Illinois Public Pension Compendium

A Five Part Series

Part Three: Components of Change in the UAAL

Pension Investment Return and Discount Rate Assumptions

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January 6th, 2015

"Cheiron recommended decreasing the interest rate assumption from 7.75% to 7.25% or lower for the upcoming 2014 valuation: SERS' actuary reported to the SERS Board in February 2013, that the expected average geometric return on SERS' investments over the next 30 years, as developed by eight national investment consulting firms, is 7.09%. The SERS actuary also noted that the probability of meeting or exceeding the 7.75% assumption is 38.6%. ***Cheiron concluded that selecting an assumption that has a 61.4% chance of not being met is unreasonable.*** *"*

(Illinois Auditor General's Summary, State Actuary's Report, Actuarial Assumptions & Valuation of the Five State-Funded Retirement Systems, December 2013)

In June 2012, Public Act 097-0694 was signed into law. It directed the State of Illinois' Auditor General to hire an actuary to review assumptions and valuations of the State's five retirement systems.

Cheiron was selected to provide such actuarial services. Annually, Cheiron furnishes to the Auditor General a State Actuary report. Cheiron has provided three such reports in each of the last three calendar years.

For this portion our Illinois pension series we are going to narrow our focus to Illinois' three main retirement systems. We define TRS, SERS, and SURS as the main systems because according to the State's preliminary 2014 actuarial valuation, the plans account for 98.4% of the State's total unfunded liability. TRS accounts for the majority with an unfunded liability of $61.6 billion (55.4% of total), followed by SERS at $26.2 billion (23.6%) and SURS at $21.6 billion (19.4%).

As this paper progresses we will elaborate on the relationship between assumed versus actual investment returns, touch upon the performance of the State of Illinois' pension bonds, and compare the condition of the State of Illinois' pension system relative to other states.

The Cheiron reports offer several recommendations. Most notably, in the 2012 and 2013 reports, Cheiron concluded that it was not comfortable with the investment return assumptions used by the three major retirement systems. The firm recommended reducing the return rate assumptions for the Teachers Retirement System (TRS), the State University Retirement System (SURS), and the State Employees Retirement System (SERS), which at the time of Cheiron's 2013 report were set at 8.0%, 7.75%, and 7.75% respectively. (See Chart 1)

The foundation for Cheiron's recommendation to reduce interest rate assumptions was based on an examination of historical investment returns of the retirement systems along with probabilistic estimates of future market returns.

As with SERS, Cheiron found similar statistical evidence in support of lower interest rate assumptions for SURS and TRS. After reviewing SURS' 2013 capital market assumptions, Cheiron found that the expected geometric

return on the system's portfolio was 6.95% over the 5-to 10-year time horizon, 55 basis points lower than a prior report from 2011.

Further, in SURS' 2010 experience study, the system's actuary relied on the opinion of nine independent investment consultants who provided that the probability of exceeding 7.75% investment return each year was 44.59%. The conclusion being that for this assumption the expected average return rate based on the current asset allocation will likely be lower than 7.75%.

Cheiron also found that the historic actual returns contained in TRS' 2013 performance review showed for all periods, except the one-year and 20-year averages, return rates were significantly below 8.0%. Cheiron surmised that the prospect of a repeat of the 1990's equity market rally, which was included in the 20-year average, was not anticipated by investment consultants to be replicated. According to the report, the 15-year average return for TRS was 7.7%.

While the Cheiron reports are technical in nature, the underlying theme is accuracy. Interest rate assumptions are key variables in balancing the actuarial valuation equation. The investment return assumption reflects anticipated returns on the pension plan's current and future assets. Meanwhile, the discount rate assumption is used to determine the present value of expected future liabilities. Reinforcing this relationship, generally, public pension plans match the assumed investment return and the discount rate. Thus, should actual results deviate from the expected values it ultimately impacts the calculation of the plan's assets and liabilities.

Consider the situation in which investment returns fall short of the pension plan's assumption, the government must choose to either increase the annual contribution payment or reduce future benefits to make up for the shortfall.

Additionally, the actuarial valuation equation's sensitivity to imprecision creates a risky proposition for stakeholders. A retirement system that assumes too high of an expected investment return may simultaneously assume a greater discount rate on future liabilities. This scenario reduces the present value of those pension obligations while lowering the annual pension contribution. Although it sounds like an ideal scenario, significant inaccuracy may incentivize current stakeholders to undervalue existing pension liabilities and transfer pension funding risk to future generations. Current pension plan participants receive greater benefits without having to make the requisite difficult choices in the immediacy.

According to a recently released preliminary actuarial valuation report for TRS:

> *"The Tier II total normal cost is less than the Tier II member contribution rate; that is, Tier II members pay for their own pensions and subsidize the State (Illinois) by paying down the UAAL."*

A Civic Federation analysis of the preliminary report noted:

> *"Tier 2 employees, hired on or after January 1, 2011, receive lower pension benefits upon retirement under a law passed in April 2010 than Tier 1 employees, who were hired prior to that time. Through FY2045, Tier 2 employees are projected to contribute $26.2 billion to fund their own benefits and $6.9 billion to pay for the unfunded liability. Tier 1 employees are projected to contribute $19.8 billion during the same period, all of which will be used to fund their own benefits."*

The line between simply underperforming on expectations and deliberately constructing assumptions that misrepresent pension funding status is blurred considerably in the context of a substantially underfunded pension plan. An additional layer of complexity is added when weighing modern retirement system's shift toward riskier asset allocations.

According to the Federal Reserve's Financial Accounts of the United States and the Pew Charitable Trust analysis of State Financial Reports that discusses retirement plan investment strategies:

"Before the early 1980s, many public retirement plans were bound by strict regulations limiting their investment options. States, for example, were previously limited in their investment options by restrictive "legal lists" that were also used to regulate insurance and savings banks, for which safety was the principal concern. But these restrictions were gradually relaxed in states in the 1980s and 1990s, allowing pension plans much more latitude to invest in a variety of financial instruments, including stocks. From the early 1980s onward, pension plans began shifting large portions of their portfolios away from fixed-income securities and toward equities. The change in allocation occurred slowly at first but picked up speed through the 1990s. Data from the Federal Reserve's Financial Accounts of the United States reveal that in 1952, nearly 96 percent of public pension assets were invested in fixed-income asset classes and cash. By 1992, the proportion of pension assets in fixed-income investments and cash had decreased to 47 percent, and by 2012, it had fallen to 27 percent. Cash and other cash equivalents, such as certificates of deposit, account for 2 to 3 percent of pension fund assets on average and are added to fixed income investments as part of what the Federal Reserve defines as safe assets."

Assuming expected rates of return that exceed historic averages reduce the size of the government's annual contribution and often end up concealing the true pension funding level, minimizing the increased risk-taking, and delay public scrutiny.

Perhaps the relationship is best exemplified by the lower than assumed investment returns generated by the State of Illinois' five retirement systems, which have resulted in $13.6 billion being added to the State's unfunded pension liability over the last 29 years. (See Chart 2)

Moreover, in anticipation of the June 30, 2014 actuarial valuations, the SURS, SERS, and TRS all voted to reduce their assumed rates of investment return per the recommendation by Cheiron. SURS and SERS voted to reduce their assumed rate of investment return from 7.75% to 7.25%, while TRS voted to change its assumption from 8.0% to 7.5%.

Although investment performance exceeded actuarial expectations in FY14, the investment return assumption changes contributed heavily to the increase in total accrued liability, as well as the net increase in the unfunded liability of $10.6 billion, in FY14. (See Chart 2)
In total, over the last 29 years, lower than expected investment returns and changes in actuarial assumptions have increased the State of Illinois' unfunded pension liability by approximately $33.5 billion or roughly one third of the total increase in the unfunded liability during that period.

A contributing factor in this transition toward riskier asset allocations has been U.S. pension systems autonomy in determining investment strategies and liability discount rates. Opponents have contended that such autonomy encourages pension systems to link the liability discount rates to the assumed rate of return on plan assets, rather than to the riskiness of the liabilities as suggested by economic theory.

Under financial economic theory, the interest rate used to value pension plan liabilities should be based on near risk free rates of return, because pension liabilities are considered more analogous to bonds, and that using the higher expected earnings rates masks the risk of achieving that return.

There have been indications that the public sector may adopt lower investment assumptions. Cheiron highlights the nationwide movement among pension plans to lower the investment return assumption.
The National Association of State Retirement Administrators (NASRA) conducts the Public Fund Survey which is an online compilation of key characteristics covering 126 public pension plans. Chart 3 shows the change in the interest rate assumptions, since the inception of the Public Fund Survey in 2001.

As shown in chart 3, many public pension plans have reduced their return assumption in recent years. Among the 126 plans measured in the Public Fund Survey, more than one-half have reduced their investment return assumption since fiscal year 2008. The survey found that the median return assumption was 7.75%.

The debate over optimal investment return and discount rate assumptions will likely continue. It could benefit stakeholders to advocate for enhanced financial risk management policies and more comprehensive annual reviews of pension plan assumptions. Later on in this paper and in an effort to differentiate pension funding performance we'll compare the investment returns and pension funding levels from the States of Illinois, Kentucky, Connecticut, North Carolina, South Dakota, and Wisconsin.

Before we get to the comparisons, we'll briefly examine pension bonds, and specifically, the State of Illinois' pension bonds.

During periods of economic strain, some municipalities have opted to issue pension obligation bonds or POBs as a budget relief mechanism. POBs can offer immediate relief when municipalities have a statutory obligation to reduce underfunding or cover shortfalls. Further, in order to maintain service levels, administrations may see POBs as the preferred option over reductions.

Before we begin our discussion on the State of Illinois' POBs, we'll provide a bit of history on the broader subject of pension obligation bonds. The first municipality to issue POBs was the city of Oakland California in 1985. Prior to the Tax Reform Act of 1986 (TRA86), POBs could be issued on a tax-exempt basis.

This allowed municipalities to invest bond proceeds in higher yielding securities through the pension funds. The strategy was to generate a net positive return after transactional costs. This arbitrage strategy was eliminated by TRA86 because it generated excess returns on a tax-exempt basis thereby denying the federal government tax revenue. Following TRA86, it was generally perceived that POBs could not be effective financing options given their taxable characteristics.

Unexpectedly, POBs made a comeback. The performance of the equity markets in the 1990's combined with a more favorable interest rate environment created an arbitrage opportunity for the now taxable version of POBs.

Furthermore, as we discussed earlier, pension funds had shifted investment portfolios to include a greater exposure to equities during this time period. This allowed pension plans to generate higher returns and make bolder assumptions on future expected returns.

Using the NASRA median return assumption of 7.75%, pension obligation bonds could make an attractive opportunity for issuers whose taxable borrowing costs are in the 3% to 5% range.

The State of Illinois has issued three series of pension bonds. The first of which was for $10 billion in 2003 (2003 Pension Bonds), followed by issuances of $3.61 billion in 2010 and $3.7 billion in 2011.

The 2003 Pension Bonds were the only series of Illinois POBs issued with the purpose of directly reducing the unfunded actuarially accrued liability. Besides reducing the UAAL, the 2003 Pension Bonds were also intended to reduce future contributions that would have been required had the proceeds not been used as additional contributions.
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Initially, the full $10 billion was to be invested into the State's pension system, but a portion of the bond proceeds was used to pay part of the FY03 pension contributions and all of the FY04 contributions, leaving a net amount of $7.3 billion.

In 2003, actuaries estimated the investment return assumptions for the pension assets and pension bond proceeds would be between 8% and 8.5%. At that time, those figures were greater than the estimated market interest rate of 5.8%. The bonds were actually issued at an interest rate of 5.05%.

According to the State's most recent official statement for its May 2014 GO Bonds issue:

> *"At the time of the issuance of the 2003 Pension Bonds, the State assumed that the investment returns made on the 2003 Pension Bond proceeds used to reduce the UAAL would be greater than the debt service on the 2003 Pension Bonds, creating a net decrease in the UAAL in each year. Since the total interest cost percentage of the 2003 Pension Bonds at date of issuance was 5.05%, then in any year that the actual returns exceeded in each specific year the amount of the debt service payments, the UAAL was effectively reduced from what the UAAL would have been had those bonds not been issued and proceeds not provided to the State's pension systems. Conversely, in those fiscal years when the actual returns were less than total interest cost percentage on the 2003 Pension Bonds, the UAAL was effectively increased from what the UAAL would have been had those bonds not been issued and proceeds provided to the State's pension systems."*

This interplay between the interest owed on the POBs and the rate of return achieved by the retirement funds defines the risk inherent in borrowing to improve the State's pension funding and is referred to as interest rate arbitrage. Since Illinois has exceeded this amount in most years, issuing the 2003 POBs at this moment appears have benefited the State's retirement systems. At other times the POBs might look less successful if investment returns suffer due to market fluctuations.

A national survey of pension borrowing published by the Center on Retirement Research at Boston College demonstrates the shifting perspective on the success of POB sales to improve pension funding based on market conditions. The study, published in July, reviewed all 5,109 POBs issued across the country by 529 different government entities with a value of $98 billion in 2013 dollars. The researchers concluded that as of 2013 the POBs netted 1.5% in positive earnings. However, the Center's data show that in 2009 POBs nationally had lost 2.6% in net earnings for issuers when the global recession hampered investment returns for pension funds.

In our final analysis of the investment return assumption topic we thought it would be interesting to compare the top three and bottom three performing state retirement systems. We compiled pension plan information for all six states using comprehensive annual financial reports, actuarial valuations, and state treasurer or comptroller investment reports. We gathered a complete dataset dating back to FY2001 (See Retirement System Summary in the Appendix). We focused primarily on data points that we thought could be comfortably compared across the different states. We are cognizant of the issues created when attempting to draw comparisons across such a small and varied subset. Our objective was to isolate investment returns as a possible indicator of proactive pension system management. We settled on plan assets, liabilities, unfunded liabilities, funded ratio, assumed investment returns and actual investment returns.

All told we investigated 10 retirement systems: Connecticut State Employees Retirement System (CT SERS, FY14 funded ratio – 41.5%), Connecticut Teachers Retirement System (CT TRS, FY14 funded ratio 59%), IL SERS, IL TRS, IL SURS, Kentucky Employee Retirement System (KY ERS, FY14 funded ratio – 23.8%), Kentucky Teachers Retirement System (KY TRS, FY14 funded ratio – 53.58%), North Carolina Teachers & State Employee Retirement System (NC T&SERS, FY13 funded ratio – 94.2%), South Dakota Public Employees Retirement System (SD PERS, FY14 funded ratio – 100%), and Wisconsin Retirement System (WRS, FY13 funded ratio 99.9%). The table in chart 5 summarizes the assumed and actual investment returns for the retirement systems. A few observations:

- The better performing pension systems appear to have adjusted investment return assumptions much earlier.
- North Carolina's assumed rate of return of 7.25% was the lowest of any system in our sample until

Wisconsin lowered its assumption to 7.2% in 2010.

- During periods of equity market declines in 2001, 2002, and 2009, Illinois pensions were the worst performing system in each year.
- South Dakota had the largest sample standard deviation of its actual returns. It also generated the largest arithmetic mean.

Our data also showed that in the bottom three states, Illinois, Connecticut, and Kentucky there were 36 out of a possible 98 instances in which actual investment returns exceeded the assumed rate of return, yet the funded ratio decreased. On average the actual investment return exceeded the assumed return by 5.9%, but the funded ratios declined by an average of 3.93%. This seems counterintuitive. Excess returns should translate into improved pension funding levels. When we looked at the percent changes in assets and liabilities we found assets actually decreased by an average of 0.13%, while liabilities increased 7.13%.

In the top three performing states, North Carolina, South Dakota, and Wisconsin we found only six such instances out of 40. Five of the six instances came from the North Carolina T&SERS. The explanation is rather straightforward. Going back to FY2001 NC T&SERS had a funded ratio of 112.8%. Since that time the State has gradually reduced the funded ratio, which reached 94.8% in FY14. Given the demands of stakeholders, it can simply become unjustifiable to maintain an overfunded pension system. In contrast, the Kentucky TRS, which had six instances in similar years, ended FY01 with a funded ratio of 90.8%, only to see it decline to 53.58% in FY14. The other instance from a top performing system was from South Dakota, that instance can be explained because it coincided with the system reducing its return assumption to 7.75% from 8.0%. In every year WRS generated excess returns, it also increased its funding ratio.

We also found that there were 14 instances from the bottom three states in which investments generated returns above the assumed rate of return and also raised the funded ratio. On average the actual investment return exceeded the assumed return by 8.41%, and the funded ratios increased by an average of 3.66%. Those figures were skewed slightly because they included the three times Illinois issued POBs. Backing out those three instances, excess returns averaged 8.48% and funded ratios increased 1.55%. Meanwhile the top three states managed to generate returns above assumed rates and raise the funded ratio 17 times.

Overall, we found that investment returns for the top three states outperformed the bottom three in all but one year, 2008, and only by 0.05%. On average the top three states outperformed the bottom three states by 1.30% annually.

For the next part in our series we'll explore the history of pension reforms in Illinois as well as possible reforms on the horizon.

Appendix

CHART 1
State of Illinois Retirement Systems
Investment Returns and Discount Rates Assumed vs. Actual

	TRS		SERS		JRS		SURS		GARS	
FY	Assumed	Actual	Assumed	Actual	Assumed	Actual	Assumed	Actual	Assumed	Actual
2003	8.50%	4.90%	8.50%	0.30%	8.00%	0.30%	8.50%	2.90%	8.00%	0.30%
2004	8.50%	16.50%	8.50%	16.40%	8.00%	16.40%	8.50%	17.00%	8.00%	16.40%
2005	8.50%	10.80%	8.50%	10.10%	8.00%	10.10%	8.50%	10.40%	8.00%	10.10%
2006	8.50%	11.80%	8.50%	11.00%	8.00%	11.00%	8.50%	11.70%	8.00%	11.00%
2007	8.50%	19.20%	8.50%	17.10%	8.00%	17.10%	8.50%	18.30%	8.00%	17.10%
2008	8.50%	-5.00%	8.50%	-6.20%	8.00%	-6.20%	8.50%	-4.50%	8.00%	-6.20%
2009	8.50%	-22.70%	8.50%	-20.10%	8.00%	-20.10%	8.50%	-19.70%	8.00%	-20.10%
2010	8.50%	12.90%	7.75%	9.10%	7.00%	9.10%	7.75%	15.00%	8.00%	9.10%
2011	8.50%	23.60%	7.75%	21.70%	7.00%	21.70%	7.75%	23.80%	7.00%	21.70%
2012	8.00%	0.80%	7.75%	0.20%	7.00%	0.20%	7.75%	0.50%	7.00%	0.20%
2013	8.00%	12.80%	7.75%	14.10%	7.00%	14.10%	7.75%	12.50%	7.00%	14.10%
2014	7.50%	17.20%	7.25%	17.50%	7.00%	16.80%	7.25%	18.20%	7.00%	16.30%

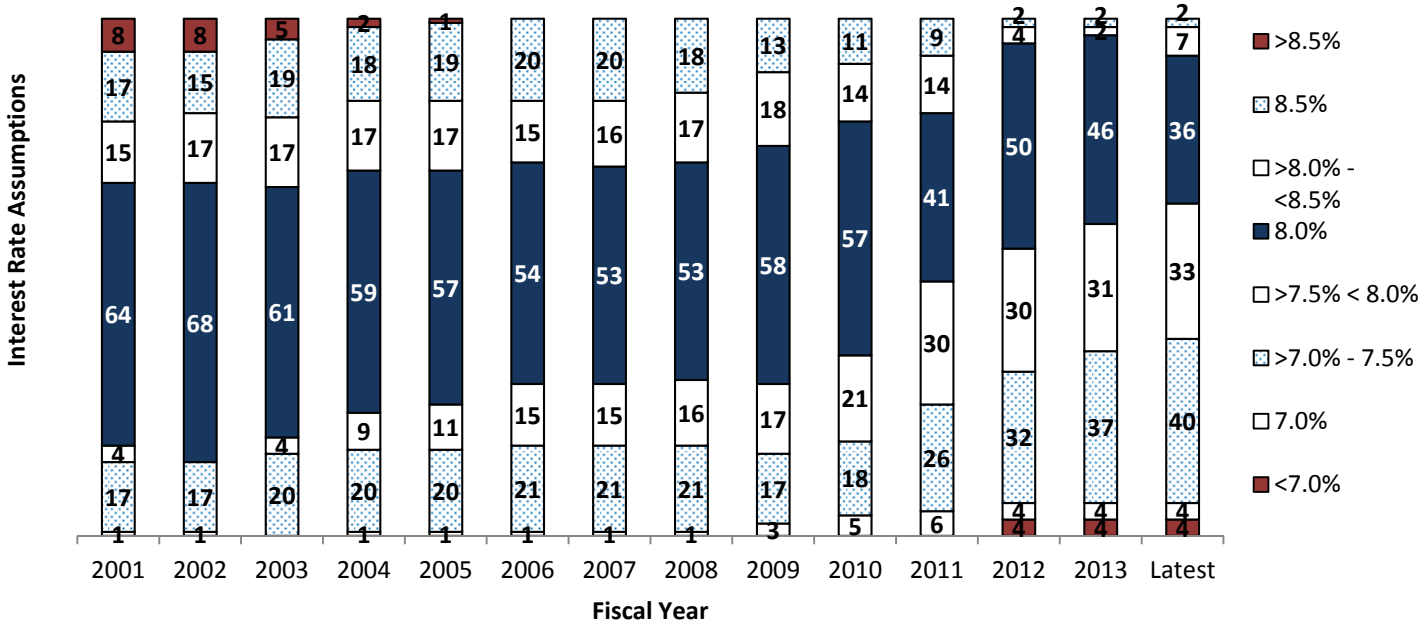
Chart 2

STATE OF ILLINOIS RETIREMENT SYSTEMS - COMBINED
CHANGES IN UNFUNDED LIABILITY
FY1985 to FY2014
In Millions

Year	Salary Increases	Investment Returns (Higher)/Lower Than Assumed	Employer Contributions N.C. + Interest (Higher)/Lower	Benefit Increases	Changes in Actuarial Assumptions	Other Factors	Total Change In Unfunded Liability from Previous Yr
6/30/85	63.0	(211)	477	66	(637)	201	(41)
6/30/86	140.0	(902)	418	0	(44)	263	(125)
6/30/87	113.5	(552)	375	129	339	(227)	178
6/30/88	(34.1)	6	520	49	118	2	661
6/30/89	111.6	(52)	566	0	(21)	11	615
6/30/90	94.5	(244)	661	1,306	186	(111)	1,892
6/30/91	(54.5)	105	812	26	214	131	1,233
6/30/92	79.9	(602)	1,031	256	(79)	488	1,174
6/30/93	188.5	(362)	1,084	95	13	192	1,210
6/30/94	180.4	(230)	1,211	193	772	763	2,890
6/30/95	66.9	238	1,506	153	0	519	2,483
6/30/96	278.0	(950)	1,648	18	(782)	317	529
6/30/97	(174.6)	(1,718)	1,572	179	(6,629)	456	(6,315)
6/30/98	(113.2)	(2,788)	984	2,250	0	276	609
6/30/99	77.1	(989)	883	34	125	894	1,025
6/30/00	154.5	(1,307)	1,047	3	0	327	225
6/30/01	44.0	6,599	1,047	652	0	1,068	9,410
6/30/02	134.4	5,575	1,741	234	1,378	903	9,966
6/30/03	125.6	2,071	2,435	2,425	0	1,101	8,158
6/30/04	135.7	(3,842)	(4,690)	0	0	385	(8,011)
6/30/05	35.1	(1,034)	2,432	0	26	2,048	3,508
6/30/06	108.3	(1,843)	3,485	0	705	(323)	2,131
6/30/07	314.9	(6,064)	3,238	0	2,735	1,221	1,445
6/30/08	72.8	9,312	2,786	0	0	36	12,207
6/30/09	(105.8)	3,832	3,231	0	0	1,098	8,055
6/30/10	(424.1)	4,818	2,746	2	5,209	950	13,302
6/30/11	(853.8)	2,667	3,666	7	581	1,099	7,166
6/30/12	(1,294.4)	2,845	4,308	0	4,625	1,191	11,675
6/30/13	(631.2)	2,399	3,353	0	(71)	727	5,777
6/30/14	(212.0)	(3,131)	2,685	0	11,107	231	10,680
Total	(1,379)	13,646	47,259	8,077	19,870	16,239	103,712

Source: Commission on Forecasting and Accountability

Chart 3
Change In Interest Rate Assumptions Since 2001
126 Pension Plans In The Nation's Largest Public Retirement Systems



Source: NASRA Issue Brief Public Pension Plan Investment Return Assumptions, October 2014

Chart 4
State of Illinois Retirement Systems (Combined TRS, SERS, SURS, JRS, GARS)
Retirement System Funding Table
($ Millions)

FY	Actuarial Valued Assets	Actuarial Valued Liabilities	Unfunded Liabilities	Funded Ratio	Amounts Contributed	Required Contribution	ARC Percentage	"+/-"
1985	$7,856	$14,930	-$7,074	52.6%				
1986	$9,551	$16,417	-$6,866	58.2%				
1987	$10,956	$17,914	-$6,958	61.2%				
1988	$11,940	$19,604	-$7,664	60.9%				
1989	$13,030	$21,264	-$8,234	61.3%				
1990	$14,375	$24,883	-$10,508	57.8%				
1991	$15,467	$27,208	-$11,741	56.8%				
1992	$17,217	$30,132	-$12,915	57.1%				
1993	$18,805	$32,929	-$14,124	57.1%				
1994	$20,409	$37,424	-$17,015	54.5%				
1995	$21,494	$40,991	-$19,497	52.4%				
1996	$23,584	$44,392	-$20,808	53.1%				
1997	$32,188	$45,900	-$13,712	70.1%				
1998	$37,241	$51,563	-$14,322	72.2%				
1999	$41,442	$56,787	-$15,345	73.0%				
2000	$45,949	$61,518	-$15,569	74.7%				
2001	$42,789	$67,768	-$24,979	63.1%				
2002	$40,252	$75,198	-$34,946	53.5%				
2003	$40,925	$83,905	-$42,980	48.8%	$1,685	$2,535	66.5%	-$850
2004	$54,769	$89,912	-$35,143	60.9%	$9,176	$2,656	345.5%	**$6,520**
2005	$58,577	$97,179	-$38,602	60.3%	$1,735	$3,084	56.3%	-$1,349
2006	$62,341	$103,073	-$40,732	60.5%	$1,022	$3,085	33.1%	-$2,063
2007	$70,731	$112,908	-$42,177	62.6%	$1,479	$3,665	40.4%	-$2,186
2008	$64,700	$119,084	-$54,384	54.3%	$2,145	$3,729	57.5%	-$1,584
2009	$48,542	$126,435	-$77,893	38.4%	$2,891	$4,076	70.9%	-$1,185
2010	$53,225	$138,794	-$85,569	38.3%	$4,130	$4,786	86.3%	-$656
2011	$63,382	$146,460	-$83,078	43.3%	$4,298	$5,906	72.8%	-$1,608
2012	$61,813	$158,611	-$96,798	39.0%	$5,012	$6,609	75.8%	-$1,597
2013	$64,957	$165,458	-$100,501	39.3%	$5,893	$7,015	84.0%	-$1,122
2014***	$72,067	$183,249	-$111,182	39.3%				
2015***	$78,920	$190,214	-$111,294	41.5%	$6,936			
2016***	$84,754	$197,264	-$112,510	43.0%	$7,617			
2017***	$91,515	$204,341	-$112,826	44.8%	$7,605			
2018***	$97,707	$211,428	-$113,721	46.2%	$7,780			
2019***	$102,587	$218,503	-$115,916	46.9%	$7,907			
2020***	$107,465	$225,561	-$118,096	47.6%	$8,065			

Source: Commisson on Government Forecasting and Accountability, State of Illinois CAFRs 1990 to 2013, State of Illinois Official Statements

***Projected

Chart 5

STATE RETIREMENT SYSTEM INVESTMENT RETURN COMPARISON

	CT SERS		CT TRS		IL SERS		IL TRS		IL SURS		KY ERS		KY TRS		NC T&SE RS		SD PERS		WRS	
FY	Assumed	Actual	Assumed	Actual	Assumed	Actual	Assumed	Actual	Assumed	Actual	Assumed	Actual	Assumed	Actual	Assumed	Actual	Assumed	Actual	Assumed	Actual
2001	8.50%	-3.7%		-3.7%	8.50%	-7.1%	8.50%	-4.2%	8.50%	-8.8%	8.25%	-4.4%	7.50%	-0.7%	7.25%	-2.0%	8.00%	-2.9%	8.00%	-5.4%
2002	8.50%	-6.4%	8.50%	-6.4%	8.50%	-6.9%	8.50%	-3.2%	8.50%	-6.1%	8.25%	-4.3%	7.50%	-4.1%	7.25%	-4.0%	8.00%	4.9%	8.00%	-4.8%
2003	8.50%	2.5%		2.5%	8.50%	0.3%	8.50%	4.9%	8.50%	2.9%	8.25%	4.3%	7.50%	4.8%	7.25%	7.6%	8.00%	5.0%	7.80%	4.6%
2004	8.50%	15.2%	8.50%	15.2%	8.50%	16.4%	8.50%	16.5%	8.50%	17.0%	8.25%	13.6%	7.50%	9.7%	7.25%	12.1%	8.00%	16.6%	7.80%	16.6%
2005	8.50%	10.5%		10.5%	8.50%	10.1%	8.50%	10.8%	8.50%	10.4%	8.25%	9.3%	7.50%	7.5%	7.25%	9.9%	7.75%	13.3%	7.80%	11.1%
2006	8.50%	10.6%	8.50%	10.6%	8.50%	11.0%	8.50%	11.8%	8.50%	11.7%	7.75%	9.7%	7.50%	5.4%	7.25%	7.2%	7.75%	13.1%	7.80%	12.2%
2007	8.50%	17.3%		17.3%	8.50%	17.1%	8.50%	19.2%	8.50%	18.3%	7.75%	15.3%	4.50%	15.3%	7.25%	14.8%	7.75%	21.4%	7.80%	18.0%
2008	8.25%	-4.8%	8.50%	-4.8%	8.50%	-6.2%	8.50%	-5.0%	8.50%	-4.5%	4.50%	-4.2%	7.50%	-5.7%	7.25%	-2.1%	7.75%	-8.7%	7.80%	-4.5%
2009	8.25%	-18.3%		-17.1%	8.50%	-20.1%	8.50%	-22.7%	8.50%	-19.7%	7.75%	-17.2%	7.50%	-14.3%	7.25%	-14.2%	7.75%	-20.4%	7.80%	-17.7%
2010	8.25%	12.9%	8.50%	12.9%	7.75%	9.1%	8.50%	12.9%	7.75%	15.0%	7.75%	15.8%	7.50%	13.1%	7.25%	12.0%	7.75%	18.7%	7.20%	13.3%
2011	8.25%	21.2%		20.8%	7.75%	21.7%	8.50%	23.6%	7.75%	23.8%	7.75%	19.0%	7.50%	21.6%	7.25%	18.5%	7.75%	25.8%	7.20%	22.9%
2012	8.00%	-0.9%	8.50%	-1.0%	7.75%	0.1%	8.00%	0.8%	7.75%	0.5%	7.75%	0.1%	7.50%	2.4%	7.25%	2.2%	7.75%	1.9%	7.20%	1.3%
2013	8.00%	11.9%		11.8%	7.75%	14.1%	8.00%	12.8%	7.75%	12.5%	7.75%	11.0%	7.50%	14.1%	7.25%	9.5%	7.25%	19.5%	7.20%	11.1%
2014	8.00%	15.6%	8.50%	15.7%	7.25%	17.5%	7.50%	17.2%	7.25%	18.2%	7.50%	15.6%	7.50%	18.1%	7.25%	15.9%	7.25%	18.9%		
ST DEV S		11.3%		11.1%		12.3%		12.5%		12.7%		10.5%		10.1%		9.1%		13.1%		11.6%
MEDIA N		10.5%		10.5%		9.6%		11.3%		11.1%		9.5%		6.5%		7.6%		13.2%		11.1%
MEA N		6.0%		6.0%		5.5%		6.8%		6.5%		6.0%		6.2%		5.49%		9.1%		6.1%
MIN		-18.3%		-17.1%		-20.1%		-22.7%		-19.7%		-17.2%		-14.3%		-14.2%		-20.4%		-17.7%
MA X		21.2%		20.8%		21.7%		23.6%		23.8%		19.0%		21.6%		18.5%		25.8%		22.9%

STATE RETIREMENT SYSTEM SUMMARY

(In thousands)

Retirement System	Fiscal Year End	Actuarial Valuation Date	Assets	Liabilities	Funded Ratio	Unfunded Liability	Assumed Inv Ret.	Actual Inv Ret.
Connecticut SERS	6/30/01	6/30/01	$7,638,854	$12,105,366	63.10%	$4,466,513	8.50%	-3.68%
Connecticut SERS	6/30/02	6/30/02	$7,893,684	$12,806,115	61.64%	$4,912,431	8.50%	-6.39%
Connecticut SERS	6/30/03	6/30/03	$8,058,587	$14,223,786	56.66%	$6,165,200	8.50%	2.49%
Connecticut SERS	6/30/04	6/30/04	$8,238,418	$15,128,502	54.46%	$6,890,084	8.50%	15.23%
Connecticut SERS	6/30/05	6/30/05	$8,517,677	$15,987,547	53.28%	$7,469,869	8.50%	10.46%
Connecticut SERS	6/30/06	6/30/06	$8,951,393	$16,830,349	53.19%	$7,878,956	8.50%	10.55%
Connecticut SERS	6/30/07	6/30/07	$9,584,970	$17,888,065	53.58%	$8,303,095	8.50%	17.34%
Connecticut SERS	6/30/08	6/30/08	$9,990,247	$19,243,373	51.92%	$9,253,126	8.25%	-4.83%
Connecticut SERS	6/30/09	6/30/09	No Actuarial Valuation Completed				8.25%	-18.25%
Connecticut SERS	6/30/10	6/30/10	$9,349,605	$21,054,197	44.40%	$11,704,592	8.25%	12.93%
Connecticut SERS	6/30/11	6/30/11	$10,122,765	$21,126,725	47.90%	$11,003,960	8.25%	21.15%
Connecticut SERS	6/30/12	6/30/12	$9,744,986	$23,018,752	42.30%	$13,273,766	8.00%	-0.90%
Connecticut SERS	6/30/13	6/30/13	$9,784,500	$23,768,191	41.20%	$13,983,691	8.00%	11.90%
Connecticut SERS	6/30/14	6/30/14	$10,584,795	$25,505,610	41.50%	$14,920,815	8.00%	15.62%
Connecticut TRS	6/30/01	6/30/01						-3.68%
Connecticut TRS	6/30/02	6/30/02	$10,387,300	$13,679,900	75.90%	$3,292,600	8.50%	-6.39%
Connecticut TRS	6/30/03	6/30/03						2.49%
Connecticut TRS	6/30/04	6/30/04	$9,846,700	$15,070,500	65.30%	$5,223,800	8.50%	15.23%
Connecticut TRS	6/30/05	6/30/05						10.46%
Connecticut TRS	6/30/06	6/30/06	$10,190,300	$17,112,800	59.50%	$6,922,455	8.50%	10.55%
Connecticut TRS	6/30/07	6/30/07						17.34%
Connecticut TRS	6/30/08	6/30/08	$15,271,000	$21,801,000	70.00%	$6,530,000	8.50%	-4.77%
Connecticut TRS	6/30/09	6/30/09						-17.14%
Connecticut TRS	6/30/10	6/30/10	$14,430,200	$23,495,900	61.40%	$9,065,700	8.50%	12.87%
Connecticut TRS	6/30/11	6/30/11						20.77%
Connecticut TRS	6/30/12	6/30/12	$13,734,800	$24,862,200	55.20%	$11,127,400	8.50%	-0.96%
Connecticut TRS	6/30/13	6/30/13						11.83%
Connecticut TRS	6/30/14	6/30/14	$15,546,500	$26,349,200	59.00%	$10,802,700	8.50%	15.67%

STATE RETIREMENT SYSTEM SUMMARY

(In thousands)

Retirement System	Fiscal Year End	Actuarial Valuation Date	Assets	Liabilities	Funded Ratio	Unfunded Liability	Assumed Inv Ret.	Actual Inv Ret.
Illinois SERS	6/30/01	6/30/01	$8,276,661	$12,572,240	65.80%	$4,295,579	8.50%	-7.10%
Illinois SERS	6/30/02	6/30/02	$7,673,893	$14,291,044	53.70%	$6,617,152	8.50%	-6.90%
Illinois SERS	6/30/03	6/30/03	$7,502,111	$17,593,980	42.60%	$10,091,869	8.50%	0.30%
Illinois SERS	6/30/04	6/30/04	$9,990,187	$18,442,665	54.20%	$8,452,478	8.50%	16.40%
Illinois SERS	6/30/05	6/30/05	$10,494,147	$19,304,647	54.40%	$8,810,499	8.50%	10.10%
Illinois SERS	6/30/06	6/30/06	$10,899,853	$20,874,542	52.20%	$9,974,689	8.50%	11.00%
Illinois SERS	6/30/07	6/30/07	$12,078,909	$22,280,917	54.20%	$10,202,008	8.50%	17.10%
Illinois SERS	6/30/08	6/30/08	$10,995,366	$23,841,280	46.10%	$12,845,914	8.50%	-6.20%
Illinois SERS	6/30/09	6/30/09	$10,999,954	$25,298,346	43.48%	$14,298,393	8.50%	-20.10%
Illinois SERS	6/30/10	6/30/10	$10,961,540	$29,309,464	37.40%	$18,347,924	7.75%	9.10%
Illinois SERS	6/30/11	6/30/11	$11,159,837	$31,395,008	35.55%	$20,235,171	7.75%	21.70%
Illinois SERS	6/30/12	6/30/12	$11,477,264	$33,091,186	34.70%	$21,613,922	7.75%	0.10%
Illinois SERS	6/30/13	6/30/13	$11,877,419	$34,720,765	34.20%	$22,843,346	7.75%	14.10%
Illinois SERS	6/30/14*	6/30/14	$13,315,600	$39,526,800	33.70%	$26,211,200	7.25%	17.50%
Illinois TRS	6/30/01	6/30/01	$23,315,646	$39,166,697	59.50%	$15,851,051	8.50%	-4.20%
Illinois TRS	6/30/02	6/30/02	$22,366,285	$43,047,674	52.00%	$20,681,389	8.50%	-3.20%
Illinois TRS	6/30/03	6/30/03	$23,124,823	$46,933,432	49.30%	$23,808,609	8.50%	4.90%
Illinois TRS	6/30/04	6/30/04	$31,544,729	$50,947,451	61.90%	$19,402,722	8.50%	16.50%
Illinois TRS	6/30/05	6/30/05	$34,085,218	$56,075,029	60.80%	$21,989,811	8.50%	10.80%
Illinois TRS	6/30/06	6/30/06	$36,584,889	$58,996,913	62.00%	$22,412,024	8.50%	11.80%
Illinois TRS	6/30/07	6/30/07	$41,909,318	$65,648,395	63.80%	$23,739,077	8.50%	19.20%
Illinois TRS	6/30/08	6/30/08	$38,430,723	$68,632,367	56.00%	$30,201,644	8.50%	-5.00%
Illinois TRS	6/30/09	6/30/09	$38,026,044	$73,027,198	52.10%	$35,001,154	8.50%	-22.70%
Illinois TRS	6/30/10	6/30/10	$37,439,092	$77,293,198	48.40%	$39,854,106	8.50%	12.90%
Illinois TRS	6/30/11	6/30/11	$37,769,753	$81,299,745	46.50%	$43,529,992	8.50%	23.60%
Illinois TRS	6/30/12	6/30/12	$37,945,397	$90,024,945	42.10%	$52,079,548	8.00%	0.80%
Illinois TRS	6/30/13	6/30/13	$38,115,191	$93,886,988	40.60%	$55,731,797	8.00%	12.80%
Illinois TRS	6/30/14*	6/30/14	$42,150,800	$103,740,400	40.60%	$61,589,600	7.50%	17.20%
Illinois SURS	6/30/01	6/30/01	$10,753,300	$14,915,300	72.10%	$4,162,000	8.50%	-8.80%
Illinois SURS	6/30/02	6/30/02	$9,814,700	$16,654,000	58.90%	$6,839,300	8.50%	-6.10%
Illinois SURS	6/30/03	6/30/03	$9,714,500	$18,025,000	53.90%	$8,310,500	8.50%	2.90%
Illinois SURS	6/30/04	6/30/04	$12,586,300	$19,078,600	66.00%	$6,492,300	8.50%	17.00%
Illinois SURS	6/30/05	6/30/05	$13,350,300	$20,349,900	65.60%	$6,999,600	8.50%	10.40%
Illinois SURS	6/30/06	6/30/06	$14,175,100	$21,688,900	65.40%	$7,513,800	8.50%	11.70%
Illinois SURS	6/30/07	6/30/07	$15,985,700	$23,362,100	68.40%	$7,376,400	8.50%	18.30%
Illinois SURS	6/30/08	6/30/08	$14,586,300	$24,917,700	58.50%	$10,331,400	8.50%	-4.50%
Illinois SURS	6/30/09	6/30/09	$14,281,998	$26,316,231	54.27%	$12,034,233	8.50%	-19.70%
Illinois SURS	6/30/10	6/30/10	$13,966,643	$30,120,427	46.37%	$16,153,784	7.75%	15.00%
Illinois SURS	6/30/11	6/30/11	$13,945,680	$31,514,336	44.25%	$17,568,656	7.75%	23.80%
Illinois SURS	6/30/12	6/30/12	$13,949,905	$33,170,216	42.10%	$19,220,311	7.75%	0.50%
Illinois SURS	6/30/13	6/30/13	$14,262,621	$34,373,104	41.50%	$20,110,483	7.75%	12.50%
Illinois SURS	6/30/14*	6/30/14	$15,844,700	$37,429,500	42.30%	$21,584,800	7.25%	18.20%

*Preliminary

STATE RETIREMENT SYSTEM SUMMARY

(In thousands)

Retirement System	Fiscal Year End	Actuarial Valuation Date	Assets	Liabilities	Funded Ratio	Unfunded Liability	Assumed Inv Ret.	Actual Inv Ret.
Kentucky ERS	6/30/01	6/30/01	$7,206,420	$5,729,229	125.8%	-$1,477,191	8.25%	-4.42%
Kentucky ERS	6/30/02	6/30/02	$7,030,468	$6,348,164	110.7%	-$682,305	8.25%	-4.28%
Kentucky ERS	6/30/03	6/30/03	$6,737,245	$6,877,342	98.00%	$140,098	8.25%	4.28%
Kentucky ERS	6/30/04	6/30/04	$6,397,727	$7,453,191	85.80%	$1,055,465	8.25%	13.59%
Kentucky ERS	6/30/05	6/30/05	$5,983,974	$8,018,089	74.60%	$2,034,114	8.25%	9.30%
Kentucky ERS	6/30/06	6/30/06	$5,822,071	$9,503,482	61.30%	$3,681,412	7.75%	9.70%
Kentucky ERS	6/30/07	6/30/07	$5,864,070	$10,044,932	58.40%	$4,180,861	7.75%	15.30%
Kentucky ERS	6/30/08	6/30/08	$5,820,925	$10,747,701	54.20%	$4,926,776	4.50%	-4.21%
Kentucky ERS	6/30/09	6/30/09	$5,297,115	$11,332,961	46.70%	$6,035,847	7.75%	-17.21%
Kentucky ERS	6/30/10	6/30/10	$4,712,945	$11,692,945	40.30%	$6,980,000	7.75%	15.81%
Kentucky ERS	6/30/11	6/30/11	$4,237,735	$11,903,435	35.60%	$7,665,701	7.75%	18.96%
Kentucky ERS	6/30/12	6/30/12	$3,598,543	$12,113,747	29.70%	$8,515,204	7.75%	0.14%
Kentucky ERS	6/30/13	6/30/13	$3,141,779	$12,170,582	25.80%	$9,028,803	7.75%	11.03%
Kentucky ERS	6/30/14	6/30/14	$2,951,853	$12,366,960	23.80%	$9,415,107	7.50%	15.55%
Kentucky TRS	6/30/01	6/30/01	$13,299,161	$14,642,129	90.80%	$1,342,968	7.50%	-0.70%
Kentucky TRS	6/30/02	6/30/02	$13,588,847	$15,695,574	86.60%	$2,106,727	7.50%	-4.10%
Kentucky TRS	6/30/03	6/30/03	$13,863,786	$16,594,781	83.50%	$2,730,995	7.50%	4.80%
Kentucky TRS	6/30/04	6/30/04	$14,255,131	$17,617,626	80.90%	$3,362,495	7.50%	9.70%
Kentucky TRS	6/30/05	6/30/05	$14,598,843	$19,134,870	76.30%	$4,536,027	7.50%	7.50%
Kentucky TRS	6/30/06	6/30/06	$14,857,641	$20,324,781	73.10%	$5,467,140	7.50%	5.40%
Kentucky TRS	6/30/07	6/30/07	$15,284,955	$21,254,974	71.90%	$5,970,019	4.50%	15.30%
Kentucky TRS	6/30/08	6/30/08	$15,321,325	$22,460,304	68.20%	$7,138,979	7.50%	-5.70%
Kentucky TRS	6/30/09	6/30/09	$14,885,981	$23,400,426	63.60%	$8,514,445	7.50%	-14.30%
Kentucky TRS	6/30/10	6/30/10	$14,851,330	$24,344,316	61.00%	$9,492,986	7.50%	13.10%
Kentucky TRS	6/30/11	6/30/11	$14,908,138	$25,968,692	57.40%	$11,060,554	7.50%	21.60%
Kentucky TRS	6/30/12	6/30/12	$14,691,371	$26,973,854	54.46%	$12,282,483	7.50%	2.40%
Kentucky TRS	6/30/13	6/30/13	$14,962,758	$28,817,232	51.92%	$13,854,474	7.50%	14.10%
Kentucky TRS	6/30/14	6/30/14	$16,174,199	$30,184,404	53.58%	$14,010,205	7.50%	18.10%

STATE RETIREMENT SYSTEM SUMMARY

(In thousands)

Retirement System	Fiscal Year End	Actuarial Valuation Date	Assets	Liabilities	Funded Ratio	Unfunded Liability	Assumed Inv Ret.	Actual Inv Ret.
NC T&SERS	6/30/01	12/31/00	$39,773,747	$35,248,770	112.80%	-$4,524,977	7.25%	-2.04%
NC T&SERS	6/30/02	12/31/01	$42,104,086	$37,713,663	111.60%	-$4,390,423	7.25%	-4.04%
NC T&SERS	6/30/03	12/31/02	$43,226,837	$39,863,983	108.40%	-$3,362,854	7.25%	7.56%
NC T&SERS	6/30/04	12/31/03	$45,117,508	$41,733,701	108.10%	-$3,383,806	7.25%	12.10%
NC T&SERS	6/30/05	12/31/04	$47,383,509	$43,827,854	108.10%	-$3,555,655	7.25%	9.85%
NC T&SERS	6/30/06	12/31/05	$49,670,182	$46,624,668	106.50%	-$3,045,514	7.25%	7.23%
NC T&SERS	6/30/07	12/31/06	$52,420,808	$49,391,907	106.10%	-$3,028,901	7.25%	14.80%
NC T&SERS	6/30/08	12/31/07	$55,283,121	$52,815,089	104.70%	-$2,468,031	7.25%	-2.10%
NC T&SERS	6/30/09	12/31/08	$55,127,658	$55,518,745	99.30%	$391,087	7.25%	-14.20%
NC T&SERS	6/30/10	12/31/09	$55,818,099	$58,178,272	95.90%	$2,360,173	7.25%	12.00%
NC T&SERS	6/30/11	12/31/10	$57,102,198	$59,876,066	95.40%	$2,773,867	7.25%	18.48%
NC T&SERS	6/30/12	12/31/11	$58,125,011	$61,846,697	94.00%	$3,721,686	7.25%	2.21%
NC T&SERS	6/30/13	12/31/12	$59,911,833	$63,630,278	94.20%	$3,718,445	7.25%	9.52%
NC T&SERS	6/30/14	12/31/13	$62,363,807	$65,805,555	94.80%	$3,441,748	7.25%	15.88%
SD PERS	6/30/01	6/30/01	$4,521,400	$4,688,400	96.40%	$167,000	8.00%	-2.90%
SD PERS	6/30/02	6/30/02	$4,425,400	$4,576,900	96.70%	$151,500	8.00%	4.90%
SD PERS	6/30/03	6/30/03	$4,685,800	$4,818,900	97.20%	$133,100	8.00%	5.00%
SD PERS	6/30/04	6/30/04	$4,937,500	$5,051,700	97.70%	$114,200	8.00%	16.60%
SD PERS	6/30/05	6/30/05	$5,381,000	$5,571,800	96.60%	$190,800	7.75%	13.34%
SD PERS	6/30/06	6/30/06	$5,668,500	$5,859,900	96.70%	$191,400	7.75%	13.11%
SD PERS	6/30/07	6/30/07	$6,526,500	$6,718,800	97.10%	$192,300	7.75%	21.39%
SD PERS	6/30/08	6/30/08	$6,784,300	$6,976,800	97.20%	$192,500	7.75%	-8.65%
SD PERS	6/30/09	6/30/09	$6,778,521	$7,387,406	91.80%	$608,886	7.75%	-20.36%
SD PERS	6/30/10	6/30/10	$7,119,875	$7,393,251	96.30%	$273,376	7.75%	18.70%
SD PERS	6/30/11	6/30/11	$7,433,777	$7,712,557	96.40%	$278,780	7.75%	25.80%
SD PERS	6/30/12	6/30/12	$7,828,000	$8,453,000	92.60%	$625,000	7.25%	1.90%
SD PERS	6/30/13	6/30/13	$8,803,700	$8,803,700	100.00%	$0	7.25%	19.50%
SD PERS	6/30/14	6/30/14	$9,887,095	$9,887,095	100.00%	$0	7.25%	18.90%
Wisconsin RS	12/31/01	12/31/01	$58,024,300	$60,134,700	96.50%	$2,110,400	8.00%	-5.40%
Wisconsin RS	12/31/02	12/31/02	$57,861,900	$59,618,800	97.10%	$1,756,900	8.00%	-4.80%
Wisconsin RS	12/31/03	12/31/03	$62,685,300	$63,211,700	99.20%	$526,400	7.80%	4.60%
Wisconsin RS	12/31/04	12/31/04	$66,209,400	$66,622,300	99.40%	$412,900	7.80%	16.60%
Wisconsin RS	12/31/05	12/31/05	$68,615,100	$68,978,600	99.50%	$363,500	7.80%	11.10%
Wisconsin RS	12/31/06	12/31/06	$73,415,300	$73,735,800	99.60%	$320,500	7.80%	12.20%
Wisconsin RS	12/31/07	12/31/07	$79,791,900	$80,079,700	99.60%	$287,800	7.80%	18.00%
Wisconsin RS	12/31/08	12/31/08	$77,159,400	$77,412,000	99.70%	$252,600	7.80%	-4.50%
Wisconsin RS	12/31/09	12/31/09	$78,911,300	$79,104,600	99.80%	$193,300	7.80%	-17.70%
Wisconsin RS	12/31/10	12/31/10	$80,626,900	$80,758,800	99.80%	$131,900	7.20%	13.30%
Wisconsin RS	12/31/11	12/31/11	$78,940,000	$79,039,300	99.90%	$99,300	7.20%	22.90%
Wisconsin RS	12/31/12	12/31/12	$78,613,000	$78,682,700	99.90%	$69,700	7.20%	1.30%
Wisconsin RS	12/31/13	12/31/13	$85,276,100	$85,328,700	99.90%	$52,600	7.20%	11.10%

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