

Commonwealth of Pennsylvania Public School Employees' Retirement System

DATE: March 12, 2009

SUBJECT: Asset Allocation Recommendation - Asset/Liability Analysis and Investment Review

TO: Members of the Board



FROM: Alan H. Van Noord, CFA
Chief Investment Officer

William G. Bensur, Jr., CFA
Wilshire Associates

At the upcoming Finance Committee meeting in March, Bill Bensur and Stephen Marshall from Wilshire Associates will be reviewing the 4th quarter investment performance and the results of their annual asset/liability analysis. A copy of Wilshire's presentation entitled "Investment Review – For the Period Ending December 31, 2008; Asset/Liability Analysis" dated March 12, 2009 has been included in your Finance Committee materials. This review is the basis for the asset allocation recommendations. The following are the changes recommended to the current asset allocation:

<u>Asset Class</u>	<u>Current Policy</u>	<u>Recommended Policy</u>	<u>Increase/(Decrease)</u>
U.S. Equity	18.75%	13.50%	(5.25%)
Non-U.S. Equity (Unhedged)	0.00%	16.50%	16.50%
Non-U.S. Equity (30% Hedg.)	<u>23.75%</u>	<u>0.00%</u>	<u>(23.75%)</u>
Total Public Equity	<u>42.50%</u>	<u>30.00%</u>	<u>(12.50%)</u>
Private Markets	18.00%	18.00%	0.00%
Real Estate	<u>12.50%</u>	<u>11.00%</u>	<u>(1.50%)</u>
Total Private Equity	<u>30.50%</u>	<u>29.00%</u>	<u>(1.50%)</u>
Total Equity	<u>73.00%</u>	<u>59.00%</u>	<u>(14.00%)</u>
U.S. Core Fixed Income	8.00%	7.50%	(0.50%)
TIPS (Unleveraged)	5.00%	0.00%	(5.00%)
TIPS (Leveraged)	0.00%	5.00%	5.00%
High Yield (Opportunistic)	5.00%	9.00%	4.00%
Global Fixed Income	4.00%	3.00%	(1.00%)
Cash	<u>0.00%</u>	<u>5.00%</u>	<u>5.00%</u>
Total Fixed Income	<u>22.00%</u>	<u>29.50%</u>	<u>7.50%</u>
Absolute Return	<u>0.00%</u>	<u>7.50%</u>	<u>7.50%</u>
Commodities	<u>5.00%</u>	<u>4.00%</u>	<u>(1.00%)</u>
	<u>100.00%</u>	<u>100.00%</u>	<u>0.00%</u>

The following are some observations regarding the recommended policy:

1. The new allocation is a more efficient allocation than our current policy. While the recommended policy has an expected return that is 13 basis points lower than the current policy (8.15% vs. 8.28%), it is expected to have much lower risk (9.92% vs. 11.13%).

2. Since the assumed actuarial investment rate of return has been reduced from 8.5% to 8.0% over a two-year period, the Fund does not need as high of a concentration in total equity. As noted above, total equity has fallen from 73.0% to 59.0% with a majority of the reduction from public equities. The public equity exposure will vary based on the actual allocation to private equity. For example, if the private equity invested allocation increases to 31.0% of the Fund, the public equity allocation will fund the excess 2.0% allocation to private equities and be reduced to 28.0%. The same is true should the private equity invested allocation fall to 27.0%, the public equity allocation will absorb the 2.0% shortfall in private markets and be increased to 32.0%. Our objective is to control the total equity exposure to 59.0% of the Fund, regardless of whether it is private or public market equity exposure.
3. We recommend eliminating the currency hedge on 30% of the non-U.S. equity allocation. This hedge was instituted a number of years ago when our non-U.S. equity allocation was around 30% of the Fund. Since the non-U.S. equity allocation is significantly lower and the general market consensus is that the U.S. dollar is more likely to weaken than strengthen over the next few years given the increasing federal deficit, we recommend the elimination of the currency hedge. Our currency hedge manager, Pareto Investment Management Limited, will be converted from an active currency hedge manager to an absolute return manager. Their risk allocation will be similar to FX Concepts with a \$1 billion notional allocation and a 4% risk target.
4. As discussed in the January Finance Committee meeting, we recommend leveraging our TIPS exposure 2:1. Inflation linked bonds have diversification benefits such as a low correlation to other asset classes, providing a hedge against future or long-term inflation, and providing real returns guaranteed by the U.S. government. Leveraging the TIPS will maximize their diversification benefits while enhancing the Fund's return profile. We are currently working with Bridgewater Associates, our external global TIPS manager, on investing in their leveraged TIPS funds.
5. We recommend increasing the allocation to high yield (opportunistic) credit to take advantage of the expected high risk adjusted returns from this asset class over the next few years due to the numerous dislocations in the credit market.
6. Given the liquidity needs of the Fund on a forward looking basis, we recommend an allocation to cash of 5.0% to cover benefit payments and capital commitments in private equity. This allocation will reduce the need to sell impaired assets at an inappropriate time while providing other operational efficiencies. The benchmark for cash will be the Merrill Lynch U.S. Treasury Bill 0 – 3 Months Index.
7. We recommend the addition of a new asset class called absolute return. The fund currently has a significant allocation to portable alpha strategies. These strategies are designed to generate uncorrelated returns and to have those returns transferred to the U.S. equity allocation. We recommend that most of that program be transferred to the absolute return allocation. By transferring a large portion of this program, we will be able to reduce our U.S. equity exposure quickly and reduce the cash volatility created by the S&P 500 index futures overlaying these portable alpha strategies. The benchmark for the absolute return program will be an absolute return of 8.0% annualized.

Staff and Wilshire recommend adopting the changes to Exhibits B, C, and D of the Investment Policy Statement, Objectives, and Guidelines that record the changes recommended. Black-lined copies have been included for your review of the changes recommended.

If you have any questions or comments, please contact me at 717-720-4702.



Pennsylvania Public School Employees' Retirement System

Investment Review – For the Period Ending December 31, 2008
Asset / Liability Analysis

William G. Bensus, Jr., CFA
Managing Director

Stephen Marshall
Vice President

March 12, 2009

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- As of December 31, 2008

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Asset / Liability Analysis

Tab 2

The Mathematics of Asset / Liability Valuation Portfolio Optimization Constraints

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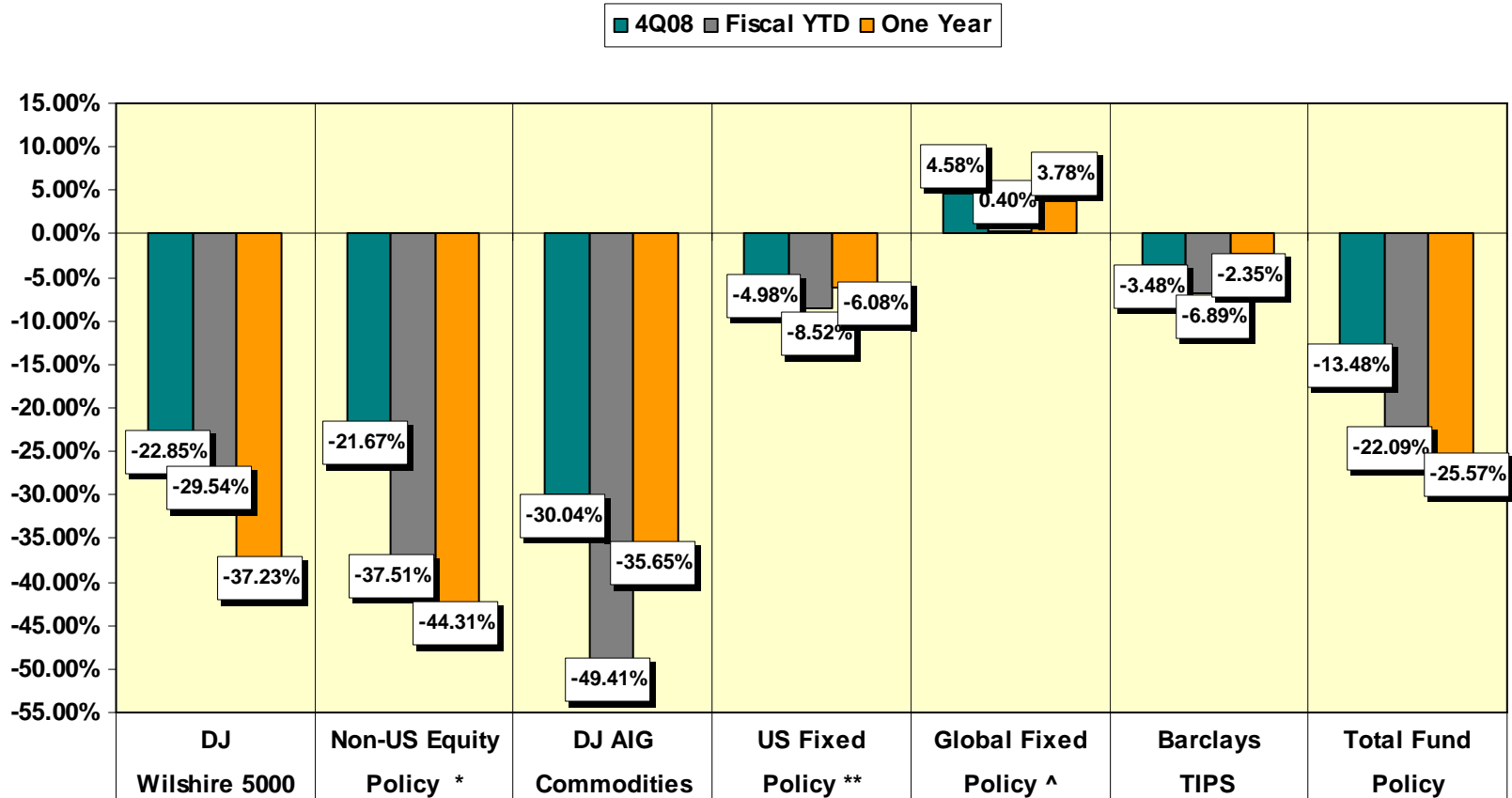
Tab 1

Investment Review *As of December 31, 2008*

Capital Market Update

Benchmark Performance

For Periods Ending December 31, 2008



* MSCI ACW x-US 30% Hedged [PSERS Non-US Equity Composite Benchmark]

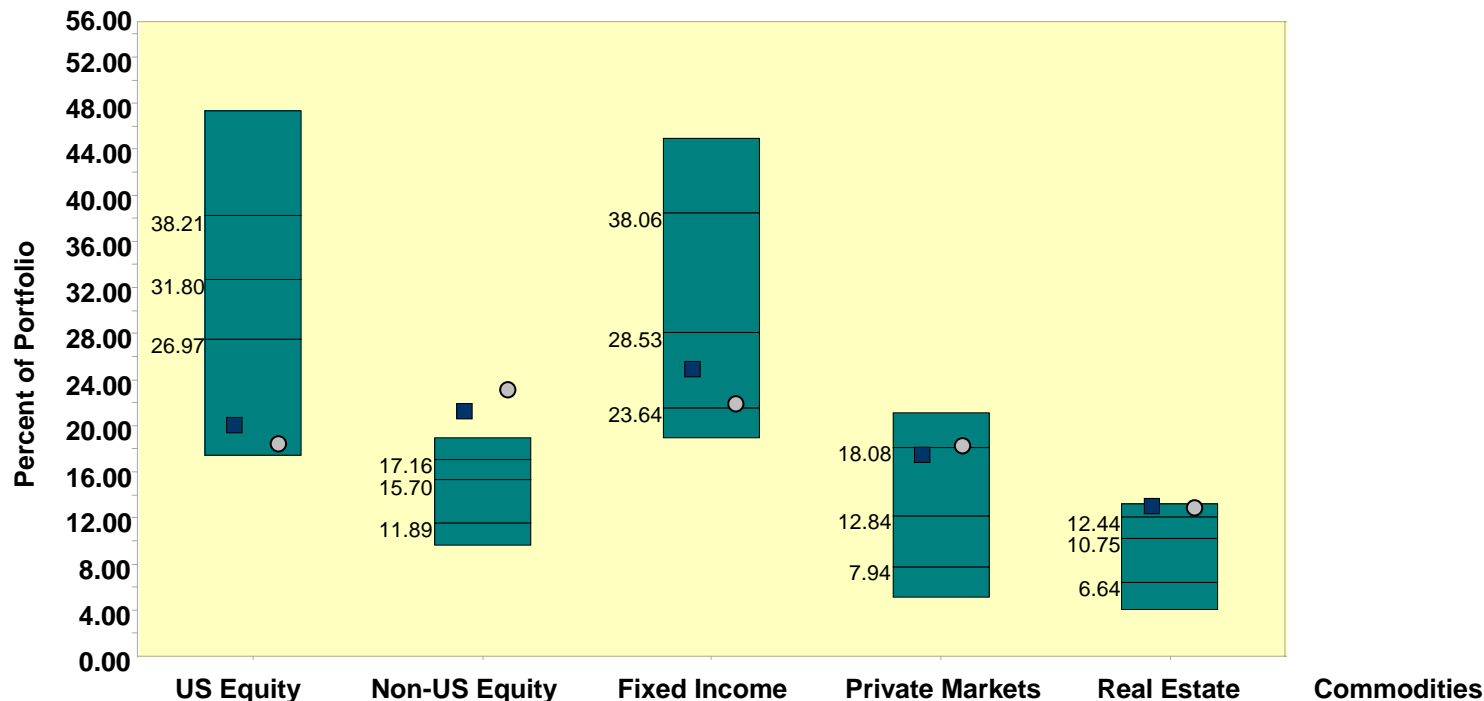
** 44.44% Barclays Universal, 27.78 CS High Yield, 27.78 Barclays US TIPS as of 2Q08

^ Barclays Multiverse Index as of 2Q07

Asset Allocation – Total Fund *

PSERS vs All Public Funds

As of December 31, 2008



■ All Assets
○ Policy ^

All Assets	19.99 (82)	21.97 (6)	24.26 (70)	17.97 (31)	12.27 (28)	3.41 --
Policy ^	18.75 (85)	23.75 (1)	22.00 (79)	18.00 (26)	12.50 (24)	5.00 --

Number of Funds	35	33	34	23	19	--
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* As Allocated
^ Policy as of January 1, 2009

Asset Allocation – Total Fund *

PSERS vs Large Public Funds **

As of December 31, 2008

	US Equity	Non-US Equity	Fixed Income	Private Markets	Real Estate	Commodities
Large Public Funds						
PSERS Total Fund Composite	19.99%	21.97%	24.26%	17.97%	12.27%	3.41%
Policy ^^	18.75%	23.75%	22.00%	18.00%	12.50%	5.00%
Variance	+1.24%	-1.78%	+2.26%	-0.03%	-0.23%	-1.59%
Large Public Fund A	18.10%	17.16%	24.44%	15.05%	11.49%	--
Large Public Fund B	31.60%	13.10%	45.60%	5.00%	3.10%	--
Large Public Fund C	15.51%	10.68%	48.44%	13.53%	9.83%	--
Large Public Fund D	34.70%	9.60%	19.80%	19.60%	12.10%	--
Large Public Fund E	34.70%	9.70%	19.10%	18.30%	12.90%	--
Large Public Fund F	30.00%	19.00%	21.00%	23.00%	6.00%	--
Large Public Fund G	25.80%	16.60%	31.20%	10.30%	13.60%	--
Large Public Fund H	--	--	--	--	--	--
Large Public Fund I	13.60%	14.90%	26.00%	21.50%	11.50%	--
Large Public Fund J	13.10%	16.70%	23.60%	25.70%	19.60%	--

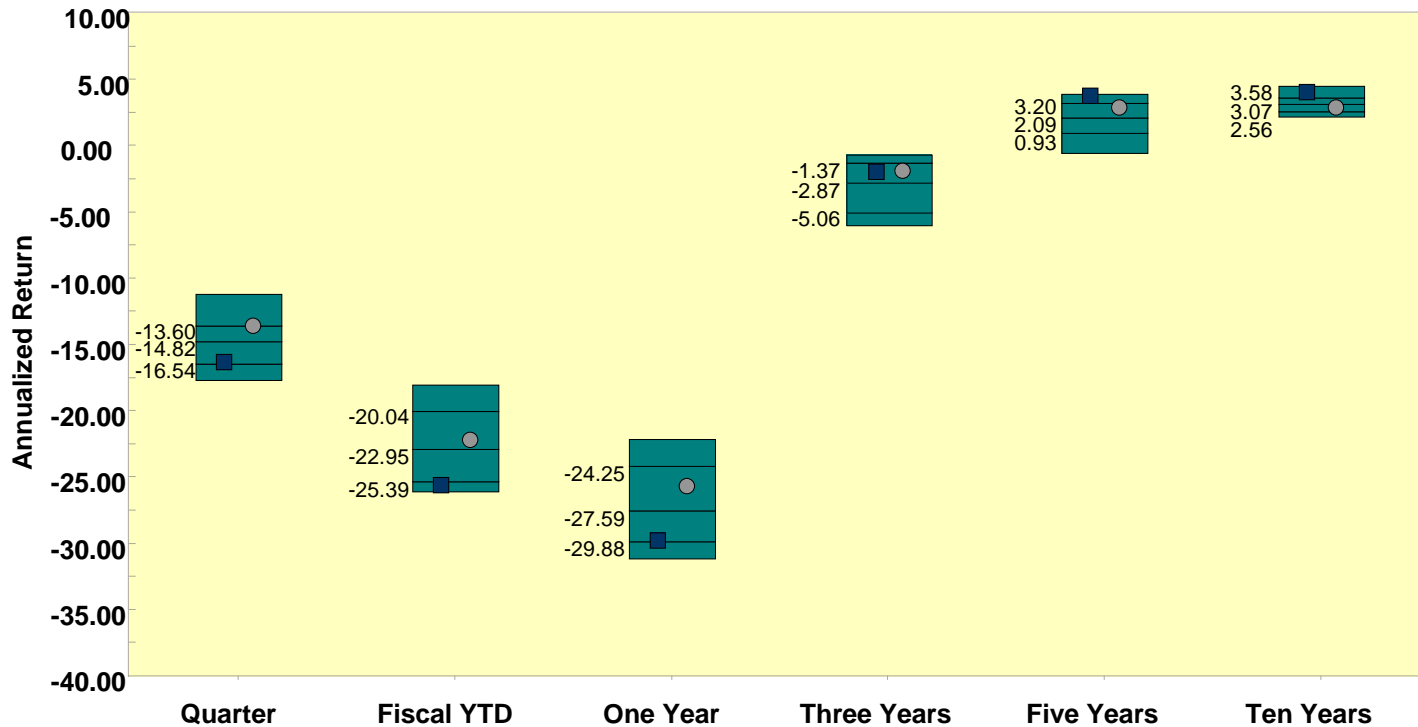
* As Allocated

** Over \$10 Billion

^^ Policy as of January 1, 2009

Performance Comparison – Total Fund *

PSERS vs All Public Funds For Periods Ending December 31, 2008



■ Total Fund
● Policy ^

	Quarter	Fiscal YTD	One Year	Three Years	Five Years	Ten Years
Total Fund	-16.25 (73)	-25.50 (76)	-29.68 (73)	-1.88 (27)	3.88 (6)	4.15 (19)
Policy ^	-13.48 (21)	-22.09 (41)	-25.57 (34)	-1.79 (27)	2.95 (34)	2.99 (53)

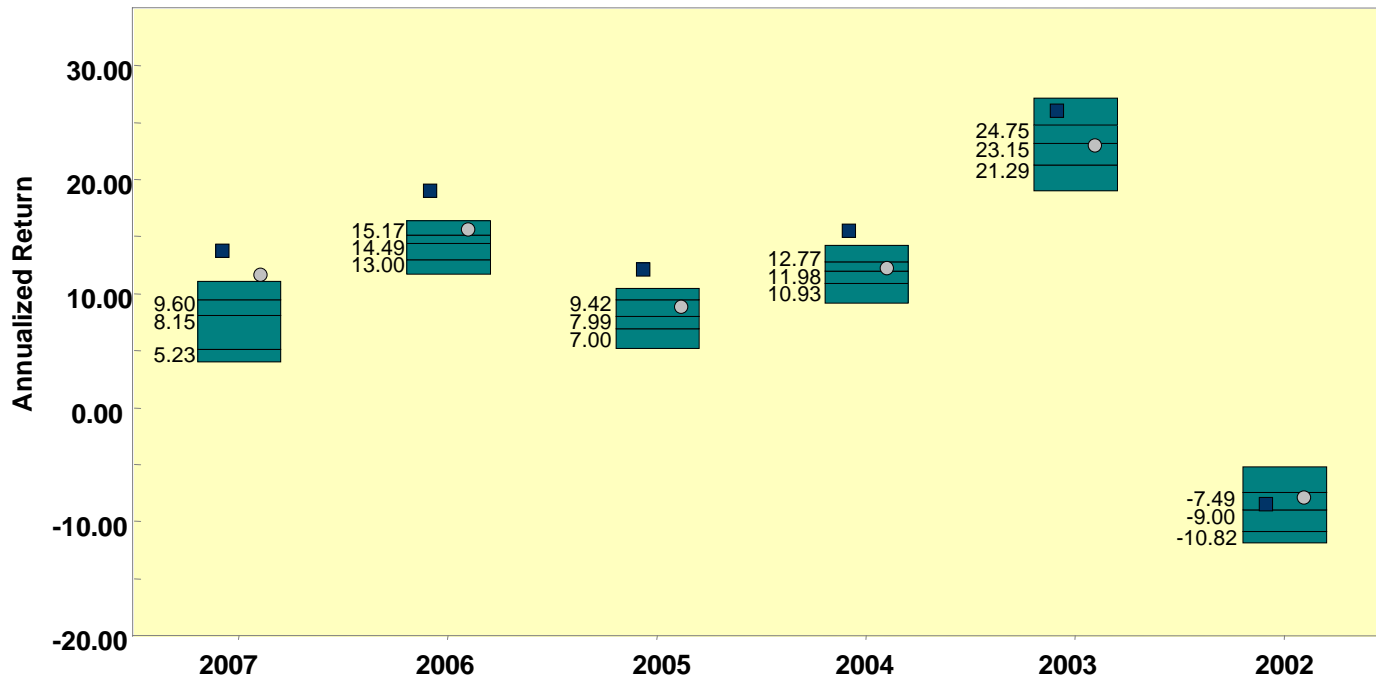
Number of Funds	Quarter	Fiscal YTD	One Year	Three Years	Five Years	Ten Years
	35	35	35	35	35	33

* Net of Fees

^ Policy for the quarter ended December 31, 2008: 21.0% DJ Wilshire 5000, 26.0% MSCI ACW x-US [18.2% USD / 7.8% LC], 15.0% Venture Econ (Lagged), 9.5% NCREIF (Lagged), 1.5% FTSE EPRA/NAREIT Global RE, 8.0% Barclays Universal, 5.0% CS High Yield, 5.0% Barclays US TIPS, 4.0% Barclays Multiverse, 5.0% DJ / AIG Commodity Index

Performance Comparison – Total Fund *

PSERS vs All Public Funds Calendar-Year Periods



■ Total Fund
● Policy

Total Fund	13.82 (2)	18.04 (3)	11.45 (4)	14.90 (5)	25.11 (20)	-8.95 (49)
Policy	10.41 (15)	15.27 (24)	9.08 (30)	12.03 (47)	22.63 (56)	-8.76 (45)

Number of Funds	49	67	70	66	71	76
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* Net of Fees

Performance Comparison – Total Fund *

PSERS vs Large Public Funds ^ For Periods Ending December 31, 2008

	Quarter	Fiscal YTD	One Year	Three Years	Five Years	Ten Years
Large Public Funds						
PSERS Total Fund Composite	-16.25%	-25.50%	-29.68%	-1.88%	3.88%	4.15%
Policy Index ^^	-13.48%	-22.09%	-25.57%	-1.79%	2.95%	2.99%
Variance	-2.77%	-3.41%	-4.11%	-0.09%	+0.93%	+1.16%
Large Public Fund A	-13.73%	-23.06%	-26.93%	-2.48%	2.99%	3.34%
Large Public Fund B	-12.09%	-20.15%	-25.05%	-2.71%	2.23%	3.58%
Large Public Fund C	-10.91%	-17.22%	-20.56%	-0.42%	3.88%	4.52%
Large Public Fund D	-14.12%	-19.41%	-24.28%	-1.10%	3.22%	3.29%
Large Public Fund E	-14.20%	-19.57%	-24.47%	-1.20%	3.15%	3.27%
Large Public Fund F	-15.21%	-22.92%	-26.98%	-2.51%	3.00%	--
Large Public Fund G	-12.05%	-20.01%	-23.68%	-0.76%	3.71%	4.42%
Large Public Fund H	-13.70%	-22.72%	-27.89%	-3.15%	2.28%	2.79%
Large Public Fund I	-15.04%	-23.25%	-27.31%	-2.84%	3.45%	4.45%
Large Public Fund J	-10.59%	-17.78%	-21.69%	1.80%	6.28%	5.07%

* As Allocated

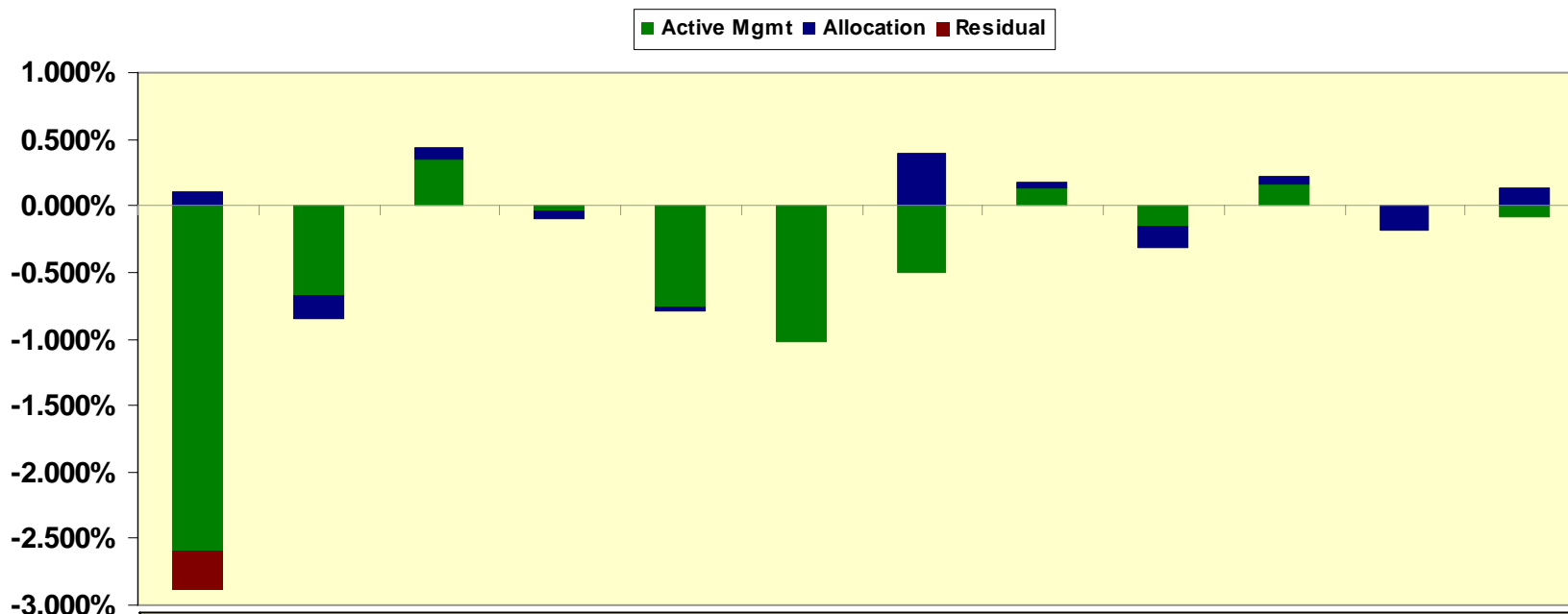
^ Over \$10 Billion

^^ Policy for the quarter ended December 31, 2008: 21.0% DJ Wilshire 5000, 26.0% MSCI ACW x-US [18.2% USD / 7.8% LC], 15.0% Venture Econ (Lagged), 9.5% NCREIF (Lagged), 1.5% FTSE EPRA/NAREIT Global RE, 8.0% Barclays Universal, 5.0% CS High Yield, 5.0% Barclays US TIPS, 4.0% Barclays Multiverse, 5.0% DJ / AIG Commodity Index

Total Fund Attribution

Net of Fees

Quarter Ending December 31, 2008



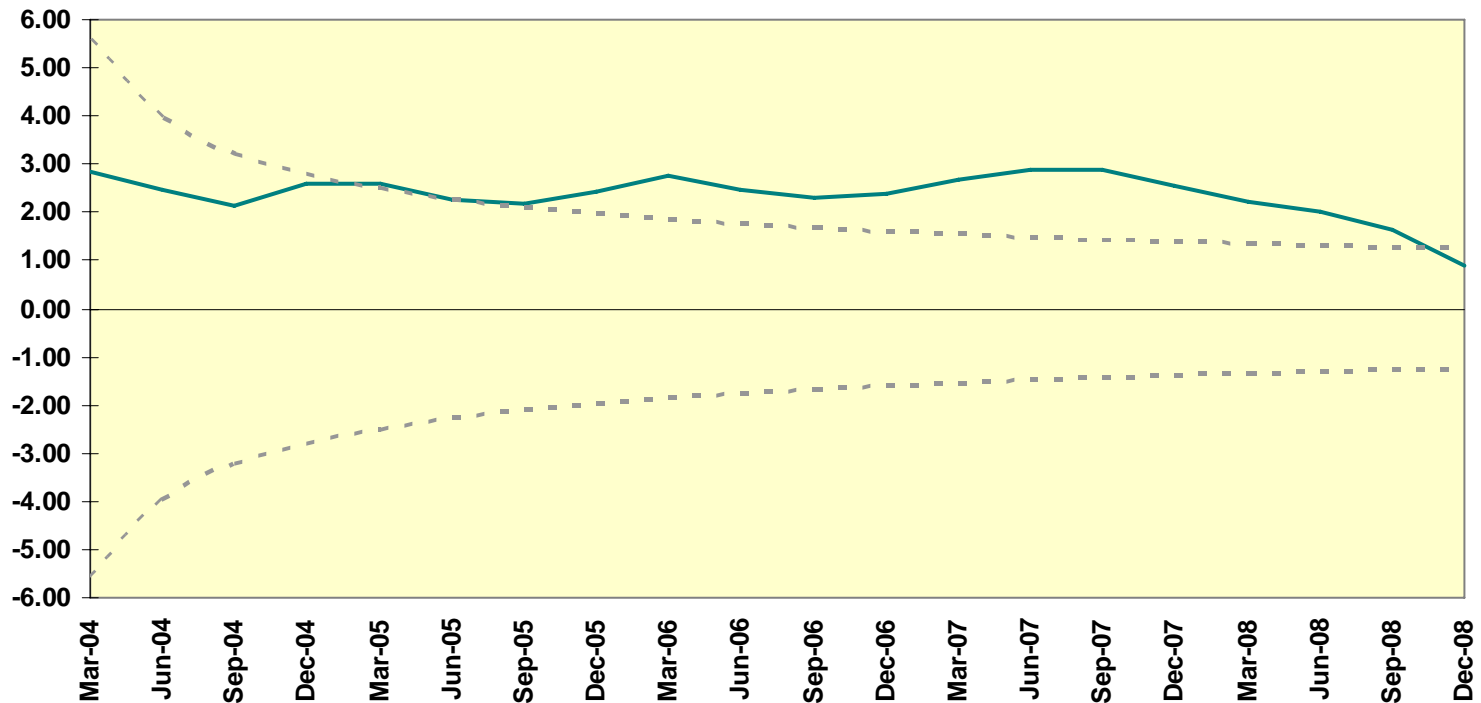
Attribution Statistics

	Total Fund	US Equity	Non-US Equity	PT RES	Private RE	Private Markets	US Core Fixed	High Yield / Opportunistic	Global Fixed	TIPS	Cash	Commodities
Total	-2.770%	-0.850%	+0.439%	-0.103%	-0.784%	-1.025%	-0.107%	+0.178%	-0.316%	+0.214%	-0.174%	+0.046%
Active Mgmt	-2.593%	-0.673%	+0.346%	-0.043%	-0.763%	-1.019%	-0.498%	+0.135%	-0.154%	+0.156%	+0.008%	-0.088%
Allocation	+0.111%	-0.177%	+0.093%	-0.060%	-0.021%	-0.006%	+0.391%	+0.043%	-0.162%	+0.058%	-0.182%	+0.134%
Residual	-0.288%											

Skill Analysis

Excess Return vs Policy Index *

Five-Year Period Ending December 31, 2008

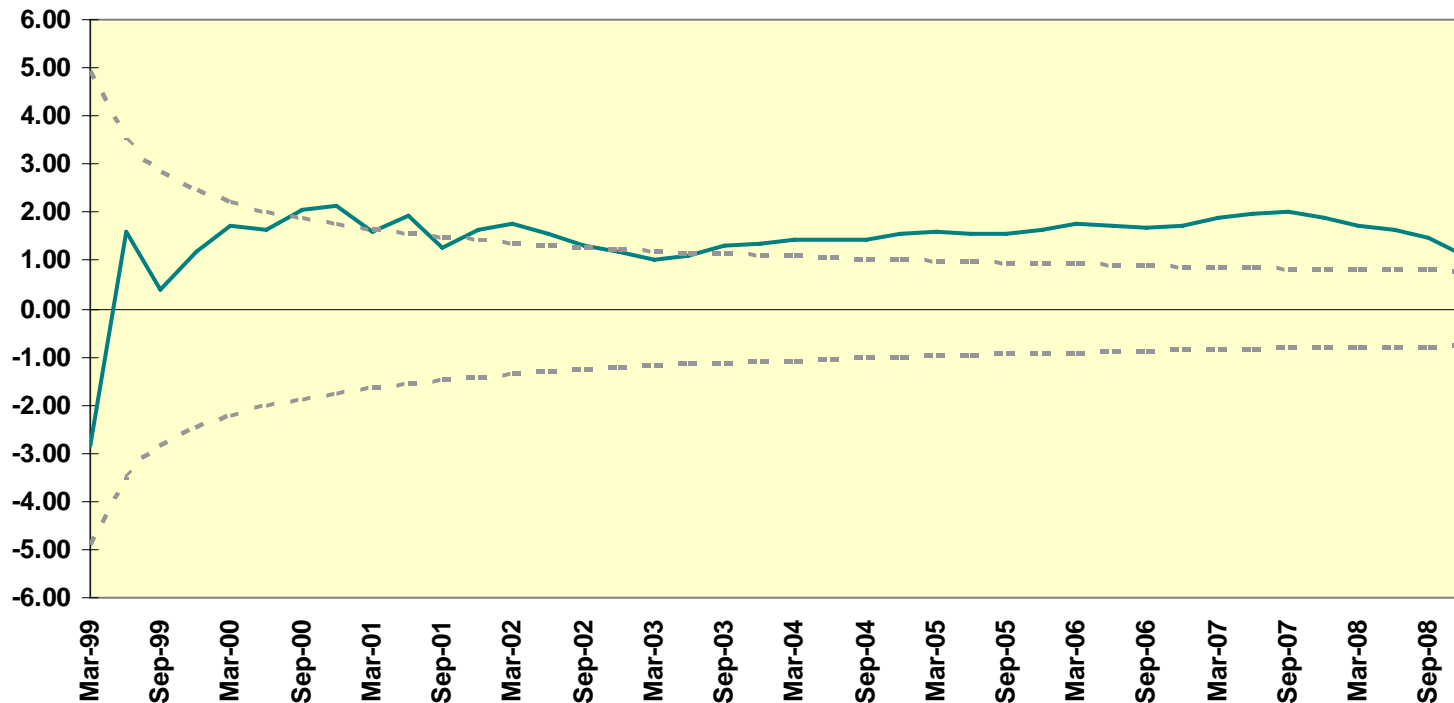


Excess Return:	0.90	Information Ratio:	0.41	N:	9.6
Excess Risk:	2.18	T-Stat:	0.93		

* Net of Fees, Geometric Excess Return Calculation

Skill Analysis

Excess Return vs Policy Index * Ten-Year Period Ending December 31, 2008



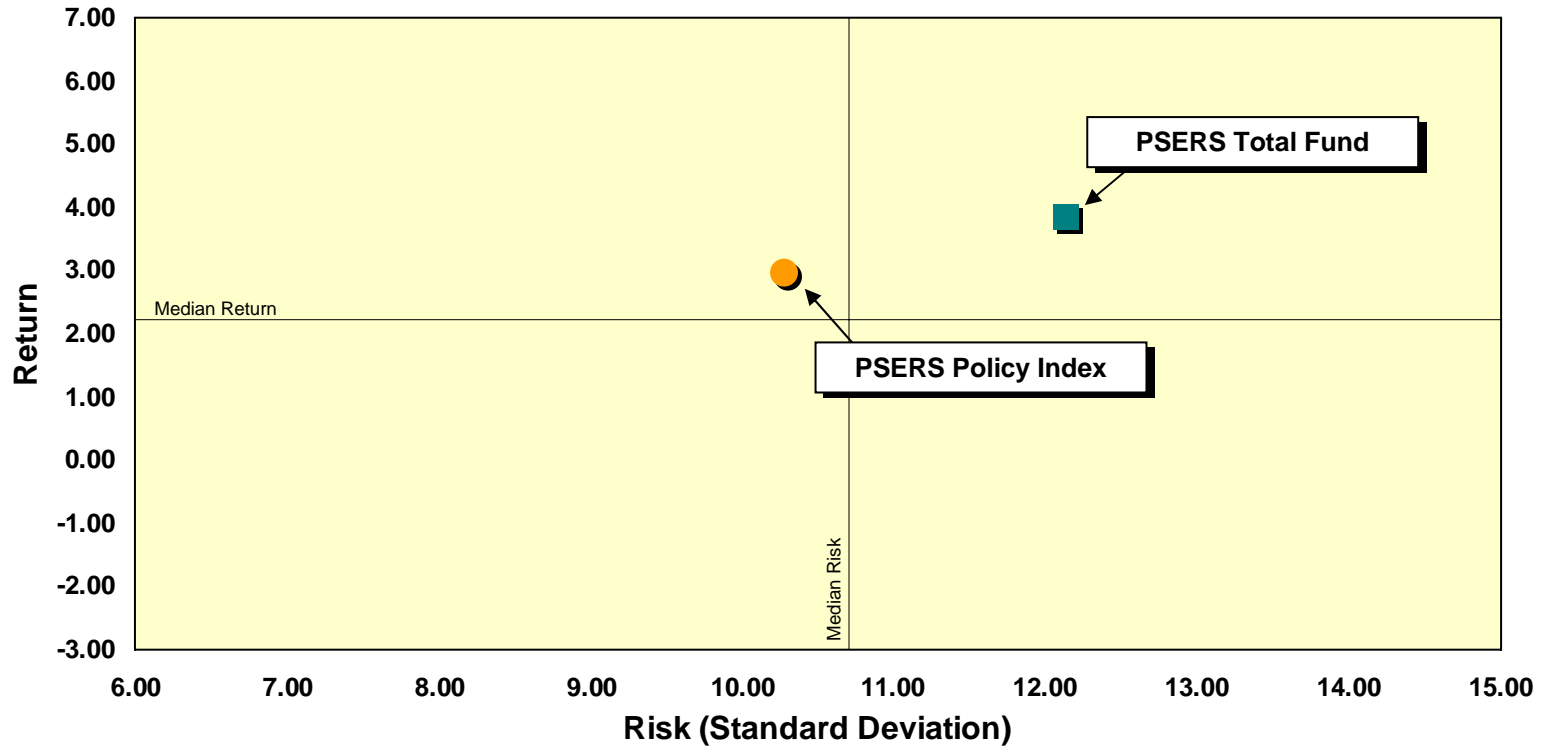
Excess Return:	1.12	Information Ratio:	0.58	N:	4.8
Excess Risk:	1.93	T-Stat:	1.84		

* Net of Fees, Geometric Excess Return Calculation

Risk / Return Analysis

PSERS Total Fund vs All Public Funds *

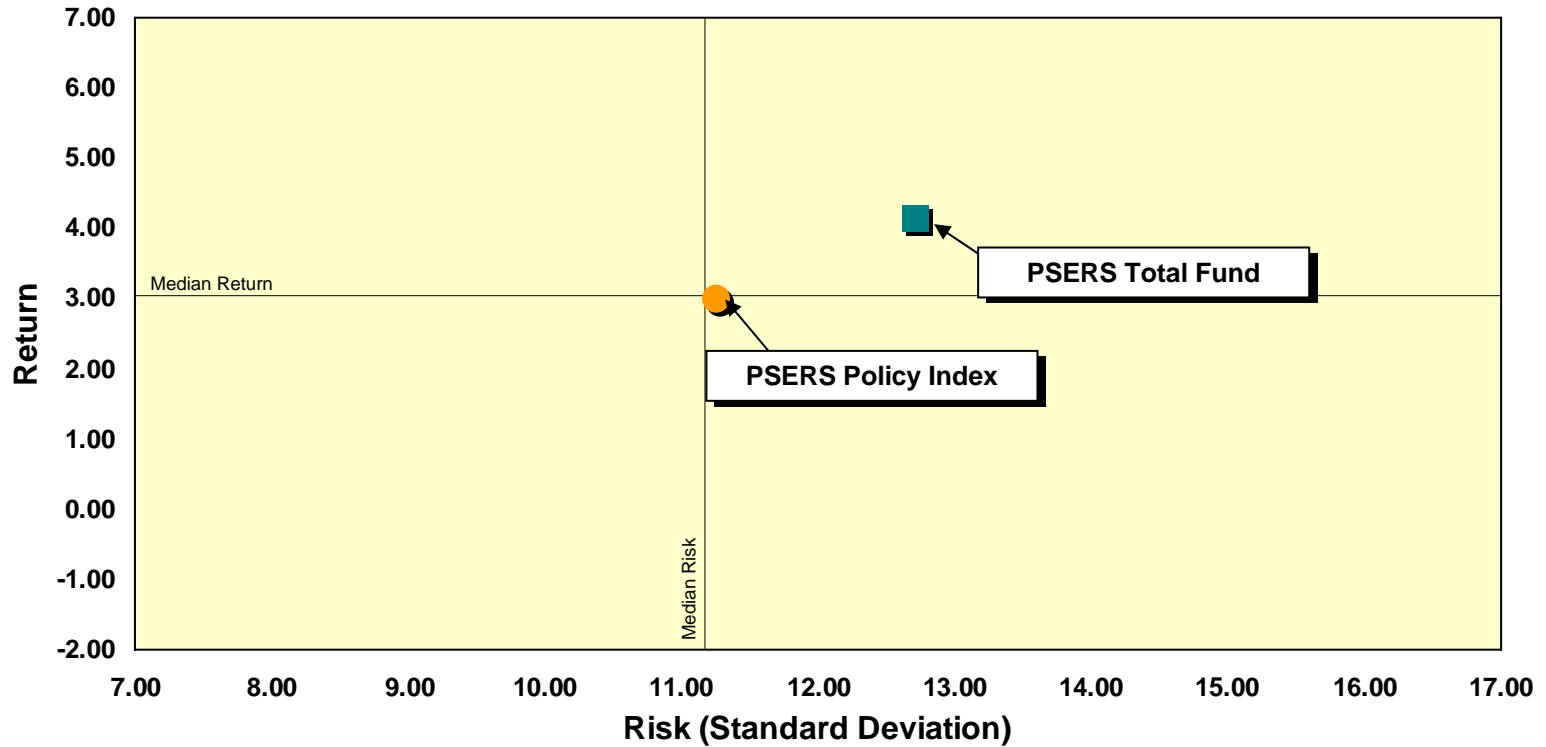
Five-Year Period Ending December 31, 2008



* Net of Fees

Risk / Return Analysis

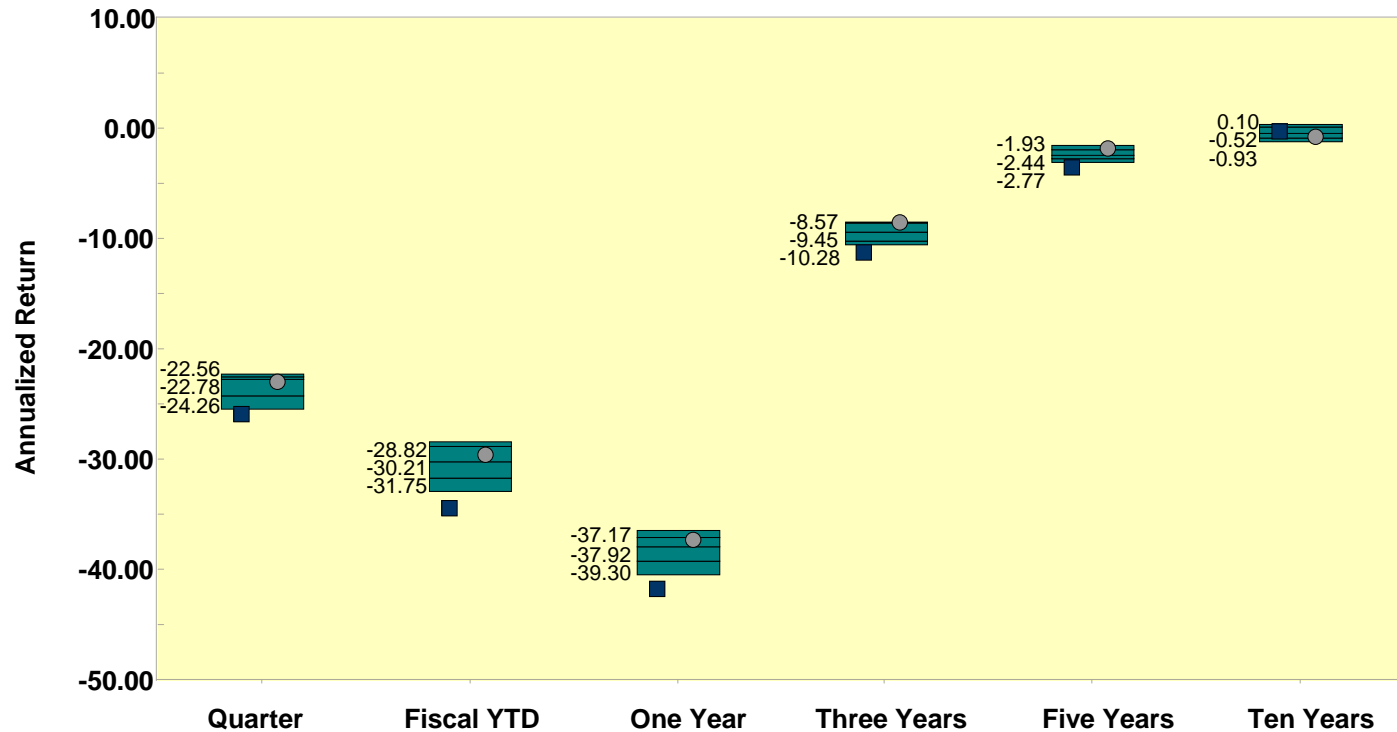
PSERS Total Fund vs All Public Funds * *Ten-Year Period Ending December 31, 2008*



* Net of Fees

Performance Comparison – US Equity *

PSERS vs All Public Funds For Periods Ending December 31, 2008



	Quarter	Fiscal YTD	One Year	Three Years	Five Years	Ten Years
■ Total US Equity	-25.79 (94)	-34.32 (97)	-41.65 (97)	-11.12 (97)	-3.42 (97)	-0.19 (34)
● DJ Wil 5000 Index	-22.85 (51)	-29.54 (44)	-37.23 (26)	-8.44 (6)	-1.69 (18)	-0.64 (57)
Number of Funds	35	35	35	35	35	33

* Net of Fees

Performance Comparison – US Equity *

PSERS vs All Public Funds Calendar Year Periods



■ Total US Equity	4.78 (53)	14.84 (42)	6.25 (67)	12.64 (39)	32.22 (32)	-20.21 (15)
● DJ Wil 5000 Index	5.61 (20)	15.77 (14)	6.38 (62)	12.48 (47)	31.63 (44)	-20.86 (31)
Number of Funds	59	67	70	66	71	76

* Net of Fees

Performance Comparison – US Equity *

PSERS vs Large Public Funds ^ For Periods Ending December 31, 2008

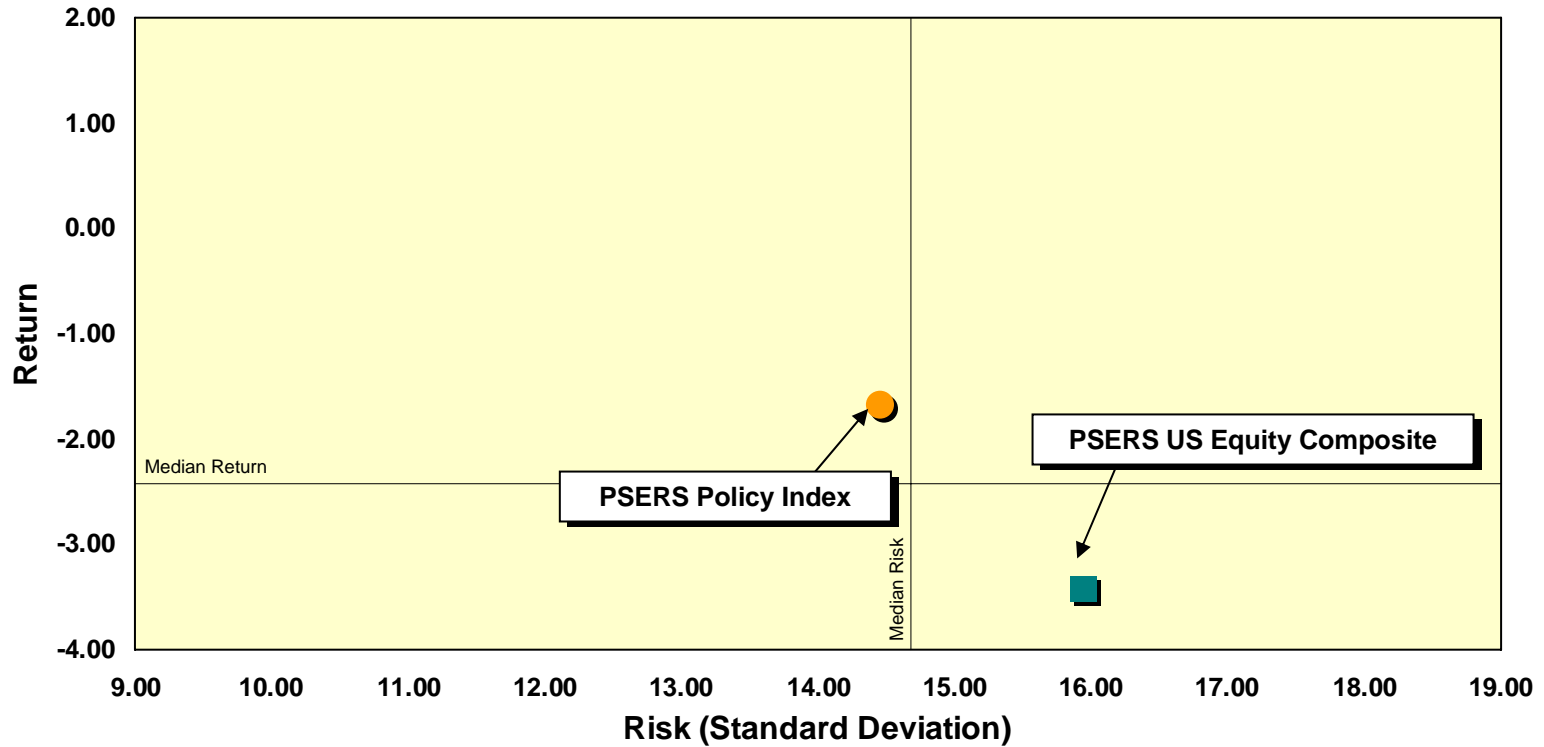
	Quarter	Fiscal YTD	One Year	Three Years	Five Years	Ten Years
Large Public Funds						
PSERS US Equity Composite	-25.79%	-34.32%	-41.65%	-11.12%	-3.42%	-0.19%
DJ Wilshire 5000 Index	-22.85%	-29.54%	-37.23%	-8.44%	-1.69%	-0.64%
Variance	-2.94%	-4.78%	-4.42%	-2.68%	-1.73%	+0.45%
Large Public Fund A	-23.03%	-30.35%	-38.14%	-8.90%	-2.15%	-0.84%
Large Public Fund B	-23.91%	-31.28%	-38.82%	-9.45%	-1.66%	0.37%
Large Public Fund C	-24.17%	-32.65%	-40.74%	-11.04%	-3.05%	-0.95%
Large Public Fund D	-22.55%	-28.81%	-37.01%	-8.55%	-2.11%	-0.93%
Large Public Fund E	-22.58%	-28.91%	-37.08%	-8.59%	-2.13%	-0.91%
Large Public Fund F	-24.34%	-31.01%	-37.64%	-10.33%	-3.18%	--
Large Public Fund G	-22.76%	-29.53%	-37.68%	-9.18%	-2.64%	-0.59%
Large Public Fund H	-22.72%	-30.20%	-38.85%	-10.22%	-2.97%	-1.30%
Large Public Fund I	-24.50%	-32.94%	-39.89%	-10.31%	-2.56%	0.12%
Large Public Fund J	-24.06%	-31.02%	-38.99%	-9.59%	-2.42%	--

* Net of Fees
^ Over \$10 Billion

Risk / Return Analysis

PSERS US Equity vs All Public Funds *

Five-Year Period Ending December 31, 2008

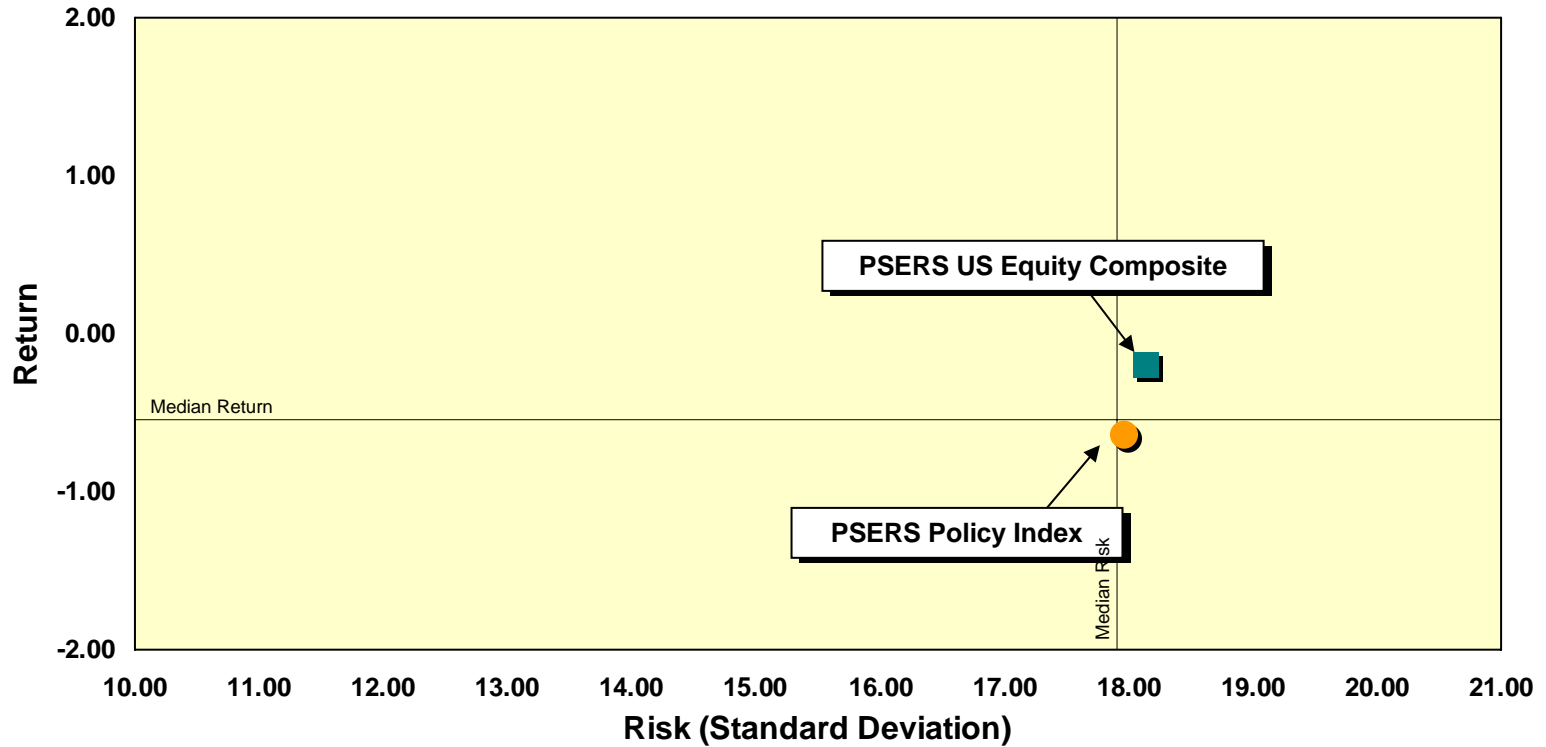


* Net of Fees

Risk / Return Analysis

PSERS US Equity vs All Public Funds *

Ten-Year Period Ending December 31, 2008



* Net of Fees

US Equity Alpha Engines

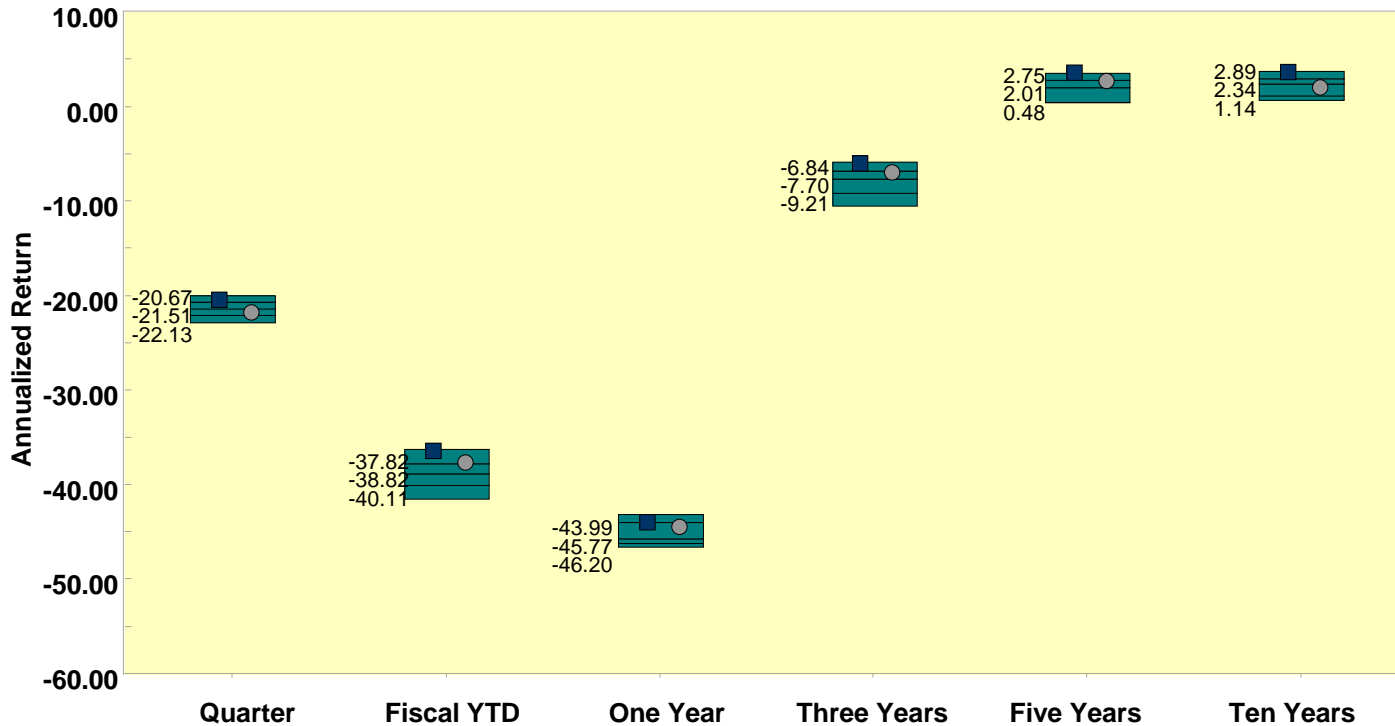
Composite Investment Performance vs Benchmarks * For Periods Ending December 31, 2008

	Quarter	Fiscal YTD	One Year	Three Years	Five Years	Ten Years
Short Duration Enhanced Composite	-29.76%	-39.45%	-49.01%	-15.11%	-6.59%	--
S&P 500 Index	-21.94%	-28.48%	-37.00%	-8.36%	-2.19%	--
Variance	-7.82%	-10.97%	-12.01%	-6.75%	-4.40%	--
Options Enhanced Composite	-22.06%	-28.56%	-36.87%	-7.78%	-1.81%	--
S&P 500 Index	-21.94%	-28.48%	-37.00%	-8.36%	-2.19%	--
Variance	-0.12%	-0.08%	+0.13%	+0.58%	+0.38%	--
Global Macro Composite **	-3.40%	-10.67%	-6.25%	0.92%	--	--
LIBOR	0.71%	1.32%	2.93%	4.55%	--	--
Variance	-4.11%	-11.99%	-9.18%	-3.63%	--	--
Currency	-1.71%	-2.94%	-2.59%	--	--	--
Other Portable Alpha Composite	-6.40%	-16.17%	--	--	--	--
LIBOR	0.71%	1.32%	--	--	--	--
Variance	-7.11%	-17.49%	--	--	--	--
Total Portable Alpha Composite	-28.28%	-38.83%	-46.12%	-13.62%	-5.46%	-2.78%
S&P 500 Index	-21.94%	-28.48%	-37.00%	-8.36%	-2.19%	-1.38%
Variance	-6.34%	-10.35%	-9.12%	-5.26%	-3.27%	-1.40%

* Net of Fees
** W/O Overlay

Performance Comparison – Non-US Equity *

PSERS vs All Public Funds For Periods Ending December 31, 2008

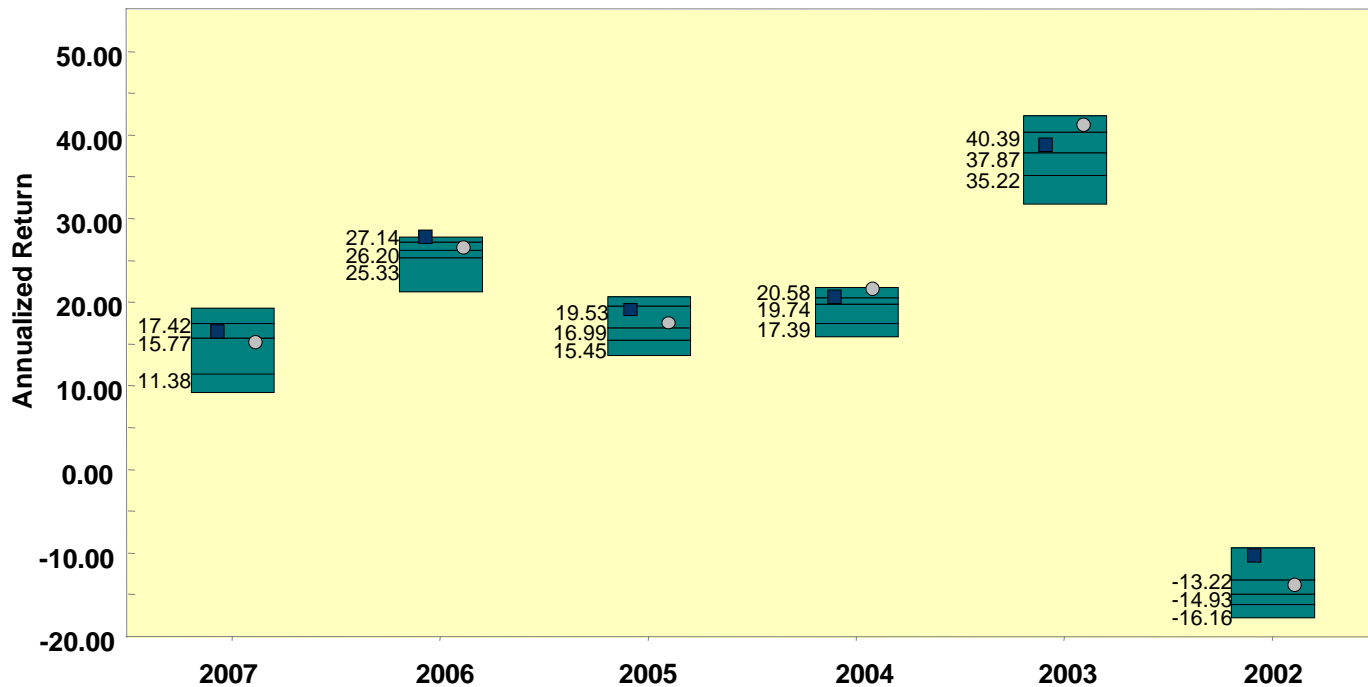


	Quarter	Fiscal YTD	One Year	Three Years	Five Years	Ten Years
■ Total Non-US Eq	-20.28 (16)	-36.29 (10)	-43.81 (23)	-5.88 (10)	3.66 (6)	3.79 (4)
● Policy Index ^	-21.67 (60)	-37.51 (20)	-44.31 (27)	-6.86 (25)	2.80 (23)	2.17 (53)
Number of Funds	33	33	33	33	33	30

* Net of Fees
^ MSCI ACW x-US Index, 30% Hedged as of 3Q06

Performance Comparison – Non-US Equity *

PSERS vs All Public Funds Calendar-Year Periods



■ Total Non-US Eq	16.26 (36)	27.66 (13)	19.03 (29)	20.56 (26)	39.81 (32)	-12.49 (16)
○ Policy Index ^	14.64 (57)	26.56 (39)	17.11 (47)	21.36 (18)	41.40 (16)	-14.66 (40)
Number of Funds	56	62	64	62	66	69

* Net of Fees

^ MSCI ACW x-US Index, 30% Hedged as of 3Q06

Performance Comparison – Non-US Equity *

PSERS vs Large Public Funds ^ For Periods Ending December 31, 2008

	Quarter	Fiscal YTD	One Year	Three Years	Five Years	Ten Years
Large Public Funds						
PSERS Non-US Equity Composite	-20.28%	-36.29%	-43.81%	-5.88%	3.66%	3.79%
MSCI ACW x-US Index ^^	-21.67%	-37.51%	-44.31%	-6.86%	2.80%	2.17%
Variance	+1.39%	+1.22%	+0.50%	+0.98%	+0.86%	+1.62%
Large Public Fund A	--	--	--	--	--	--
Large Public Fund B	-22.50%	-40.17%	-46.62%	-8.08%	2.13%	4.23%
Large Public Fund C	-20.73%	-37.41%	-43.21%	-6.62%	2.72%	2.81%
Large Public Fund D	-21.50%	-38.03%	-45.78%	-10.50%	0.44%	0.64%
Large Public Fund E	-21.51%	-38.04%	-45.77%	-10.48%	0.45%	0.65%
Large Public Fund F	-22.16%	-39.69%	-46.56%	-8.58%	0.45%	--
Large Public Fund G	-22.90%	-40.09%	-45.79%	-7.38%	2.05%	2.73%
Large Public Fund H	-21.20%	-38.92%	-45.56%	-7.43%	3.46%	2.15%
Large Public Fund I	-20.32%	-37.75%	-43.25%	-5.81%	3.80%	3.77%
Large Public Fund J	-21.60%	-38.70%	-44.74%	-6.67%	2.82%	--

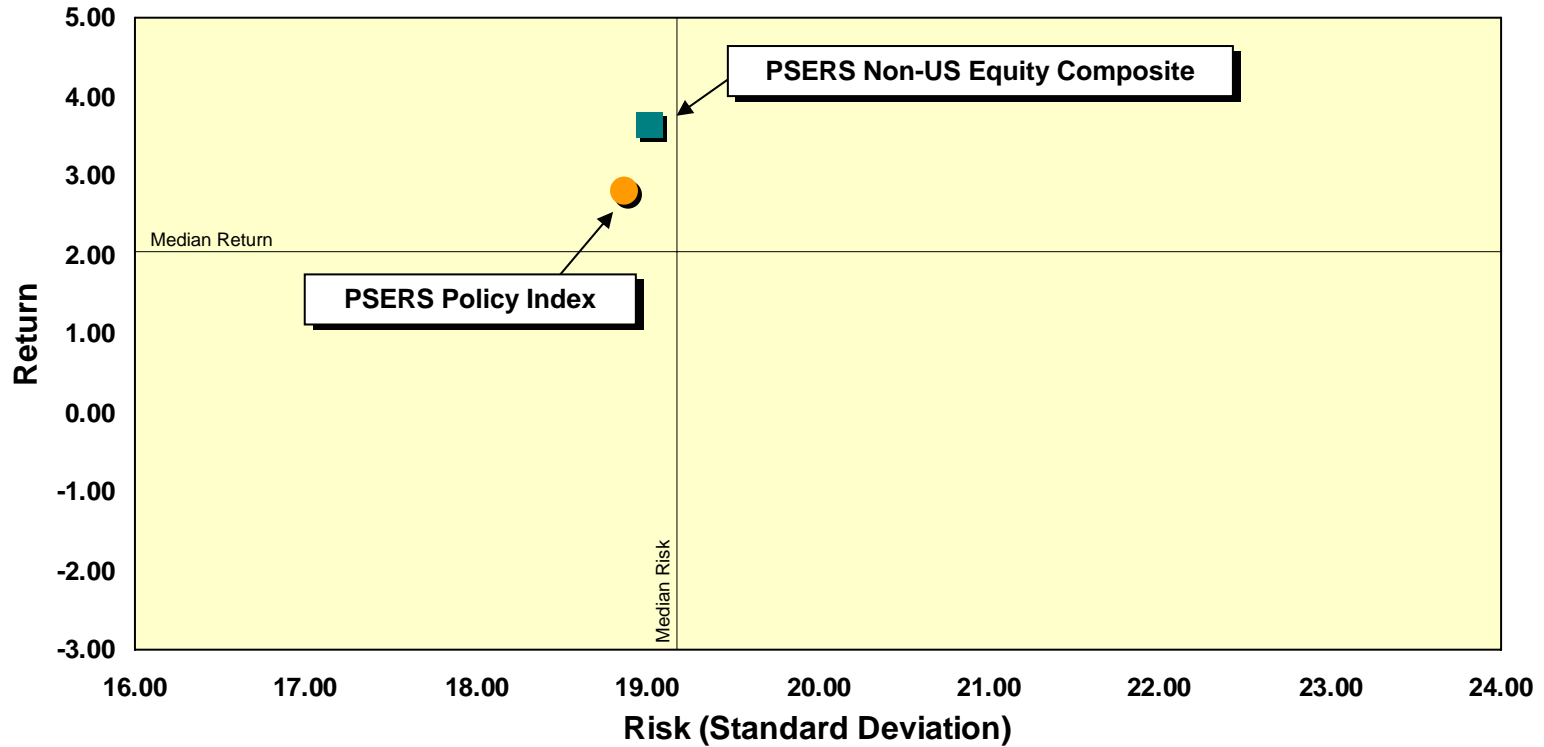
* Net of Fees

^ Over \$10 Billion

^^ MSCI ACW x-US Index, 30% Hedged as of 3Q06

Risk / Return Analysis

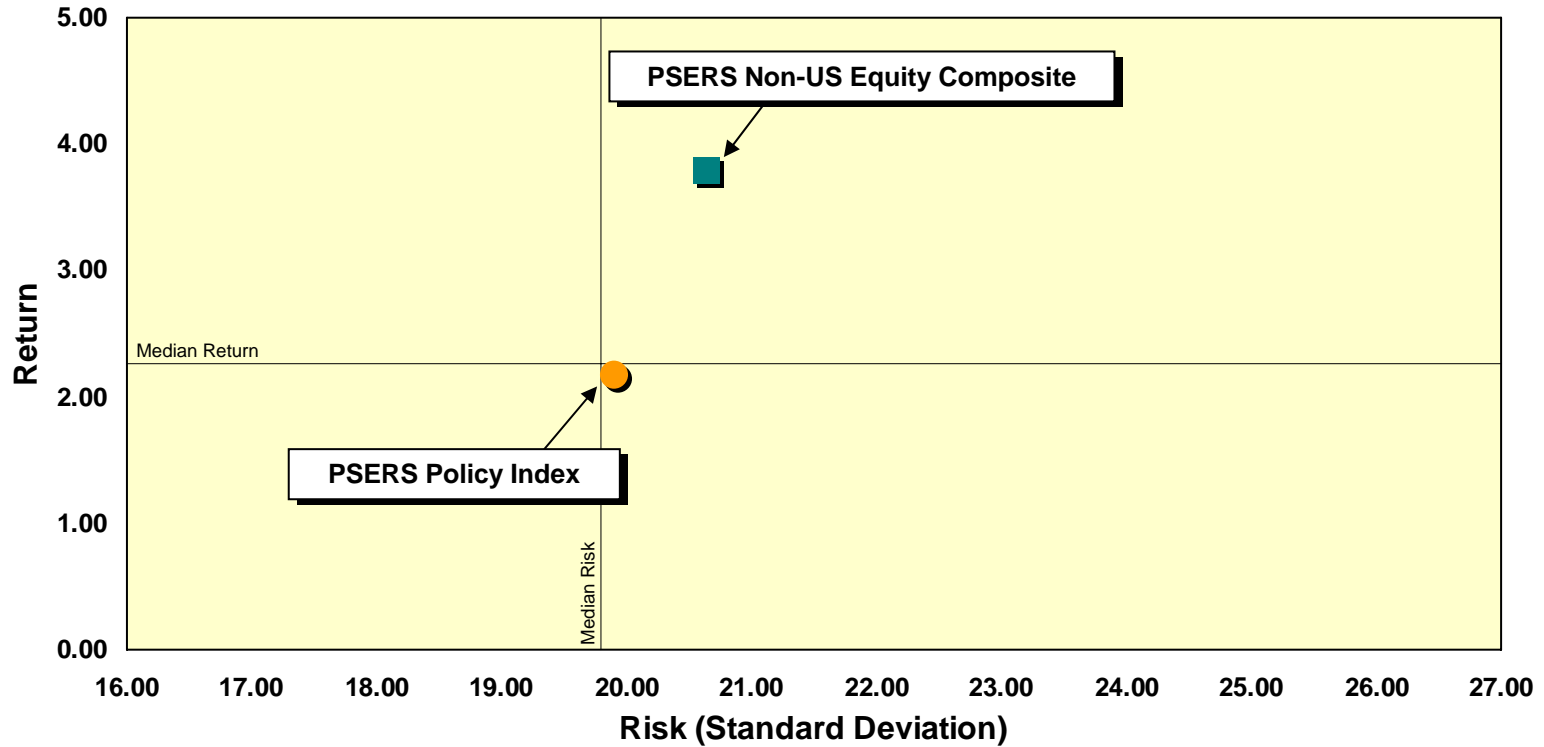
PSERS Non-US Equity vs All Public Funds * *Five-Year Period Ending December 31, 2008*



* Net of Fees

Risk / Return Analysis

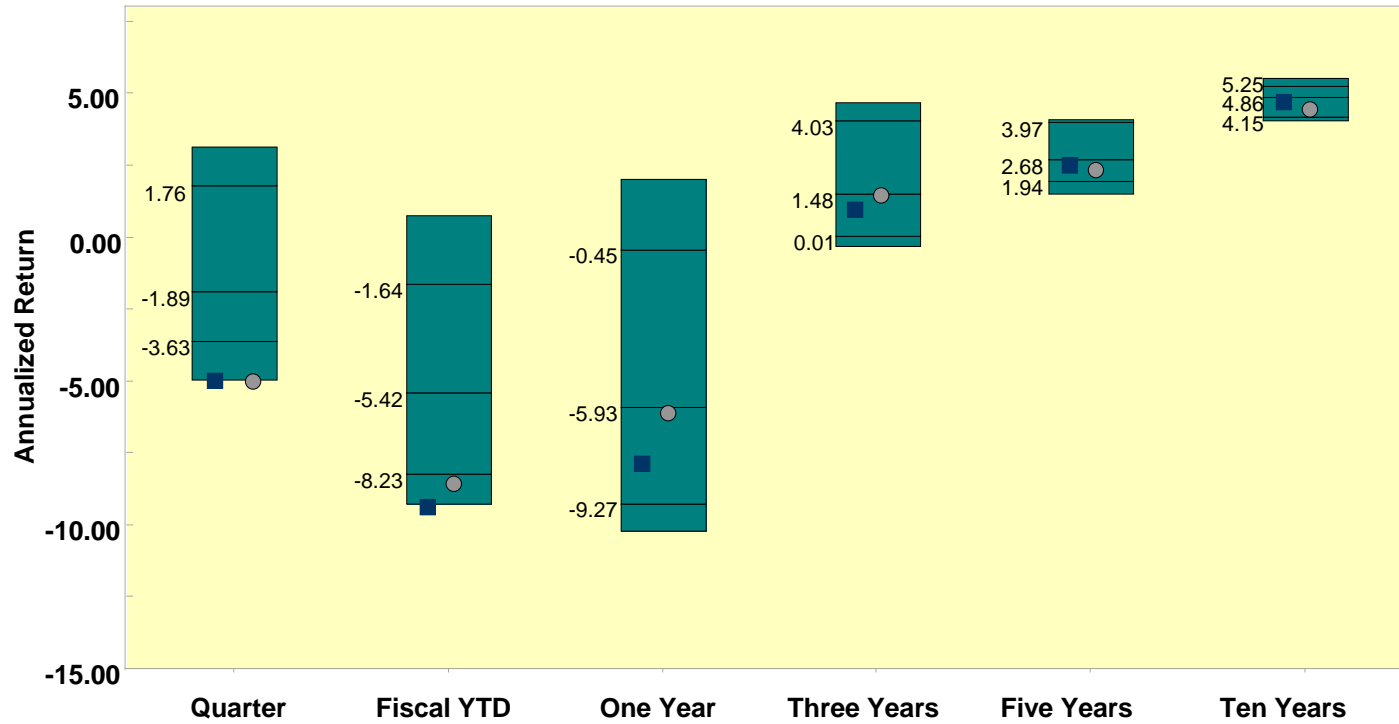
PSERS Non-US Equity vs All Public Funds * *Ten-Year Period Ending December 31, 2008*



* Net of Fees

Performance Comparison – US Fixed Income *

PSEERS vs All Public Funds For Periods Ending December 31, 2008



■ Total US Fixed
● Policy Index ^

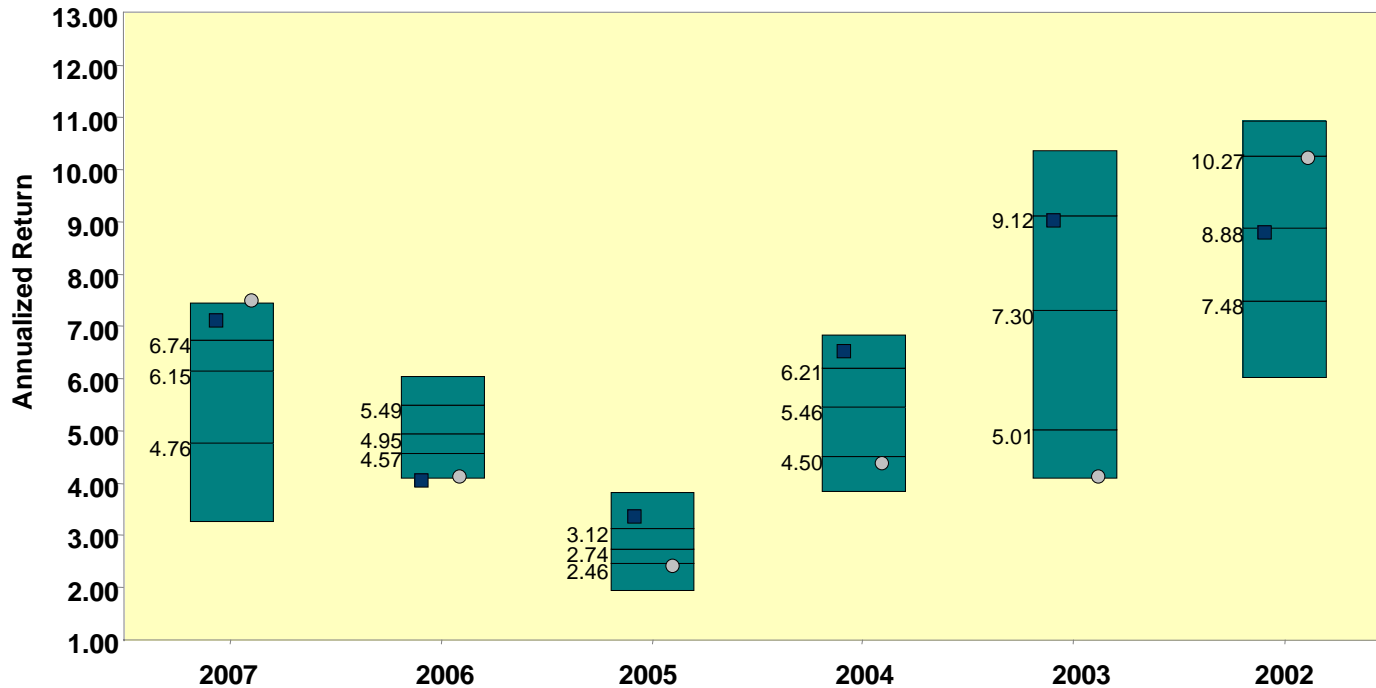
	Quarter	Fiscal YTD	One Year	Three Years	Five Years	Ten Years
Total US Fixed	-4.96 (88)	-9.35 (91)	-7.85 (66)	1.00 (66)	2.53 (56)	4.75 (55)
Policy Index ^	-4.98 (91)	-8.52 (82)	-6.08 (52)	1.50 (50)	2.39 (58)	4.48 (62)

Number of Funds: Quarter (34), Fiscal YTD (34), One Year (34), Three Years (34), Five Years (34), Ten Years (31)

* Net of Fees
^ 44.44% Barclays Universal, 27.78% CS High Yield, 27.78% Barclays US TIPS as of 2Q08

Performance Comparison – US Fixed Income *

PSEERS vs All Public Funds Calendar-Year Periods



■ Total US Fixed

○ Policy Index ^

7.19 (16)

7.79 (9)

4.21 (86)

4.34 (83)

3.17 (20)

2.43 (76)

6.61 (15)

4.33 (78)

9.17 (23)

4.11 (90)

8.80 (54)

10.27 (25)

Number of Funds

58

65

67

62

67

71

* Net of Fees

^ 73.26% Barclays Universal, 26.74% Barclays US TIPS as of 2Q07

Performance Comparison – US Fixed Income *

PSERS vs Large Public Funds ^ For Periods Ending December 31, 2008

	Quarter	Fiscal YTD	One Year	Three Years	Five Years	Ten Years
Large Public Funds						
PSERS US Fixed Composite	-4.96%	-9.35%	-7.85%	1.00%	2.53%	4.75%
Policy Index ^^	-4.98%	-8.52%	-6.08%	1.50%	2.39%	4.48%
Variance	+0.02%	-0.83%	-1.77%	-0.50%	+0.14%	+0.27%
Large Public Fund A	1.88%	-3.39%	-3.82%	2.78%	4.02%	5.54%
Large Public Fund B	0.91%	-2.23%	-2.02%	2.91%	3.33%	--
Large Public Fund C	--	--	--	--	--	--
Large Public Fund D	1.78%	0.43%	2.02%	4.69%	4.05%	5.25%
Large Public Fund E	1.76%	0.37%	1.95%	4.66%	4.04%	5.29%
Large Public Fund F	-7.13%	-10.67%	-10.26%	0.19%	1.95%	--
Large Public Fund G	0.16%	-3.28%	-3.26%	2.68%	3.26%	5.00%
Large Public Fund H	7.55%	2.72%	1.66%	4.04%	3.89%	5.50%
Large Public Fund I	-5.45%	-9.03%	-9.86%	0.01%	1.94%	4.45%
Large Public Fund J	-0.01%	-2.54%	-0.45%	3.88%	3.97%	--

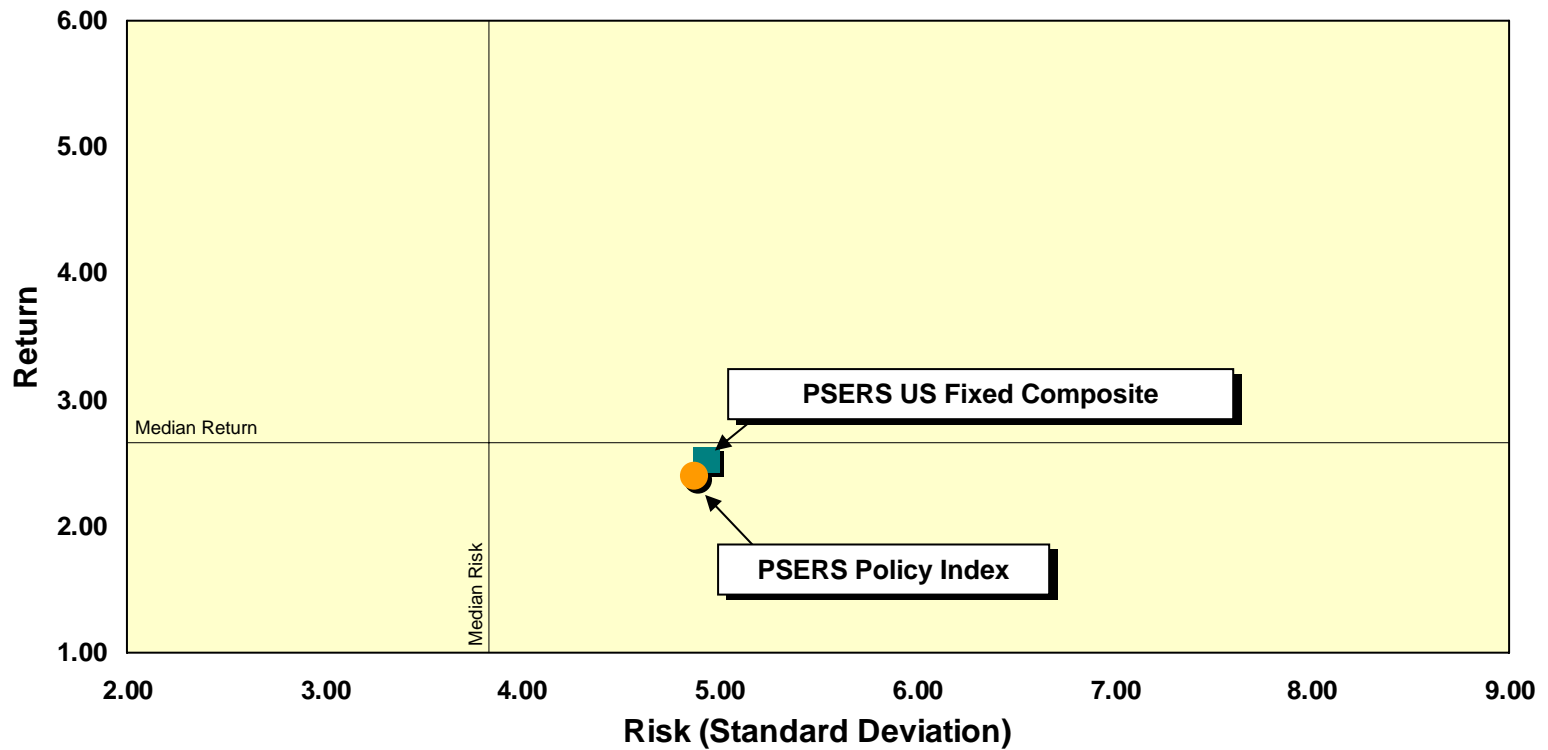
* Net of Fees

^ Over \$10 Billion

^^ 44.44% Barclays Universal, 27.78% CS High Yield, 27.78% Barclays US TIPS as of 2Q08

Risk / Return Analysis

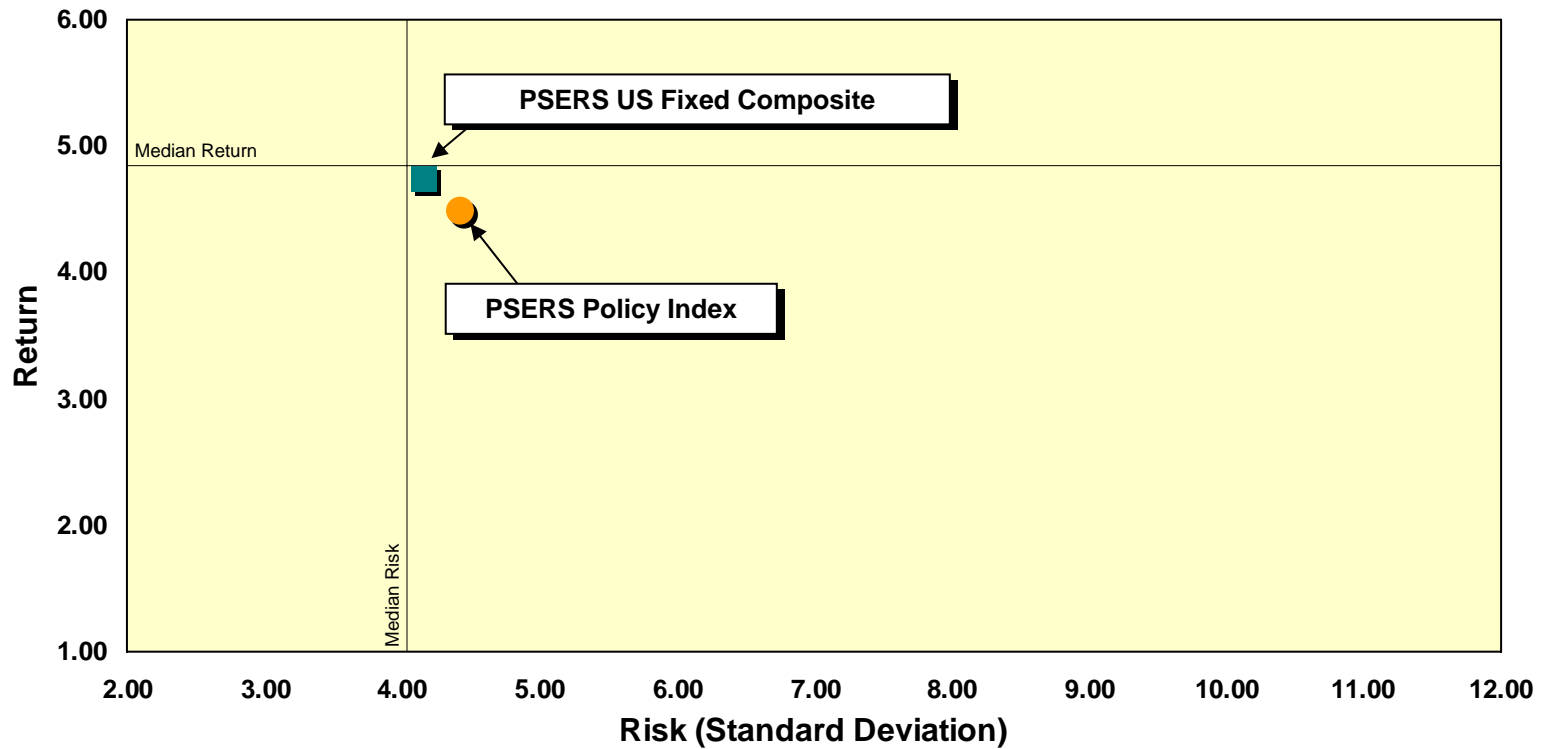
PSERS US Fixed Income vs All Public Funds * *Five-Year Period Ending December 31, 2008*



* Net of Fees

Risk / Return Analysis

PSERS US Fixed Income vs All Public Funds * *Ten-Year Period Ending December 31, 2008*



* Net of Fees

Global Fixed Income

Composite Investment Performance vs Benchmark *

For Periods Ending December 31, 2008

	Quarter	Fiscal YTD	One Year	Three Years	Five Years	Ten Years
Global Fixed Income Composite	-0.37%	-5.24%	-3.08%	3.76%	3.44%	4.34%
Global Fixed Income Policy **	4.58%	0.40%	3.78%	6.52%	4.75%	5.02%
Variance	-4.95%	-5.64%	-6.86%	-2.76%	-1.31%	-0.68%

* Net of Fees

** Barclays Multiverse Index as of 2Q07

Real Estate / Private Markets / Commodities

Composite Investment Performance vs Benchmarks *

For Periods Ending December 31, 2008

	Quarter	Fiscal YTD	One Year	Three Years	Five Years	Ten Years
PTRES Composite	-34.72%	-42.15%	-49.52%	-12.63%	1.81%	8.42%
Blended Policy Benchmark **	-32.38%	-39.42%	-47.73%	-11.59%	0.99%	7.55%
Variance	-2.34%	-2.73%	-1.79%	-1.04%	+0.82%	+0.87%
Private Real Estate Composite	-8.34%	-10.77%	-17.15%	12.00%	17.86%	13.19%
NCREIF (Lagged)	-0.17%	0.39%	5.27%	13.24%	14.24%	11.83%
Variance	-8.17%	-11.16%	-22.42%	-1.24%	+3.62%	+1.36%
Pvt Equity / Venture / Prvt Debt Composite	-9.01%	-8.48%	-3.23%	18.21%	20.39%	12.25%
Venture Econ Index (Lagged)	-2.22%	-2.44%	-0.78%	7.54%	8.06%	3.13%
Variance	-6.79%	-6.04%	-2.45%	+10.67%	+12.33%	+9.12%
Commodities Composite	-32.13%	-51.66%	-42.37%	--	--	--
DJ AIG Commodity Index	-30.04%	-49.41%	-35.65%	--	--	--
Variance	-2.09%	-2.25%	-6.72%	--	--	--

* Net of Fees

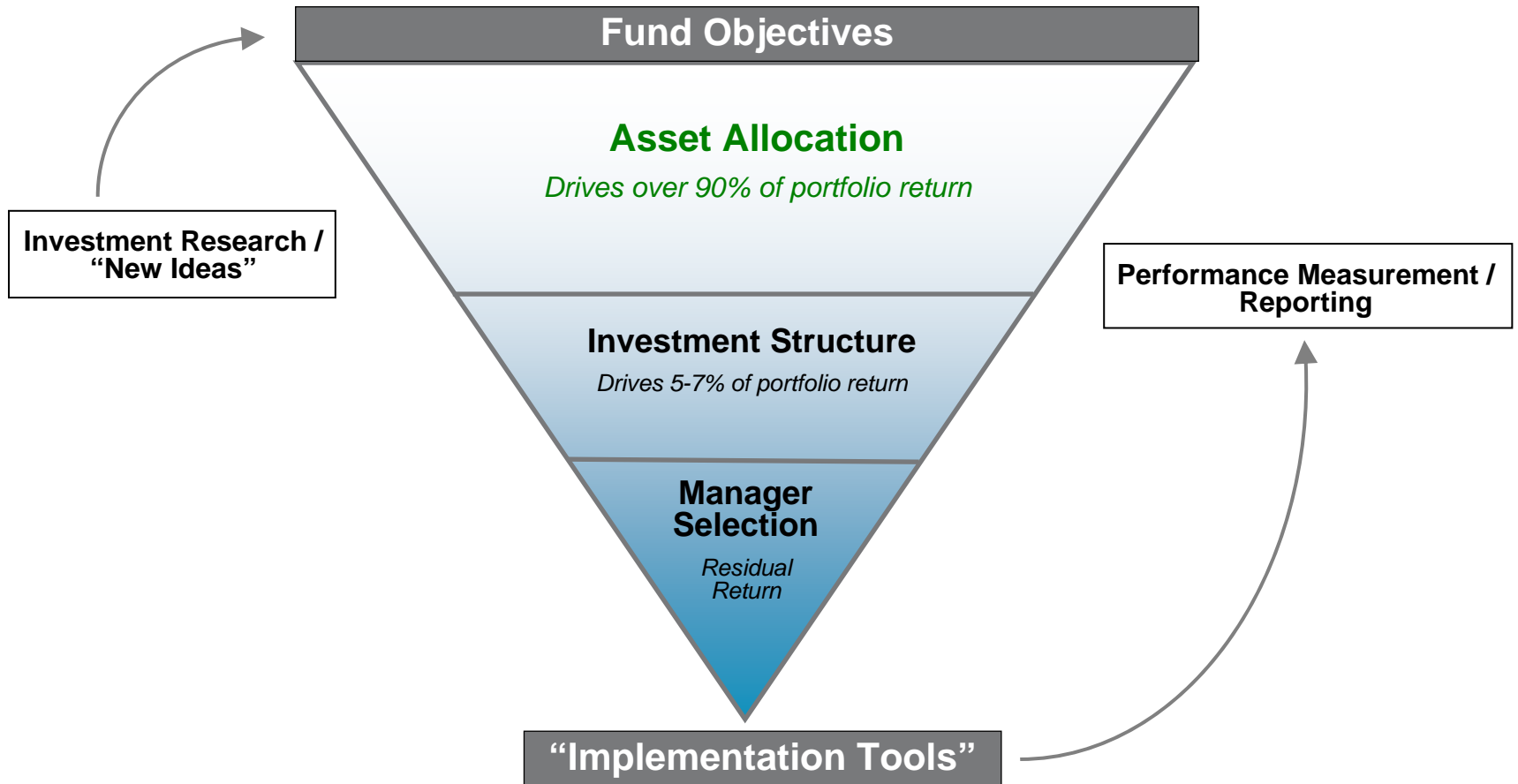
** FTSE ERPA / NAREIT Global RE Index as of 4Q06

Tab 2

Asset / Liability Analysis

Investment Consulting Process

Top-Down Approach



Result: Clear investment recommendations, communication of rationale, and alternatives considered

Asset / Liability Analysis

The Role of Asset Allocation

- Asset allocation is the process of selecting a policy portfolio that allocates assets among asset classes that have the potential to serve the financial objectives of the plan.
 - 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 the core mission.
 - The primary goal of asset allocation is to **maximize the safety** of promised benefits and **minimize the cost** of funding the benefits – Wilshire’s Asset Liability Valuation (ALV) model provides a methodology for selecting a policy portfolio that achieves both of these goals.

Asset / Liability Analysis

Plan Statistics *

(\$ Billions)	July 1 st , 2007	July 1 st , 2008
<u>Liabilities</u>		
a. Participating employees	33.303	35.286
b. Participants with deferred benefits	1.589	0.941
c. Participants receiving benefits	31.604	34.618
d. Health Insurance Assets for Premium Assistance	<u>0.097</u>	<u>0.096</u>
e. Total Accrued Liability for Funding	66.593	70.941
<u>Assets</u>		
f. Actuarial Value of Assets	57.155	61.018
g. Funded Status (f./e.)	85.8%	86.0%
h. Present Value of Future Benefit	82.458	89.512
i. Market Value of Assets	67.438	62.569
j. Present Value of Future Member Contribution	8.431	9.090
k. "Cost" (i. – h. – j.)	6.589	17.853
l. Present Value of Future Pay	113.566	126.592
m. Cost as Percentage of Pay (k. / l.)	7.42%	14.10%
<u>Assumption</u>		
Expected Rate of Return	8.50%	8.25%^
Inflation Rate	3.25%	3.25%

* Based on current valuation from Buck Consultants (June 30, 2008)
 ^ Expected rate of return for 2009 and beyond is 8.00%

Asset / Liability Analysis

Asset Allocation Process – Inputs

- Capital market expectations
 - Expected return
 - Expected risk
 - Expected correlation
- Portfolio optimization
 - Asset class constraints
 - Efficient frontier analysis
 - Model policy portfolios
- Asset allocation modeling
- Asset / liability simulation

Asset Allocation

Wilshire's Asset Class Return Assumptions

2008 vs 2009

	2008	2009	Difference
US Equity	8.25%	8.50%	+0.25%
Non-US Equity	8.50%	8.70%	+0.20%
US Core Fixed Income	5.00%	4.00%	-1.00%
TIPS	4.00%	3.50%	-0.50%
Leveraged TIPS	4.68%	4.68%	--
High Yield Fixed Income	7.00%	8.50%	1.50%
Global Fixed Income	4.75%	3.75%	-1.00%
Private Markets	11.25%	11.00%	-0.25%
Real Estate	5.91%	7.14%	1.23%
Commodities	5.25%	3.50%	-1.75%
Cash	3.00%	2.00%	-1.00%
Absolute Return	7.25%	8.00%	+0.75%

Asset Allocation

Wilshire's 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**).

	US Equity	Non-US Equity	US Core Fixed Income	TIPS	Leveraged TIPS	High Yield Fixed Income	Global Fixed Income	Private Markets	Real Estate	Commodities	Cash	Absolute Return
Return (%)	8.50	8.70	4.00	3.50	4.68	8.50	3.75	11.00	7.14	3.50	2.00	8.00
Risk (%)	16.00	17.25	5.00	6.00	11.88	10.00	10.00	21.75	14.30	13.00	1.25	8.00
Correlations												
US Equity	1.00											
Non-US Equity	0.83	1.00										
US Core Fixed Income	0.29	0.04	1.00									
TIPS	-0.05	0.04	0.20	1.00								
Leveraged TIPS	-0.05	0.05	0.18	0.99	1.00							
High Yield Fixed Income	0.48	0.37	0.28	0.01	0.01	1.00						
Global Fixed Income	-0.01	0.25	0.40	0.05	0.06	0.01	1.00					
Private Markets	0.73	0.66	0.37	0.01	0.00	0.40	0.07	1.00				
Real Estate	0.36	0.28	0.16	0.15	0.15	0.32	0.06	0.34	1.00			
Commodities	0.00	0.22	0.00	0.20	0.21	0.08	0.15	0.04	0.21	1.00		
Cash	0.00	-0.09	0.20	0.15	0.05	0.00	-0.10	0.00	0.00	-0.05	1.00	
Absolute Return	0.62	0.69	0.05	0.00	-0.01	0.56	0.05	0.41	0.39	0.09	0.06	1.00

Asset / Liability Analysis

Background

The Underfunded Status of Pension Funds

- Demographic shifts
 - Aging baby boomers
 - Plan membership – more retirees than active participants
 - Retirees are living longer
 - Pressure to continue to improve benefits
- Capital market opportunities
 - Credit / liquidity challenges
 - Availability of financing for private equity and real estate
 - Consumer spending contraction
 - Corporate earnings growth / outlook
 - Single digit equity return expectations
 - Low interest rate environment
 - Low inflation environment
- Increased contribution requirements
 - Budgetary shortfalls
 - Expectations for slower long-term economic growth in developed countries

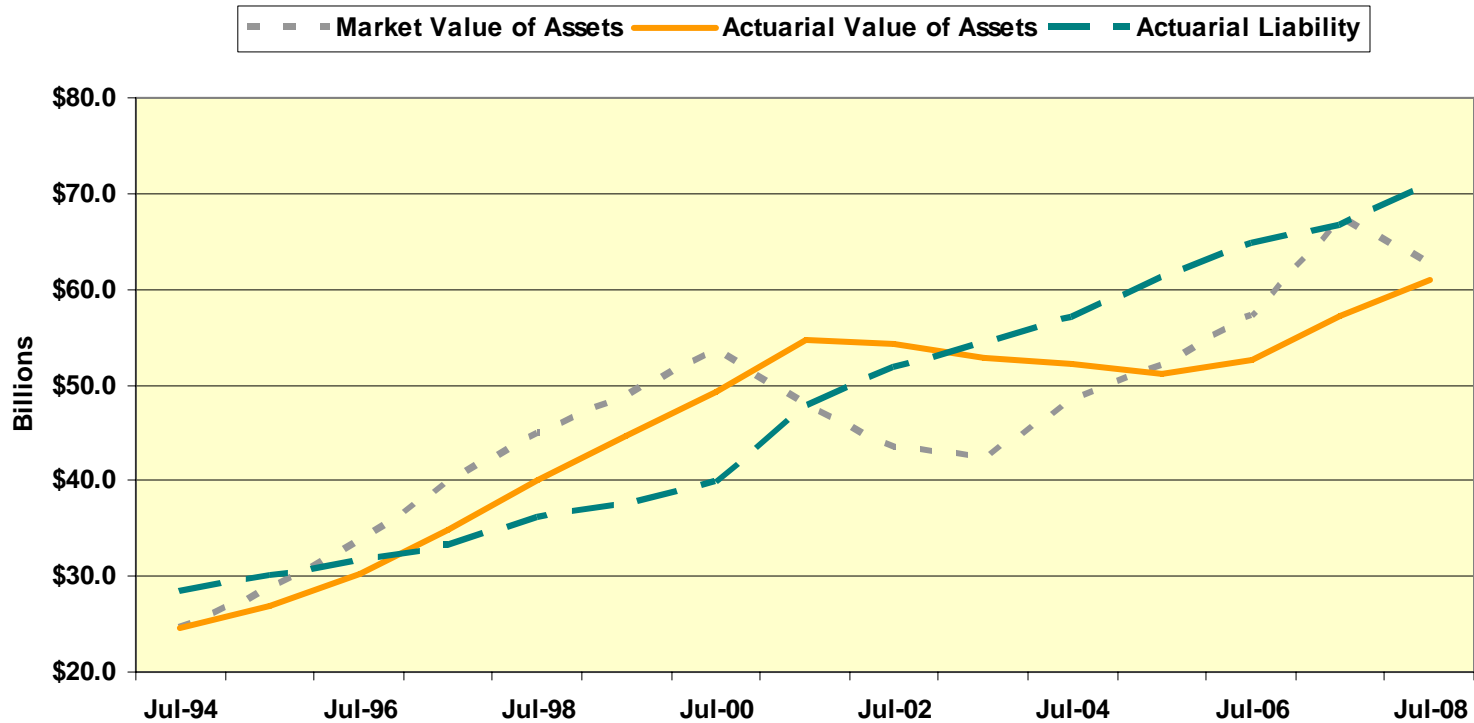
Asset / Liability Analysis

Historical Observations and Current Conditions

- PSERS funded status peaked in the March – June 2000 period on both a market value and an actuarial value basis.
- The combination of negative equity returns from March 2000 through March 2003 and pension legislation to improve benefits (multiplier change and COLA) in 2000 had a meaningful and negative impact on the funded status of PSERS.
- At June 30, 2008, the funded ratio based on the market value of assets was approximately 88%, down from the 101 % as of June 30, 2007. Based on the actuarial value of assets (five-year smoothing technique), the funded ratio as of June 30, 2007 was approximately 86%, up from the 85.8 % as of June 30, 2007.
- The current strategic asset allocation policy for PSERS is expected to generate a long-term return of 8.28%. No expected alpha has been modeled in this analysis.
- The actuarial discount rate assumption was 8.25% for 2008 and 8.00% for 2009 and beyond.
- Wilshire uses the market value of assets for asset allocation policy analysis.

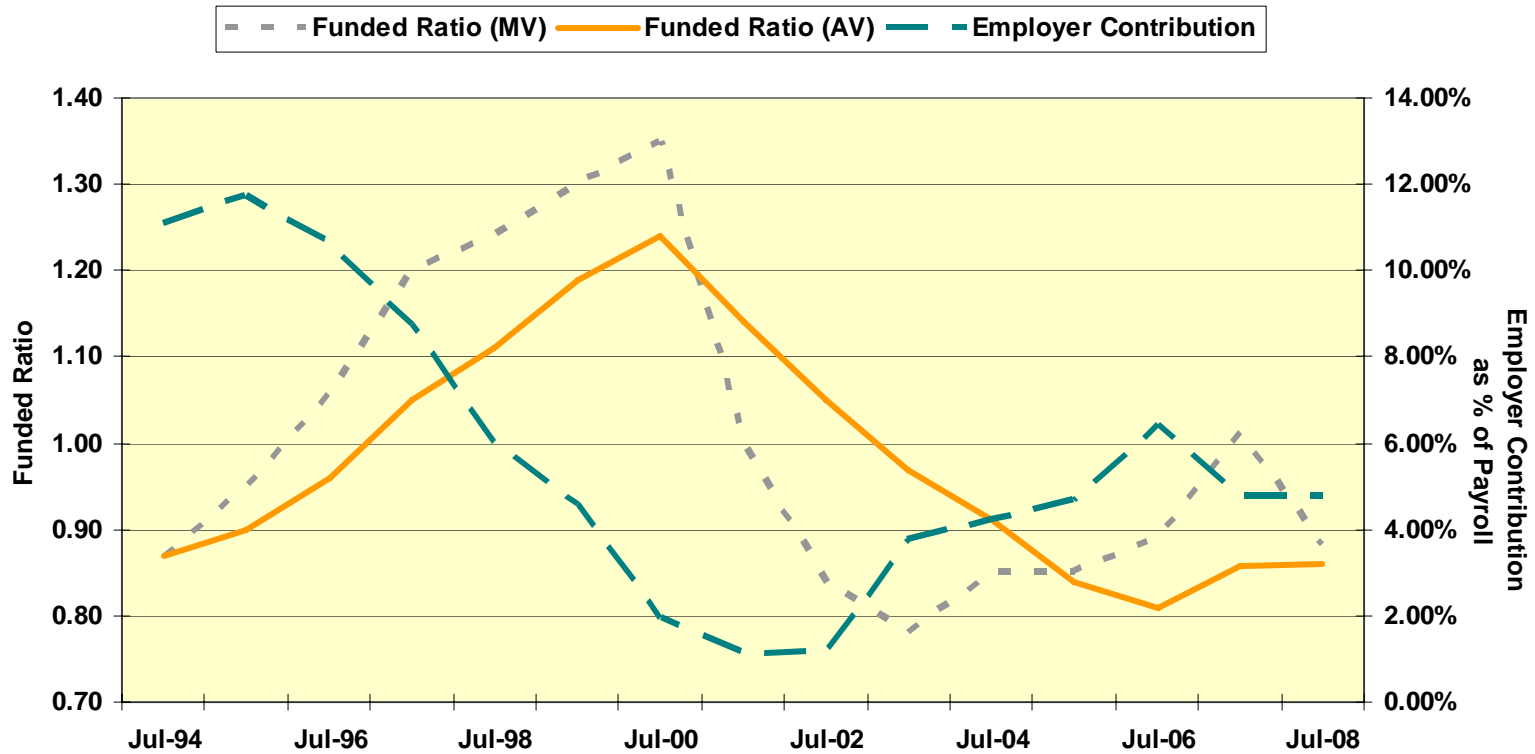
Asset / Liability Analysis

Historical Perspective – Asset and Liability Growth *July 1994 Through July 2008*



Asset / Liability Analysis

Historical Perspective – Funded Ratios vs Employer Contributions *July 1994 Through July 2008*



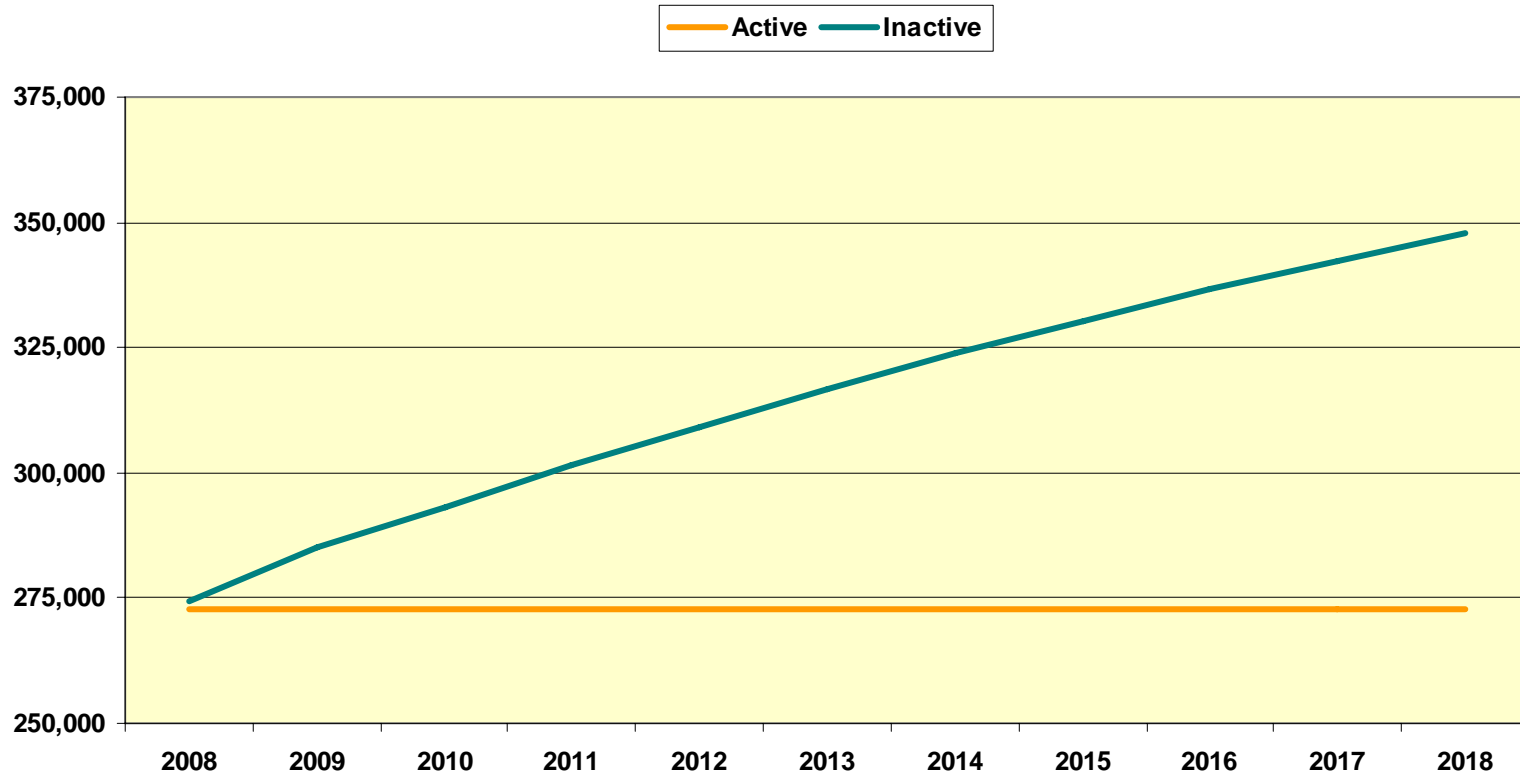
Asset / Liability Analysis

Expected Conditions

- A ten-year planning horizon (January 2009 through January 2019) is used in the analysis.
- Seven alternative portfolios were tested to determine the simulated impact of asset allocation policy on future funding levels.
- Employee contributions are assumed to remain stable at approximately 7.30% - 7.50% of payroll.
- Over the next ten years, the projected market value of assets is expected to grow to approximately \$60 billion, based on the present allocation.
- Accrued liabilities are expected to grow to approximately \$100 billion over the next ten years.
- Based on the demographic profile of the PSERS membership, the inactive population is expected to grow steadily over the next ten years.

Asset / Liability Analysis

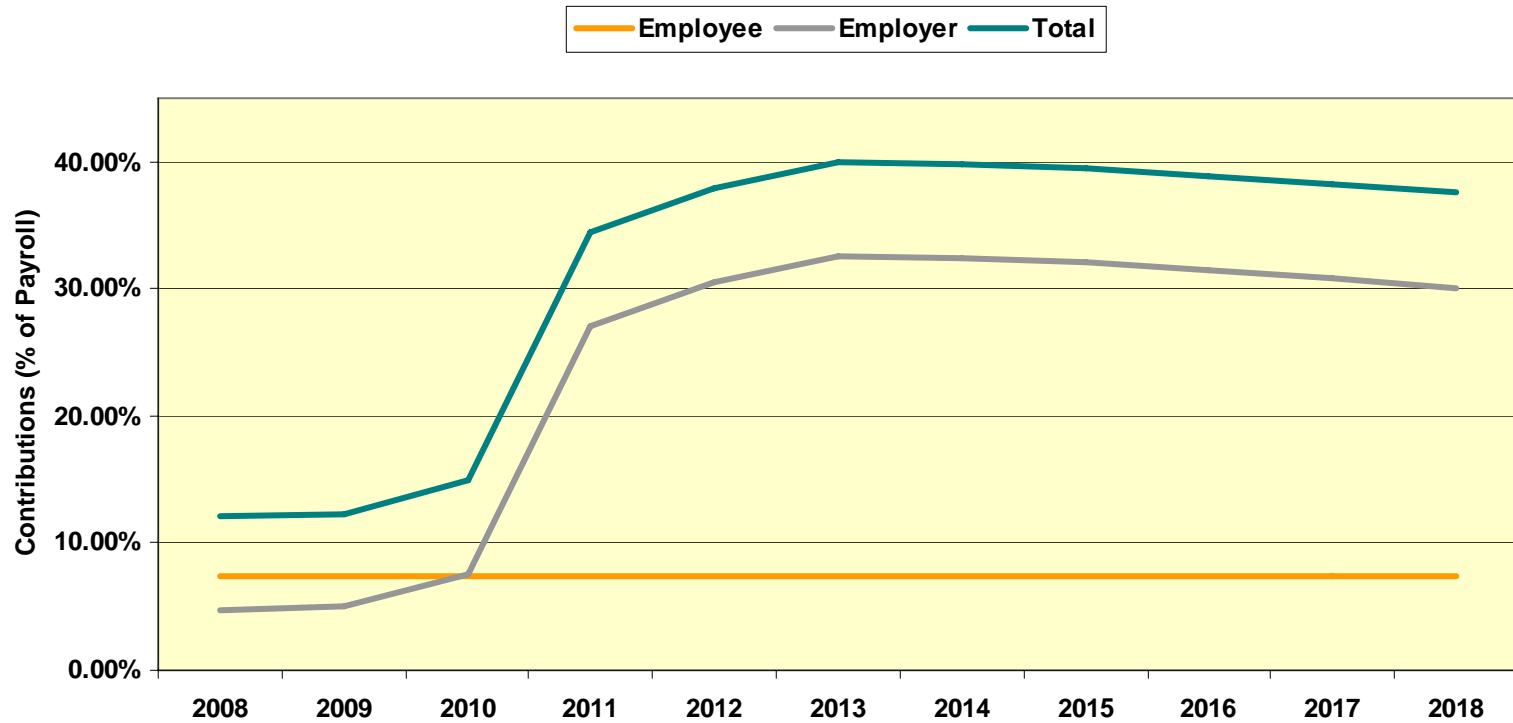
Expected Conditions *Membership Demographics*



Profile at June 30, 2008	
Active	272,691
Inactive	274,343
Total	547,033

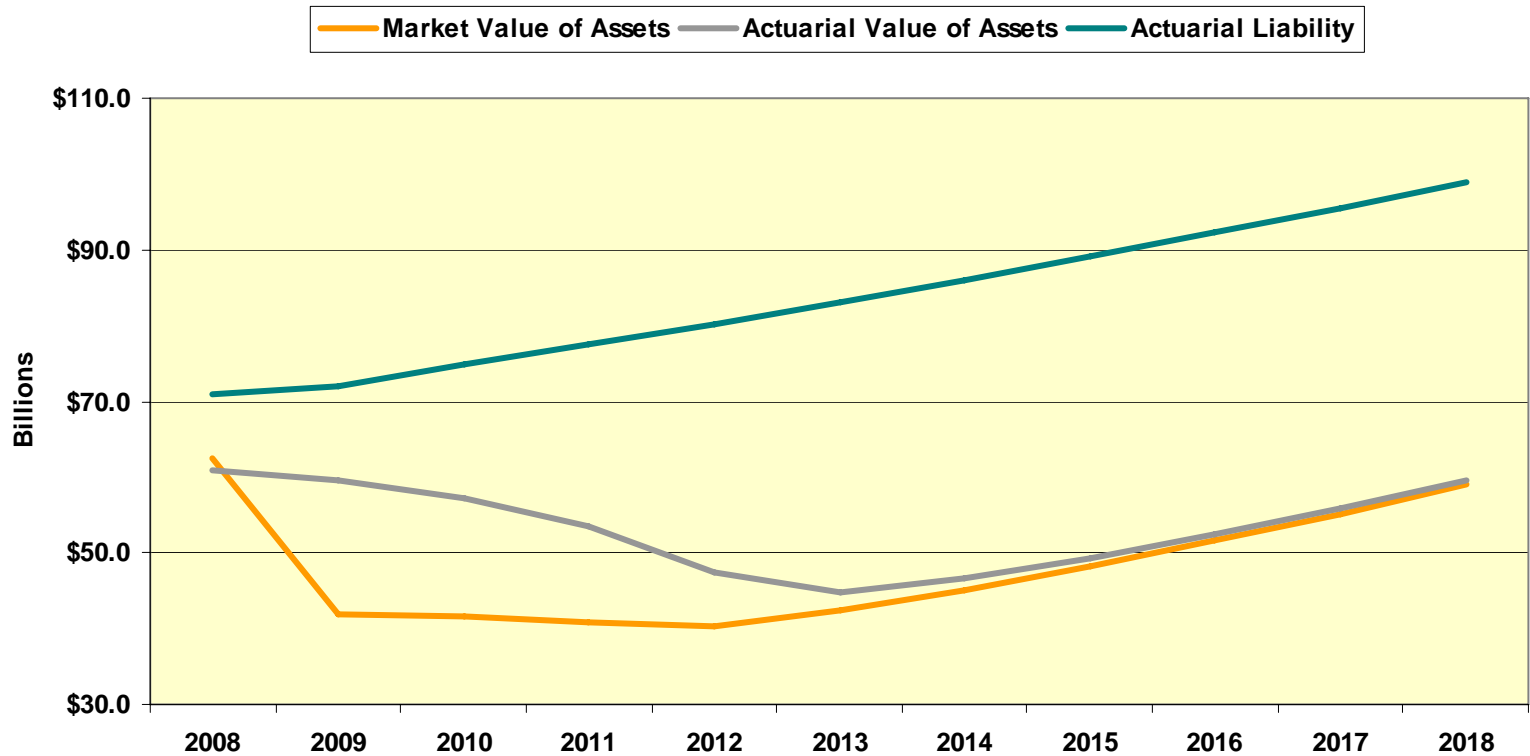
Asset / Liability Analysis

Expected Conditions *Contribution Rates*



Asset / Liability Analysis

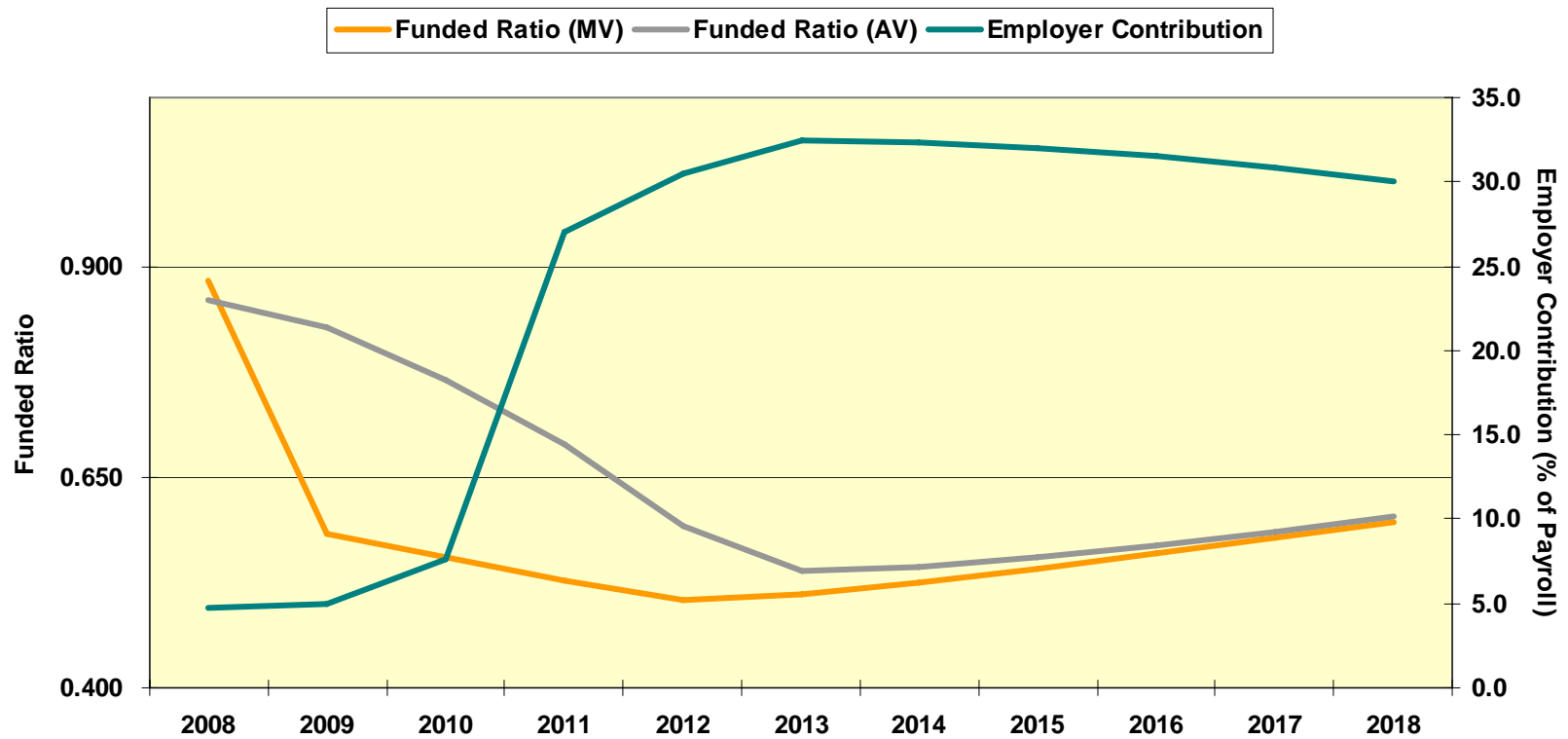
Expected Conditions *Asset and Liability Growth*



Asset / Liability Analysis

Expected Conditions

Funded Ratios vs Employer Contributions



Asset / Liability Analysis

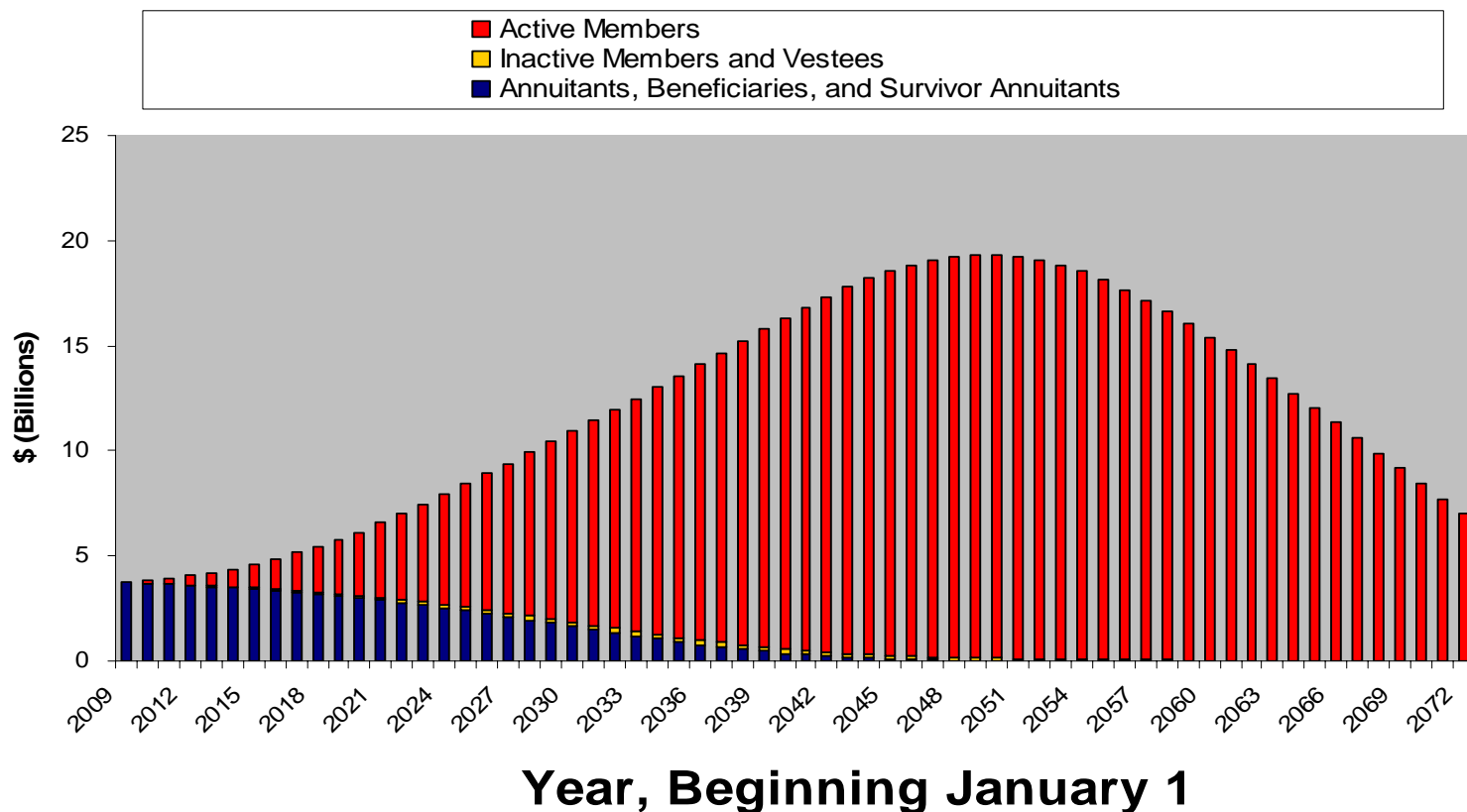
Actuarial and Liability Projection Assumptions

- Planning Horizon: 10 Years
- Funding Method: Entry Age Normal
- Start Date: Dec 31, 2008 (Wilshire liability estimates)
 - Market Value of Assets (MVA): \$40.2 Billion
 - Actuarial Value of Assets (AVA): \$48.4 Billion
 - Current Accrued Liability (AL): \$70.7 Billion
 - Unfunded Liability (AL-AVA): \$22.3 Billion
 - Payroll: \$12.7 Billion
- Actuarial Discount Rate Assumption: 8.25% in initial year, 8.00% in subsequent years
- Workforce Growth Rate: 0.00%
- Initial Employee Contribution Rate as a Percent of Payroll: 7.32%
- No Changes to the Benefit Formula or Benefit Enhancements

Asset / Liability Analysis

Plan Commitment

- Projected by Wilshire – from information provided by Buck Consultants in the actuarial valuation - the benefit commitment includes projections of future pay and service for the current participant population



Asset / Liability Analysis

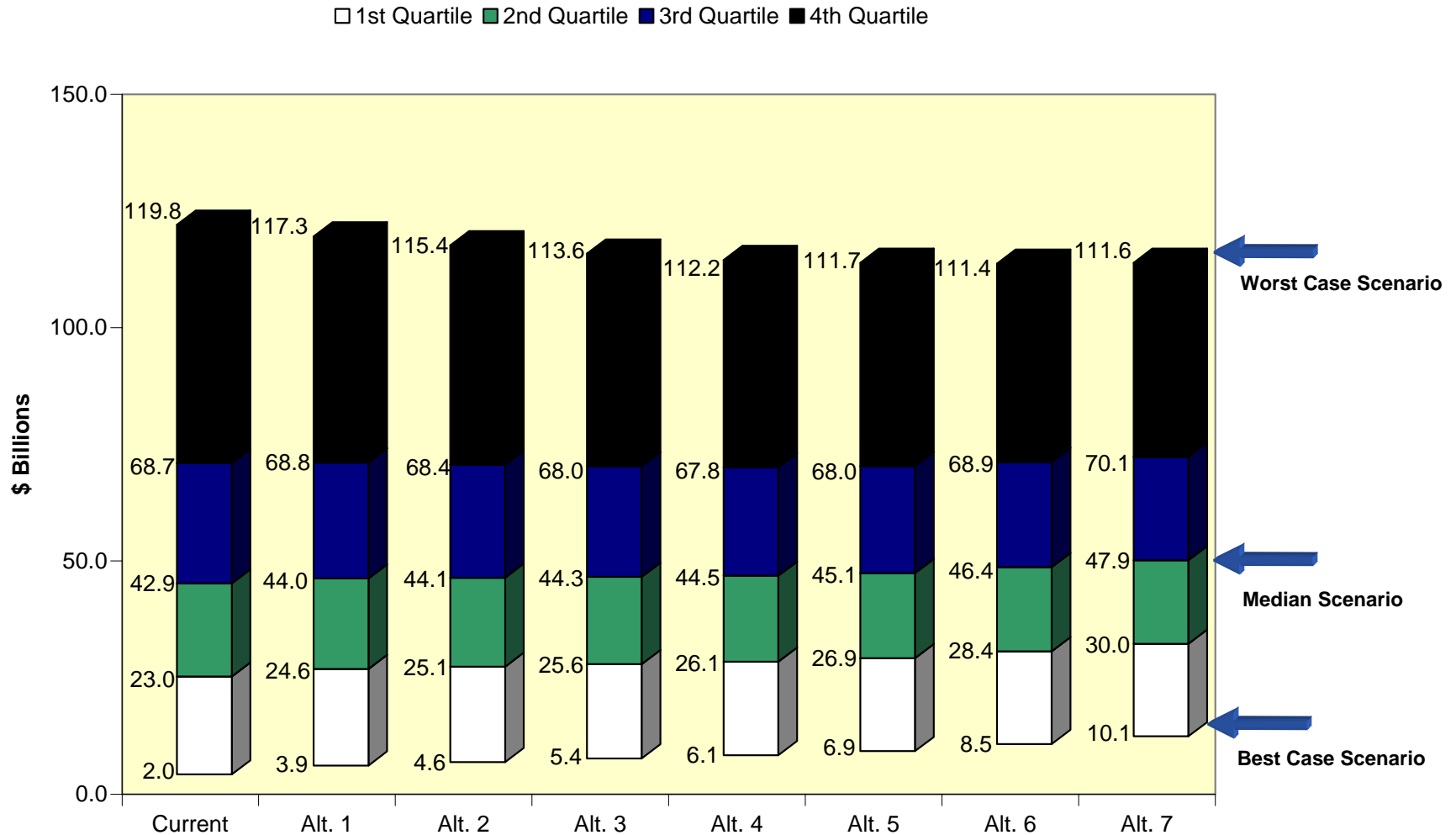
Alternative Portfolios

	Current Policy	Optimization Constraints			Alternative Policy Portfolios						
					1	2	3	4	5	6	7
US Equity	18.8%	0.0%	-	100.0%	16.9%	15.8%	14.6%	13.5%	12.4%	11.2%	10.1%
Non-US Equity *	23.8%	0.0%	-	100.0%	20.6%	19.3%	17.9%	16.5%	15.1%	13.7%	12.4%
Total Public Equity	42.5%				37.5%	35.0%	32.5%	30.0%	27.5%	25.0%	22.5%
US Core Fixed Income	8.0%	7.5%	-	100.0%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%
TIPS	5.0%	0.0%	-	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Levered TIPS	0.0%	0.0%	-	10.0%	5.0%	5.0%	5.0%	5.0%	5.5%	8.0%	10.0%
High Yield (Opportunistic)	5.0%	0.0%	-	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%
Global Fixed Income	4.0%	3.0%	-	10.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.5%
Cash	0.0%	5.0%	-	7.5%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Total Fixed Income	22.0%				29.5%	29.5%	29.5%	29.5%	30.0%	32.5%	35.0%
Private Markets	18.0%	10.0%	-	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%
Real Estate	12.5%	10.0%	-	13.0%	10.0%	10.0%	10.0%	11.0%	13.0%	13.0%	13.0%
Commodities	5.0%	4.0%	-	7.5%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Absolute Return	0.0%	0.0%	-	7.5%	1.0%	3.5%	6.0%	7.5%	7.5%	7.5%	7.5%
Total Alternatives	35.5%				33.0%	35.5%	38.0%	40.5%	42.5%	42.5%	42.5%
TOTAL	100.0%				100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	100.0%
Median Return	8.28%				8.20%	8.18%	8.17%	8.15%	8.10%	8.02%	7.93%
Standard Deviation	11.13%				10.60%	10.36%	10.13%	9.92%	9.71%	9.40%	9.09%
Increase / (Decrease) Return (bps)					(8)	(10)	(11)	(13)	(18)	(26)	(35)
Increase / (Decrease) St Dev (bps)					(53)	(77)	(100)	(121)	(142)	(173)	(204)

* Current policy reflects a 30% hedge / Alternative policies are unhedged. Non-US Equity constrained to no greater than 55% of the total Public Equity allocation.

Asset / Liability Analysis

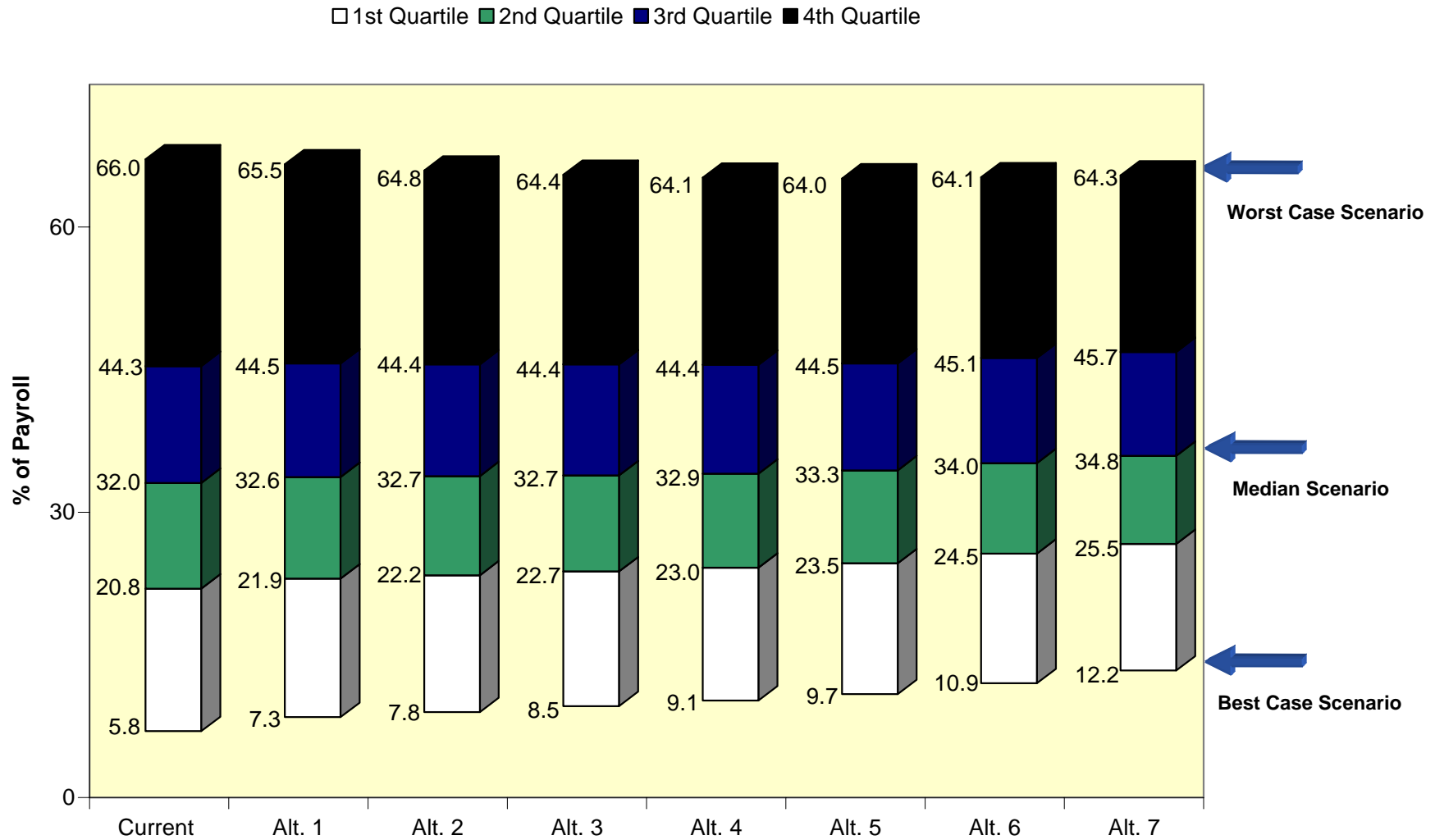
Distribution of Additional Cost



Additional Cost is the cost – as of January 1, 2009 - above assets and member contributions to fund the benefit commitment.

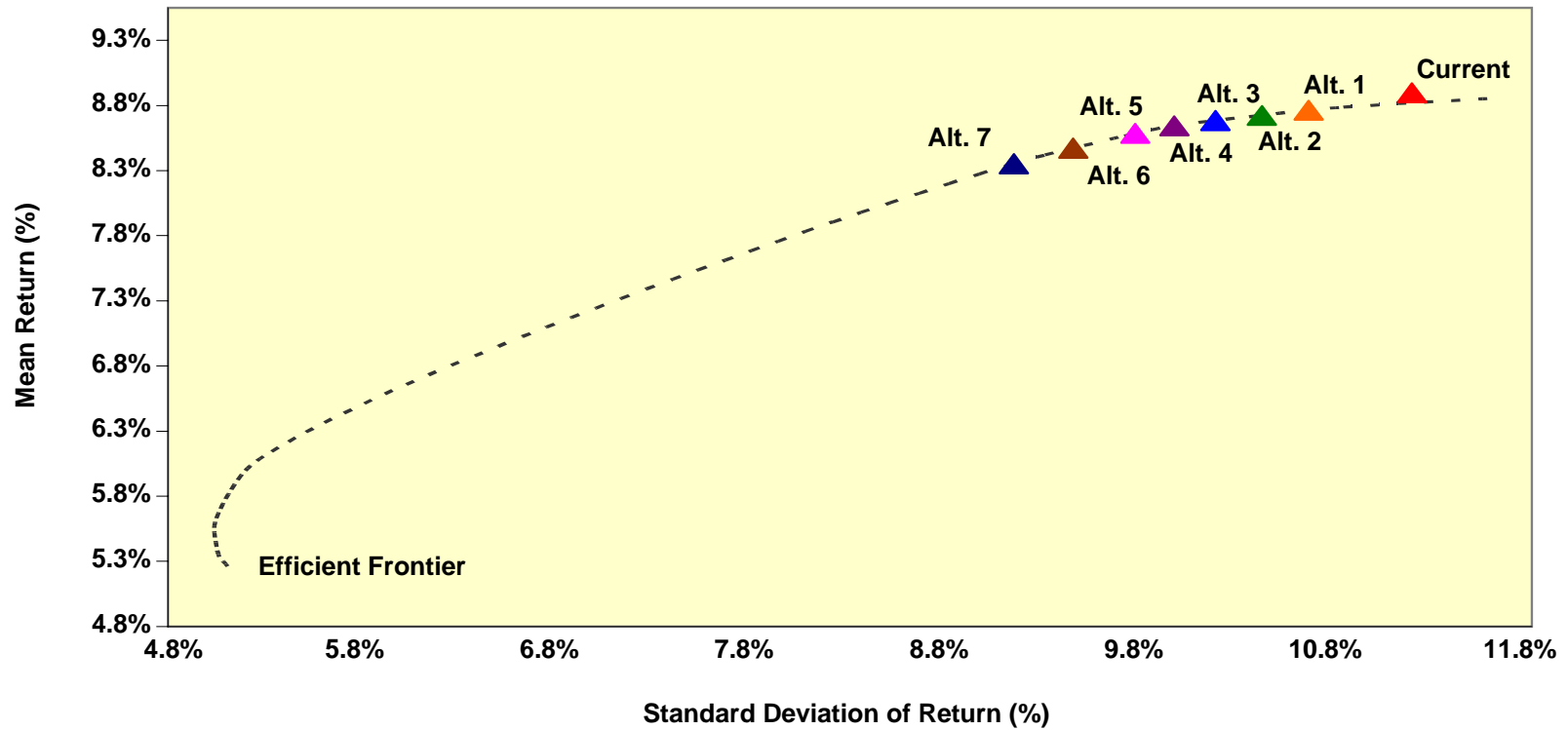
Asset / Liability Analysis

Distribution of Annual Cost as a Percentage of Payroll



Efficient Frontier

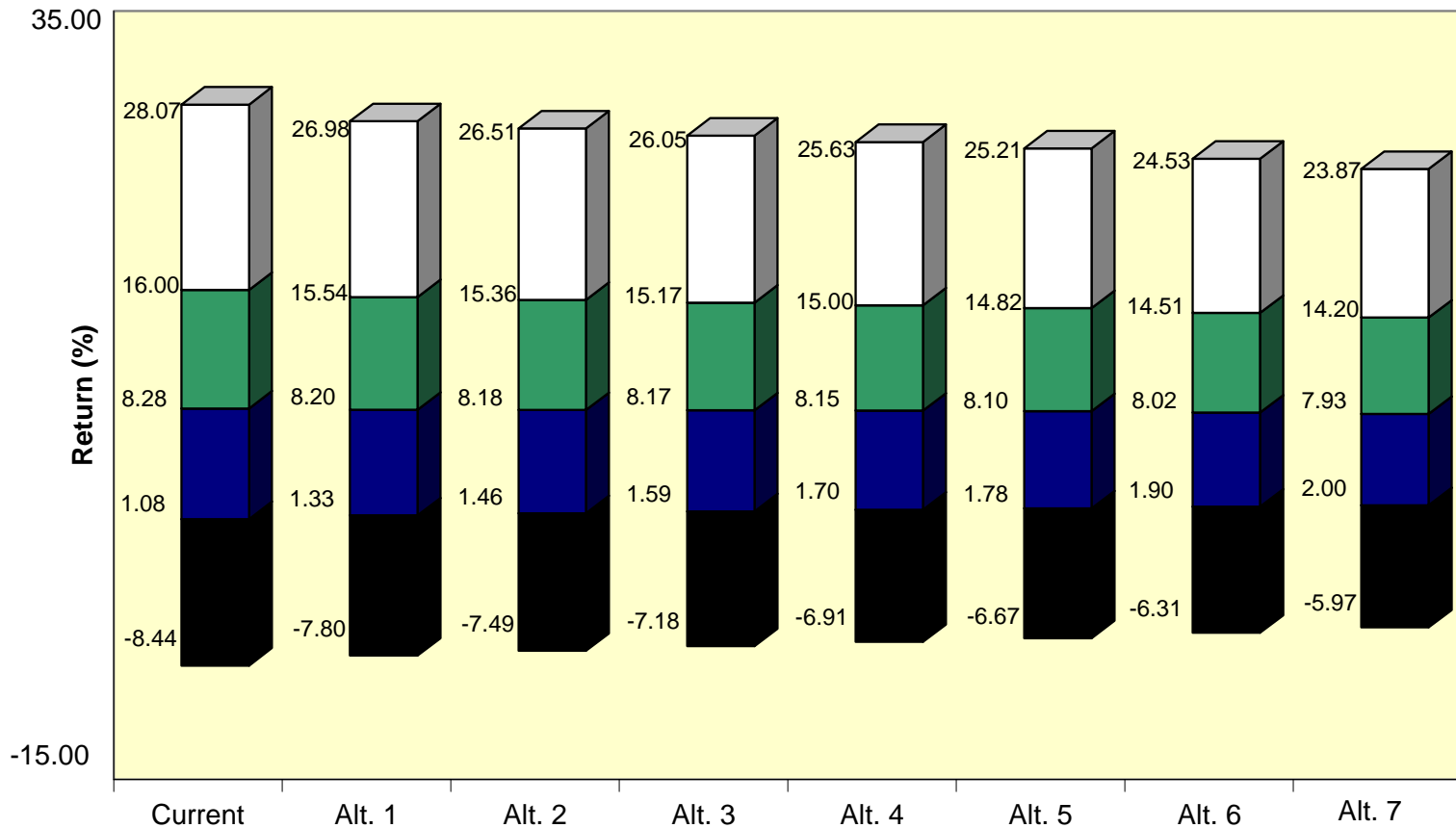
PSERS Policy Alternatives



Asset / Liability Analysis

One Year Compound Annual Return

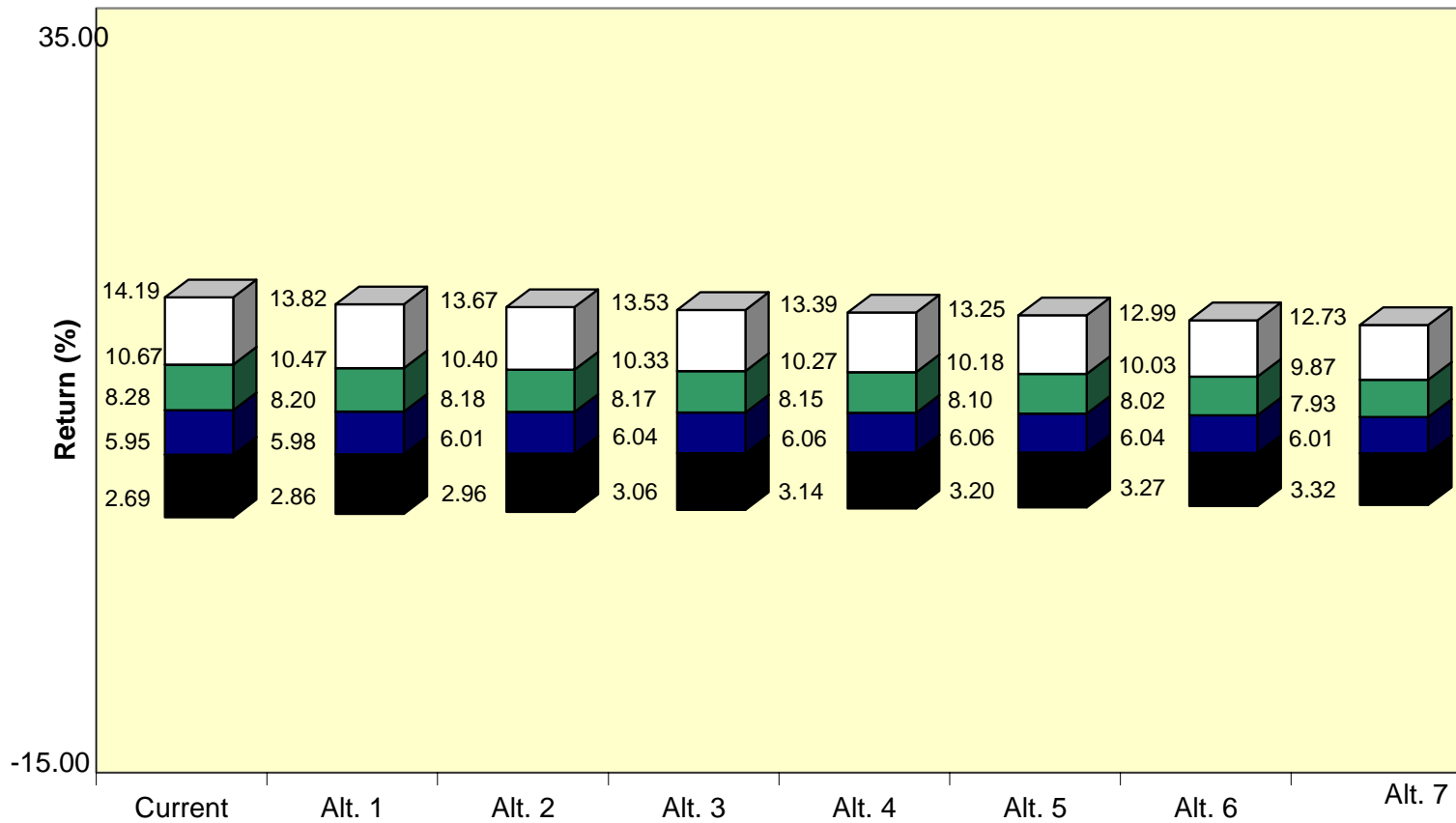
■ 4th Quartile ■ 3rd Quartile ■ 2nd Quartile □ 1st Quartile



Asset / Liability Analysis

Ten Year Compound Annual Return

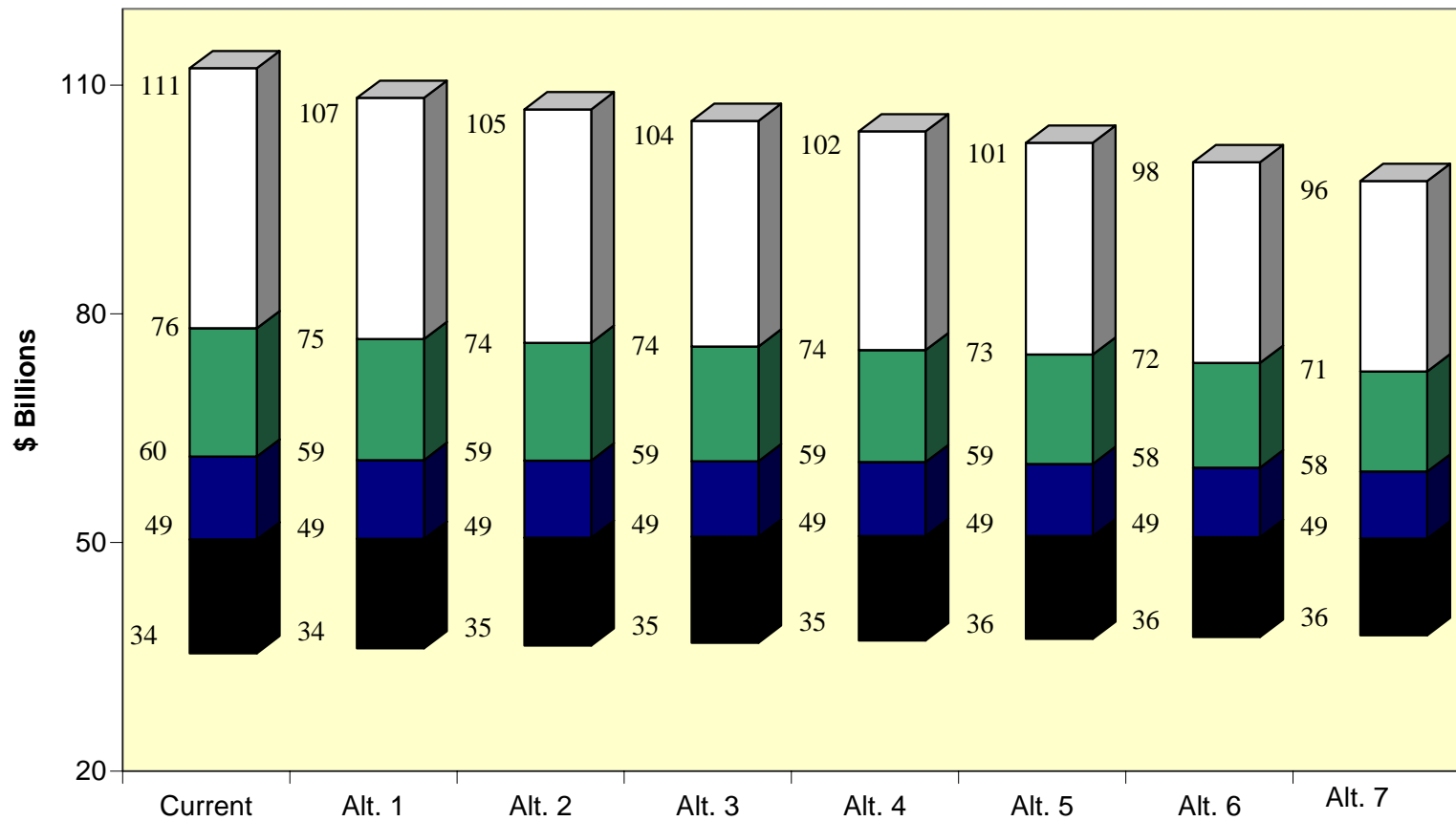
■ 4th Quartile ■ 3rd Quartile ■ 2nd Quartile □ 1st Quartile



Asset / Liability Analysis

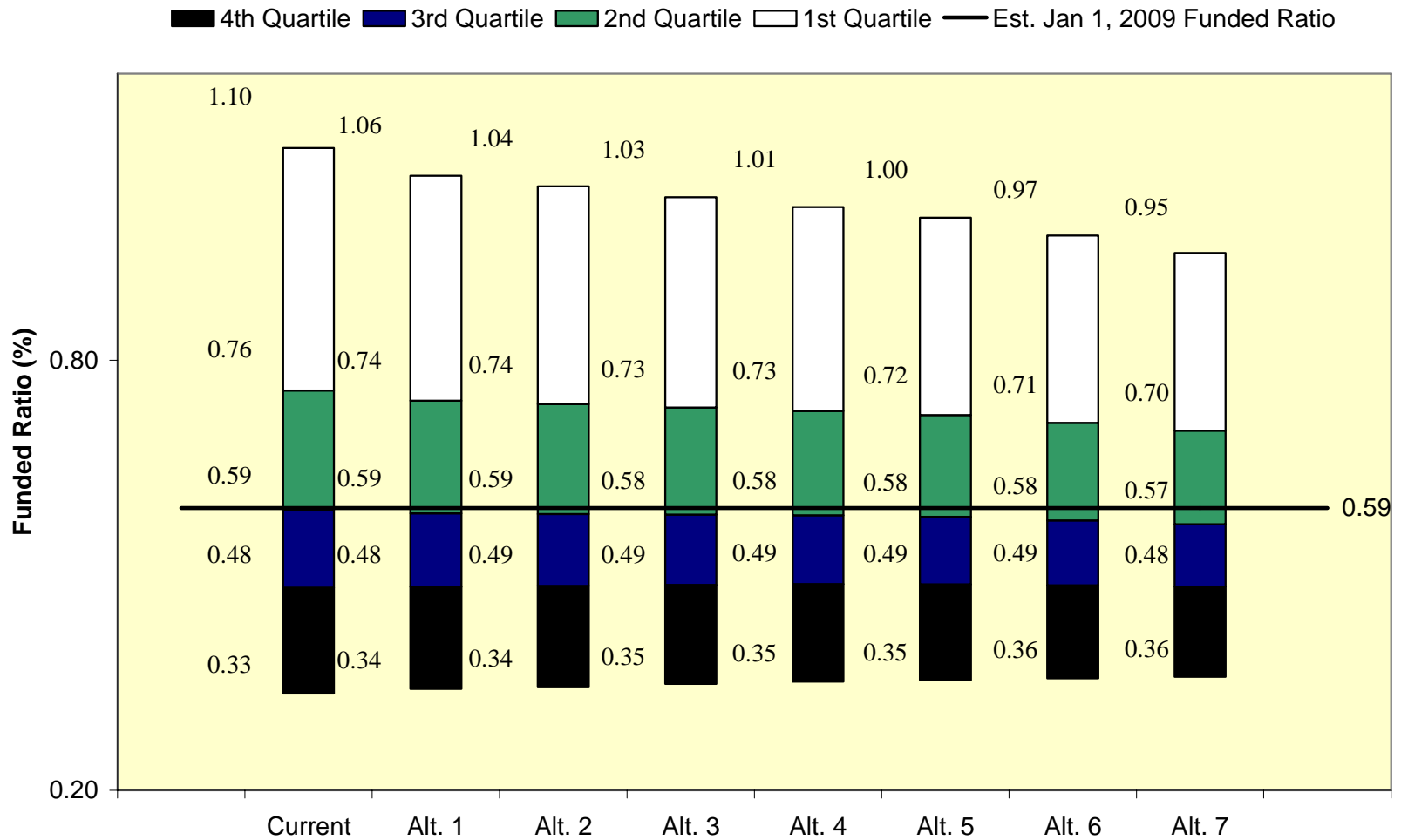
Distribution of Market Value of Assets - Year 10

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



Asset / Liability Analysis

Funded Status - Year 10



Asset / Liability Analysis

Critical Factors

Plan Characteristics

- Plan liabilities are long-term. The duration of plan liabilities is approximately 9.7 years. Time is an ally to long-term investors.
- Over the next 10 years, the PSERS membership is expected to continue shifting to a mature retirement system with inactive members outnumbering active members.

Historical and Current Funded Status

- In 1992, PSERS funded status was 87%. By 1996, PSERS achieved fully funded status, both in market value and actuarial value terms.
- Funded surplus peaked in 2000 (135% on a market value basis / 123% on an actuarial value basis).
- Beginning in 2000, the combination of capital market conditions, a drop in contribution rates, and benefit enhancements reduced the funded status to a low of approximately 80% for both measures. The funded ratio is currently 88% (based on market value of assets).
- Over the last fiscal year, the market value decreased by \$4.8 billion (\$67.4 vs \$62.6) as liabilities increased by \$4.3 billion (\$66.6 vs \$70.9).

Contributions – Historical and Current

- In 1993, the employer contribution rate was approximately 13% of payroll, this coincided with a funded ratio of 87%.
- As funded status improved during the 1990's, employer contributions as a percent of payroll fell from 13% to approximately 1% by 2000.

Asset / Liability Analysis

Asset Allocation Recommendations

- Public Equity
 - Reduce the overall allocation from 42.5% to 30.0% of the total fund policy
 - Maintain the market-weighted profile between US and non-US equity
 - Eliminate the alpha transfer (overlay) component of US equity
 - Convert to an absolute return element
- Fixed Income / Cash
 - Increase the overall allocation from 22.0% to 29.5% of the total fund policy
 - Introduce a 5.0% dedicated cash allocation
 - Expand the high yield / opportunistic credit exposure from 5.0% to 9.0% of the total fund policy
 - Identify investment managers
 - Reduce the core-oriented exposure from 8.0% to 7.5%
 - Leverage the TIPS exposure 2:1
 - Reduce global fixed income from 4.0% to 3.0%
- Alternative Investments
 - Maintain the current private markets exposure at 18.0% of total fund policy
 - Reduce the real estate allocation from 12.5% to 11.0% of total fund policy
 - Reduce the commodities policy from 5.0% to 4.0% of the total fund policy
 - Introduce an absolute return element to the alternative investments strategy
 - Target at 7.5% of the total fund policy

Appendix

The Mathematics of Asset / Liability Valuation

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

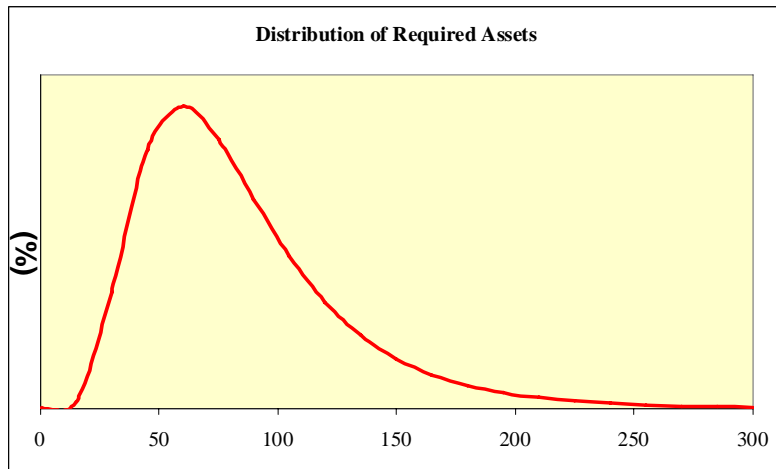
- Future asset returns in each year:

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

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).

PSERB Resolution 2009-07
Re: Investment Policy Statement, Objectives, and Guidelines
March 12, 2009

RESOLVED, that the Public School Employees' Retirement Board adopt the proposed changes to Exhibits B, C, and D of the Investment Policy Statement, Objectives, and Guidelines for the Public School Employees' Retirement Board as recommended by Alan H. Van Noord, Chief Investment Officer, and William G. Bensus, Jr., Managing Director, Wilshire Associates in their joint letter dated March 12, 2009.