

The Fifteenth Annual National Pension and Institutional Investor Summit:  
Investing During the Recovery

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**LDI – Should We Hedge All or Portion of Liabilities?**  
3 December 2009



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Q: LDI Should We Hedge All or a Portion of Liabilities?

A: It Depends

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No simple answer

Variety of factors contribute to this decision

- Plan status, asset mix, business factors

Reducing volatility is not free

- Cost/benefit analysis suggests being “reasonable”

Over time more plans will manage to a closer match with their liabilities

# Factors That Influence the LDI Decision

## LDI Spectrum



Plan Characteristics

- Plan size relative to company
- Benefit accruals
- Plan demographics
- Funded status

Liability Matching

- Large-----Small
- Frozen-----Ongoing
- Retiree-dominant-----Active-dominant
- Downside protection-----Reduce expected cost

Return Seeking

Business Characteristics

- Contribution sensitivity
- Cyclical of earnings
- Operating cash flows
- Risk tolerance

- High-----Low
- Cyclical-----Non-cyclical
- Less predictable-----More predictable
- Low-----High

## How Much Volatility Is Acceptable?

<i>Asset Allocation</i>	<i>Asset Volatility</i>	<i>Funded Ratio Volatility</i>
60% Eq, 40% FI Core Bond	9.11	13.28
60% Eq, 40% FI Long Bond	9.78	11.63
60% Eq, 40% FI Long w/overlay	12.59	9.31
All Cash	0.00	11.20
All Core Bond	3.60	7.60
All Long Bond* (duration match)	9.60	0.00
100% Equity	15.00	18.72

\*The duration matched long bond portfolio will have a tracking risk of about 200 bps due to the imperfect co-movement of the long bond yield and the liability spot discount rate.  
 Volatility ratios calculated using historical market indexes.  
 Source: Wellington Management proprietary model

# Reducing Funding Ratio Volatility

## Extending Duration, Reducing (and Modifying) Equities

	<i>Current 65/35 Core</i>	<i>Long Bonds</i>	<i>Long Bonds + Swaps</i>	<i>40/60</i>	<i>Modify Equities</i>	<i>Alpha Transport + LB Beta<sup>3</sup></i>	<i>Match 65/35 Long Return</i>	<i>Duration Match</i>
Core equities	65%	65%	65%	40%	30%	40%	30%	0%
Unconstrained/niche equities	0	0	0	0	10	0	15	0
Core Bonds	35	0	0	0	0	0	0	0
Long Bonds <sup>1</sup>	0	35	35	60	60	40	35	100
Alpha Transport & Long Bonds <sup>2</sup>	0	0	0	0	0	20	20	0
Physical Core/Long Bond CTD	1.3	3.4	3.4	5.8	5.8	3.8	3.4	9.1
Synthetic Beta CTD	0.0	0.0	5.4	4.4	4.4	6.0	5.2	4.9
Targeted Fixed Income Duration	1.3	3.4	8.8	10.2	10.2	9.8	8.5	14.0
Liability Duration	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Expected Asset Return	7.0%	7.5%	7.5%	6.5%	6.8%	7.0%	7.5%	5.1%
Funded Ratio Volatility	11.9	11.3	10.1	6.5	6.3	6.5	7.3	2.1
Asset Volatility	11.2	11.7	14.9	12.8	12.8	12.7	12.2	11.1
Deficit/(Surplus) After One Year								
• Expected Deficit/(Surplus)	\$164	\$160	\$160	\$168	\$166	\$164	\$160	\$179
• Unexpected Decline (2 SD)	214	204	184	118	116	120	133	39
• 2 Standard Deviation Deficit/(Surplus)	378	364	344	286	282	284	293	218
Average Future PPA Contribution: Expected and Unexpected								
• Expected	\$71	\$64	\$64	\$77	\$74	\$71	\$63	\$95
• Unexpected	37	35	32	21	20	21	23	7
Average Future FAS 87 Expense: Expected and Unexpected								
• Expected	\$46	\$36	\$36	\$51	\$47	\$43	\$35	\$74
• Unexpected	21	17	15	9	9	9	10	2

<sup>1</sup>\$1 billion liability and \$50 million normal cost; average over 7 years; plan is 80.0% funded

<sup>2</sup>Long bond portfolio is invested in 75% long credit and 25% long government bonds.

<sup>3</sup>Long bond beta is replicated synthetically via STRIPS futures plus CDX

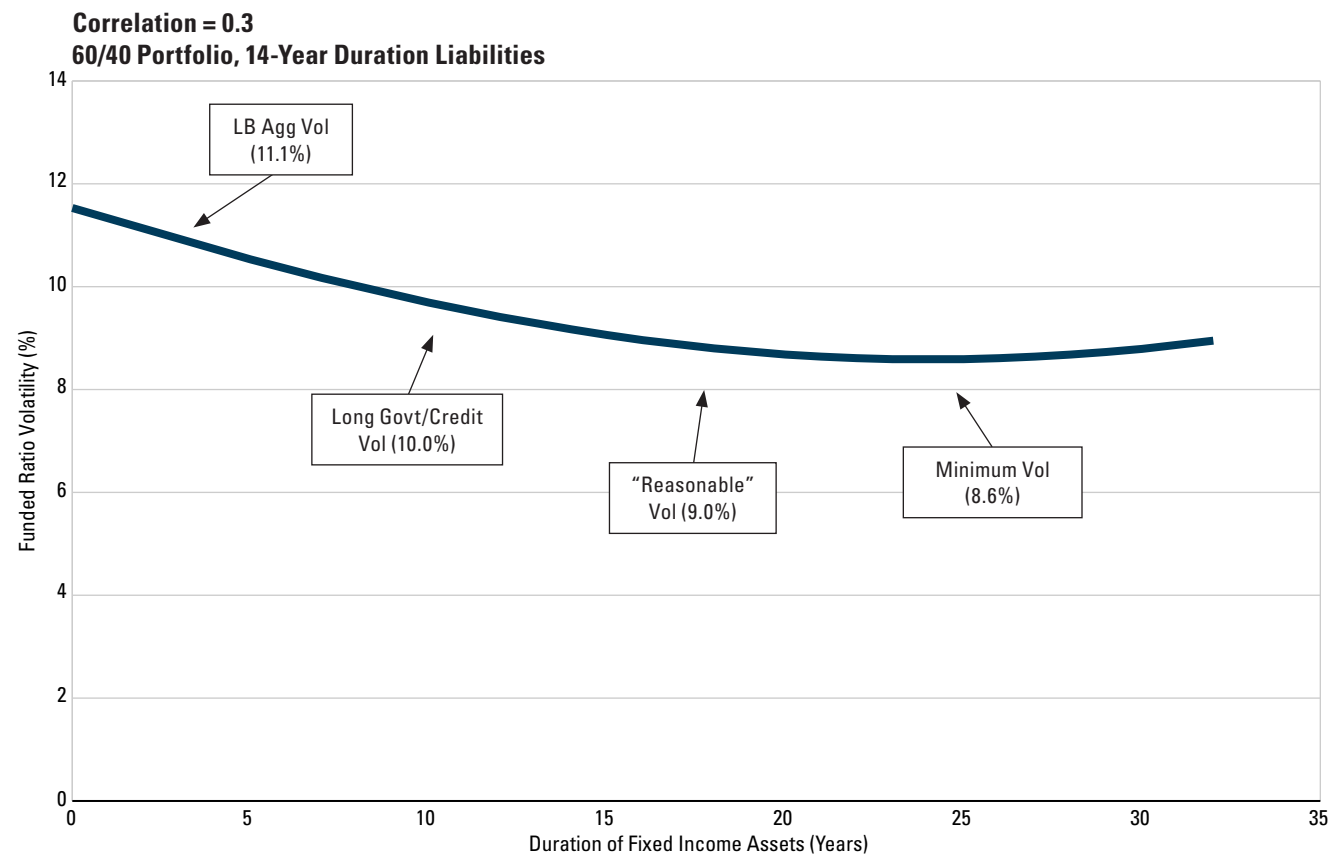
The above results are based upon the assumptions described on page A1, which rely upon historical data and expectations about future events. Not representative of an actual account or investment.

Actual results will vary and depend upon each clients individual circumstances.

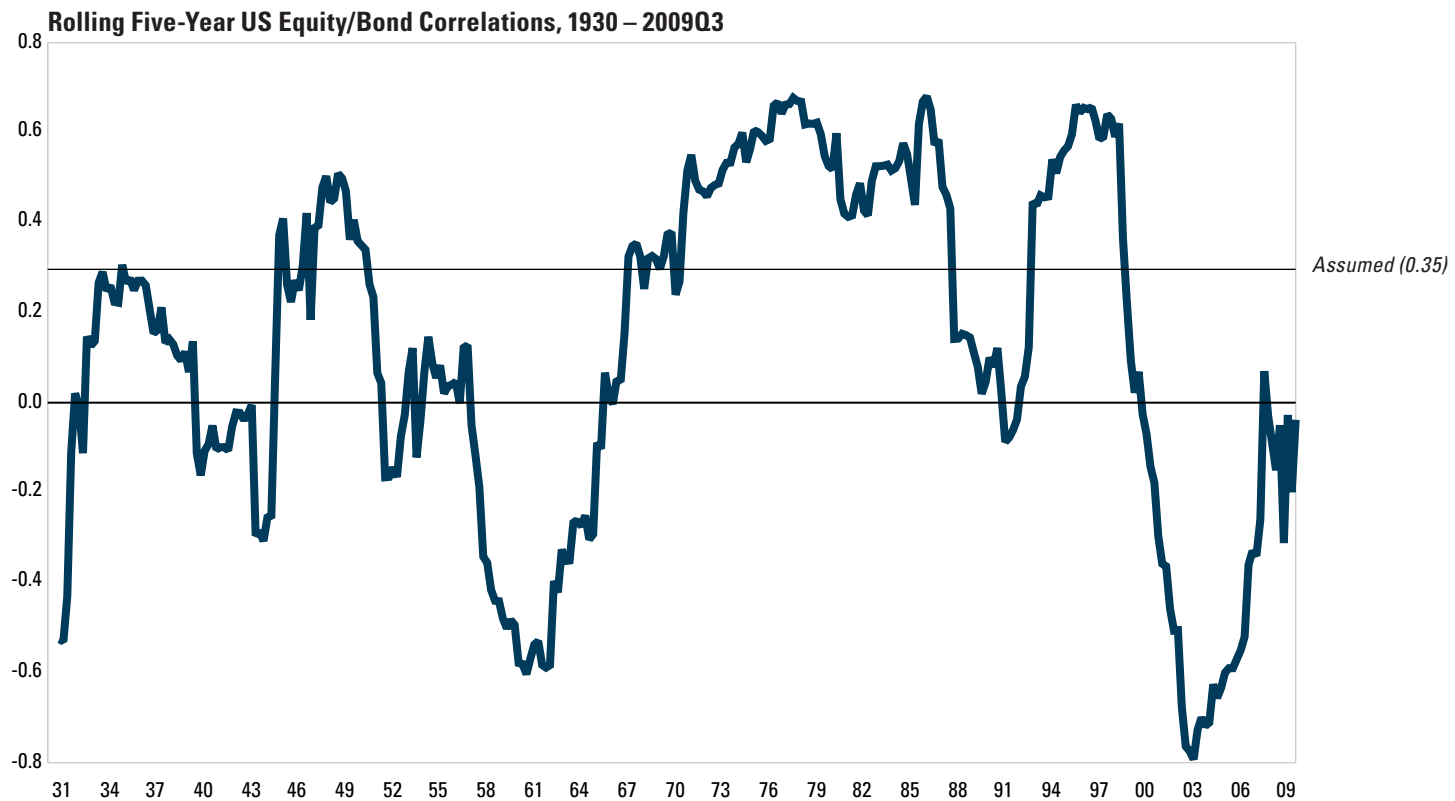
31 October 2009

Source: Wellington Management proprietary model

## How Much Duration Do You Need? With Equities, Probably Less

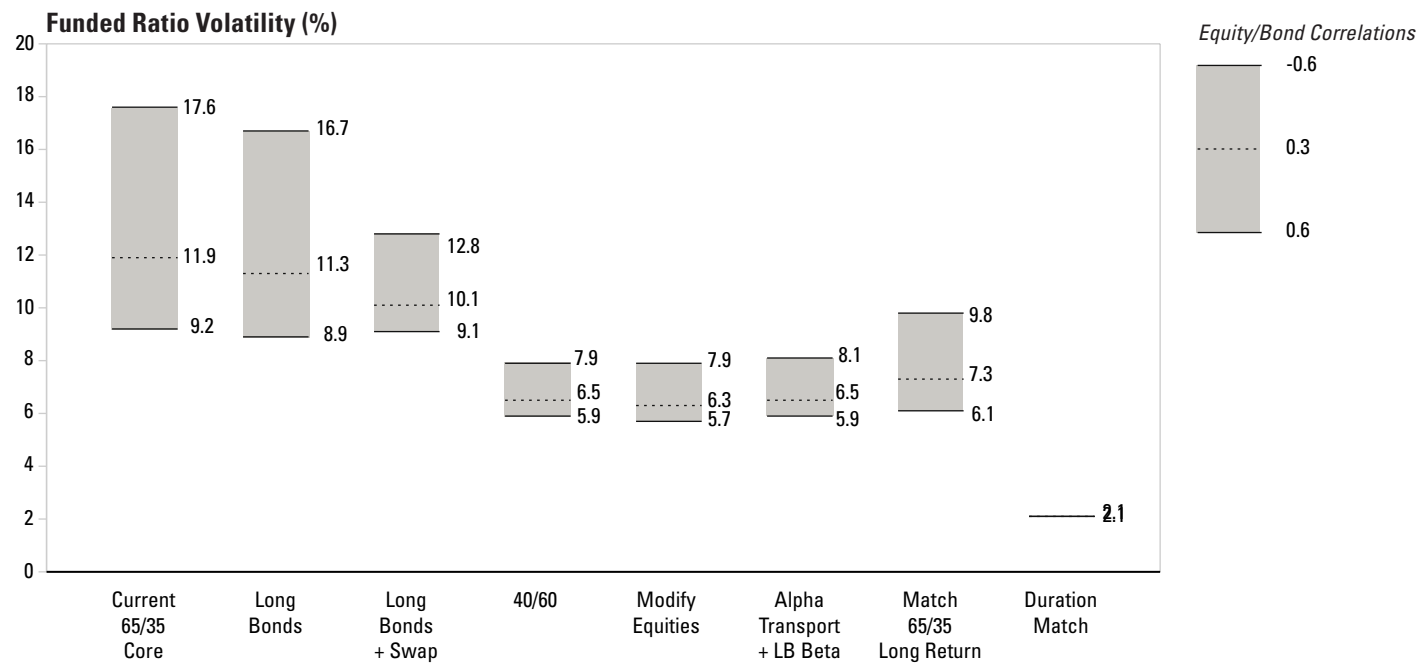


## A Word on Equity/Bond Correlations They're Unstable!



Sources: S&P, Barclays Capital, Ibbotson

## A Closer Duration Match Reduces the Variation in Volatility, but Reducing Equity Reduces the Magnitude



Expected Asset Return	7.0	7.5	7.5	6.5	6.8	7.0	7.5	5.1
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Assets over Liabilities  
 Liability discount rate is 5.50%  
 Source: Wellington Management proprietary model  
 31 October 2009