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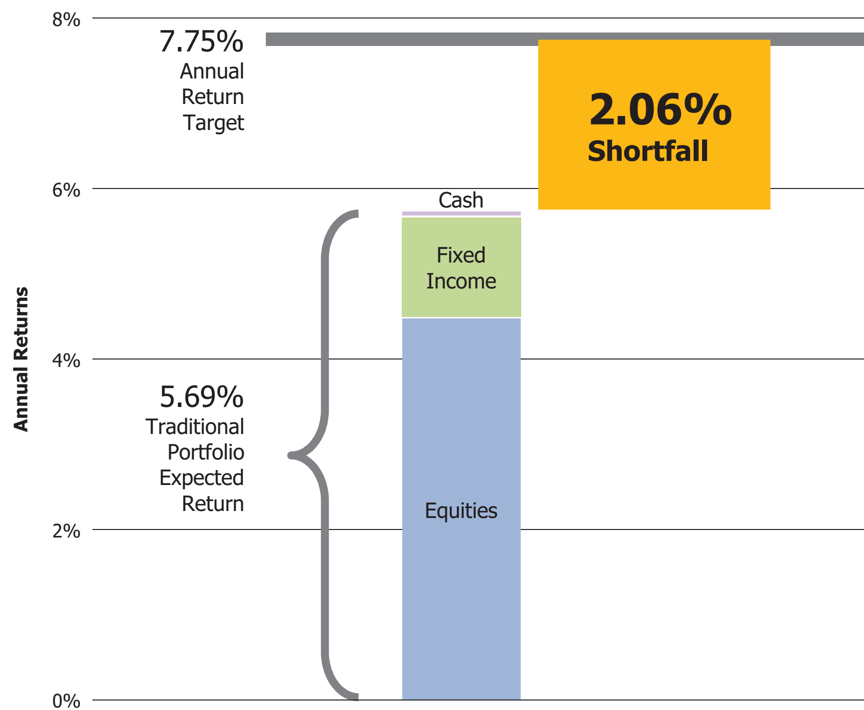
Pension Shortfall: Solving for the Missing 2%

Pension plan sponsors face significant challenges. Retirement obligations continue to increase, and the two major equity market set-backs in 2000 and 2008 have produced widening funding gaps. So what does the future hold? Will their plans be able to reliably achieve their stated return objectives? Unfortunately for plans relying solely on traditional equities and fixed income, the prospects look grim. Our analysis suggests these plans will likely experience a 2% shortfall per annum over the next 7-10 years.

The following chart plots the forecasted performance of a traditional investment portfolio relative to a 7.75% return target, revealing a 2.06% expected annual shortfall.

To address this, we will examine the potential role of alternative investments to help narrow this divide.

Figure 1: Traditional Investment Portfolios Are Unlikely to Achieve Targeted Rates of Return



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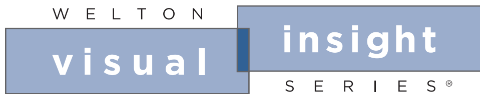

Analyzing the Pension Investment Challenge

About Pension Return Targets

Public and private pension plans rely on formal return targets to match their funding requirements against the present value of estimated future retirement benefits. This target is typically set by actuaries using a methodology approved by the Government Accounting Standards Board (GASB), and is a critical factor in helping to ensure that each plan will have sufficient funding to meet anticipated retirement liabilities. Return targets for U.S. public pensions typically range between 7.0 – 8.5%, with a median target of about 8.0% according to Wilshire Associates.[1] For our analysis, we chose a slightly more conservative rate of 7.75%.

Plans are also required to revisit their target return assumption periodically. For example, in March 2012 CalPERS, the largest U.S. public pension plan, voted to reduce its return target from 7.75% to 7.50% to reflect diminished forward market expectations. As pension funding gaps continue to widen (public pension funding ratios were approximately 77.2% as of November 2011[2]), other plans around the country have begun to follow suit. Although CalPERS' proposed reduction of just 0.25% may appear minor, the impact on state and local funding levels, plan contributions, and total benefits could equate to a very meaningful $167 million per year.[3] With this in mind, it is easy to see why a potential 2% per annum shortfall has potentially large and serious consequences.

How Did We Forecast Future Returns?

There are numerous accepted approaches used in forecasting future investment returns. For our analysis, we scrutinized a variety of methods and ultimately chose the Grinold and Kroner model to forecast equity returns. This model estimates future annual equity returns based on factors such as inflation, dividends and earnings growth, among others. Our resulting analysis yielded a forecast of 7.39%, which falls slightly above or in-line with those of well-known market pundits. For purposes of comparison, John Bogle, the founder of Vanguard, claimed 7% as a reasonable estimate for stock returns over the next decade. The more bearish Jeremy Grantham from GMO forecasts a more somber 5.6% for U.S. large-cap stocks over the next seven years.[4] Furthermore, methods with a reliable 50-year track record of using normalized 10-year earnings to forecast

1 "CalPERS Lowers Investment Target to 7.5%," Michael Corkery, WSJ, March 14, 2012.
2 "Public Funds Stick to Aggressive Targets," top100funds.com, November 30, 2011.
3 "CalPERS Vote Could Cost State's General Fund $167 Million a Year," Sacramento Bee, March 13, 2012.
4 "Your Forecasts for Stock and Bond Returns," Christine Benz, Morningstar.com, October 30, 2011.

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forward returns currently project approximately 6% returns over the next decade.[5] To forecast fixed income returns, we surveyed corporate bond and treasury yields across various maturities and risk profiles, ultimately producing a composite fixed income return expectation of 3.25%.

We then blended these three asset classes of equities, fixed income, and cash into a portfolio weighted at 61/36/3% respectively, a ratio intended to approximate that of a traditionally-oriented public pension plan. The resulting portfolio yielded a forward annual return of 5.69% per annum, which represents a 2.06% shortfall relative to a 7.75% annual return objective.

Do Varying Equity Assumptions Change the Result? Somewhat, But Not Enough.

Not surprisingly, equity returns and allocation weightings are the most influential drivers in our analysis. Investors will undoubtedly harbor a variety of opinions on both, and so in **Figure 2** we varied these assumptions to see if different inputs would significantly alter the results. As this data shows, neither increasing risk through additional equity exposure nor above-consensus forward equity returns are likely to entirely close pensions' investment shortfall gap. In short, traditional investments, combined in traditional ways, are unlikely to produce satisfactory future results.

[5] "Hard-Negative," John Hussman, Ph.D., December 12, 2011.

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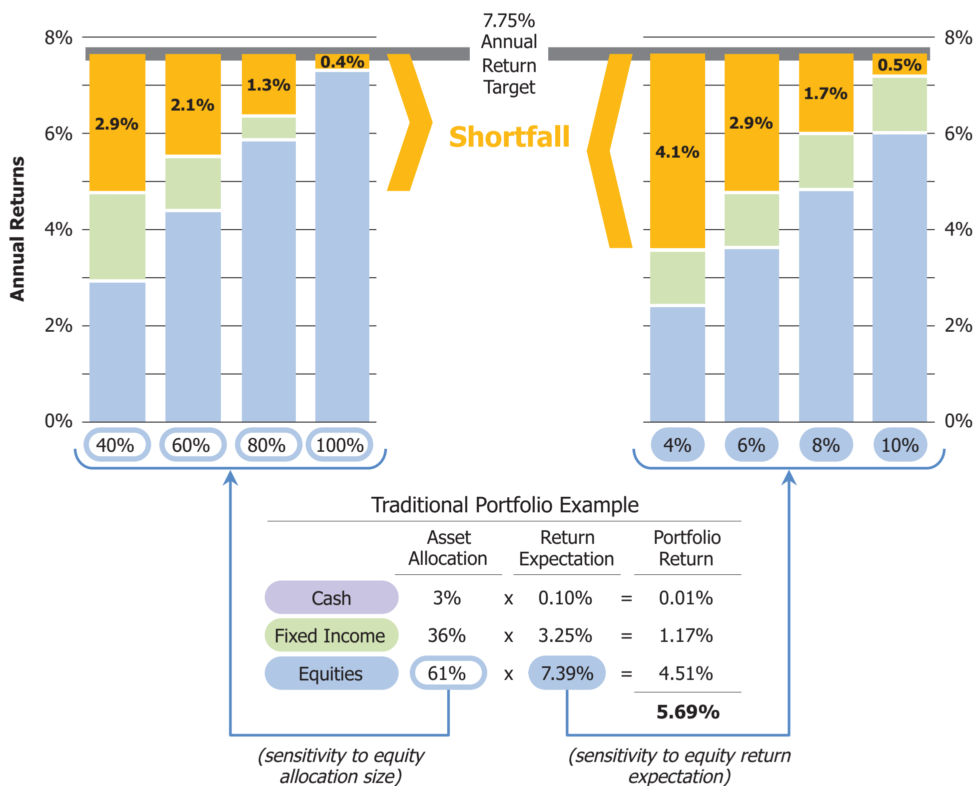
The following analysis reveals that the investment shortfall is likely to persist under most reasonable traditional asset allocation scenarios.

While portfolios vary according to the nature of the underlying benefits, scenarios in this chart are likely to look familiar to many investors with traditional allocation frameworks.

Figure 2: Sensitivity Analysis Examining the Impact of Equity Assumptions



Traditional Portfolio Example

	Asset Allocation		Return Expectation		Portfolio Return
Cash	3%	x	0.10%	=	0.01%
Fixed Income	36%	x	3.25%	=	1.17%
Equities	61%	x	7.39%	=	4.51%
					5.69%

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Implications for a Plan's Alternatives Allocation

While our bottoms-up return forecast approach may be new to some, the conclusion that traditional investments alone are insufficient is not especially insightful. Many, if not most, pensions have already concluded this for themselves, and are actively allocating to alternatives like private equity, venture capital, real estate, commodities, hedge funds and managed futures.

For these investors, the question is not whether to include alternatives, but how much? Our prior analysis allows us to revisit this question armed with an estimate of how traditionals will likely perform over the intermediate term. Since most investors already know how much they invest in alternatives (10%? 20%? 30%?), let's back-solve to find the implied return required from these alternatives to achieve 7.75% portfolio returns per annum.

These relationships are captured in **Figure 3**. It shows the required rate of return on a portfolio's alternative investments (center chart values) to achieve an overall portfolio return target of 7.75% per annum, given various alternatives' portfolio weight assumptions (y-axis) and forward equity return assumptions (x-axis). For example, the plan sponsor with a 20% allocation to alternatives (and with the remaining 80% of their portfolio invested at the same traditionalist ratios on page 1) and a 7% per annum forward equity return expectation is implying that their alternatives investments must return 17.0% in order to achieve an overall portfolio return of 7.75%.

While investors can decide for themselves which investments they would like to include in their alternatives allocation (hedge funds? commodities? real estate? etc.), this exploration serves as a reminder that one's alternatives allocation strategy must be linked to the achievement of performance goals. For example, in an environment of low yielding traditionals, a modest allocation to alternatives may be placing unrealistically high performance expectations on one's alternative investments. Instead, plans may be better served by committing a larger allocation to alternatives with more modest, yet achievable, performance expectations.

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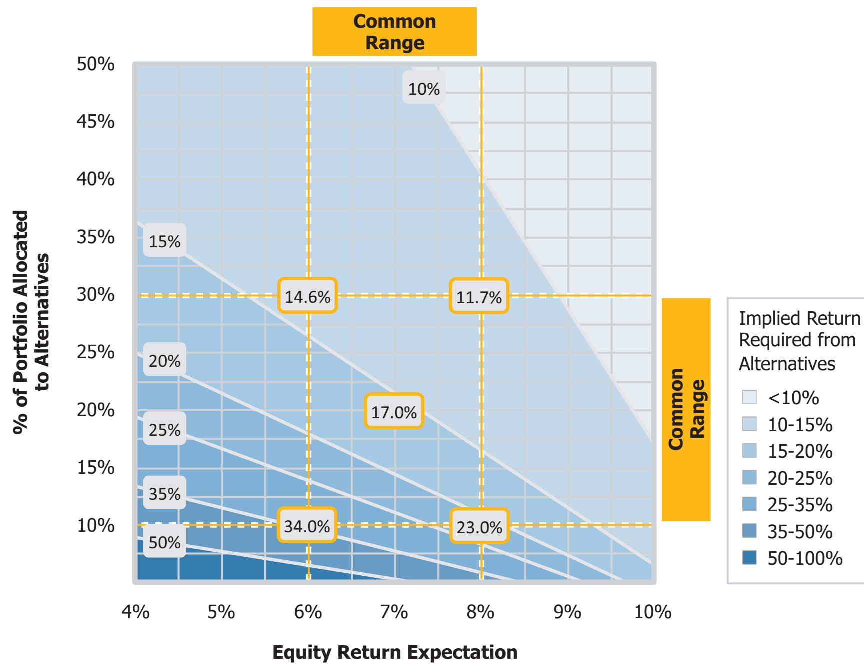
The following chart plots the implied required rate of return for a sponsor's alternative investments in order to achieve a 7.75% target portfolio return.

As shown, many investors' portfolios are likely underweight alternative return sources in their pursuit of stated plan objectives.

Figure 3: Plotting the Implied Rate of Return Required from Alternative Investments to Achieve Target Portfolio Returns of 7.75%



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The Terminal Wealth Impact of Investment Shortfalls

The Impact in Real Dollars

Returning to the shortfall discussion of **Figure 1** and **Figure 2**, what is the impact of a persistent 2.06% shortfall in real dollars over time? For a $1 billion pension plan, the shortfall amounts to $20 million in year 1, but what happens to the deficit if the annual shortfall persists? As **Figure 4** shows, when compounded over 30 years, the 2.06% shortfall produces a terminal year funding deficit of $4.1B, which equates to a 44% deficit relative to required funding levels. Stated inversely, this is equivalent to a 56% funding ratio. Seem unreasonable? While it's true that few investment officers would expect to reliably miss their targets every year as implied here, the funding shortfall endpoint is not unrealistic. In fact, it may be worse given current funding levels. According to the National Association of State Retirement Administrators (NASRA), a survey of 126 public funds reflected that in aggregate these plans were 77.2% funded representing a total of $766.9 billion in combined unfunded liabilities.[6] Similarly, a recent study by Milliman, an independent global consulting and actuarial firm, indicates that the 100 largest corporate pension plans were $326.8B underfunded relative to $1.2 trillion under management at the end of 2011.[7] As evidenced, even as strength in equity markets can temporarily improve plan funding ratios, the overarching funding challenge persists.

[6] "Public Funds Stick to Aggressive Targets," top100funds.com, November 30, 2011.
[7] "U.S. Corporate Pensions See Record Underfunding," Reuters, March 29, 2012.

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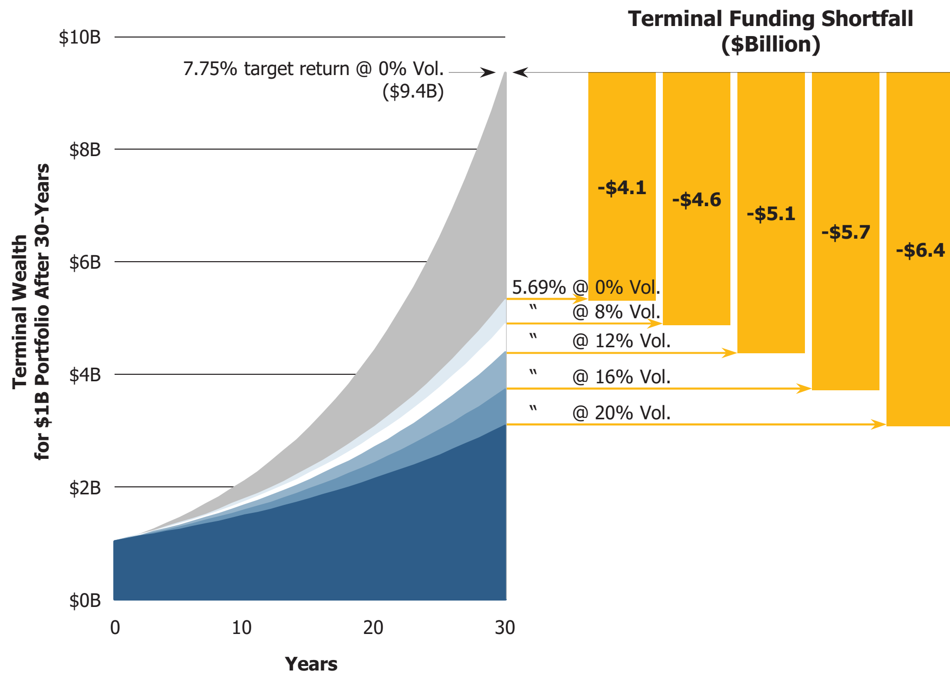
Compounded over time, these seemingly small funding shortfalls can have very serious long-term consequences.

Making matters worse, unexpected volatility is a secondary source of wealth destruction over time. The pathway we design in portfolio architecture is critically important.

Figure 4: Terminal Wealth Impacts of Investment Shortfalls and Volatility



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Volatility as an Additional Source of Wealth Destruction

Another topic worth illustrating when discussing target shortfalls is the real world impact of volatility on investment returns. As **Figure 4** shows, reliably compounding precisely at a target return rate year after year doesn't paint the whole picture. Investors well know that the real world is not nearly as predictable. The last decade alone has dealt investors two recessions with downward correlation convergence among seemingly different asset classes and negative to flat equity returns.

Using standard Monte Carlo techniques, we simulated a more realistic pathway for our 5.69% portfolio by assuming volatilities ranging from 0% to 20%. As shown in **Figure 4**, the terminal wealth funding shortfall increases significantly with greater levels of volatility. For example, a portfolio earning a 5.69% average annual return with 12% volatility compounded over 30 years produces a $5.1B funding shortfall (vs. $4.1B at 0% vol), representing a deficit of 54.3% (vs. a 44% deficit at 0% vol).

The Investment Pathway Matters

To minimize the corrosive effects of volatility, plan trustees are increasingly mindful of more than just annual return targets, but also of the return efficiency of their combined investments through measures like return-to-risk and non-correlation. For example, while leveraging a plan's exposure may initially appear to add return, the accompanying volatility may actually lower the plan's probability of achieving its terminal wealth goals.

Perhaps the two most wealth destructive shortcomings exposed by the recent financial crisis were the correlation convergence among investments that were previously considered to be different, and the need for investments capable of offering tail risk protection during crises. So glaring was this, that many investors openly questioned the validity of their asset allocation models themselves, with many concluding that changes were indeed required. We analyzed this issue in greater depth ourselves in a prior Visual Insight Series piece titled "Diversification: Often Discussed, but Frequently Misunderstood."

Fortunately, there are at least two established investment strategies that address both the diversification and the tail risk protection issue: global macro and managed futures. Both have a tendency to contribute returns while at the same time reducing portfolio volatility by harnessing both long and short capital flows during periods of volatility, tail risk price momentum, and correlation convergence, converting sources of risk into sources of return and dampening overall portfolio volatility.

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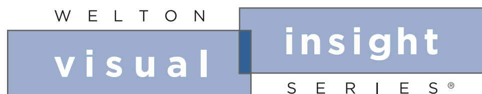

Conclusion

Because pensions operate under the pressure of tangible future liabilities, they bear the burden of trying to achieve specific long-range terminal wealth endpoints. While annual investment performance will inevitably vary, investment staffs and trustees seek to construct portfolios that stand the highest reasonable chance of achieving targeted rates of return. While equities and fixed income have traditionally formed the backbone of most plans' portfolios, low yields and tepid forward equity forecasts now require plan sponsors to seek out alternative sources of return in order to help maintain their plans' funding ratios.

As these investigations into alternatives persist, many plans will be pleasantly surprised to learn of the depth and variety of investment strategies available to help them construct more resilient and diversified portfolios. For example, hedge funds have historically delivered equity-like returns, but at about half the volatility of long-only equities. Because of its inherent non-correlation characteristics, managed futures can often be added to provide return and potentially lower overall portfolio risk at the same time. Real estate and private equity can change the risk reward characteristics of income and growth, further diversifying public capital market investments. And as **Figure 4** showed previously, minimizing portfolio volatility at equivalent rates of return translates into tangible terminal wealth improvements, and achieving a terminal wealth objective to satisfy future liability payouts is the primary objective in pension investment management.

Of course, the handful of alternative strategies cited here are unlikely to represent a complete solution. By providing meaningful return, diversification, and volatility suppression at times when portfolios (and correspondingly sponsors, fiduciaries, and beneficiaries) need them most, however, the proper blend of alternatives will assist in addressing the primary investment challenge of our time.

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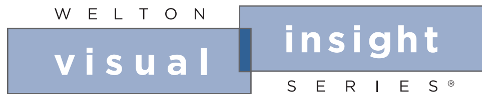

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Contact / Credits

Christopher Keenan
Senior Managing Director
+1 (831) 620-6607
ckeenan@welton.com
California | New York

Peter Tarricone
Manager

Nash Dykes, CFA
Senior Associate

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