levels), many glide paths don't provide enough growth allocation to allow a plan to reach a higher funded status in a relatively short period of time without future cash contributions from the plan sponsor.

Sample Glide Path	
Plan Funded Status (%)	Portfolio Allocation: Growth/Hedging (%)
85	60/40
90	45/55
93	37/63
95	30/70
98	22/78
100	15/85
103	7/93
105	0/100

So, the challenge is how to address both of these issues; how can we better control downside risk as well as maintain a greater allocation to the growth portfolio throughout the glide path in order to reduce expected contributions?

We believe both of these issues can be addressed through the use of risk management tools such as equity based put and call options. These tools can be added to a portfolio to manage equity risk in a cost effective and customized way, while also allowing the interest rate hedging portfolio to increase.

Trading off potential upside for downside protection

Pension plans, especially frozen ones, have asymmetric risk profiles: the benefit of \$1 of additional upside, past a point, is worth far less than \$1 of loss that is borne by the plan sponsor for a decline in funded status. For most plan sponsors, the point at which any future upside is not needed is the funding level sufficient to terminate the plan without any further contributions. Thus a plan sponsor should be happy to sell off potential future investment returns above this point in exchange for increased downside protection. For a plan sponsor holding equities, it is possible to sell off potential upside that it does not expect to need, using call options, and to buy protection against market falls using put options, forming a “collar” on equity returns. Using put and call options in this way can allow a plan sponsor to hold more growth assets for longer while still reducing risk. This decreases the expected time to reach the next trigger and to reach the plan’s objective, potentially terminating the plan earlier.

Use of options to increase growth assets towards the end of the glide path

An option strategy, especially as the funded status gets closer to the desired goal, allows a plan sponsor to have more exposure in growth assets than the typical glide path without materially increasing equity risk. This decreases the expected time to reach the next trigger and to reach the plan’s objective. This will result in a reduction of annual costs and the potential of terminating your plan earlier. This is shown further in the call out box “Illustrating the Result”.

Use of derivatives to increase the interest rate hedge ratio throughout a glide path

The equity option strategy described above helps to manage equity risk, but doesn’t address interest rate risk. Most plan sponsors hedge less than 100% of their interest rate risk (the risk that liabilities increase as long-term interest rates fall). This risk arises from a sponsor choosing to invest in assets, like equities, whose value is not sensitive to interest rates. Unlike taking equity risk, taking interest rate risk does not come with an expected return since future expected rates are imbedded in the current yield curve. It would take an upward shift in rates or a widening of credit spreads for this risk to pay off. It is our opinion that plan sponsors in current market conditions will not see enough upside potential in upward rate shifts to take on the risk that interest rates may fall. Many plan sponsors would choose to reduce their interest rate risk and lock in today’s long term bonds yields if it could be done without sacrificing growth asset returns.

However, it is possible to increase the level of interest rate hedging while maintaining growth asset exposure by buying more long duration fixed income (hedging assets) while simultaneously creating synthetic equity exposure. For example, a pension plan could hold 100% of its physical assets in liability matching long duration fixed income and have 40% of its asset value exposed to the equity markets synthetically. Using this strategy can allow a plan sponsor to **increase** expected returns while taking **less** funding level risk.

Illustrating the Result

Let’s say a plan is 100% funded but wishes to get to 105% funded over the next four years. The plan currently has an allocation that is 25% allocated to a growth portfolio and 75% to the hedging portfolio. Let’s also assume the plan’s liabilities are discounted at 4% per year, or in other words, the liabilities will earn 4% each year and thus the hedging assets will as well. In this scenario, the 25% growth portfolio would need to earn about 9% per year for 4 years to improve the funded status by 5% at the end of the 4th year. A very possible outcome, but still not without market risk. This also assumes interest rates remain constant throughout the period.

If a plan sponsor was willing to extend the time period to reach the additional 5% improvement in funded status, then the needed return would reduce each year. However this comes with paying more years of costs associated with maintaining a pension plan as well as still having the other risks (longevity, interest rate, compliance, etc.)

Continued on page 3...

The increase in expected return happens due to the use of leverage. The portfolio gains the expected return of investing in equities, offset by the cost of financing the position. Looked at from an asset-only perspective, this style of investing would be more risky than a traditional 40% growth / 60% hedging portfolio. However, this strategy is less risky when risk is looked at from an asset/liability perspective, which is what should matter most to a pension plan sponsor. Plus, fees would normally be lower than for a traditional actively managed portfolio.

Some pension plans have used interest rate swaps or Treasury futures to increase their hedge ratios by lengthening the duration of hedging assets. Doing this allows a plan to hold more growth assets for the same funding level risk than would be otherwise possible. While this is beneficial, and similar in concept to holding long duration bonds plus synthetic equity, there are drawbacks. First, there is a significant amount of difference between Treasury futures or swap interest rates versus credit based liability discount rates. Second, it is easier (and more logical) to shape equity returns by selling off unneeded upside in exchange for downside protection versus trying to do something similar with interest rates.

Putting it together and rebuilding a glide path

When you put these strategies together, by having more assets in fixed income and shaped equity returns, we find that you can support a larger growth portfolio, with a higher expected return while reducing the overall funded status risk. The increase in hedging assets is the main driver in reducing the funded status risk. Coupling this with using put and call options allows the sponsor to maintain higher equity exposure with a similar or lower risk profile than with a traditional glide path.

The glide path itself can also be reconstructed. Instead of moving the growth/hedging allocation as a plan's funded status increases, the revised glide path would keep the existing growth/hedge allocation the same (or tying the interest rate hedge ratio directly to rate triggers) while revising the put/call collar as the funded status improves by selling off more unneeded upside to produce more downside protection. This new approach to the glide path tightens the range of expected returns as funding improves while keeping more assets "at work" for the plan, which should lower the amount of contributions the sponsor will ultimately need to make.

The chart below illustrates the concept further. The chart shows the range of outcomes after five years using a stochastic model and assuming an 85% funded pension plan invested 60% in growth assets and 40% in hedging assets.

Illustrating the Result

Continued from page 2...

Let's use the sample portfolio from before but with 100% hedging assets (all physical) and 40% growth assets (all synthetic equity). Any unneeded upside of the growth portfolio can be sold off to buy downside protection such that a 40% growth/100% hedging portfolio, produces a funded status risk equivalent to a portfolio of 25% growth and 75% hedging assets (based on pricing at the time of this paper). The increase in growth assets from 25% to 40% means that you now need only a 7% equity return to close the funding gap over four years, or 2% per year less than the 9% required with a 25/75 portfolio. This allows the sponsor to create an option strategy that sells off upside beyond 7% (total returns above 28% over four years), the proceeds of which can be used to pay for downside protection.



The first column (Current with No Glide Path) shows a range of results if no glide path was in place and thus the 60/40 portfolio remains intact throughout the period. The plan is assumed to fully de-risk and terminate at 106% funded so no outcomes above this level are possible. The second column (Current with Traditional Glide Path) depicts the results using the example glide path shown earlier. Here you will see that the results have a slight impact on the eventual results with a tightening of results between the 25th and 75th percentile, but no benefit in significant up or down markets. The third column (Current with New Glide Path) shows the results obtained by revising the glide path to maintain the growth/hedging split at 60% synthetic equity/100% liability matching bonds. This process improves results over the distribution of outcomes and produces a higher 50th percentile (expected) return with less downside. The higher expected return is a consequence of leaving more equity exposure on for longer under the assumption that equities are expected to outperform bonds.

Addressing Potential Concerns

There are a few concerns that are often raised when the strategies described above are considered. First, using synthetic instruments like options and futures means that there is the potential for increased counterparty and operational risk.

For example, a pension plan would have so-called counterparty exposure if it enters into an option transaction with an investment bank and the value of the options moves in favor of the plan (and vice versa). If the bank were to default, the plan would be at risk of losing its gain. To mitigate this potential exposure, best practice is to use high quality collateral (cash or Treasuries) to cover any financial exposure. If a bank owes a pension plan \$10m on an option

position, then the bank will post \$10m in cash to the pension plan, and if the bank defaults, the plan keeps the money. These collateral positions are updated daily. It is normal for a pension plan to post Treasuries as collateral as 1) these are already held as part of a liability hedging portfolio and 2) the plan retains economic exposure to them (so they still work as hedging assets even if posted). The fact the derivative strategies we describe are relatively simple and are collateralized daily means that counterparty risk is small.

Second, there is a degree of complexity in creating and managing option positions in a pension funding environment that changed rapidly. The kinds of transactions discussed in this paper are liquid and transparent and can be closed or changed at any time – the plan sponsor is never “locked-in” to a particular outcome. This feature can be particularly useful if the market is fast approaching the ceiling of the contract (i.e. where you sold the call) and you can then terminate the contract and write a new contract (rolling the contract) based on the new market pricing.

Finally, with a strategy that increases both the interest rate hedge ratio and the amount of equity exposure, there is a concern that if long-term interest rates rise significantly and equity markets fall significantly, this strategy will underperform more traditional approaches. This is true and is representative of the kind of regret risk that one takes whenever a new strategy is adopted.

But the interesting thing is that the expected performance difference in a rising interest rate and falling equity market scenario is not as significant as one might expect. When options are used to shape the equity exposure, much (if not all) of the fall in equity markets may be mitigated versus an alternative, unhedged, growth strategy. On the rates side, the negative impact of hedging rates in a rising rate environment is less severe than NOT hedging rates in a falling one, due to the concept of convexity. So long as the liability matching assets actually match the liabilities, rising rates don't hurt the plan funding level. This regret risk in portfolio construction can always be tempered to accommodate the views of a plan sponsor. If a sponsor has high conviction that long term interest rates will rise meaningfully, then they can always hold less in hedging assets as part of such strategies.

Summary

Current glide path structures and thinking have helped to improve the governance and decision-making process of plan sponsors over the past decade. They have helped to reduce portfolio risk in a very structured way. However there are concerns that current glide paths still have meaningful downside exposure and/or can leave a sponsor with a prolonged time to reach their final goal due to the growth exposure being too low.

By accessing equity markets synthetically and/or overlaying an option strategy on the growth portfolio, plan sponsors can 1) increase hedging assets significantly, reducing interest rate risk and 2) keep the allocation to growth assets relatively constant throughout a glide path. Putting this all together can lead to a lower timeframe to reach your target with less volatility along the way.

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