

Wilshire Consulting

2011 Wilshire Report on State Retirement Systems: Funding Levels and Asset Allocation

*Julia K. Bonafede, CFA, President
Steven J. Foresti, Managing Director
Russell J. Walker, Vice President*

February 28, 2011



1299 OCEAN AVENUE, SUITE 700
SANTA MONICA, CA 90401
T.310.451.3051 F.310.458.6936

February 28, 2011



Table of Contents

Summary of Findings.....	1
Financial Overview.....	2
Asset Allocation.....	12
Appendix A: State Retirement Systems.....	17

Wilshire Associates Incorporated
1299 Ocean Avenue, Suite 700
Santa Monica, CA 90401
Phone: 310.451.3051
Fax: 310.458.6936
Email: contactconsulting@wilshire.com



Summary of Findings

- The following study includes 126 state retirement systems. Of these 126 retirement systems, 99 systems reported actuarial values on or after June 30, 2010 and 27 systems last reported before June 30, 2010. Only one of these 27 late-reporting systems last reported on or before June 30, 2008.
- Wilshire Consulting estimates that the ratio of pension assets-to-liabilities, or *funding ratio*, for all 126 state pension plans was 69% in 2010, up from an estimated 65% in 2009. This improvement in funding ratio reflects the U.S. economy's ongoing recovery from the global market dislocation events of 2007 and 2008, and the resultant recession that economists declared ended in June 2009. Growth in fund assets managed to outpace growth in plan liabilities over fiscal 2010. (Exhibit 1)
- For the 99 state retirement systems that reported actuarial data for 2010, pension assets and liabilities were \$1,671.4 billion and \$2,538.4 billion, respectively. The funding ratio for these 99 state pension plans was 66% in 2010, up from 62% for the same plans in 2009. (Exhibit 2)
- For the 99 state retirement systems that reported actuarial data for 2010, pension assets grew by 9.3%, or \$141.8 billion, from \$1,529.6 billion in 2009 to \$1,671.4 billion in 2010 while liabilities grew 2.4%, or \$59.6 billion, from \$2,478.8 billion in 2009 to \$2,538.4 billion in 2010. The increase in asset values offset the continued steady growth in liabilities for the 99 state pension plans and led to a drop in the aggregate shortfall, as the -\$949.2 billion shortfall in 2009 narrowed to a -\$867.0 billion shortfall in 2010. (Exhibit 2)
- For the 125 state retirement systems that reported actuarial data for 2009, pension assets and liabilities were \$2,014.4 billion and \$3,113.3 billion, respectively. The funding ratio for these 125 state pension plans was 65% in 2009. (Exhibit 1)
- Of the 99 state retirement systems that reported actuarial data for 2010, 99% have market value of assets less than pension liabilities, or are *underfunded*. The average underfunded plan has a ratio of assets-to-liabilities equal to 65%.
- Of the 125 state retirement systems that reported actuarial data for 2009, 100% were *underfunded*. The average plan has a ratio of assets-to-liabilities equal to 66%.
- State pension portfolios have, on average, a 63.6% allocation to equities – including real estate and private equity – and a 36.4% allocation to fixed income. The 63.6% equity allocation is lower than the 65.0% equity allocation in 2000 and largely reflects a rotation out of U.S. public equities. (Exhibit 13)
- Asset allocation varies by retirement system. Nine of 126 retirement systems have allocations to equity that equal or exceed 75%, and 12 systems have an equity allocation below 50%. The 25th and 75th percentile range for equity allocation is 57.3% to 70.7%.
- Wilshire forecasts a long-term median plan return equal to 6.5% per annum, which is 1.5 percentage points below the median actuarial interest rate assumption of 8.0%.



Financial Overview

This is Wilshire Consulting's sixteenth report on the financial condition of state-sponsored defined benefit retirement systems and is based upon data gathered from the most recent financial and actuarial reports provided by 126 retirement systems sponsored by the 50 states and the District of Columbia. Appendix A lists the 126 retirement systems included in this year's study.

The Data

Financial data on public retirement systems lack the timeliness and uniform disclosure governing pension plans sponsored by publicly traded companies, making it difficult to conclude a study with data that are both current and consistent across systems. For this reason, our study methodology involves collecting data during the first one and a half months of each calendar year with the objective of acquiring as many reports as possible with a June 30 valuation date from the previous year. Even for systems with the desire to report in a timely manner, it often takes six months to a year for actuaries to determine liability values. Ninety-nine systems reported actuarial values on or after June 30, 2010 and the remaining 27 systems last reported prior to June 30, 2010. However, only one of these 27 late-reporting systems last reported on or before June 30, 2008.

Assets versus Liabilities

Exhibit 1 shows the market value of assets, actuarial value of assets, and pension liability values for all state retirement systems for which Wilshire has data. With the exception of the two rows identifying Wilshire's estimated funded ratios, the data presented in each column of Exhibit 1 are limited to only those systems that reported on or after June of that year. For example, all 126 retirement systems reported actuarial values for 2008 while only 99 systems reported actuarial values for 2010. Note that Exhibit 1 includes both market value and actuarial value of assets. Unless otherwise noted, "assets" will refer to market value of assets for the remainder of this report.



Exhibit 1 Financial Overview of State Retirement Systems¹ (\$ billions)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total Pension Assets:										
Market Value	\$1,863.7	\$1,695.9	\$1,799.5	\$2,017.4	\$2,183.5	\$2,381.4	\$2,703.5	\$2,400.0	\$2,014.4	\$1,671.4
Actuarial Value	\$1,956.4	\$1,943.7	\$1,986.8	\$2,054.4	\$2,143.1	\$2,279.8	\$2,469.3	\$2,519.2	\$2,459.4	\$1,931.5
Total Pension Liabilities:	\$1,964.3	\$2,084.4	\$2,222.2	\$2,345.4	\$2,489.8	\$2,649.2	\$2,834.8	\$2,976.0	\$3,113.3	\$2,538.4
Difference:										
Market Value	-\$100.7	-\$388.4	-\$422.6	-\$328.0	-\$306.3	-\$267.7	-\$131.3	-\$576.0	-\$1,098.9	-\$867.0
Actuarial Value	-\$7.9	-\$140.7	-\$235.4	-\$291.0	-\$346.7	-\$369.4	-\$365.5	-\$456.9	-\$653.9	-\$606.9
Market Value of Assets as a % of Liabilities:										
All Plans (estimate)*	95%	81%	81%	86%	88%	90%	95%	81%	65%	69%
Reported Plans (actual)	95%	81%	81%	86%	88%	90%	95%	81%	65%	66%
Actuarial Value of Assets as a % of Liabilities:										
All Plans (estimate)*	100%	93%	89%	88%	86%	86%	87%	85%	79%	77%
Reported Plans (actual)	100%	93%	89%	88%	86%	86%	87%	85%	79%	76%
Total No. of Retirement Systems:	126	126	126	126	126	126	126	126	125	99

*The estimation process is explained later in the report (exhibit 3 and its preceding text).

The aggregate pension asset and liability values in Exhibit 1 are not directly comparable across columns because of the different number of retirement systems included for each year. As such, in the case of recent years that do not yet include data for the complete set of plans, we include an estimate of the funding ratios across all 126 plans. By combining these estimates with the historical funding ratios for the complete set of plans we can better evaluate the financial health for these 126 retirement systems over the last nine years. Market value funding ratios fell dramatically between 2001 and 2003, from 95% to 81% but rebounded steadily to 95% by 2007. Fiscal year 2009 extended the reversal in funded ratios that began in 2008, as market value funding ratios declined 16% to end the 2009 fiscal year at an estimated 65%. However, recovering capital markets allowed funding ratios to rebound to an estimated 69% at fiscal year-end 2010. Actuarial value funding ratios declined between the years 2001 and 2005, falling from 100% to 86% and holding relatively constant until the 2009 fiscal year's 6% decrease to an estimated 79%. Given actuaries' standard practices of smoothing actuarial asset valuations, it is not surprising that the actuarial value-based funding ratio for fiscal year-end 2010 actually nudged downward to an estimated 77%; smoothing formulas currently in place will incorporate the sharp market downturns of 2008 as well as the strong capital asset performance experienced since early 2009 to the present.

Exhibit 2 shows asset and liability values for the 99 retirement systems which reported actuarial values for 2010 and compares them with the same totals from the previous nine years.

¹ As disclosed in annual reports (most annual reports use a June 30 or December 31 fiscal year). Liabilities are the reported actuarial accrued liabilities and assets are the current market and actuarial values as of the same valuation date as liabilities.



Exhibit 2
Financial Overview of 99 State Retirement Systems (\$ billions)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Annualized Growth %	
											2001-2010	2009-2010
Total Pension Assets:												
- Market Value	\$1,455.1	\$1,330.4	\$1,368.5	\$1,545.6	\$1,671.1	\$1,816.3	\$2,097.7	\$1,952.2	\$1,529.6	\$1,671.4	1.6%	9.3%
- Actuarial Value	\$1,526.4	\$1,508.3	\$1,538.1	\$1,593.3	\$1,655.5	\$1,755.0	\$1,902.5	\$1,964.4	\$1,914.4	\$1,931.5	2.6%	0.9%
Total Pension Liabilities:	\$1,527.6	\$1,620.7	\$1,730.2	\$1,836.9	\$1,954.3	\$2,076.3	\$2,225.9	\$2,346.7	\$2,478.8	\$2,538.4	5.8%	2.4%
Difference:												
- Market Value	-\$72.5	-\$290.4	-\$361.7	-\$291.3	-\$283.1	-\$260.0	-\$128.2	-\$394.6	-\$949.2	-\$867.0		
- Actuarial Value	-\$1.1	-\$112.4	-\$192.1	-\$243.5	-\$298.8	-\$321.4	-\$323.4	-\$382.3	-\$564.4	-\$606.9		
Assets as a % of Liabilities:												
- Market Value	95%	82%	79%	84%	86%	87%	94%	83%	62%	66%		
- Actuarial Value	100%	93%	89%	87%	85%	85%	85%	84%	77%	76%		
Underfunded Plans as % of All Plans:												
- Market Value	69%	93%	95%	89%	88%	83%	69%	87%	100%	99%		
- Actuarial Value	56%	68%	78%	81%	85%	86%	84%	87%	95%	96%		
Total No. of Systems:	99	99	99	99	99	99	99	99	99	99		

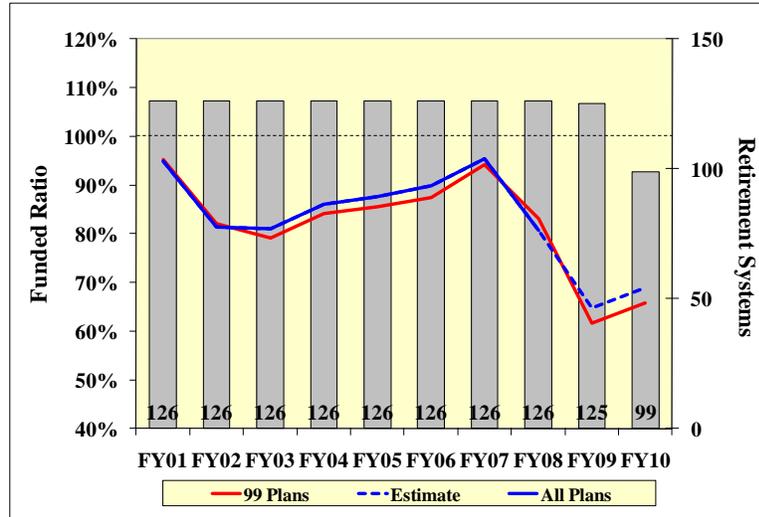
In 2009, pension liabilities for these 99 plans exceeded assets by \$949.2 billion and the funding ratio, or ratio of assets-to-liabilities, one measure of pension fund health, stood at 62%. One year later, assets have risen to \$1,671.4 billion, a change of 9.3%, while liabilities have grown to \$2,538.4 billion, a rate of 2.4%. The result has been a decrease in the shortfall between assets and liabilities from -\$949.2 billion to -\$867.0 billion, a \$82.2 billion decline, and an increase in the funding ratio for these 99 plans from 62% to 66%.

In 2003, after the equity market declines of 2000 through 2002, pension liabilities for these 99 plans exceeded assets by \$361.7 billion and the funding ratio stood at 79%. During the next four years, assets grew at an average rate of 11.3% while liabilities grew by 6.5%. This difference in growth rates is reflected in the increasing funding ratio of the market value of assets to liabilities through the year 2007. In 2008 however, the shortfall between assets and liabilities widened dramatically from -\$128.2 billion to -\$394.6 billion, leading to a fall in the funding ratio for these 99 plans from 94% to 83%. 2009, as mentioned above, extended this trend as the effects of the global market dislocations of 2007 and 2008 fully impacted fund performance. Funding ratios have started to recover from their 2009 lows, with asset growth outpacing the growth in fund liabilities through fiscal year 2010.

It is important to note, as with any sample, there exists some level of statistical error. Although the 99 funds with 2010 fiscal year data constitute a sizable majority of the state plans in our survey, one will find some transient variance in sample data from the entire plan cohort. Exhibit 3 provides a graphical comparison between the historical data of all plans versus the subset of 99 plans with more recently reported data. The dotted line represents Wilshire's estimated funding ratio for the complete set of 126 plans, which is derived from the historical relationship between the 99-plan sample and the complete set of 126 plans. Using this approach one can reasonably expect a funding ratio of approximately 69% once all plans have reported 2010 actuarial data. This estimation approach and graphical representation of estimated data will be used throughout the remainder of this report.



Exhibit 3
Funding Ratio Comparison of 99 Plan Sample vs. Complete Set of 126 Plans



Funding Ratios

Expanding on Exhibit 3, Exhibit 4 shows the aggregate, average, median, 25th, and 75th percentile market value funding ratios for the 126 state pension systems by fiscal year. Historically, the market value funding ratios for our sample generally fell between 2001 and 2002. After stabilizing in 2003, the funding ratios experienced a fairly steady improvement through 2007. In 2008 and 2009 however, funding ratios broke trend and rapidly declined. Fiscal year 2010 saw funding ratios reverse course and stage a moderate recovery.



Exhibit 4
Market Value Funding Ratios by Fiscal Year for 126 Plans

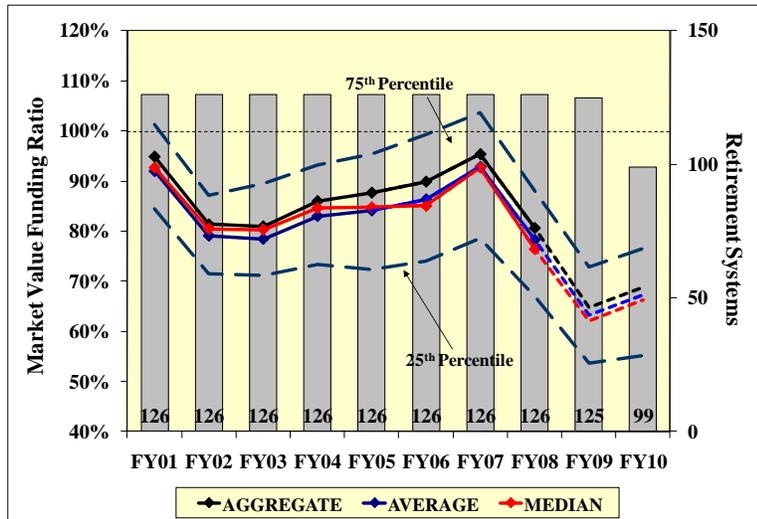


Exhibit 5 shows the same information as Exhibit 4, except it uses the actuarial value of assets to determine funding ratios. Similar to Exhibit 4, though at a slower rate, funding ratios generally fell between 2001 and 2002. However, unlike Exhibit 4, funding ratios based on actuarial value of assets continued to fall through 2006, briefly stabilizing in 2007 and then declining slightly during 2008 and more markedly through 2009, with a further downward drift in 2010. In contrast to market value funding ratios, actuarial value funding ratios tend to exhibit moderated patterns of change, as a result of the smoothing of actuarial values.

Exhibit 5
Actuarial Value Funding Ratios by Fiscal Year for 126 Plans

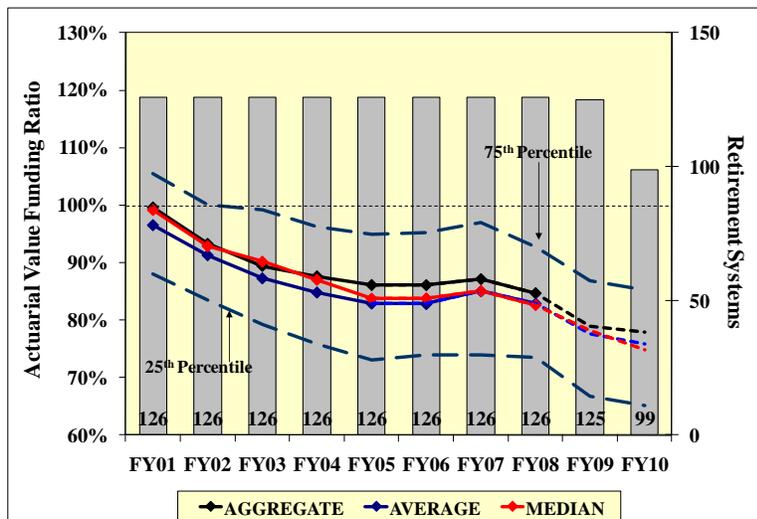
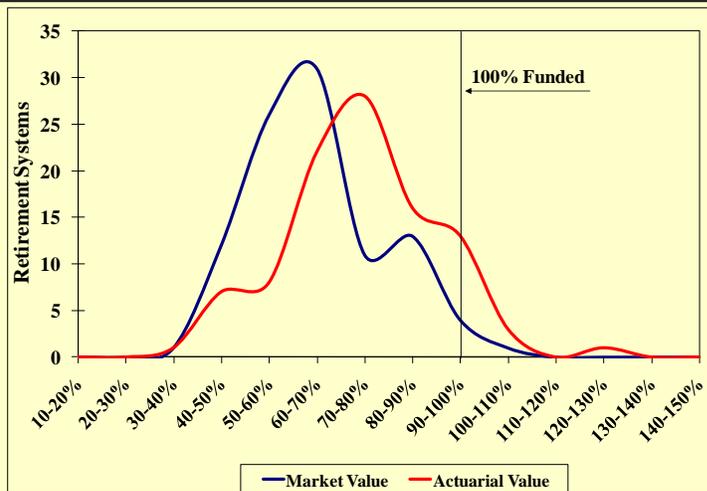




Exhibit 6 gives a more detailed picture of the fiscal condition for the 99 state retirement systems that reported actuarial values for 2010.

Exhibit 6
Distribution of 99 State Pension Systems by FY10 Funding Ratio



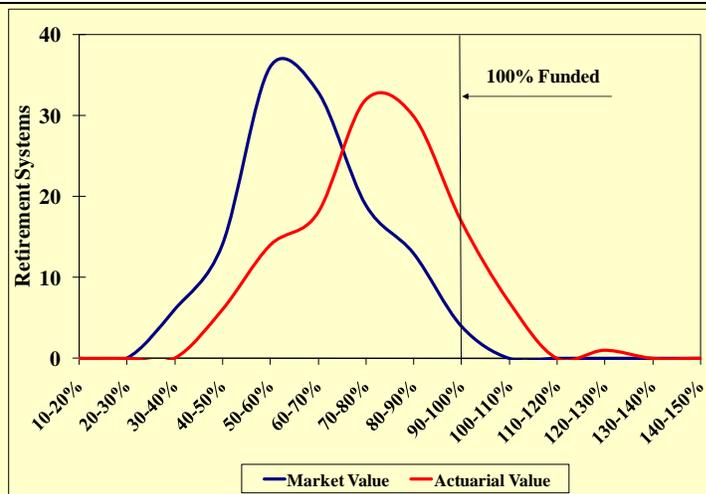
Distribution	Bucket Count				Distribution	Cumulative Count			
	Market Value		Actuarial Value			Market Value		Actuarial Value	
	Count	% of Total	Count	% of Total		Count	% of Total	Count	% of Total
0-50%	13	13%	8	8%	0-50%	13	13%	8	8%
50-60%	26	26%	8	8%	0-60%	39	39%	16	16%
60-70%	31	31%	22	22%	0-70%	70	71%	38	38%
70-80%	11	11%	28	28%	0-80%	81	82%	66	67%
80-90%	13	13%	16	16%	0-90%	94	95%	82	83%
90-100%	4	4%	13	13%	0-100%	98	99%	95	96%
100-110%	1	1%	3	3%	0-110%	99	100%	98	99%
110-120%	0	0%	0	0%	0-120%	99	100%	98	99%
120-130%	0	0%	1	1%	0-130%	99	100%	99	100%
130-140%	0	0%	0	0%	0-140%	99	100%	99	100%
140-150%	0	0%	0	0%	0-150%	99	100%	99	100%
Total	99	100%	99	100%	Total	99	100%	99	100%

We have noted above that 99% of these 99 plans with 2010 actuarial data, or 98 plans, are underfunded; Exhibit 6 demonstrates the extent of the shortfall. Thirty-nine plans have assets less than 60% of liabilities; 70 plans have assets less than 70% of liabilities; and 81 plans have assets less than 80% of liabilities. Using the actuarial value of assets to determine funding ratios, 95 plans have assets below liabilities. Sixteen plans have assets less than 60% of liabilities; 38 plans have assets less than 70% of liabilities; and 66 plans have assets less than 80% of liabilities.

Similarly to Exhibit 6, Exhibit 7 examines the fiscal condition of the 125 state retirement systems that reported actuarial values for 2009.



Exhibit 7 Distribution of 125 State Pension Systems by FY09 Funding Ratio



Distribution	Bucket Count				Distribution	Cumulative Count			
	Market Value		Actuarial Value			Market Value		Actuarial Value	
	Count	% of Total	Count	% of Total		Count	% of Total	Count	% of Total
0-50%	20	16%	6	5%	0-50%	20	16%	6	5%
50-60%	36	29%	14	11%	0-60%	56	45%	20	16%
60-70%	33	26%	18	14%	0-70%	89	71%	38	30%
70-80%	19	15%	32	26%	0-80%	108	86%	70	56%
80-90%	13	10%	30	24%	0-90%	121	97%	100	80%
90-100%	4	3%	17	14%	0-100%	125	100%	117	94%
100-110%	0	0%	7	6%	0-110%	125	100%	124	99%
110-120%	0	0%	0	0%	0-120%	125	100%	124	99%
120-130%	0	0%	1	1%	0-130%	125	100%	125	100%
130-140%	0	0%	0	0%	0-140%	125	100%	125	100%
140-150%	0	0%	0	0%	0-150%	125	100%	125	100%
Total	125	100%	125	100%	Total	125	100%	125	100%

Using the market value of assets to determine funding ratios, all of the 125 plans had assets less than liabilities. Twenty plans had assets less than 50% of liabilities; 56 plans had assets less than 70% of liabilities; and 108 plans had assets less than 80% of liabilities. Using the actuarial value of assets to determine funding ratios, 117 of the 125 plans, or 94%, had assets less than liabilities. Six plans had assets less than 50% of liabilities; 38 plans had assets less than 70% of liabilities; and 70 plans had assets less than 80% of liabilities.

Unfunded Actuarial Accrued Liability

The financial health of retirement systems can also be measured by comparing the size of the unfunded actuarial accrued liability (UAAL) to relevant metrics. Since assets under Governmental Accounting Standards Board (GASB) Statement No. 25² are based on actuarial values, this section calculates the UAAL using actuarial value of assets.

² GASB No. 25, *Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans*.



Exhibit 8 shows the median size of the UAAL relative to the covered payroll during the last ten fiscal years for the 126 retirement systems. Exhibit 8 also shows the 25th and 75th percentile for each year. UAAL has increased over the past decade, with an especially steep climb during the most recent recession:

Exhibit 8
UAAL as a % of Covered Payroll by Fiscal Year for 126 Plans

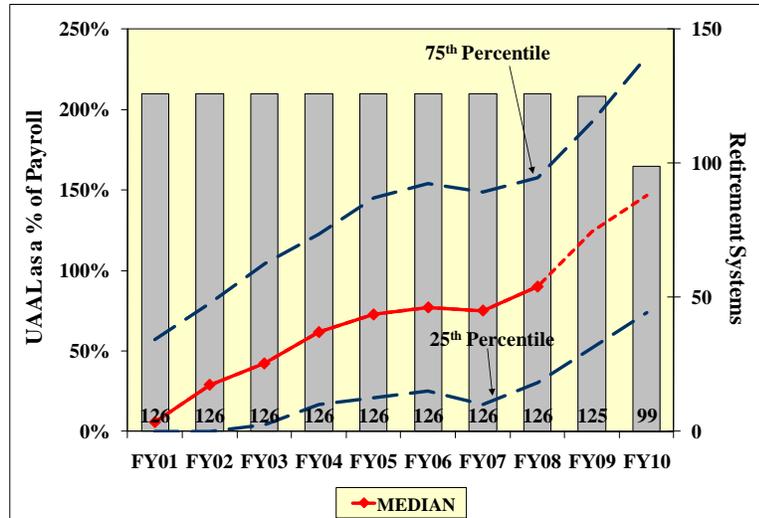


Exhibit 9 shows the median size of the UAAL relative to the actuarial value of assets during the last ten fiscal years for the 126 plans. Exhibit 9 also shows the 25th and 75th percentile for each year.



Exhibit 9
UAAL as a % of Actuarial Value of Assets by Fiscal Year for 126 Plans

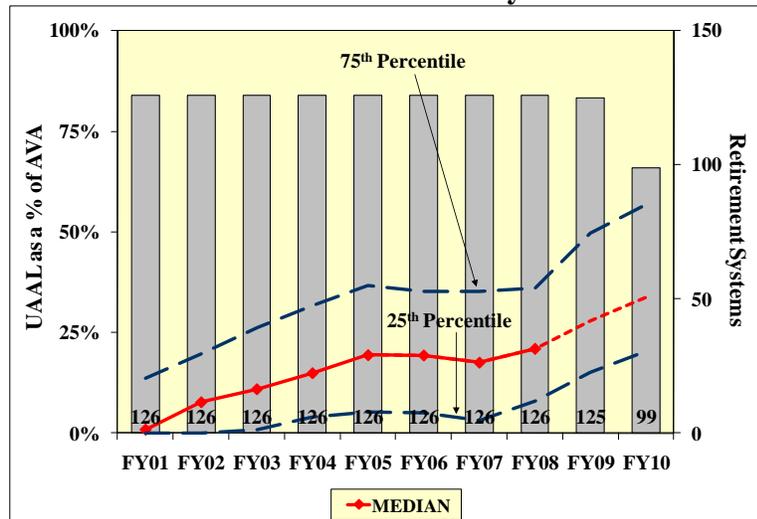
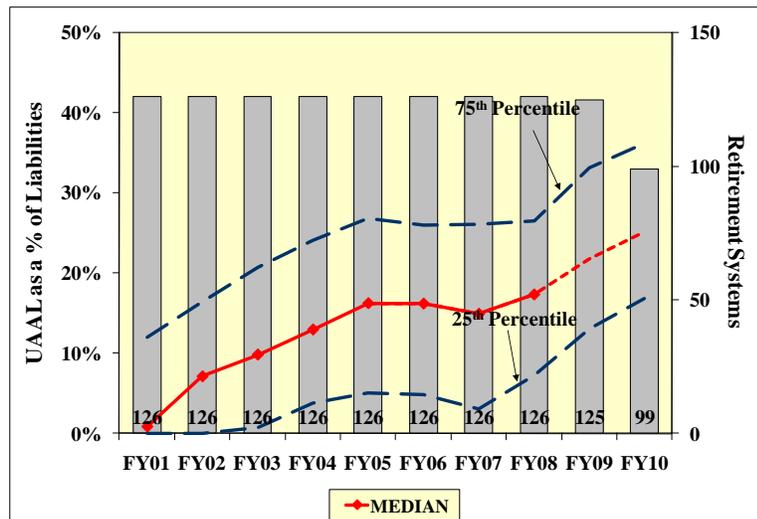


Exhibit 10 shows the median size of the UAAL relative to the actuarial accrued liability during the last ten years for all 126 retirement systems. Exhibit 10 also shows the 25th and 75th percentile for each year.

Exhibit 10
UAAL as a % of Accrued Liabilities by Fiscal Year for 126 Plans



From 2005 to 2008, the UAAL had generally stabilized relative to all metrics. Over 2008 and 2009, however, poor market performance pushed the covered payroll ratio and the 25th and 75th percentiles of the actuarial value of assets and accrued liability higher. We must also bear in mind that actuarial valuation typically employs smoothing formulae in order to reduce the impact of market fluctuations when determining pension fund contributions. If the UAAL were



calculated using the market value of assets, the negative market returns experienced during fiscal 2008 and 2009 would have led to a much larger increase in the UAAL relative to these metrics, indicating a more substantial deterioration in the financial health of most state retirement systems. However, thanks to the strong markets experienced during fiscal 2010, UAAL as a percent of asset market value has decreased somewhat over the past fiscal year.

Market Value of Assets versus Actuarial Value of Assets

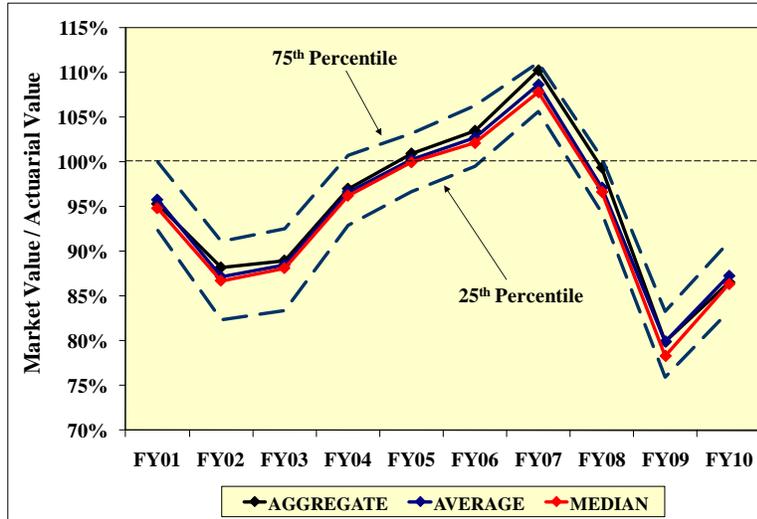
As mentioned above, the actuarial value of assets is often calculated using a smoothing method in order to reduce the effects of market volatility when determining contribution rates. For example, a five-year smooth market value method would recognize 20% of the gain or loss³ in the market value of assets over five years. Therefore, the dramatic market losses of 2007 and 2008 and the current recovery that started in early 2009 are all being incorporated into smoothing formulae when calculating the actuarial value of assets.

Exhibit 11 displays the aggregate, average, and median ratio of the market value of assets (MVA) as a percentage of the actuarial value of assets (AVA) during the last ten years for the 99 state plans that reported actuarial values for 2010. Exhibit 11 also shows the 25th and 75th percentiles for each year. From FY03 to FY07, actuarial values declined relative to market values since they were still reflecting the poor market returns experienced during the bust of the internet stock bubble. In FY08, the actuarial value of assets now recognizes mostly positive market returns experienced between 2003 and 2007. Driving the overall ratio lower for FY08 and FY09 is the severe market sell-off in late 2007 through early 2009, which is fully reflected in plan assets at market value but only partially recognized in today's actuarial values. The notable rally in global capital markets over fiscal 2010 resulted in a fairly sharp increase in the MVA/AVA ratio over fiscal 2009.

³ A gain (loss) occurs when the actual rate of return is greater than (less than) the assumed rate of return.



Exhibit 11
MVA as a Percentage of AVA by Fiscal Year for 99 Plans



Asset Allocation

In this section we examine the investment strategies employed by the state retirement systems. Exhibit 12 provides a snapshot of the average asset allocation as of the latest fiscal year-end across all 126 state retirement systems.

Exhibit 12
Average Asset Allocation for State Pension Plans

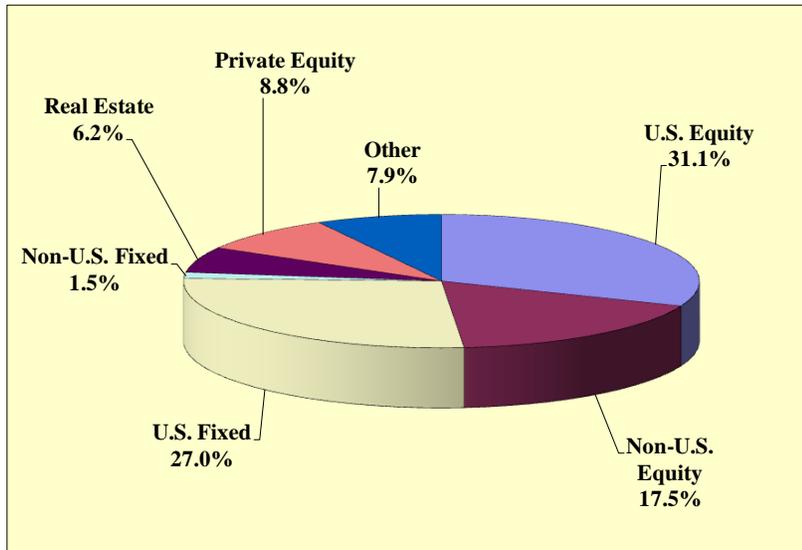




Exhibit 13 examines the change in average asset allocation during the last ten years. During this period, the average allocations to Non-U.S. equities increased from 13.0% to 17.5% while allocations to U.S. Bonds decreased from 31.0% to 27.0%.

Exhibit 13
Change in Average Asset Allocation for State Pension Plans

Equity	2000	2005	2010	Change in Exposure	
				00-10	05-10
U.S. Equity	45.0 %	44.0 %	31.1 %	-13.9 %	-12.9 %
Non-U.S. Equity	13.0	15.0	17.5	4.5	2.5
Real Estate	4.0	4.2	6.2	2.2	2.0
Private Equity	3.0	4.4	8.8	5.8	4.4
Equity Subtotal	65.0	67.6	63.6	-1.4	-4.0
Debt					
U.S. Fixed	31.0	28.6	27.0	-4.0	-1.6
Non-U.S. Fixed	2.0	1.2	1.5	-0.5	0.3
Other	2.0	2.6	7.9	5.9	5.3
Debt Subtotal	35.0	32.4	36.4	1.4	4.0
Return *	6.3	6.5	6.5	0.1	0.0
Risk *	10.4	10.8	10.3	-0.1	-0.5

* Return and Risk are based on Wilshire Consulting's current asset class assumptions (exhibit 14).

Overall equity exposure, comprised of U.S. and non-U.S. public market equities along with real estate and private equity, decreased 1.4% over the past decade, while overall debt exposure, comprised of U.S. and non-U.S. fixed income and other non-equity assets (itself consisting of cash and cash equivalents as well as hedge funds and other absolute return/zero net-beta strategies), increased. However, it must be noted that plans' exposures to U.S. public market equity and U.S. fixed income over this period fell while allocations to non-U.S. assets, real estate, private market equity and other risk assets increased. One can propose several possible explanations, alone or in combination:

- Depressed U.S. equity holdings still recovering from the recent market plunge;
- Rotation out of the relatively efficient U.S. stock and bond markets into less-efficient asset spaces;
- Plan sponsors reducing the home-market bias in their fund holdings;
- Plan sponsors increasing asset diversification in an attempt to de-risk the Total Fund.

Portfolio expected return and risk are calculated by combining Wilshire's assumptions for the major asset classes and each retirement system's actual asset allocation. Exhibit 13 calculates the expected return and risk based on the average asset allocations from 2000, 2005 and 2010 using Wilshire's current long-term return and risk assumptions illustrated in Exhibit 14. The redeployment of assets over the past decade out of U.S. public markets and into offshore and alternative assets has caused the average state pension plan to move towards a slightly higher



expected return and slightly lower risk profile along the efficient frontier. Increased allocations to real estate and private equity from 2005 to 2010 provided notably lower risk expectations for the average state plan.

Exhibit 14
Wilshire’s 2011 Capital Market Assumptions

	Expected	
	<u>Return</u>	<u>Risk</u>
U.S. Equity	7.25 %	16.0 %
Non-U.S. Equity	7.25	17.0
Private Equity	9.70	26.0
Real Estate	5.50	15.0
U.S. Bonds	3.75	5.0
Non-U.S Bonds	3.40	4.0

Exhibit 15 contains summary statistics on asset allocation for all state retirement systems. The median allocation⁴ is 31.6% to U.S. equities and 17.4% to Non-U.S. equities. However, as the lowest and highest columns suggest, there is considerable variability in allocations among individual systems. Wilshire estimates that the median state pension fund has an expected return of 6.5%. This result is 1.5% less than the current median actuarial interest rate of 8.0%.

Exhibit 15
Summary Asset Allocation Statistics for State Pension Plans

	<u>Lowest (%)</u>	<u>Median (%)</u>	<u>Highest (%)</u>
U.S. Equity	0.0 %	31.6 %	65.0 %
Non-U.S. Equity	0.0	17.4	52.2
Private Equity	0.0	7.8	46.1
Real Estate	0.0	5.2	18.7
U.S. Bonds	11.2	25.0	65.4
Non-U.S Bonds	0.0	0.0	12.5
Hedge Funds	0.0	0.0	15.0
Other	0.0	4.6	29.9
Expected Returns	0.0 %	6.5 %	7.5 %

Exhibit 16 plots the expected return and risk for each of the 126 state retirement systems based upon their actual asset allocation. Systems that plot in the upper right employ more aggressive asset mixes while systems that plot in the lower left represent those with more conservative mixes. The dashed horizontal line, equal to 8.0%, represents the current median actuarial interest rate assumption employed by state pension plans.

Using Wilshire’s return forecasts, none of the 126 state retirement systems are expected to earn long-term asset returns that equal or exceed their actuarial interest rate assumption. It is

⁴ The “Median” column in Exhibit 15 represents the median for each asset class and therefore does not sum to 100%. The median expected return is based on the median fund return, not on the median asset mix.



important to note that Wilshire return assumptions represent beta only, with no projection of alpha from active management.

Exhibit 16
Projected Return & Risk Forecasts for State Pension Plans

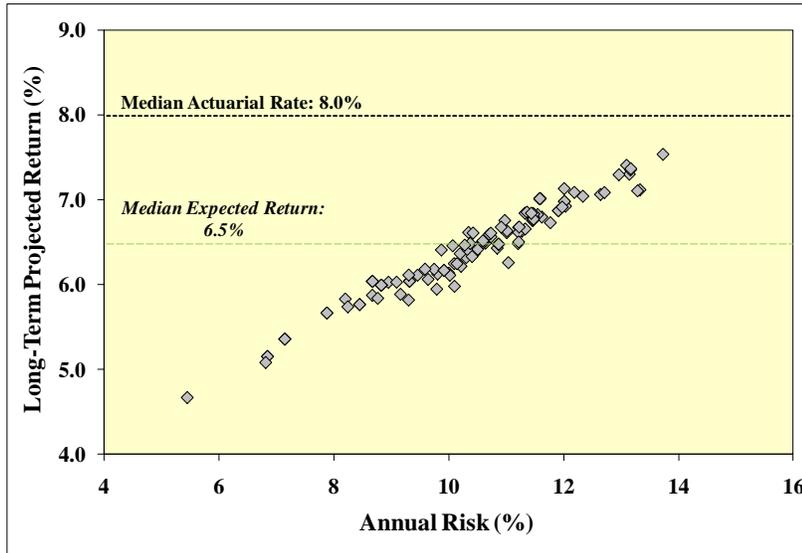
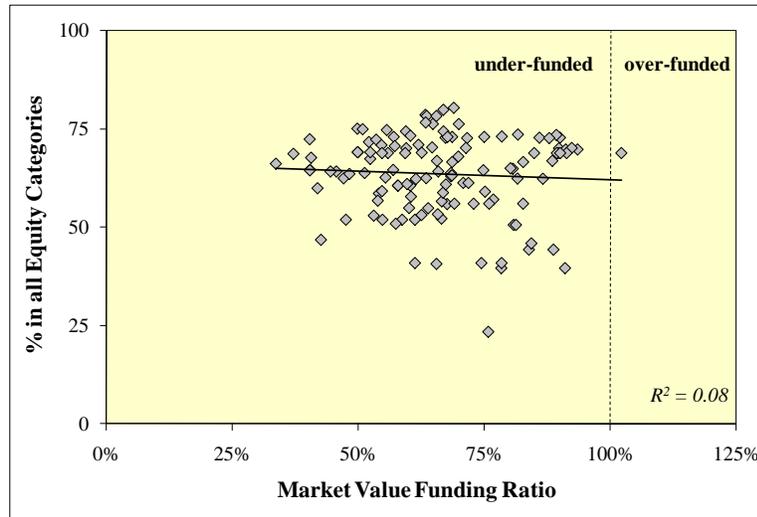


Exhibit 17 addresses the relationship between asset allocation and funding for all state systems. The allocation to equity asset classes, a proxy for investment aggressiveness, is plotted on the vertical scale. The market value funding ratio is on the horizontal scale.



Exhibit 17 Asset Allocation & Actuarial Funding Ratios for State Pension Plans



The vertical line in Exhibit 17 separates overfunded plans (or, in the current case, the single plan in funding surplus) from underfunded plans. Casual observation uncovers no pattern connecting funded ratio to equity exposure. There is almost no correlation between the equity allocation and a plan's funding ratio when taking into account the effect of outliers. In summary, there is no discernable relationship between asset allocation and funding. State retirement systems show a broad spectrum of asset allocations that appear to be unrelated to the size of their unfunded liabilities.⁵

⁵ We would like to thank Amy Hemphill, Jason Samansky, Peter Bragança, Monica Chum, Nicholas Douty, Thomas Dunlap, Alex Ford, Jeremy Henningsen, Kaleena Iszkula, David Johnson, Swetha Ketty, Razmik Kirakosyan, Juan Lozano, Taveen Miloyan, Mangala Murthy, Mayank Prasad, Shahnawaz Sani, Andrew Schroeck, Liana Shir, Brian White and Megan Young for their diligence in the data collection for this report.



Appendix A: State Retirement Systems⁶

<u>Retirement System</u>	<u>Retirement System</u>	<u>Report Date</u>
Alabama ERS	Alabama Employees' Retirement System	9/30/2010
Alabama TRS	Alabama Teachers' Retirement System	9/30/2010
Alaska PERS	Alaska Public Employees' Retirement System	6/30/2010
Alaska TRS	Alaska Teachers' Retirement System	6/30/2010
Arizona PSPRS	Arizona Public Safety Personnel Retirement System	6/30/2010
Arizona SRS	Arizona State Retirement System	6/30/2010
Arkansas Highway ERS	Arkansas Highway Employees Retirement System	6/30/2010
Arkansas PERS	Arkansas Public Employees Retirement System	6/30/2010
Arkansas TRS	Arkansas Teachers Retirement System	6/30/2010
California PERS	California Public Employees' Retirement System	6/30/2010
California Regents	The Regents of the University of California	6/30/2010
California STRS	California State Teachers' Retirement System	6/30/2010
Colorado Fire & Police	Colorado Fire & Police Pension Association	12/31/2009
Colorado PERA: Municipal	Colorado PERA: Municipal Division Trust Fund	12/31/2009
Colorado PERA: State & School	Colorado PERA: State & School Division Trust Fund	12/31/2009
Connecticut SERS	Connecticut State Employees' Retirement System	6/30/2010
Connecticut TRS	Connecticut State Teacher's Retirement System	6/30/2010
DC Police & Fire	District of Columbia Police Officers & Fire Fighters' Retirement System	9/30/2009
DC TRS	District of Columbia Teachers Retirement System	9/30/2009
Delaware PERS	Delaware Public Employees' Retirement System	6/30/2010
Florida RS	Florida Retirement Systems	6/30/2010
Georgia ERS	Georgia Employees Retirement System	6/30/2009
Georgia TRS	Georgia Teachers Retirement System	6/30/2009
Hawaii ERS	Hawaii Employees' Retirement System	6/30/2008
Idaho PERS	Idaho Public Employee Retirement System	6/30/2010
Illinois Muni Ret Fund	Illinois Municipal Retirement Fund	12/31/2009
Illinois SERS	Illinois State Employees' Retirement System	6/30/2009
Illinois SURS	Illinois State Universities Retirement System	6/30/2010
Illinois TRS	Illinois State Teachers' Retirement System	6/30/2010
Indiana PERF: Employees	Indiana Public Employees' Retirement Fund: Employees	6/30/2010
Indiana PERF: Police & Fire	Indiana PERF: Police Officers' & Firefighters' Pension & Disability Fund	6/30/2010
Indiana TRF	Indiana State Teachers Retirement Fund	6/30/2010
Iowa Fire & Police	Iowa Municipal Fire & Police Retirement System	6/30/2010
Iowa PERS	Iowa Public Employees Retirement System	6/30/2010
Kansas PERS	Kansas Public Employees Retirement System	6/30/2010
Kentucky RS: County Employees	Kentucky Employees Retirement System: County Employees	6/30/2010
Kentucky RS: Employees	Kentucky Employees Retirement System: Employees	6/30/2010
Kentucky TRS	Kentucky Teachers' Retirement System	6/30/2010
Louisiana School ERS	Louisiana School Employees' Retirement System	6/30/2010
Louisiana SERS	Louisiana State Employees' Retirement Systems	6/30/2010
Louisiana State Police	Louisiana State Police Pension & Retirement System	6/30/2010
Louisiana TRS	Louisiana Teachers Retirement System	6/30/2010
Maine SRS	Maine State Retirement System	6/30/2010

⁶ All state plan information is obtained from public information sources.



Appendix A: (cont.)

<u>Retirement System</u>	<u>Retirement System</u>	<u>Report Date</u>
Maryland SRPS: Employees	Maryland State Retirement & Pension System: Employees	6/30/2010
Maryland SRPS: State Police	Maryland State Retirement & Pension System: State Police	6/30/2010
Maryland SRPS: Teachers	Maryland State Retirement & Pension System: Teachers	6/30/2010
Massachusetts SRB	Massachusetts Public Employee Retirement Administration Commission: SRB	6/30/2010
Massachusetts Teachers	Massachusetts Public Employee Retirement Administration Commission: Teachers	6/30/2010
Michigan Municipal	Michigan Municipal Employees Retirement System	12/31/2009
Michigan Public School ERS	Michigan Public School Employees Retirement System	9/30/2010
Michigan SERS	Michigan State Employees Retirement System	9/30/2010
Michigan State Police	Michigan State Police Retirement System	9/30/2010
Minnesota PERA: Employees	Minnesota Public Employees Retirement Association: Employees	6/30/2010
Minnesota PERA: Police & Fire	Minnesota Public Employees Retirement Association: Police & Fire	6/30/2010
Minnesota SRS: Employees	Minnesota State Retirement System: Employees	6/30/2010
Minnesota SRS: State Patrol	Minnesota State Retirement System: State Patrol	6/30/2010
Minnesota TRA	Minnesota Teachers Retirement Association	6/30/2010
Mississippi PERS	Mississippi Public Employees' Retirement System	6/30/2010
Missouri ERS	Missouri State Employee Retirement System	6/30/2010
Missouri Highway ERS	Missouri Highway & Transportation Employees and Highway Patrol Retirement System	6/30/2010
Missouri PEERS	Missouri Public Education Employee Retirement System	6/30/2010
Missouri PSRS	Missouri Public School Retirement System	6/30/2010
Montana PERB	Montana Public Employees Retirement Board	6/30/2010
Montana TRS	Montana Teachers' Retirement System	6/30/2010
Nebraska RS	Nebraska Retirement System	6/30/2010
Nevada PERS	Nevada Public Employees' Retirement System	6/30/2010
New Hampshire RS: Employees	New Hampshire Employees Retirement System	6/30/2010
New Hampshire RS: Police & Fire	New Hampshire Firefighters & Police Officers Retirement System	6/30/2010
New Hampshire RS: Teachers	New Hampshire Teachers Retirement System	6/30/2010
New Jersey PERS	New Jersey Public Employees Retirement System	6/30/2010
New Jersey Police & Fire	New Jersey Police & Firemen's Retirement System	6/30/2010
New Jersey State Police	New Jersey State Police Retirement System	6/30/2010
New Jersey TPAF	New Jersey Teachers' Pension & Annuity Fund	6/30/2010
New Mexico ERB	New Mexico Educational Retirement System	6/30/2010
New Mexico PERA	New Mexico Public Employees Retirement Association	6/30/2010
New York STRS	New York State Teachers Retirement System	6/30/2010
New York: ERS	New York State & Local Employees' Retirement System	3/31/2010
New York: Police & Fire	New York Police & Fire Retirement System	3/31/2010
North Carolina Local ERS	North Carolina Local Governmental Employees' Retirement System	6/30/2010
North Carolina TSERS	North Carolina Teachers' & State Employees' Retirement System	6/30/2010
North Dakota PERS	North Dakota Public Employees Retirement System	6/30/2010
North Dakota TFFR	North Dakota Teachers' Fund for Retirement	6/30/2010
Ohio PERS	Ohio Public Employees Retirement System	12/31/2009
Ohio Police & Fire	Ohio Police & Fire Pension Fund	12/31/2009
Ohio School Employees RS	Ohio School Employees Retirement System	6/30/2010



Appendix A: (cont.)

<u>Retirement System</u>	<u>Retirement System</u>	<u>Report Date</u>
Ohio STRS	Ohio State Teachers Retirement System	6/30/2010
Oklahoma Firefighters	Oklahoma Firefighters Pension & Retirement System	6/30/2010
Oklahoma PERS	Oklahoma Public Employees Retirement System	6/30/2010
Oklahoma Police	Oklahoma Police Pension & Retirement System	6/30/2010
Oklahoma TRS	Oklahoma Teachers Retirement System	6/30/2010
Oregon PERS	Oregon Public Employees Retirement System	6/30/2010
Pennsylvania PSERS	Pennsylvania Public School Employees' Retirement System	6/30/2010
Pennsylvania SERS	Pennsylvania State Employees' Retirement System	12/31/2009
Rhode Island ERS: Employees	Rhode Island Employees Retirement System: Employees	6/30/2009
Rhode Island ERS: Teachers	Rhode Island Employees Retirement System: Teachers	6/30/2009
Rhode Island MERS	Rhode Island Municipal Employees Retirement System	6/30/2009
South Carolina Police	South Carolina Police Officers Retirement System	6/30/2010
South Carolina RS	South Carolina Retirement System	6/30/2010
South Dakota RS	South Dakota Retirement System	6/30/2010
Tennessee PSPP	Tennessee Consolidated Retirement System Political Subdivision Pension Plan	6/30/2010
Tennessee SETHEPP	Tennessee Consolidated Retirement System State Employees, Teachers, Higher Education Employees Pension Plan	6/30/2010
Texas CDRS	Texas County & District Retirement System	12/31/2009
Texas ERS	Texas Employees Retirement System	8/31/2010
Texas LECOSRF	Texas Law Enforcement & Custodial Officers Supplemental Retirement Fund	8/31/2010
Texas Municipal	Texas Municipal Retirement System	12/31/2009
Texas TRS	Texas Teachers Retirement System	8/31/2010
Utah Contributory RS	Utah Contributory Retirement System	12/31/2009
Utah Firefighters RS	Utah Firefighters Retirement System	12/31/2009
Utah Noncontributory RS	Utah Noncontributory Retirement System	12/31/2009
Utah Public Safety RS	Utah Public Safety Retirement System	12/31/2009
Vermont MERS	Vermont Municipal Employees' Retirement System	6/30/2010
Vermont SERS	Vermont State Employees' Retirement System	6/30/2010
Vermont TRS	Vermont State Teacher's Retirement System	6/30/2010
Virginia RS	Virginia Retirement System	6/30/2010
Washington LEOFF 1	Washington Law Enforcement Officers & Fire Fighters' Retirement System 1	6/30/2010
Washington LEOFF 2	Washington Law Enforcement Officers & Fire Fighters' Retirement System 2	6/30/2010
Washington PERS 1	Washington Public Employees' Retirement System Plan 1	6/30/2010
Washington PERS 2/3	Washington Public Employees' Retirement System Plan 2	6/30/2010
Washington SERS 2 & 3	Washington School Employees' Retirement System Plan 2 & 3	6/30/2010
Washington TRS 1	Washington Teachers' Retirement System Plan 1	6/30/2010
Washington TRS 2 & 3	Washington Teachers' Retirement System Plan 2 & 3	6/30/2010
Washington WSPRS 1 & 2	Washington State Patrol Retirement System	6/30/2010
West Virginia PERS	West Virginia Public Employees Retirement System	6/30/2010
West Virginia TRS	West Virginia Teachers Retirement System	6/30/2010
Wisconsin RS	Wisconsin Retirement System	12/31/2009
Wyoming RS	Wyoming Retirement System	12/31/2009



Important Information

This material contains confidential and proprietary information of Wilshire Consulting, and is intended for the exclusive use of the person to whom it is provided. It may not be modified, sold or otherwise provided, in whole or in part, to any other person or entity without prior written permission from Wilshire Consulting.

The information contained herein has been obtained from sources believed to be reliable. Wilshire Consulting gives no representations or warranties as to the accuracy of such information, and accepts no responsibility or liability (including for indirect, consequential or incidental damages) for any error, omission or inaccuracy in such information and for results obtained from its use. Information and opinions are as of the date indicated, and are subject to change without notice.

This material is intended for informational purposes only and should not be construed as legal, accounting, tax, investment, or other professional advice. Past performance does not guarantee future returns.

Wilshire® is a registered service mark of Wilshire Associates Incorporated, Santa Monica, California. All other trade names, trademarks, and/or service marks are the property of their respective holders.

Copyright © 2011 Wilshire Associates Incorporated. All rights reserved.