



# Pennsylvania Public School Employees' Retirement System

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January 22, 2009

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# **Tab 1**

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## **2009 Capital Market Expectations**

# Introduction

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- “Once in a lifetime” market environment
  - Collapse of sub-prime mortgage market
  - “Flight” to quality / historically low Treasury yields
  - Severe sell-off in risk-based assets
  - Investment grade and high yield spreads widen dramatically
- Difficult conditions for long-term forecasting
  - Traditional models with a proven record must be scrutinized in the current environment
  - Overlay judgment to enhance quantitative signals while maintaining transparency in the forecasting process
  - Notable areas of exception this year include:
    - Inflation
    - US Stocks
    - Bonds – Investment Grade and High Yield

# Inflation

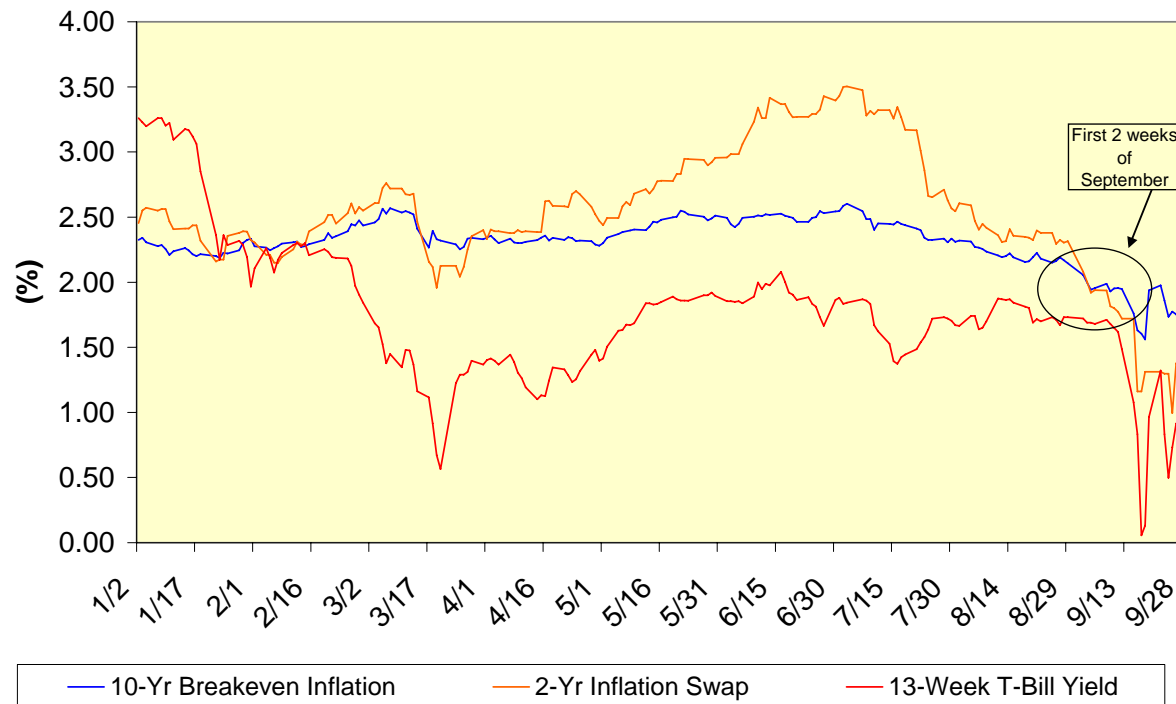
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- Historically – Breakeven inflation equal to yield difference between a nominal Treasury and 10-year TIPS
- Issues in 2009
  - TIPS do not provide the exact same liquidity as nominal bonds – market has priced-in this risk
  - Market uncertainty concerning inflation / deflation is wreaking havoc with the TIPS spread
- Possible solutions
  - Inflation swaps – unfortunately, rate is higher than “true” expectation due to costs associated with the swap
  - Observe trend in breakeven for a more reliable signal

# Inflation

- Problems arose during a relatively short time period
  - 2-year inflation swap dropped dramatically in September
  - Liquidity and quality entered the picture in mid-September, T-Bills drop by 140 bps in three days

**Inflation Signals through September 2008**



# Inflation Assumption

- 2009 Wilshire long-term Inflation assumption = 1.50%
  - Based on breakeven inflation just after flight-to-quality and deflation concerns were priced into the market
  - Open-market TIPS pricing at year-end appears to provide a severely distorted view of true expectations
- Level not seen since mid-1960's, but Wilshire believes it is prudent
  - Recognize expectation of some deflation with 2-year swap at -2.40% at year-end
  - Although monetary base is rising dramatically, banks need to start lending again and consumers need to spend
  - Unemployment expected to rise, GDP to fall
  - A year or two of deflation would need to be re-inflated

# Fixed Income Assumptions

- Historically derived from yield on Treasury indexes with no assumed permanent change in rates
- Inflation forecast leads to elimination of that assumption
- Solution for 2009
  - Inflation environment typically affects Fed behavior
  - Begin with 1.50% inflation assumption and assume market “normalizes” to historical spread for Treasury yields
  - Result is a rising rate environment over the next 10 years
  - A normalization of yields lead to:
    - Core Treasury = 2.00% versus current yield of 1.55% as reinvestment rate improves
    - Long Term Treasury = 2.50% versus current yield of 2.97% as decreasing principal value detracts from yield

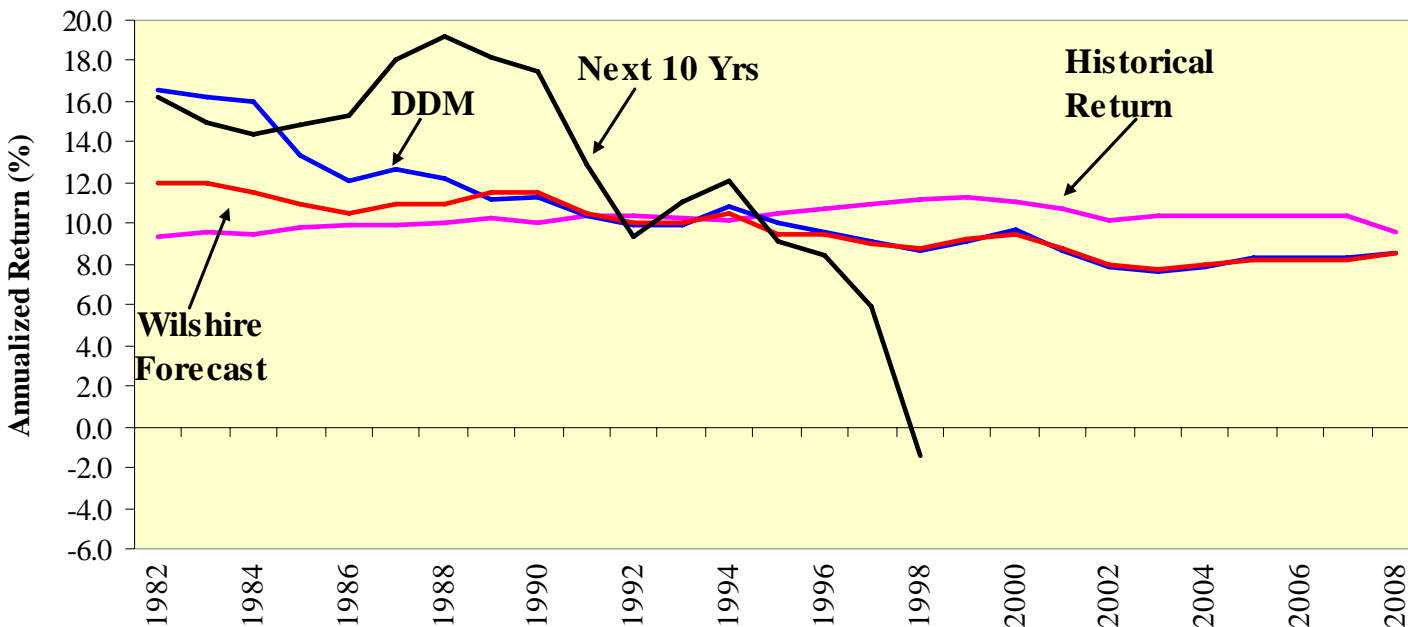


# Resulting Changes – TIPS and High Yield

- Wilshire's inflation forecast differs from current pricing
  - Compute inflation "surprise" as difference between our assumption and breakeven inflation on 10-year TIPS
  - Add to current yield on like-maturity, nominal Treasury
- High Yield's forecast affected by rising rate environment and historically high corporate spreads
  - Initial spread in the high teens decreasing to 5.5%
  - Defaults are to increase to 15% in year 1
  - Wilshire's long-term 2009 assumption = 8.50%

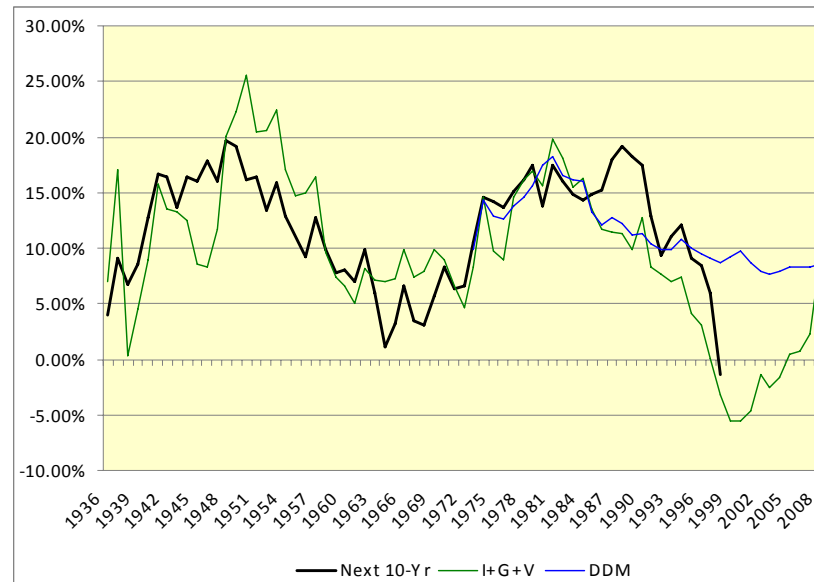
# US Equity Assumption

- Except for two periods (late 1980's and early 1990's), the Dividend Discount Model (DDM) has been a reliable forecast
  - Wilshire utilizes a DDM to forecast equity returns
  - Returns beginning in those years included the technology bubble – which we would not expect our methodology to predict



# US Equity Assumption

- Wilshire has identified an Income + Growth + Valuation Change Model (IGV) that provides a valuable signal
  - Avoids making assumptions as it relies solely on past data
  - Allows for long historical evaluation periods
  - Appears accurate over many market environments and cycles
  - However, cannot forecast systematic shifts in fundamentals
- IGV is complimentary to the DDM



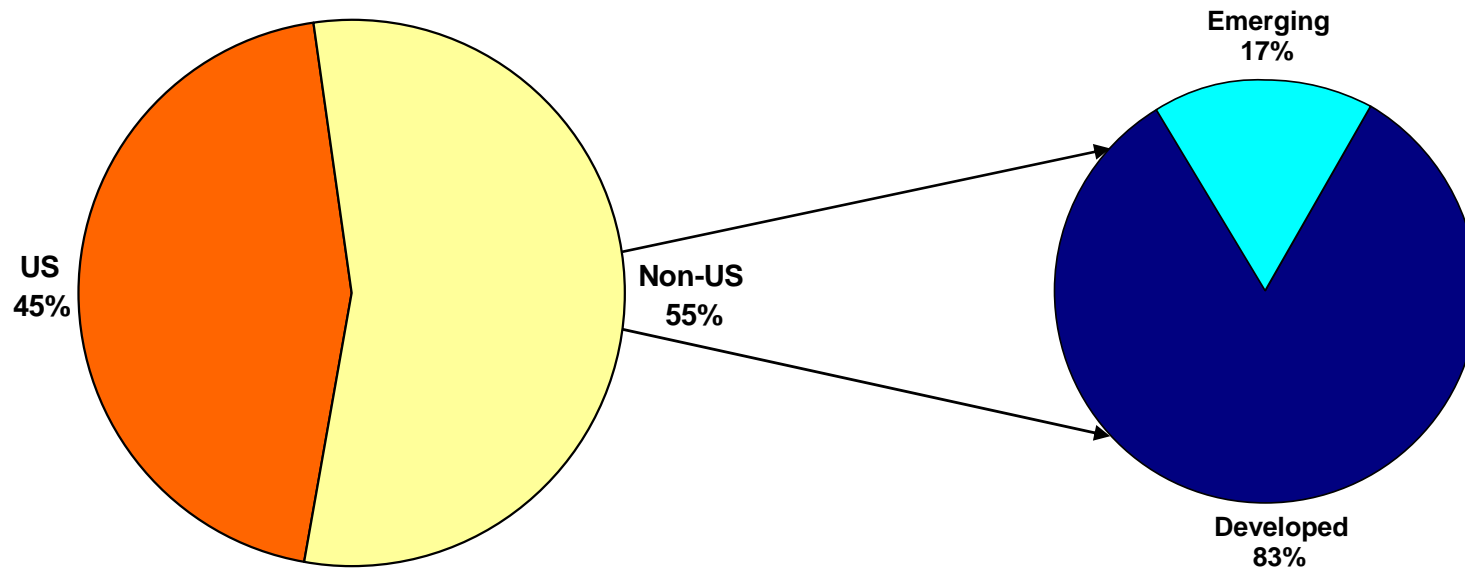
# 2009 US Equity Assumption

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- Both models are suggesting a long-term assumption of 8.50%
- DDM assumptions include the following:
  - Year-end S&P 500 Index price of 903
  - Base earnings level of \$62.4 per share
  - Earnings-per-share growth of 7.25% during the next five years, dropping incrementally to 4.00% from years six through 15
  - Dividend payout ratio of 40% over the next five years, increasing incrementally from years six through 15 to 45% – the historically average over the past quarter-century

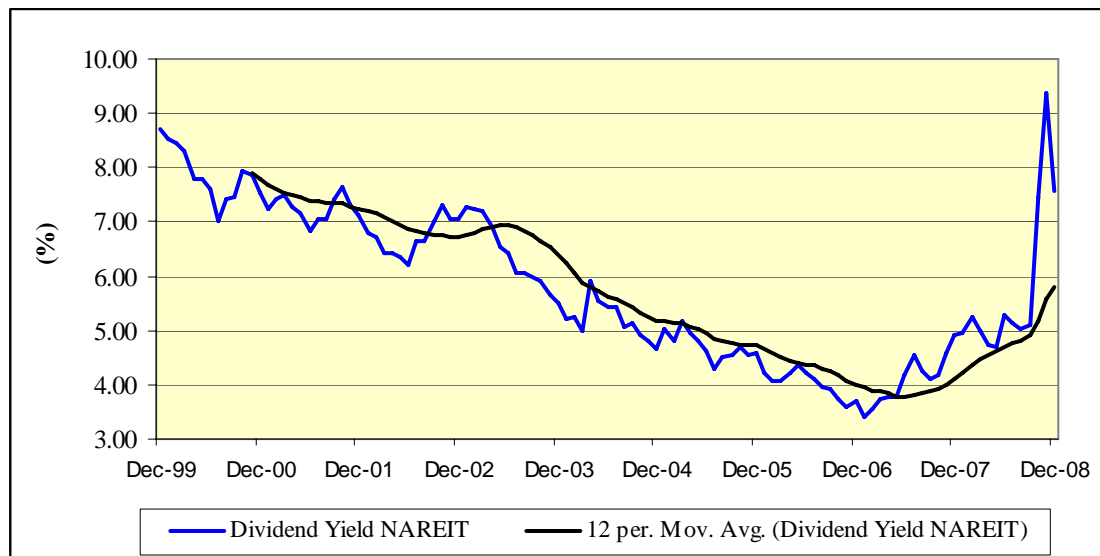
# Global Equity

- Wilshire uses the same 8.50% expected long-term return as US Equity for non-US developed markets and emerging markets equity
- Market-weighted blends of Wilshire's equity return and risk assumptions results in an 8.70% long-term return forecast for Global Equity, with or without the US included



# Public Real Estate Assumption

- Public real estate cumulative 2-year return = -50%
- 2009 long-term assumption = 7.00%, up from 5.75% last year
- Dividend yield jumped sharply in 2008
  - Forecast derived from combining average yield for 2008 with an expected growth rate of 1.13%
  - Growth rate a direct product of Wilshire's 1.50% inflation forecast



# Real Asset Basket

- Wilshire has created a Real Asset Basket of investment types
  - Effort to foster a more diversified approach to inflation linked investments
  - Equally weighted asset class with two major sub-asset components:
    - Public Real Asset Basket
      - TIPS
      - Commodity futures
      - Global REIT's
    - Private Real Asset Basket
      - Private Real Estate (including Infrastructure)
      - Timberland
      - Oil & Gas Partnerships
- 2009 long-term assumptions
  - Return: 6.70%
  - Risk: 8.50%

# Comparison: 2009 vs. 2008 Long-Term Assumptions

In general, equity (which arguably includes High Yield) assumptions are up while fixed income forecasts are down

	<u>Total Return</u>			<u>Risk</u>		
	2008	2009	Change	2008	2009	Change
<u>Investment Categories:</u>						
US Stocks	8.25 %	<b>8.50 %</b>	0.25 %	16.00 %	<b>16.00 %</b>	0.00 %
Dev ex-US Stocks	8.25	<b>8.50</b>	0.25	17.00	<b>17.00</b>	0.00
Emerging Mkt Stocks	8.25	<b>8.50</b>	0.25	24.00	<b>24.00</b>	0.00
Cash Equivalents	3.00	<b>2.00</b>	-1.00	1.00	<b>1.25</b>	0.25
US Bonds	5.00	<b>4.00</b>	-1.00	5.00	<b>5.00</b>	0.00
High Yield Bonds	7.00	<b>8.50</b>	1.50	10.00	<b>10.00</b>	0.00
TIPS	4.00	<b>3.50</b>	-0.50	6.00	<b>6.00</b>	0.00
Non-US Bonds	4.75	<b>3.75</b>	-1.00	10.00	<b>10.00</b>	0.00
US RE Securities	5.75	<b>7.00</b>	1.25	15.00	<b>15.00</b>	0.00
Private Real Estate	6.50	<b>7.65</b>	1.15	12.25	<b>12.25</b>	0.00
Non-US RE Securities	5.75	<b>7.00</b>	1.25	13.00	<b>13.00</b>	0.00
Private Markets	11.25	<b>11.55</b>	0.30	26.00	<b>26.00</b>	0.00
Real Assets	n.a.	<b>6.70</b>	n.a.	n.a.	<b>8.50</b>	n.a.
Commodities	4.25	<b>3.50</b>	-0.75	13.00	<b>13.00</b>	0.00
Inflation:	2.25	<b>1.50</b>	-0.75	1.00	<b>1.75</b>	0.75
<u>Total Returns minus Inflation:</u>						
US Stocks	6.00	<b>7.00</b>	1.00			
US Bonds	2.75	<b>2.50</b>	-0.25			
Cash Equivalents	0.75	<b>0.50</b>	-0.25			
<u>Stocks minus Bonds:</u>	3.25	<b>4.50</b>	1.25			
<u>Bonds minus Cash:</u>	2.00	<b>2.00</b>	0.00			



## **Tab 2**

### **Current Portfolio Observations**

# Asset Allocation

## Current Policy

	Current Policy	
US Equity	21.00%	
Non-US Equity (Hedged)	26.00%	
Non-US Equity (Unhedged)	0.00%	
<b>TOTAL EQUITY</b>	<b>47.00%</b>	
US Core Fixed Income	8.00%	
TIPS (Unlevered)	5.00%	
TIPS (Levered)	0.00%	
TIPS Levered Cash	0.00%	
High Yield and Opportunistic Fixed Income	5.00%	
Global Fixed Income	4.00%	
<b>TOTAL FIXED INCOME</b>	<b>22.00%</b>	
Private Markets	15.00%	
Real Estate	11.00%	
Commodities	5.00%	
<b>TOTAL ALTERNATIVES</b>	<b>31.00%</b>	
<b>CASH</b>	<b>0.00%</b>	
<b>TOTAL</b>	<b>100.00%</b>	
	<b>2008</b>	<b>2009</b>
Median Return	8.14%	8.40%
Standard Deviation of Return	11.46%	11.70%
Return / Risk	0.71	0.72

# 2008 vs. 2009 Wilshire Capital Market Assumptions

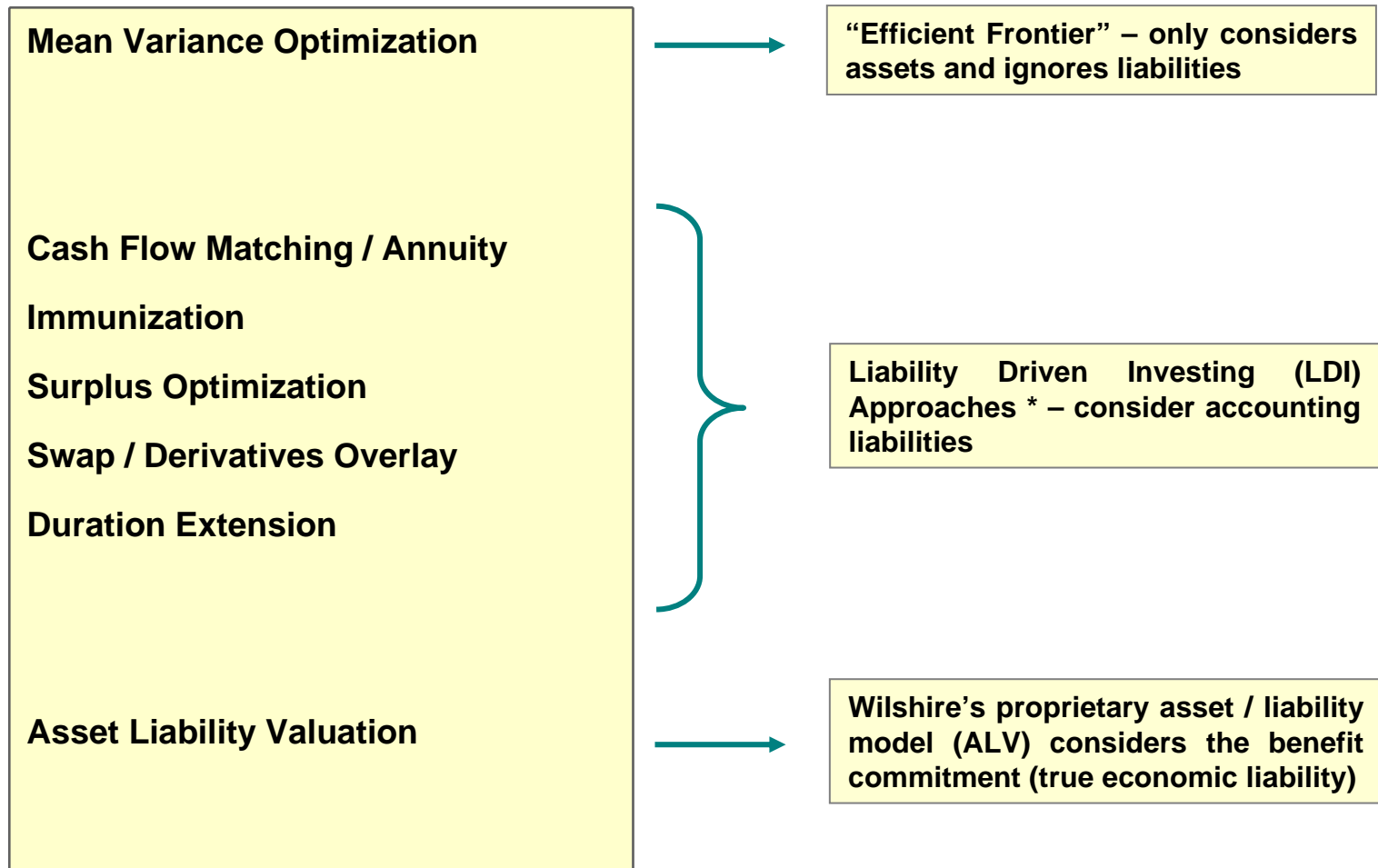
## Current Policy

The 2009 Wilshire Capital Market Assumptions increases long-term expected risk and return for the current policy portfolio

	Current Policy		
	2008	2009	Difference
<b>Median Return</b>	8.14%	8.40%	+0.26%
<b>Standard Deviation of Return</b>	11.46%	11.70%	+0.24%

# Asset / Liability Analysis

## Comparison of Asset Allocation Methodologies



\* There is no standard definition for *Liability Driven Investing*. Vendors of LDI-based products (insurance companies, investment managers, brokers, etc.) tend to define it in ways that align with their individual product offerings.

# Asset / Liability Analysis

## The Role of Asset Allocation

- Wilshire believes that the core mission of a defined benefit plan is to fund the benefits promised to participants
- The role of asset allocation is to manage the risk to that core mission
- Primary goal of asset allocation
  - Maximize the safety of promised benefits
  - Minimize the cost of funding these benefits
- Wilshire's Asset Liability Valuation (ALV) model provides a methodology for selecting a policy portfolio that considers both goals.

# Asset / Liability Analysis \*

## Plan Status as of November 30, 2008 (\$Billion)

a) Present Value of Future Benefits	\$88.6
b) Present Value of Future Member Contributions	\$8.8
c) Estimated Market Value of Assets **	\$42.6
d) Present Value of Future Employer Contributions (a - b - c)	\$37.1
e) Present Value of Future Compensation	\$117.5
f) Employer Cost as a Percentage of Payroll (d / e)	31.6%

- Economic Assumptions
  - Assumed Rate of Return = 8.50%
  - Salary Increase Rate – varies by age
  - Inflation \*\*\* = 3.25%
  - Assumed Real Rate of Return = 5.25%

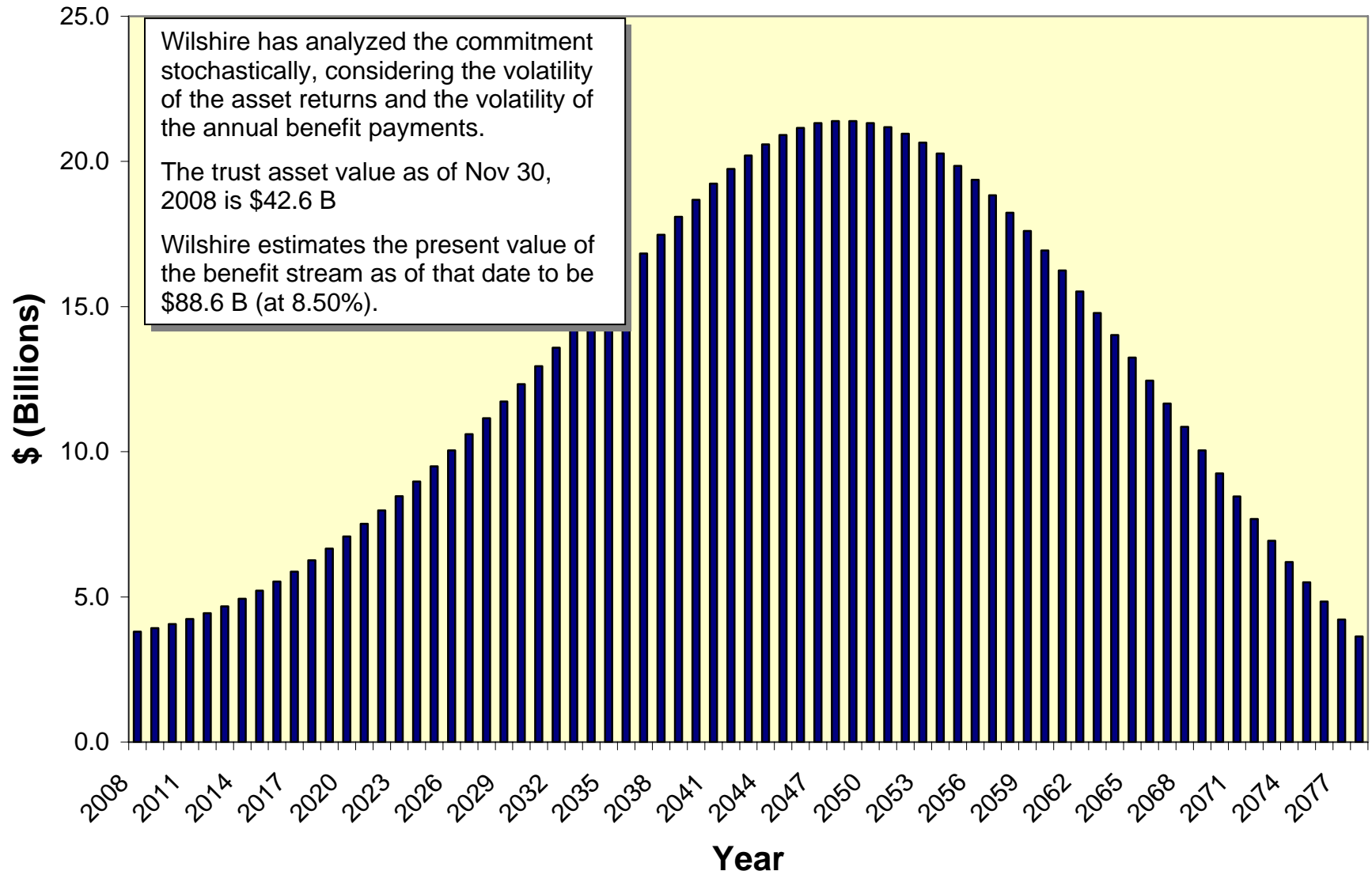
\* Liability measures are Wilshire estimates based on July 1, 2007 valuation report.

\*\* Estimated market value includes an estimated writedown for Private Equity and Real Estate

\*\*\* Inflation rate set by PSERS's actuary

# Asset / Liability Analysis

## Plan Commitment



Includes projections of all future benefits for the participant population as of November 30, 2008

# Asset Allocation

## Wilshire's 2009 Asset Class Assumptions

- Wilshire's asset class return, risk and correlation assumptions are developed based on 10-year forward looking expected rates of return and historical risk and correlation, adjusted to incorporate recent trends.
- Return expectations represent a passive investment in the asset class (**beta**). They do not reflect value added from active management (**alpha**).

	Equity					Fixed Income						Alternative					US CPI
	US Stock	Dev ex-US Stock		Emg Stock	Gbl ex-US Stock	Cash	Core		High Yield	Non-US Bond		Real Estate			Prvt Mkts	Cmnty	
		(USD)	(Hdg)				Bond	TIPS		(USD)	(Hdg)	US RES	Prvt RE	xUS RES			
Expected Return (%)	8.50	8.50	8.40	8.50	8.70	2.00	4.00	3.50	8.50	3.75	3.65	7.00	7.65	7.00	11.55	3.50	1.50
Expected Risk (%)	16.00	17.00	16.00	24.00	17.25	1.25	5.00	6.00	10.00	10.00	4.00	15.00	12.25	13.00	26.00	13.00	1.75
Cash Yield (%)	3.00	3.75	3.75	3.75	3.75	2.00	4.00	3.50	8.50	3.75	3.65	5.75	4.45	5.75	0.00	2.25	
<b>Correlations:</b>																	
US Stock	1.00																
Dev ex-US Stock (USD)	0.80	1.00															
Dev ex-US Stock (Hdg)	0.85	0.85	1.00														
Emerging Mkt Stock	0.70	0.68	0.63	1.00													
Global ex-US Stock	0.83	0.98	0.85	0.80	1.00												
Cash Equivalents	0.00	-0.09	-0.01	-0.05	-0.09	1.00											
Core Bond	0.29	0.05	0.04	0.00	0.04	0.20	1.00										
TIPS	-0.05	0.05	-0.05	0.00	0.04	0.15	0.20	1.00									
High Yield Bond	0.48	0.35	0.40	0.35	0.37	0.00	0.28	0.01	1.00								
Non-US Bond (USD)	-0.01	0.32	-0.07	-0.04	0.25	-0.10	0.40	0.05	0.01	1.00							
Non-US Bond (Hdg)	0.16	0.26	0.25	-0.01	0.21	0.10	0.68	0.25	0.27	0.45	1.00						
US RE Securities	0.35	0.25	0.25	0.30	0.28	0.00	0.15	0.15	0.30	0.05	0.00	1.00					
Private Real Estate	0.34	0.24	0.24	0.29	0.27	0.02	0.24	0.16	0.37	0.14	0.08	0.82	1.00				
Non-US RE Securities	0.50	0.65	0.50	0.60	0.68	0.00	0.10	0.15	0.40	0.30	0.10	0.50	0.44	1.00			
Private Markets	0.75	0.65	0.68	0.63	0.68	0.00	0.32	0.01	0.34	0.07	0.27	0.35	0.33	0.58	1.00		
Commodities	0.00	0.20	0.15	0.24	0.22	-0.05	0.00	0.20	0.08	0.15	0.00	0.20	0.21	0.25	0.05	1.00	
Inflation (CPI)	-0.10	-0.15	-0.05	-0.13	-0.15	0.10	-0.12	0.10	-0.08	-0.05	-0.08	-0.10	-0.07	0.00	-0.10	0.20	1.00



# Asset / Liability Analysis

## Alternative Policy Portfolios

- **Current policy** is the asset allocation policy as of October 1, 2008
- **Alternative 1** introduces a 5.0% Cash allocation funded by Equity
- **Alternative 2** introduces a 5.0% Cash allocation funded by Fixed Income
- **Alternative 3** introduces a 7.5% Cash allocation funded by Equity
- **Alternative 4** introduces a 7.5% Cash allocation funded by Fixed Income
- **Alternative 5** introduces a 5% Cash allocation funded by Fixed Income, and an expansion of Opportunistic Credit to 10% funded by Equity
- **Alternative 6** introduces a 5% Cash allocation funded by Fixed Income, an expansion of Opportunistic Credit to 10% funded by Equity, and a 5% Levered TIPS allocation funded by TIPS
- **Alternative 7** introduces a 5% Cash allocation funded by Fixed Income, an expansion of Opportunistic Credit to 10% funded by Equity, a 5% Levered TIPS allocation funded by TIPS, and the removal of Non-US Equity hedging
- **Alternative 8** introduces a 7.5% Cash allocation funded by Fixed Income (5%) and Equity (2.5%), an expansion of Opportunistic Credit to 10% funded by Equity, a 5% Levered TIPS allocation funded by TIPS, and the removal of Non-US Equity hedging

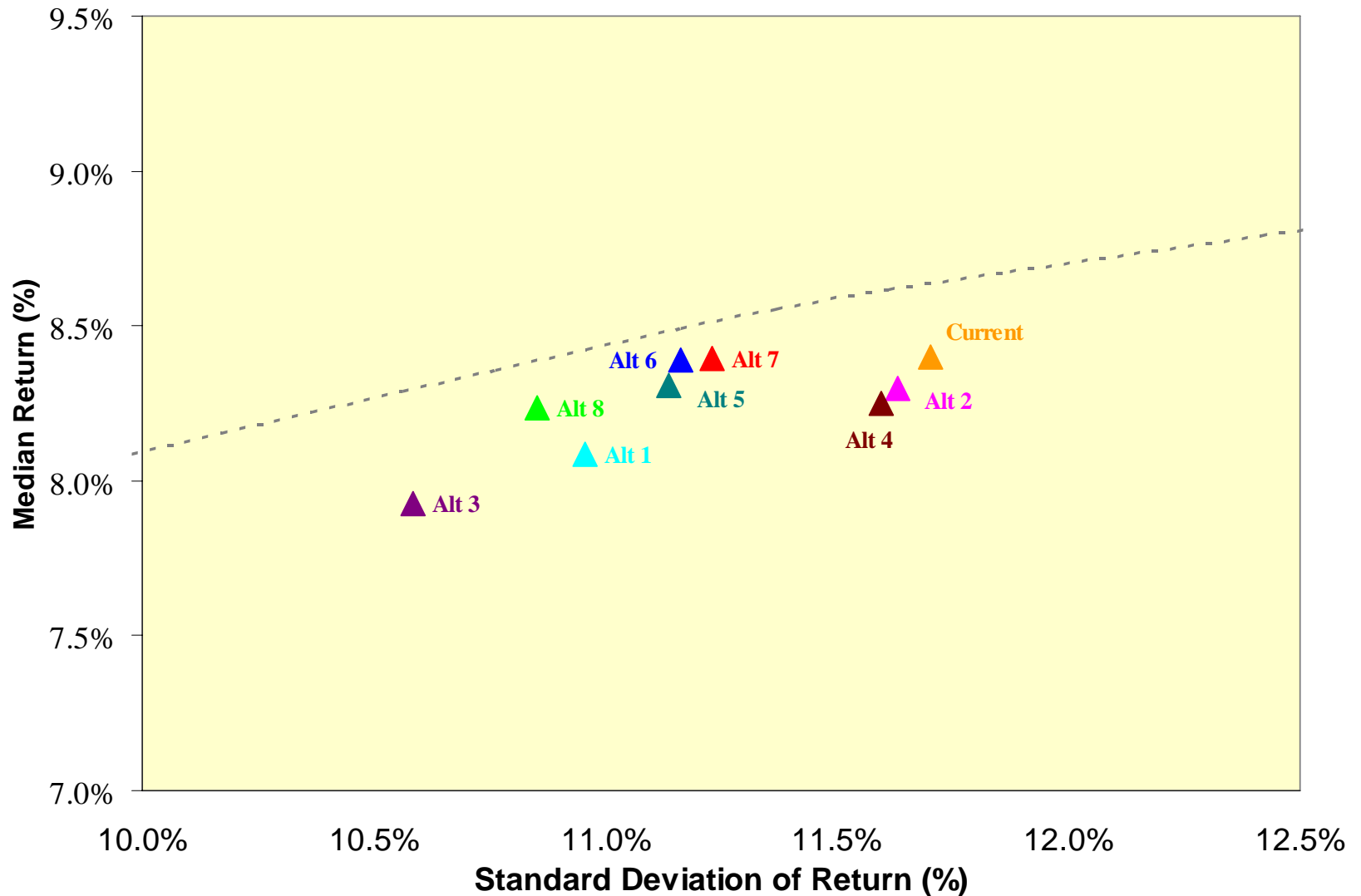
# Asset / Liability Analysis

## Alternative Policy Portfolios

	Asset Allocation Policies								
	Current Policy	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7	Alternative 8
US Equity	21.00%	19.00%	21.00%	18.00%	21.00%	19.00%	19.00%	19.00%	18.00%
Non-US Equity (Hedged)	26.00%	23.00%	26.00%	21.50%	26.00%	23.00%	23.00%	0.00%	0.00%
Non-US Equity (Unhedged)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	23.00%	21.50%
<b>TOTAL PUBLIC EQUITY</b>	<b>47.00%</b>	<b>42.00%</b>	<b>47.00%</b>	<b>39.50%</b>	<b>47.00%</b>	<b>42.00%</b>	<b>42.00%</b>	<b>42.00%</b>	<b>39.50%</b>
US Core Fixed Income	8.00%	8.00%	5.00%	8.00%	3.50%	5.00%	5.00%	5.00%	5.00%
TIPS (Unlevered)	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	0.00%	0.00%	0.00%
TIPS (Levered)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.00%	5.00%	5.00%
TIPS Levered Cash	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-5.00%	-5.00%	-5.00%
High Yield Fixed Income / Opportunistic Credit	5.00%	5.00%	5.00%	5.00%	5.00%	10.00%	10.00%	10.00%	10.00%
Global Fixed Income	4.00%	4.00%	2.00%	4.00%	1.00%	2.00%	2.00%	2.00%	2.00%
<b>TOTAL FIXED INCOME</b>	<b>22.00%</b>	<b>22.00%</b>	<b>17.00%</b>	<b>22.00%</b>	<b>14.50%</b>	<b>22.00%</b>	<b>17.00%</b>	<b>17.00%</b>	<b>17.00%</b>
Private Markets	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%
Real Estate	11.00%	11.00%	11.00%	11.00%	11.00%	11.00%	11.00%	11.00%	11.00%
Commodities	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
<b>TOTAL ALTERNATIVES</b>	<b>31.00%</b>	<b>31.00%</b>	<b>31.00%</b>	<b>31.00%</b>	<b>31.00%</b>	<b>31.00%</b>	<b>31.00%</b>	<b>31.00%</b>	<b>31.00%</b>
<b>CASH</b>	<b>0.00%</b>	<b>5.00%</b>	<b>5.00%</b>	<b>7.50%</b>	<b>7.50%</b>	<b>5.00%</b>	<b>5.00%</b>	<b>5.00%</b>	<b>7.50%</b>
<b>TOTAL</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>
<b>Median Return</b>	<b>8.40%</b>	<b>8.08%</b>	<b>8.30%</b>	<b>7.92%</b>	<b>8.25%</b>	<b>8.31%</b>	<b>8.39%</b>	<b>8.40%</b>	<b>8.24%</b>
<b>Standard Deviation of Return</b>	<b>11.70%</b>	<b>10.95%</b>	<b>11.63%</b>	<b>10.58%</b>	<b>11.60%</b>	<b>11.14%</b>	<b>11.16%</b>	<b>11.23%</b>	<b>10.85%</b>
<b>Return / Risk</b>	<b>0.72</b>	<b>0.74</b>	<b>0.71</b>	<b>0.75</b>	<b>0.71</b>	<b>0.75</b>	<b>0.75</b>	<b>0.75</b>	<b>0.76</b>

# Asset / Liability Analysis

## Efficient Frontier

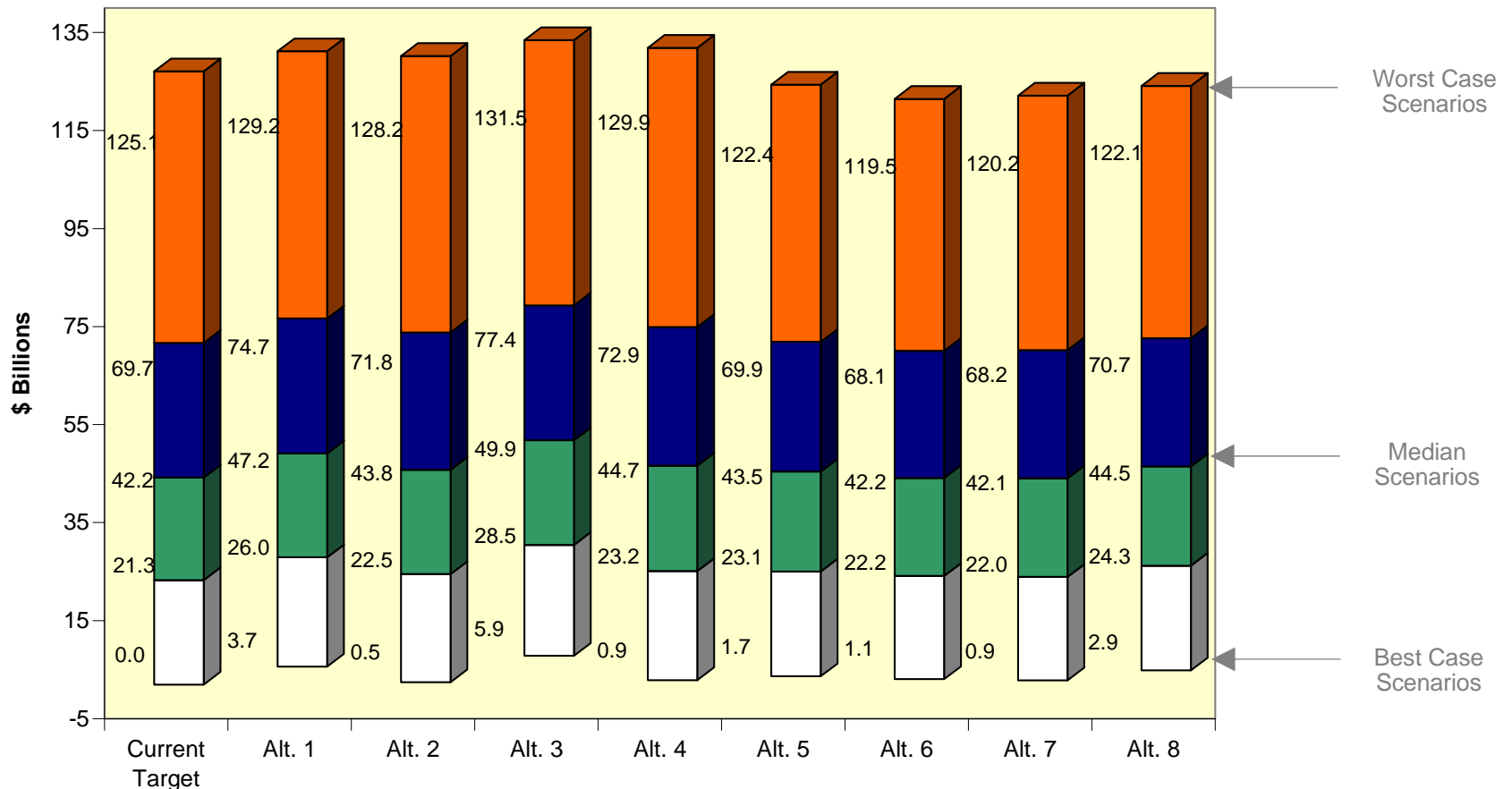


# Asset / Liability Analysis

## Distribution of Employer Cost \*

- Current asset allocation policy yields a median cost of \$42.2 billion, given the estimated asset value as of November 30, 2008 and Wilshire's 2009 capital market assumptions
- Alternative policies have lower costs in worse-case scenarios

□ 4th Quartile ■ 3rd Quartile ■ 2nd Quartile ■ 1st Quartile

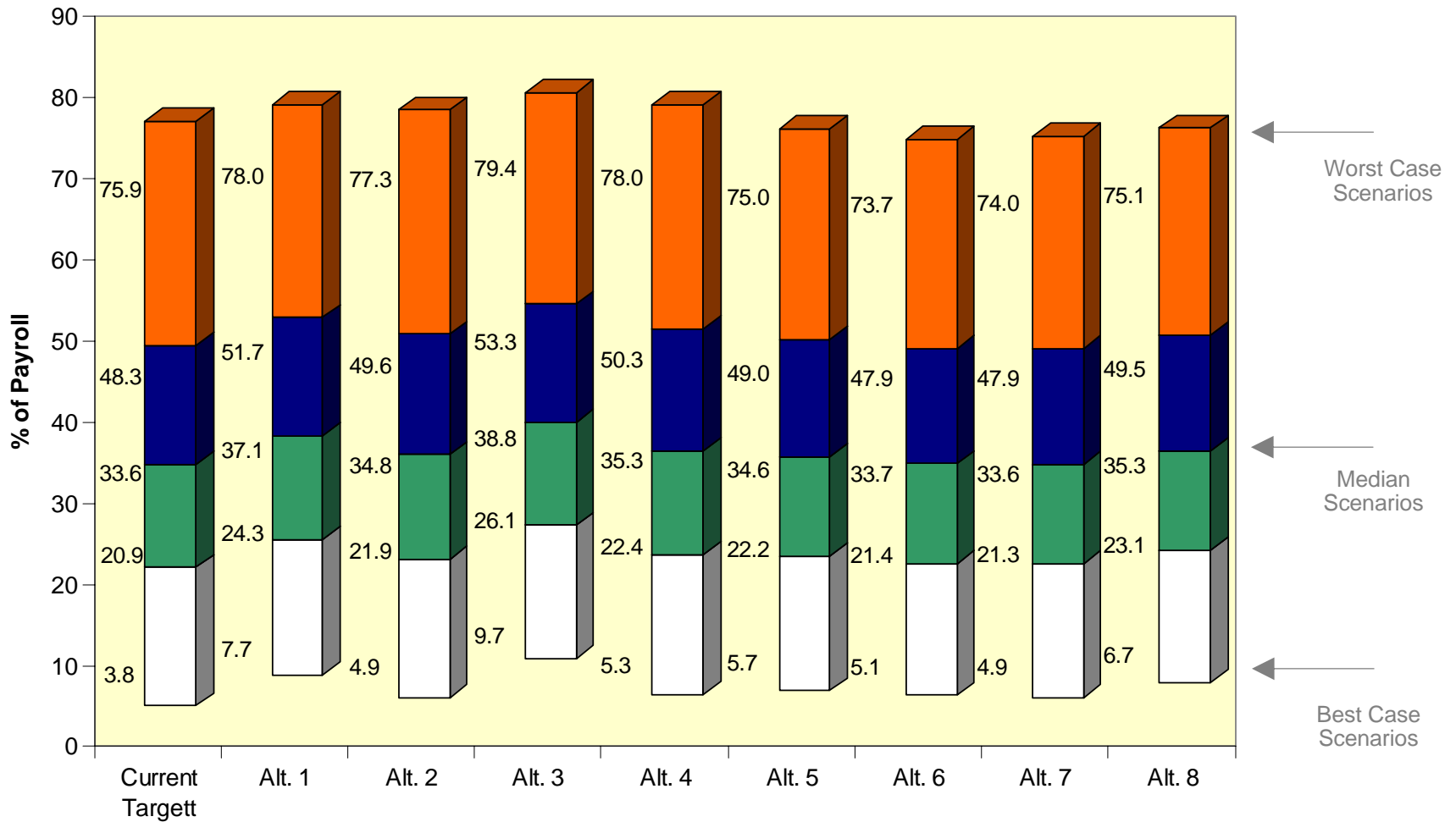


\* Return distributions are asymmetric

# Asset / Liability Analysis

## Distribution of Cost as a Percentage of Payroll \*

□ 4th Quartile ■ 3rd Quartile ■ 2nd Quartile ■ 1st Quartile

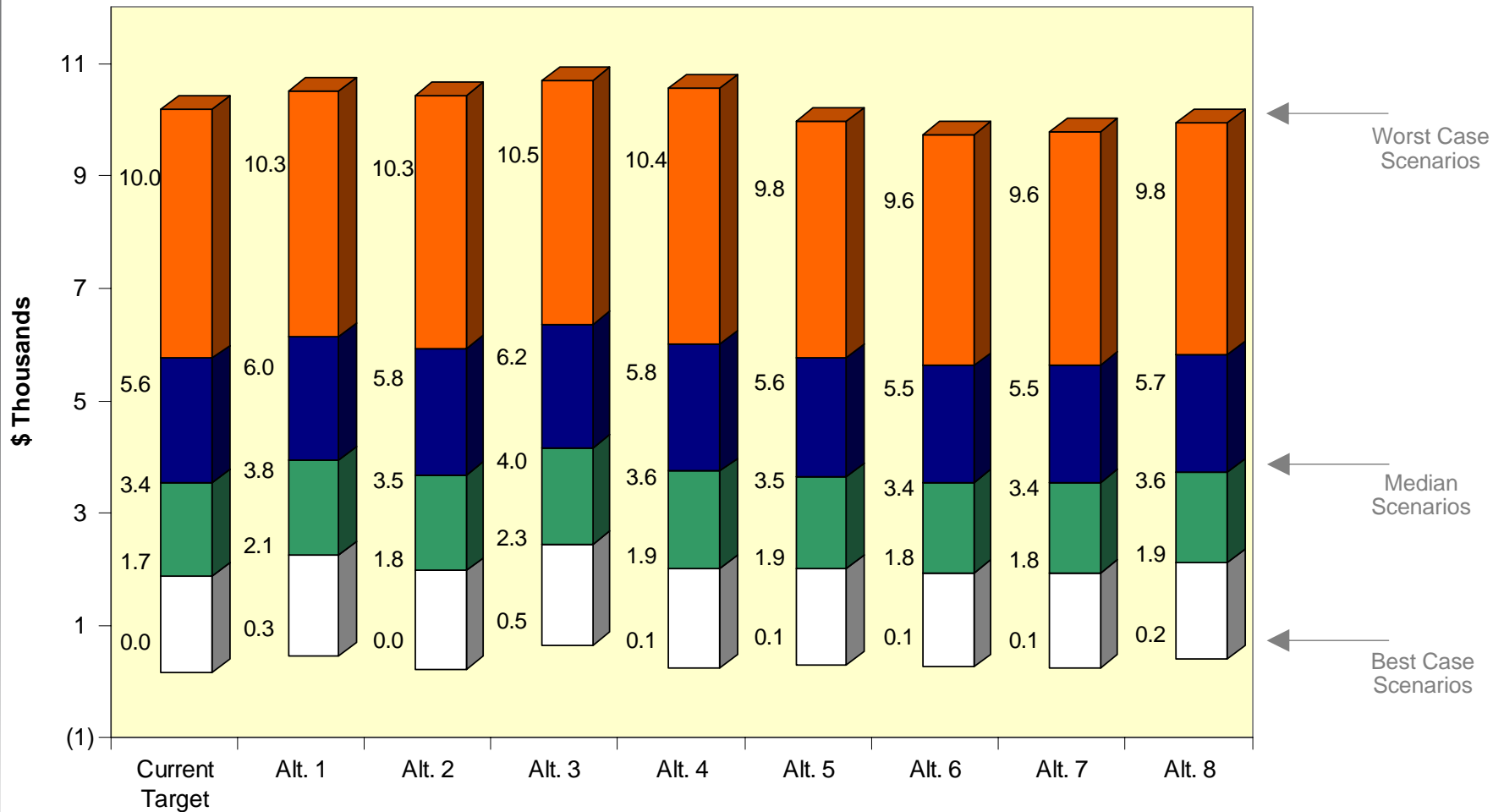


\* Return distributions are asymmetric

# Asset / Liability Analysis

## Distribution of Cost (per-capita)\*

□ 4th Quartile ■ 3rd Quartile ■ 2nd Quartile ■ 1st Quartile



\* Estimated state population of 12.5 million. Return distributions are asymmetric

# The Mathematics of Asset / Liability Valuation

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# The Mathematics of Asset / Liability Valuation

*Inadequate long term asset returns should be a concern of any pension plan. We need a tool to measure how it affects a plan's abilities to pay promised benefits. With apologies, a bit of math will be involved...*

- Assume you know for certain that you will have to pay exactly \$100 a year from now. Further assume you know that your investments will earn exactly 3% during the year. You then can calculate exactly how much you need to have invested today to pay that \$100 a year from now using the following equation:

$$\text{Required Assets} * 1.03 = \$100$$

- Dividing Both sides by 1.03 solves for Required Assets

$$\text{Required Assets} = \$100/1.03 = \$97.09$$

- Outside of U.S. Treasuries, none of us know exactly how much any investment will earn in the future. Investing involves risk. Since funding a pension plan involves paying benefits over an extended period of time out of these assets, our goal should be to minimize the cost of providing those benefits and maximizing their safety.



# The Mathematics of Asset / Liability Valuation

- Let

$$B_1, B_2, \dots, B_{100}$$

be the benefits the System will pay, over the next 100 years. Provided by the actuary, it is a point estimate of the pension commitment.

- The benefits include the actuary's estimates of wage and price inflation. Since future inflation is unknown, let

$$I_1, I_2, \dots, I_{100}$$

represent that uncertainty over each of the next 100 years. The actual benefits paid will then be

$$B_1(1+I_1), B_2(1+I_1)(1+I_2), \dots, B_{100}(1+I_1)(1+I_2)\dots(1+I_{100})$$

This series of promised benefits is the true liability of the system.

# The Mathematics of Asset / Liability Valuation

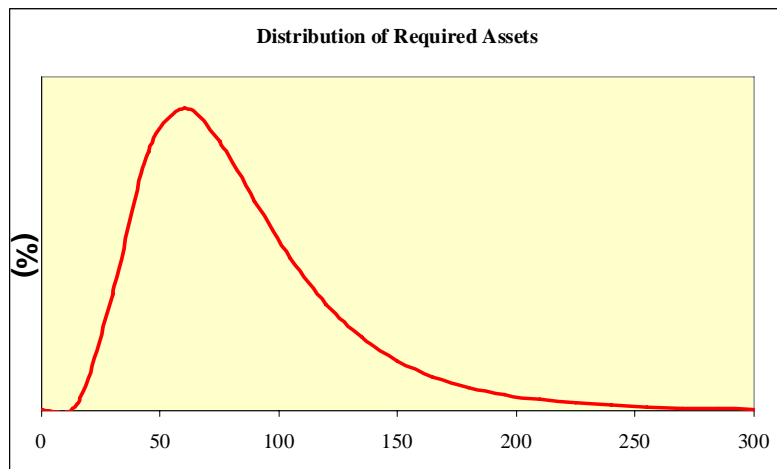
- Future asset returns in each year:

$$R_1, R_2, \dots, R_{100}$$

are also unknown.

- Extending our equation of required assets to include multiple payments yields

$$\text{Required Assets} = \frac{B_1(1 + I_1)}{(1 + R_1)} + \frac{B_2(1 + I_1)(1 + I_2)}{(1 + R_1)(1 + R_2)} + \dots + \frac{B_{100}(1 + I_1)(1 + I_2)\dots(1 + I_{100})}{(1 + R_1)(1 + R_2)\dots(1 + R_{100})}$$



Rather than a fixed number, Required Assets has a distribution. We can minimize its expected value (cost), and its standard deviation (risk).

## **Tab 3**

### **Asset Allocation / Investment Structure Recommendations**

# Asset Allocation / Investment Structure

## Investment Program Initiatives for 2009

- Establish a liquidity reserve portfolio
- Expand opportunistic credit exposure
- Lever the TIPS exposure 2:1
- Remove currency hedge on Non-US Equity

# Asset Allocation / Investment Structure

## Liquidity Reserve Portfolio

- Liquidity challenges
  - Core mission – benefit payments
  - Capital commitments
  - Margin variation
  - Rebalancing (ongoing)
- Operational efficiency
  - Support ongoing liquidity needs
  - Reduce need to sell impaired assets
  - Peace of mind

# Asset Allocation / Investment Structure

## Liquidity Reserve Portfolio

*Core Mission -- Benefit Payments*

• Annual outflow:		(\$5.2 B)
▪ Benefit payments:	(\$4.7 B)	
▪ Investment expenses and other:	(\$0.5 B)	
• Annual inflow:		<u>\$3.4 B</u>
▪ Contributions (employer and employee):	\$1.4 B	
▪ Dividends and interest:	\$2.0 B	
• Net annual shortfall:		<u>(\$1.8 B)</u>

# Asset Allocation / Investment Structure

## Liquidity Reserve Portfolio

### *Capital Commitments*

- Approximately 25% of 2009 anticipated net drawdowns held in liquidity reserve recommended
  - \$2.8 B anticipated 2009 net drawdowns
  - Approximately \$700 Million

	Outstanding Commitments	Anticipated 2009 Net Drawdowns
Private Equity	\$8.1 B	\$1.7 B
Real Estate	\$4.6 B	\$1.1 B
<b>TOTAL</b>	<b>\$12.7 B</b>	<b>\$2.8 B</b>
<b>% of Total Fund</b>	<b>27.9%</b>	<b>6.1%</b>

# Asset Allocation / Investment Structure

## Liquidity Reserve Portfolio

### *Margin Variation*

- Future contracts used to maintain strategic beta exposure
- Performance mimics S&P 500 return
- Requires daily margin variation
- “Worst case” scenario
  - October / November 2008
  - Negative margin variation
    - Approx. \$2.0 B
  - 50% of worst case scenario = \$1.0 B



# Asset Allocation / Investment Structure

## Liquidity Reserve Portfolio

- Benefit payments: \$1.8 B
  - Estimated annual benefit payment shortfall
- Capital commitments: \$0.7 B
  - 25% of 2009 expected net drawdowns
- Margin variation: \$1.0 B
  - 50% worst case scenario
- Total liquidity reserve portfolio: \$3.5 B
  - Approximately 7.5% of total fund

# Asset Allocation / Investment Structure

## Expand Opportunistic Credit Exposure

- Current policy: 5% of total assets
  - Current exposure: 4.6% of total assets
  - Approx. \$2.1 B
    - Brigade Capital Management
    - MacKay Shields
    - BlackRock
    - Hyperion
    - Oaktree
    - Sankaty
    - TCW
- Recommended policy: 10% of total assets
  - Approx. \$2.5 B in additional assignments
  - Expand current assignments: \$0.75 B
    - Approved: Increase Brigade by \$250 M
    - Proposed: Sankaty (bank loans) = \$500 M
  - New assignments: \$1.75 B
    - Conduct investment grade corporate credit and high yield investment manager searches

# Asset Allocation / Investment Structure

## Levered TIPS

- Inflation linked bonds have diversification benefits
  - Low correlation to other asset classes
  - Hedge against future / long-term inflation
  - Provide real returns guaranteed by the US government
- Inflation linked bonds are a low return / low risk asset class
- Leveraging TIPS magnifies the benefits of this asset class
  - Maximize diversification benefits
  - Enhance return profile

# Asset Allocation / Investment Structure

## Summary / Observations / Recommendations

- Difficult environment to forecast capital market returns
- Wilshire 2009 Capital Market Assumptions were used to develop model portfolios
- Conducted an abbreviated Asset / Liability analysis with current and alternative portfolios to illustrate Wilshire's methodology
  - Several alternative portfolios achieve greater efficiency relative to the current portfolio
- Dislocation of capital markets offer a number of attractive investment opportunities
  - Expand Opportunistic Credit
  - Leverage TIPS
  - Remove Non-US Equity hedge
- We recommend establishing a cash allocation to provide liquidity
  - Support the Core Mission of paying benefits
  - Risk management of portfolio operations