

## Investment Strategies To Reduce Funded Ratio Volatility

Actuaries' Club of Boston  
Actuaries' Club of Hartford and Springfield  
November 12, 2009

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## What Is Liability-Driven Investing (LDI)?

An LDI strategy redefines risk

- “Traditional” pension investment strategy ignores the interest rate sensitivity of the liabilities
- LDI strategy quantifies and manages funded ratio volatility




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## Factors Affecting the LDI Decision

### LDI Spectrum

Plan Characteristics	Liability Matching	Return Seeking
Plan size relative to company	Large	Small
Benefit accruals	Frozen	Ongoing
Plan demographics	Retiree-dominant	Active-dominant
Funded status	Downside protection	Reduce expected cost
Regulatory Framework	Market based	Long-term view
Business Characteristics		
Contribution sensitivity	High	Low
Cyclicality of earnings	Cyclical	Non-cyclical
Operating cash flows	Less predictable	More predictable
Risk tolerance	Low	High




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## Case Study Hypothetical Corporate DB Plan

Liability	\$1,000 Mil
Assets	800
Funded ratio	80%
Service cost	\$50 Mil
Service cost growth	4% per year
Liability discount rate	5.75%
Liability duration	14 years

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## Increase Duration \$ Duration Matched Bonds

	Current	Long	\$ Duration	Duration Match
Equities	70%	70%	70%	0%
Core Bonds	30	0	0	0
Long Bonds*	0	30	30	100
Expected Return	7.2%	7.6%	7.6%	5.1%
Funded Ratio Volatility	12.7	12.0	11.0	2.1
Asset Volatility	11.7	12.3	14.5	11.2
Expected Deficit Yr 1	\$164M	\$161M	\$161M	\$182M
Unexpected Deficit	229	218	200	40
Avg Expected Contrib**	71	65	65	98
Avg Unexpected Contrib**	40	38	35	7

\*75% long credit/25% long government bonds  
\*\*Average contribution over 7 years

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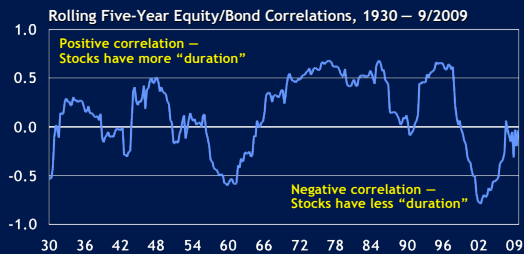
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## Stock Bond Correlations Unpredictable, Uncooperative



Sources: S&P, Barclays Capital, Ibbotson

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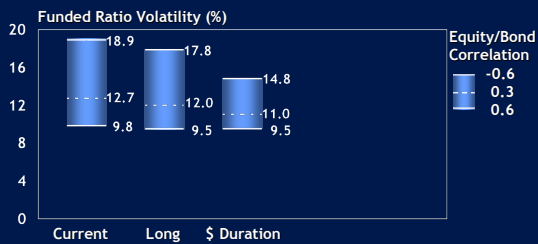
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## \$ Duration Match Narrows Range of Volatility



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## How Will Asset Allocation Change For an LDI Investor?

Will likely result in:

- Larger allocation to bonds
  - Less equity market beta
- Longer duration emphasis

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## Reduced Equity Exposure Required To Reduce Volatility Further

	Current	Long	\$ Duration	Reduce Equities	Duration Match
Equities	70%	70%	70%	30%	0%
Core Bonds	30	0	0	0	0
Long Bonds	0	30	30	70	100
Expected Return	7.2%	7.6%	7.6%	6.2%	5.1%
Funded Ratio Volatility	12.7	12.0	11.0	5.1	2.1
Asset Volatility	11.7	12.3	14.5	12.0	11.2
Expected Deficit Yr 1	\$164M	\$161M	\$161M	\$173M	\$182M
Unexpected Deficit	229	218	200	94	40
Avg Expected Contrib**	71	65	65	87	98
Avg Unexpected Contrib**	40	38	35	17	7

\*75% long credit/25% long government bonds  
\*\*Average contribution over 7 years

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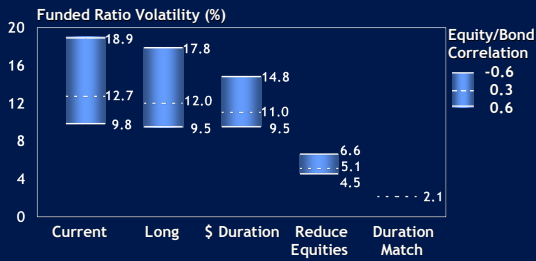
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## Reducing Equities Improves the Magnitude of Volatility




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## How Will Asset Allocation Change For an LDI Investor?

- Will likely result in:
- Larger allocation to bonds
    - Less equity market beta
  - Longer duration emphasis

- May result in active strategies to mitigate return/risk tradeoff:
- Portable alpha (bond beta and alpha sources)
  - More unconstrained, non-benchmark positions

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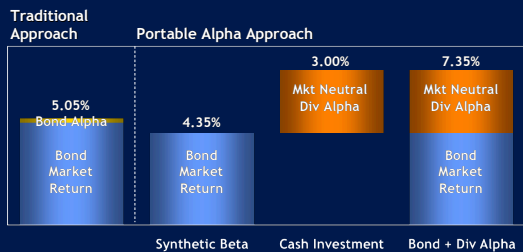
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## Portable Alpha Mechanics



Based on Wellington Management five-year capital market expectations

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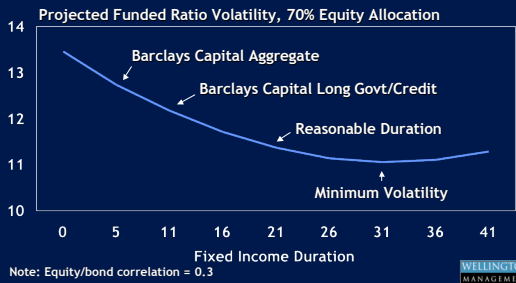
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## Is It Necessary To Fully Hedge Interest Rate Risk?

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## Capital Market Expectations

Appendix

### Projections

	Market Return	Alpha	Fee	Net Return	Risk
Core equities	7.50%	2.0%	0.75%	8.75%	16.0%
Unconstrained/ Opportunistic equities	7.75	4.5	1.25	11.00	19.0
Core bonds	3.50	0.5	0.30	3.70	5.0
Long bonds	4.85	0.5	0.30	5.05	9.0
Alpha transport + long bond beta	4.35	4.3	1.30	7.35	11.9

Based on Wellington Management five-year capital market expectations

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