

**STATE UNIVERSITIES RETIREMENT  
SYSTEM OF ILLINOIS**  
2015 EXPERIENCE REVIEW  
FOR THE YEARS JUNE 30, 2010, TO JUNE 30, 2014

January 16, 2015

Board of Trustees  
State Universities Retirement System of Illinois  
1901 Fox Drive  
Champaign, IL 61820

**Subject: Experience Review for the Years June 30, 2010, to June 30, 2014**

Dear Members of the Board:

At your request, we have performed a review of the actuarial assumptions used in the annual actuarial valuation of the State Universities Retirement System of Illinois (“SURS”). The primary purpose of the study is to determine the continued appropriateness of the current actuarial assumptions by comparing actual experience to expected experience. Our study was based on census information for the period from June 30, 2010, to June 30, 2014, as provided by SURS Staff.

Our study includes a review of the experience associated with the following actuarial assumptions:

- Salary Increases
- Mortality
- Disability
- Withdrawal
- Retirement

The following assumptions were reviewed as part of the economic study performed in May 2014 and implemented in the actuarial valuation as of June 30, 2013. That analysis is repeated in this report for completeness.

- Price Inflation
- Investment Return
- Wage Inflation (based on uncapped pay)

The Effective Rate of Interest (ERI) assumption was studied in December 2012 and those results are incorporated into this overall experience study. A copy of that study has been included in the back of this report.

The results of this analysis are set forth in Section II of this report. Section III contains the economic assumption analysis completed in the May 2014 study. Section IV contains the cost impact on the Annual Required Contribution and funded status of the plan as a result of the assumption modifications. Finally, Section V contains a summary of all proposed rates.



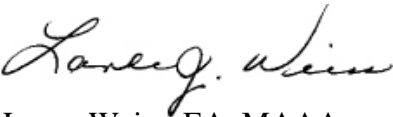
Leslie L. Thompson, Amy Williams and Lance Weiss are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

The signing actuaries are independent of the plan sponsor.

This report should not be relied on for any purpose other than the purpose stated.

The results of the experience study and recommended assumptions set forth in this report are based on the data and actuarial techniques and methods described above, and upon the provisions of SURS as of the most recent valuation date, June 30, 2014. To the best of our knowledge the information contained in this report is accurate and fairly presents the experience of members participating in the SURS defined benefit plans for the period July 1, 2010, through June 30, 2014. All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

Sincerely,

		
Leslie L. Thompson, FSA, EA, MAAA Senior Consultant	Amy Williams, ASA, MAAA Consultant	Lance Weiss, EA, MAAA Senior Consultant

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**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
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**SECTION I**  
**EXPERIENCE REVIEW SUMMARY**

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# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

## EXPERIENCE REVIEW SUMMARY

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### **Background**

For any pension plan, actuarial assumptions are selected that are intended to provide reasonable estimates of future expected events, such as System investment returns, interest crediting, and patterns of retirement, turnover and mortality. These assumptions, along with an actuarial cost method, the employee census data and the plan's provisions are used to determine the actuarial liabilities and overall actuarially determined funding requirements for the plan. The true cost to the plan over time will be the actual benefit payments and expenses required by the plan's provisions for the participant group under the plan. To the extent the actual experience deviates from the assumptions, experience gains and losses will occur. These gains (losses) then serve to reduce (increase) future actuarially determined contributions and increase (reduce) the funded ratio. The actuarial assumptions should be individually reasonable and consistent in the aggregate. They should also be reviewed periodically to ensure that they remain appropriate. The actuarial cost method, for plan sponsors that use actuarially based funding policies, automatically adjusts contributions over time for differences between what is assumed and the actual experience under the plan.

The Actuarial Standards Board ("ASB") provides guidance on measuring the costs of financing a retirement program through the following Actuarial Standards of Practices (ASOPs):

- (1) ASOP No. 4, *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions*;
- (2) ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*;
- (3) ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*; and
- (4) ASOP No. 44, *Selection and Use of Asset Valuation Methods for Pension Valuations*.

The recommendations provided in this report are consistent with the preceding actuarial standards of practice.

ASOP No. 27 provides guidance related to selecting economic assumptions, including the investment return, discount rate, inflation, postemployment benefit increases, compensation increases and other related assumptions such as the ERI.

A revised version of ASOP No. 27 was adopted in September 2013. The revised statement is applicable for valuations with a measurement date on or after September 30, 2014. Therefore, the first valuation for SURS that will be impacted by the revised statement will be the June 30, 2015, actuarial valuation.

In developing specific assumptions, ASOP No. 27 requires the actuary to follow a general process of:

1. Identifying the components of the assumption;
2. Evaluation relevant data;
3. Considering specific and general factors related to the measurement; and
4. Selecting a reasonable assumption.

# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

## EXPERIENCE REVIEW SUMMARY

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In evaluating relevant data, the actuary should include appropriate recent and long-term historic data, but not give undue weight to recent experience.

Prior to the revision under ASOP No. 27, actuaries could use a “best-estimate” range to determine reasonableness for the assumption. Under the best-estimate standard, an assumption was deemed reasonable if it was selected from within a probabilistic range over which it was “more likely than not” to fall. However, under the revised ASOP, an assumption is considered reasonable if:

- It is appropriate for the purpose of the measurement;
- It reflects the actuary’s professional judgment;
- It takes into account historical and current economic data that is relevant as of the measurement date;
- It reflects the actuary’s estimate of future experience, the actuary’s observation of the estimates inherent in market data, or a combination thereof; and
- It has no significant bias (i.e., it is not significantly optimistic or pessimistic).

Thus, the economic assumption recommendation has moved from a range to a single estimate.

Also according to the revised ASOP No. 27, the actuary should recognize the uncertain nature of the items for which assumptions are selected and, as a result, may consider several different assumptions reasonable for a given measurement. The actuary should also recognize that different actuaries will apply different professional judgment and may choose different reasonable assumptions. As a result, a range of reasonable assumptions may develop both for an individual actuary and across actuarial practice.

### **Assumptions Reviewed**

The actuarial assumptions are usually divided into two categories:

1. Economic assumptions, which include:

- Assumed rate of price inflation (as measured by the change in the Consumer Price Index for all urban consumers)
  - Underlies all other economic assumptions
  - Basis for cost-of-living increases for members hired on or after January 1, 2011
- Assumed long-term rate of return on investments (prescribed rate as defined in statute)
  - Rate at which projected benefits are reduced to present value
  - Basis for money purchase annuity factors
- Assumed effective rate of interest (rate at which member contributions are accumulated to generate benefits under the Money Purchase Benefit formula – Rule 2)
- General wage increases
  - Reflects inflationary forces on increases in pay for all members

# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

## EXPERIENCE REVIEW SUMMARY

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- Rate of payroll growth
  - Reflects expectation of growth in total payroll and affects level percent of pay statutory contribution

The economic assumptions are generally chosen on the basis of the actuary's expectations as to the effect of future economic conditions on the operation of the plan, with input from Staff, the Board, and other investment advisors.

The economic assumptions were studied in May 2014.

### 2. Demographic assumptions, which include the following rates:

- Mortality
- Retirement
- Disablement
- Withdrawal (other termination of employment)

Demographic assumptions are generally based on the plan's own experience, taking into account emerging trends. Rates of salary increase due to promotion and longevity are also related to the plan's experience.

The accuracy and extent of the data is an important consideration in assessing demographic experience. The accuracy of the data for this study was generally good, but a very large amount of data is required to develop a credible mortality table. For this reason, we do not necessarily give full credibility to the recent mortality experience of the plan's members. We also factor in general mortality experience among a wider universe of pension plans and retirement systems. The selection of a mortality table was therefore based on trends in the plan's experience as well as general trends among other pension plans and retirement systems.

### 3. Other methods and assumptions including the following:

- Cost method
- Amortization method
- Asset smoothing method
- Dependent assumptions
- Assumptions on reciprocal service and service purchases
- Assumptions on refund of contributions vs. deferred annuity
- Pay increase and decrement timing assumptions
- Plan election assumptions (Traditional/Portable vs. Self-Managed Plan)

The ERI assumption was studied in December 2012 and that study is included in this report.

### **Key Findings and Recommendations**

Gabriel, Roeder, Smith & Company ("GRS") has performed an experience study of the State Universities Retirement System of Illinois ("SURS") for the period from June 30, 2010, to June 30, 2014. The primary purpose of the study was to compare the demographic experience against



# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

## EXPERIENCE REVIEW SUMMARY

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the actuarial assumptions used in the valuations. Our study was based on the information used to perform the annual actuarial valuations for the period from June 30, 2010, to June 30, 2014.

Following is a summary of the key findings and recommendations:

- **Salary increase:** We reviewed salary experience for the period from June 30, 2010, to June 30, 2014. Overall, salaries did not increase as much as assumed. We determined salary increases between valuations and calculated average annual salary increases. We recommend modifying the current salary increase assumptions to service-based rates, ranging from 3.75 percent to 15.00 percent based on years of service, with underlying wage inflation of 3.75 percent. On an aggregate basis the proposed salary increase assumptions are lower than the currently assumed salary increase rates.
- **Normal retirement rates:** The observed experience showed that there were more retirements at ages younger than 60, and fewer retirements at ages greater than 70 than expected. Retirement counts were very close to the assumed amounts for members retiring between the ages of 60 and 69. We recommend changes to retirement rates at ages younger than 60, age 66, and ages 70-79 to reflect observed experience.
- **Early retirement rates:** The observed experience indicated there were more early retirements at ages 55 and 56 than assumed, while retirements at ages 57, 58, and 59 were very close to the assumption. We recommend a slight increase to the rates at ages 55 and 56.
- **Turnover rates:** Overall the observed experience showed that fewer members terminated employment than expected. We recommend modifications to the current service-based rates. The proposed rates produce lower expected turnover for members with less than 10 years of service and higher turnover for members with more than 10 years of service than the currently assumed rates. In total, the proposed turnover rates produce fewer expected number of terminations than the current turnover rates.
- **Mortality rates:** We recommend changing from the RP 2000 Mortality table projected to 2017, sex distinct, with the rates multiplied by certain factors for males and females and pre and post-retirement mortality to the RP-2014 mortality tables with projected generational mortality improvement. We recommend having a separate mortality assumption for disabled participants. This new mortality table is a move from a single-dimensional age-based table to a two dimensional table, where the year a person was born also influences their mortality rate.

The specific mortality table recommendations and a more detailed description of the new mortality tables can be found in Section II.

- **Disability rates:** Observed disability counts were less than the assumed counts. We recommend decreasing the current disability rates and having separate rates for males and females to reflect observed experience.
- **Cost Method:** The actuarial cost method is Projected Unit Credit, which is required to be used by State Statute.

## STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS EXPERIENCE REVIEW SUMMARY

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- **Amortization Method:** The State Statute requires that the plan be funded at a level such that the funded ratio reaches 90% in the year 2045. There is no separate amortization of the unfunded accrued liability that leads to a 100% funding of the accrued liability. This funding method does not comply with generally accepted actuarial principles for the funding of a retirement system.
- **Asset Smoothing Method:** The asset smoothing method is also defined by State Statute. Gains and losses (the difference between the actual investment return and the expected investment return) are smoothed in over a five-year period at a rate of 20 percent per year. There is currently no asset corridor. An asset corridor limits the amount that the actuarial (smoothed) value of assets can deviate from the market value of assets. Because the statutory funding policy defers contributions, we recommend that an asset corridor of 80 percent to 120 percent of market value of assets be implemented. However, our understanding is that this change could require legislative action.
- **Plan Election:** We recommend increasing the assumption percent of future hires that elect to participate in the Self-Managed Plan (SMP) from 15 percent to 30 percent.
- **Dependent assumptions:** We recommend maintaining the current assumption on marital status that varies by age and sex and the assumption that males are three years older than their spouses. No dependent assumptions are made for current retirees as actual eligible spouse and dependent data is provided.
- **Load for reciprocal benefits, service purchases, and refunds of excess contributions:** We recommend maintaining the liability load of 10 percent on the liabilities for service retirees whose benefits have not been finalized. SURS has provided additional data for these members. We recommend monitoring the gains and losses for these participants as we accumulate more experience while using the new data.

The following recommendations were made in the economic study completed in May 2014. Changes were implemented in the actuarial valuation as of June 30, 2014.

- **Price inflation:** We recommended maintaining the rate of price inflation of 2.75 percent.
- **Investment return:** The investment return assumption, net of investment expenses, compounded annually, was previously 7.75 percent. This reflects an underlying inflation assumption of 2.75 percent. We recommended lowering the assumed rate to either 7.25 percent or 7.00 percent and monitoring the assumption for continued reasonableness in the future. Note the Board adopted a 7.25% investment return assumption.
- **Payroll growth assumption:** We recommended maintaining the general payroll growth assumption of 3.75 percent, which reflects an underlying general or price inflation assumption of 2.75 percent.

The following recommendation was made in the ERI study completed in December 2012. Changes were implemented in the actuarial valuation as of June 30, 2013.

- **Effective rate of interest assumption:** We recommend the long-term assumption for the ERI for crediting the money purchase accounts be reduced, from 7.75% per year to 7.00% per year.

**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**EXPERIENCE REVIEW SUMMARY**

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The impact of adopting the recommended assumptions is summarized in the table below. The recommended assumptions increase the actuarial liability and contribution requirements and decrease the funded ratio.

	<b>Dollars in Millions</b>		
	<b>Valuation as of 6/30/14</b>	<b>Proposed Assumptions</b>	<b>Change</b>
Actuarial Accrued Liability	\$ 37,430	\$ 38,320	\$ 890
Actuarial Value of Assets	15,845	15,845	-
Unfunded Actuarial Accrued Liability	21,585	22,475	890
Funded Ratio	42.33%	41.35%	-0.98%
 <b>Illustrated Employer Contributions (FY 2016)</b>			
Annual Required Contribution (GASB 25/27 ARC) <sup>1</sup>	\$ 1,879	\$ 1,944	\$ 65
Old Law Statutory Contribution (Level % reach 90% Funded in 2045)	1,647	1,702	54
Deficit Contribution (from ARC)	232	242	11

<sup>1</sup> Based on a level percentage of capped payroll.

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**SECTION II**  
**EXPERIENCE ANALYSIS**

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# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

## ECONOMIC ASSUMPTIONS

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### Salary Increase

The components that determine the total salary increase are wage inflation, merit and longevity increases and promotion increases. We recommend a change to the merit and longevity and promotion increase portion of the salary increase assumption to better reflect actual experience.

The observed experience in Table I shows high increases in pay (about 20 percent) for the first two years of service. Even higher salary increases during the first two years of service (about 77 percent in the first year and 33 percent in the second year) were observed in the last experience study in 2010. Additional data was provided after the last experience study to better estimate annualized pay for short service members. This significantly decreased the observed increase in pay during the first two years of service in the 2014 experience study compared to the 2010 experience study. GRS will continue to work with SURS staff to further refine the salary data that is provided for newer members. Although very short service members have a low liability, we will continue working to improve the valuation of liabilities for these members.

The experience in Table I shows that salary increases were lower than the current assumptions during the experience study period for members with more than three years of service. However, average inflation over the experience study period was about 2.26 percent, which is lower than the current assumption of 2.75 percent. Therefore, our recommended rates of salary increases in excess of inflation are based on reviewing the real salary increase experience. The recommended rates are lower than the current assumed rates of salary increase for members with more than five years of service.

Table and Graph I compare the salary experience, current assumptions and recommended assumptions by years of service for each of the following:

- Table I – Salary Experience by Service
- Graph I – Salary Experience by Service

**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**SALARY SCALE ASSUMPTION**

**Table I**

Service at End of Year	Number	Actual		Actual Real Increase <sup>1</sup>	Actual Total Increase	Expected Real Increase <sup>2</sup>	Expected Total Increase	Proposed Real Increase <sup>3</sup>	Proposed Total Increase
		Prior Year	Current Year						
1	3,364	112,181,246	136,141,485	19.10%	21.36%	9.25%	12.00%	12.25%	15.00%
2	12,880	469,773,078	568,973,297	18.86%	21.12%	7.25%	10.00%	9.25%	12.00%
3	14,368	615,073,935	667,660,272	6.29%	8.55%	5.75%	8.50%	6.25%	9.00%
4	15,475	625,563,304	666,485,401	4.28%	6.54%	4.50%	7.25%	4.50%	7.25%
5	15,434	626,275,990	662,885,989	3.59%	5.85%	3.75%	6.50%	3.75%	6.50%
6	14,776	635,858,938	669,131,665	2.97%	5.23%	3.50%	6.25%	3.25%	6.00%
7	13,474	602,337,448	632,417,964	2.73%	4.99%	3.25%	6.00%	3.00%	5.75%
8	11,712	546,878,282	572,018,164	2.34%	4.60%	3.00%	5.75%	2.75%	5.50%
9	10,787	525,120,555	547,282,977	1.96%	4.22%	2.75%	5.50%	2.50%	5.25%
10	10,192	511,565,846	533,018,323	1.93%	4.19%	2.25%	5.00%	2.25%	5.00%
11	9,818	508,661,724	528,633,022	1.67%	3.93%	2.25%	5.00%	2.00%	4.75%
12	9,430	502,119,247	521,856,983	1.67%	3.93%	2.25%	5.00%	1.75%	4.50%
13	8,782	471,680,257	489,213,693	1.46%	3.72%	2.25%	5.00%	1.50%	4.25%
14	7,842	425,425,611	440,233,594	1.22%	3.48%	2.25%	5.00%	1.50%	4.25%
15	6,957	385,107,071	398,160,579	1.13%	3.39%	2.00%	4.75%	1.25%	4.00%
16	6,289	361,049,531	372,846,334	1.01%	3.27%	2.00%	4.75%	1.25%	4.00%
17	5,985	359,761,811	372,932,701	1.40%	3.66%	2.00%	4.75%	1.25%	4.00%
18	5,678	355,970,072	368,461,344	1.25%	3.51%	2.00%	4.75%	1.25%	4.00%
19	5,405	348,579,621	361,002,918	1.30%	3.56%	2.00%	4.75%	1.25%	4.00%
20	5,683	361,351,977	373,096,584	0.99%	3.25%	1.50%	4.25%	1.25%	4.00%
21	5,355	352,284,513	364,260,769	1.14%	3.40%	1.50%	4.25%	1.25%	4.00%
22	5,030	345,678,373	356,732,702	0.94%	3.20%	1.50%	4.25%	1.25%	4.00%
23	4,624	328,573,715	337,907,805	0.58%	2.84%	1.50%	4.25%	1.25%	4.00%
24	3,883	290,037,499	298,908,929	0.80%	3.06%	1.50%	4.25%	1.25%	4.00%
25	3,437	261,706,649	269,570,728	0.74%	3.00%	1.50%	4.25%	1.25%	4.00%
26	3,174	243,452,529	251,045,652	0.86%	3.12%	1.50%	4.25%	1.25%	4.00%
27	2,902	229,932,982	237,957,908	1.23%	3.49%	1.50%	4.25%	1.25%	4.00%
28	2,415	197,607,412	204,535,362	1.25%	3.51%	1.50%	4.25%	1.25%	4.00%
29	1,870	156,182,803	161,603,997	1.21%	3.47%	1.50%	4.25%	1.25%	4.00%
30	1,263	112,821,243	116,503,852	1.00%	3.26%	1.50%	4.25%	1.25%	4.00%
31	883	81,698,802	84,514,623	1.19%	3.45%	1.50%	4.25%	1.25%	4.00%
32	658	64,437,353	66,666,666	1.20%	3.46%	1.50%	4.25%	1.25%	4.00%
33	532	53,516,900	55,358,624	1.18%	3.44%	1.50%	4.25%	1.25%	4.00%
34	421	43,905,829	45,648,587	1.71%	3.97%	1.50%	4.25%	1.25%	4.00%
35+	1,407	152,013,029	156,760,849	0.86%	3.12%	1.00%	3.75%	1.00%	3.75%
<b>Total</b>	<b>232,185</b>	<b>12,264,185,175</b>	<b>12,890,430,342</b>	<b>2.85%</b>	<b>5.11%</b>	<b>2.80%</b>	<b>5.55%</b>	<b>2.62%</b>	<b>5.37%</b>
<b>Total Years 3+</b>	<b>215,941</b>	<b>11,682,230,851</b>	<b>12,185,315,560</b>	<b>2.05%</b>	<b>4.31%</b>	<b>2.56%</b>	<b>5.31%</b>	<b>2.26%</b>	<b>5.01%</b>

<sup>1</sup>Total increase less average inflation of 2.26% over experience study period.

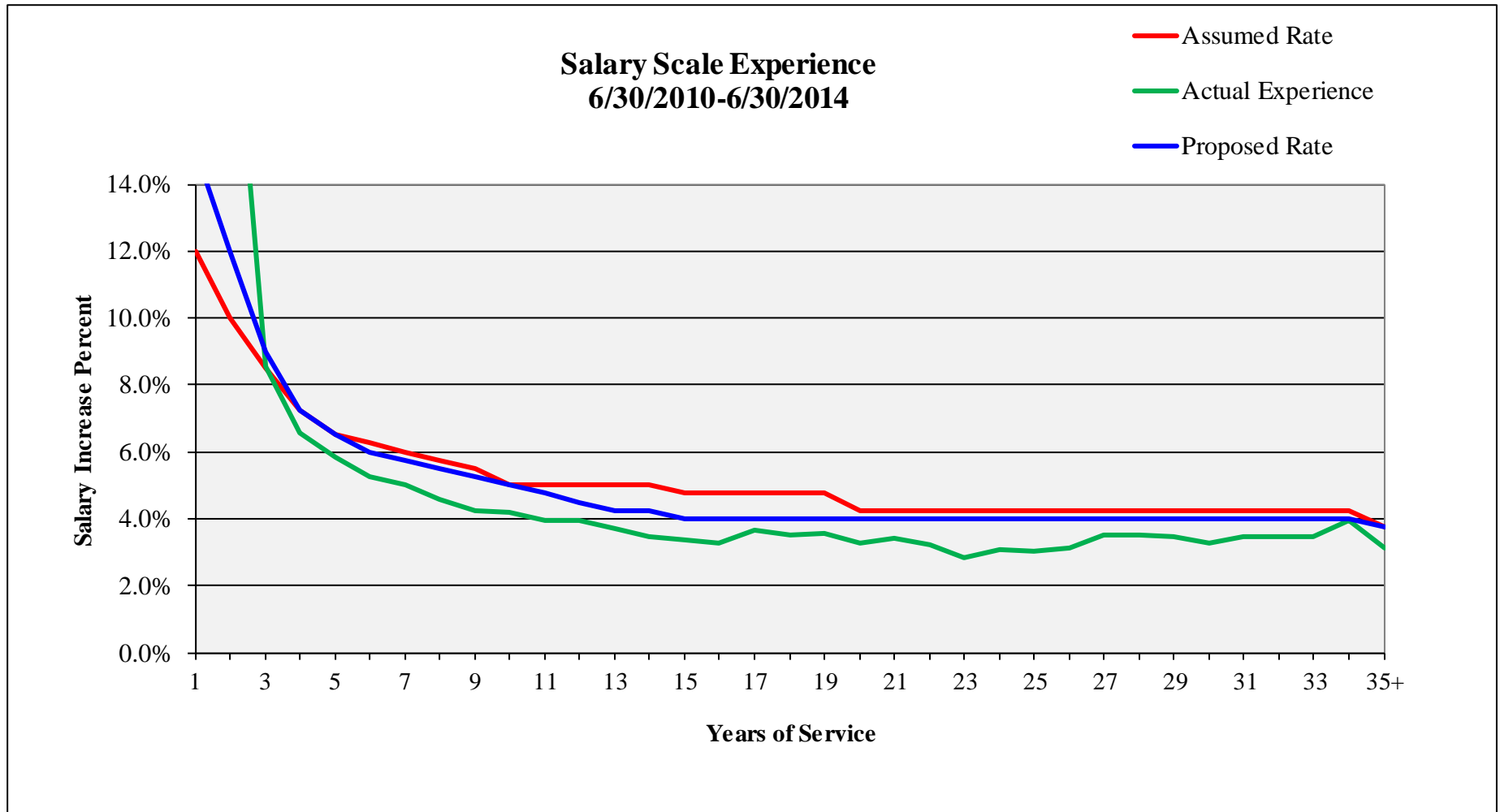
<sup>2</sup>Total increase less average assumed inflation of 2.75%.

<sup>3</sup>Total increase less proposed assumed inflation of 2.75%.

**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**SALARY SCALE ASSUMPTION**

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**Graph I**



*Actual inflation was about 50 basis points lower than assumed inflation during the experience study period.*

# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

## DEMOGRAPHIC ASSUMPTIONS

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The following pages present the analysis of the demographic assumptions. These assumptions include assumed rates of mortality among active and retired members, retirement patterns, disability incidence and turnover patterns. These patterns generally take the form of tables of rates of incidence based on age and/or years of service.

Absent any significant changes in benefit provisions, these assumptions generally exhibit relative consistency over periods of time. As a result, each demographic assumption is normally reviewed by relating actual experience to that assumed over the recent past.

The analysis of demographic experience is conducted for each assumption using a measure known as the “Actual to Expected (A/E) Ratio.” The A/E Ratio is simply the ratio of the actual number of occurrences of the event to which the assumption applies (e.g., deaths or retirements) to the number expected to occur in accordance with the assumption. An A/E Ratio of 1.00 indicates that the assumption precisely predicted the number of occurrences. An A/E Ratio exceeding 1.00 indicates that the assumption underestimated actual experience. Conversely, an A/E Ratio lower than 1.00 indicates that the assumption overestimated actual experience.

These are statistical analyses. As a result, there are several considerations we must keep in mind as we analyze these ratios:

1. An actuarial assumption is designed to reflect average experience over long periods of time (30 - 50 years). As a result:
  - a. A deviation between actual experience and that expected from our assumptions for one or two years does not necessarily mean that the assumption should be changed.
  - b. A change in actuarial assumption should result if the experience indicates a consistent pattern which is different from that assumed over a period of years.
2. The larger the amount of data available, the more reliable the statistics used in the analysis. As a result:
  - a. Events that occur with great frequency (e.g., general employment turnover) are more credibly predictable than those occurring less frequently (e.g., active member death).
  - b. In all cases, data covering the entire study period produce more credible results than data for a single year.
  - c. Year by year experience is helpful only in identifying trends and determining whether the four-year data is truly reflective of the entire period.

This analysis is based on the valuation data for the four-year period from June 30, 2010, to June 30, 2014.



# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

## RETIREMENT ASSUMPTION

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### Retirement

The Plan provisions establish the minimum eligibility requirements for retirement. Participants of the plan that became members before January 1, 2011<sup>1</sup>, are eligible for immediate normal retirement benefits at the earlier of 30 years of service at any age, age 60 with 8 years of service, or age 62 with 5 years of service. (Police officers and firefighters are eligible at age 50 with 25 years of service or age 55 with 20 years of service.) Participants of the plan that became members before January 1, 2011<sup>1</sup>, are eligible for early (reduced) retirement benefits on or after the attainment of age 55 with 8 years of service.

Retirement cost, however, is determined not by the minimum eligibility requirements but by the ages at which members actually retire. The valuation does not assume that everyone retires at earliest eligibility. The assumption about the timing of retirement once eligibility has been established is a major component in cost calculations. Note that higher rates of retirement at earlier retirement ages or years of service upon attaining retirement eligibility generally result in higher actuarially determined contributions, and vice versa.

Experience during the last four years was considered in the analysis shown on the following pages. The “Exposure” column shows the number of employees eligible to retire at various years of service or ages throughout the experience period. An individual could potentially be counted up to four times if eligible each year in the period. By tabulating employees in this fashion we are able to answer the question “For all employees eligible at condition X, how many retired?”

The table below shows the number of actual retirements during each year of the experience study period compared with the number expected under the current assumptions. There were a higher number of retirements during FY 2012 than during the other three years of the experience study period. New money purchase factors were first effective on July 2, 2012, and are likely the reason for the higher retirements during fiscal year 2012.

Fiscal Year End	Normal Retirement			Early Retirement		
	Actual	Current Assumption	Actual/Expected	Actual	Current Assumption	Actual/Expected
2011	1,830	2,066	0.9	437	414	1.1
2012	2,139	2,112	1.0	483	405	1.2
2013	1,525	2,004	0.8	356	391	0.9
2014	1,755	2,033	0.9	413	382	1.1
<b>Total</b>	<b>7,248</b>	<b>8,215</b>	<b>0.9</b>	<b>1,689</b>	<b>1,592</b>	<b>1.1</b>

<sup>1</sup> Participants who become members of the plan on or after January 1, 2011, are eligible for retirement at age 67 with 10 years of service. Assumed retirement rates for these members will differ from current members.

**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**RETIREMENT ASSUMPTION**

---

*Normal Retirement Experience*

Current and past experience has shown that retirement rates under this plan are correlated with age. Currently, the Plan uses age-based rates with higher rates at key ages, with 100 percent retirement at age 80. We recommend the following changes:

- An increase in rates for members younger than age 60 and members age 66
- A decrease in rates for members age 70 through 79

Applying the proposed rates to historical data generates the following number of retirements by age at retirement:

<b>Nearest Age</b>	<b>Number of Retirements</b>		
	<b><u>Actual</u></b>	<b><u>Current Assumption</u></b>	<b><u>Proposed Assumption</u></b>
Under 50	56	30	38
50-54	550	460	528
55-59	664	524	630
60-64	3,134	3,158	3,158
65-69	1,961	1,896	1,953
70-74	602	1,217	609
75-79	202	385	258
80+	79	545	545
<b>Total</b>	<b>7,248</b>	<b>8,215</b>	<b>7,719</b>

*Early Retirement Experience*

Early retirement experience was a good fit to the current early retirement rates. We recommend a slight increase in the rate at ages 55 and 56 and maintaining the current rates at other ages.

*Retirement Experience and Recommendations*

The tables and graphs on the following pages show experience for normal and early retirement.

- Table and Graph II(a) – Normal Retirement Experience
- Table and Graph II(b) – Early Retirement Experience

**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**NORMAL RETIREMENT ASSUMPTION**

**Table II(a)**

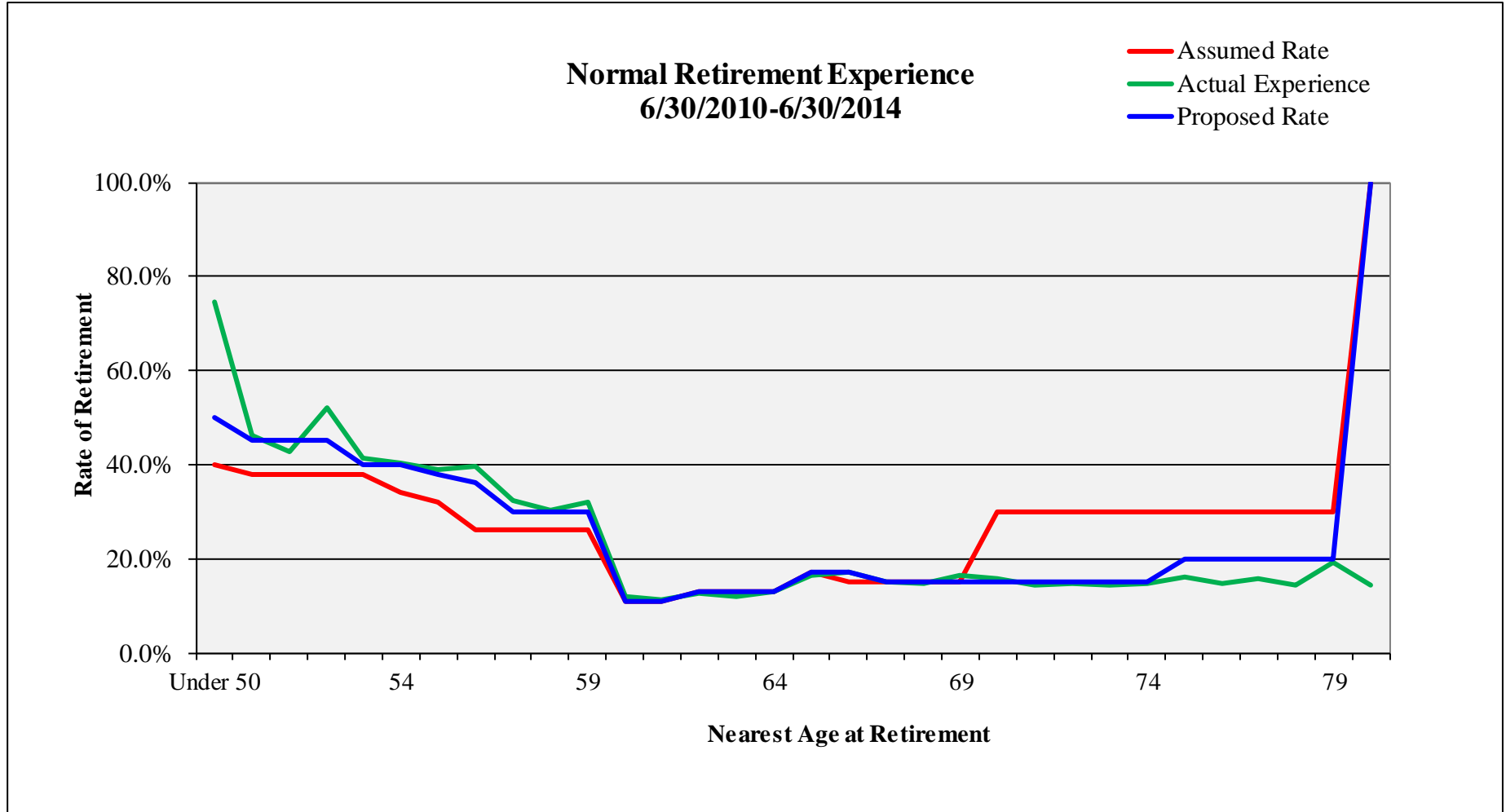
Nearest Age @ Retirement	Actual Experience			Current Assumptions			Proposed Assumptions		
	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate	Actual / Expected	Expected Retirements	Proposed Rate	Actual / Expected
Under 50	75	56	74.7%	30	40.0%	1.9	38	50.0%	1.5
50	123	57	46.3%	47	38.0%	1.2	55	45.0%	1.0
51	211	90	42.7%	80	38.0%	1.1	95	45.0%	0.9
52	269	140	52.0%	102	38.0%	1.4	121	45.0%	1.2
53	306	127	41.5%	116	38.0%	1.1	122	40.0%	1.0
54	338	136	40.2%	115	34.0%	1.2	135	40.0%	1.0
55	372	145	39.0%	119	32.0%	1.2	141	38.0%	1.0
56	365	144	39.5%	95	26.0%	1.5	131	36.0%	1.1
57	347	112	32.3%	90	26.0%	1.2	104	30.0%	1.1
58	415	125	30.1%	108	26.0%	1.2	125	30.0%	1.0
59	431	138	32.0%	112	26.0%	1.2	129	30.0%	1.1
60	5,770	689	11.9%	635	11.0%	1.1	635	11.0%	1.1
61	5,220	580	11.1%	574	11.0%	1.0	574	11.0%	1.0
62	5,640	704	12.5%	733	13.0%	1.0	733	13.0%	1.0
63	4,923	588	11.9%	640	13.0%	0.9	640	13.0%	0.9
64	4,431	573	12.9%	576	13.0%	1.0	576	13.0%	1.0
65	3,652	601	16.5%	621	17.0%	1.0	621	17.0%	1.0
66	2,890	498	17.2%	434	15.0%	1.1	491	17.0%	1.0
67	2,268	345	15.2%	340	15.0%	1.0	340	15.0%	1.0
68	1,819	265	14.6%	273	15.0%	1.0	273	15.0%	1.0
69	1,522	252	16.6%	228	15.0%	1.1	228	15.0%	1.1
70	1,276	199	15.6%	383	30.0%	0.5	191	15.0%	1.0
71	978	142	14.5%	293	30.0%	0.5	147	15.0%	1.0
72	719	105	14.6%	216	30.0%	0.5	108	15.0%	1.0
73	599	85	14.2%	180	30.0%	0.5	90	15.0%	0.9
74	485	71	14.6%	146	30.0%	0.5	73	15.0%	1.0
75	375	60	16.0%	113	30.0%	0.5	75	20.0%	0.8
76	308	45	14.6%	92	30.0%	0.5	62	20.0%	0.7
77	243	38	15.6%	73	30.0%	0.5	49	20.0%	0.8
78	188	27	14.4%	56	30.0%	0.5	38	20.0%	0.7
79	168	32	19.0%	50	30.0%	0.6	34	20.0%	0.9
80+	545	79	14.5%	545	100.0%	0.1	545	100.0%	0.1
<b>Totals:</b>	<b>47,271</b>	<b>7,248</b>	<b>15.3%</b>	<b>8,215</b>	<b>17.4%</b>	<b>0.9</b>	<b>7,719</b>	<b>16.3%</b>	<b>0.9</b>
<b>Excluding 80+:</b>	<b>46,726</b>	<b>7,169</b>	<b>15.3%</b>	<b>7,670</b>	<b>16.4%</b>	<b>0.9</b>	<b>7,174</b>	<b>15.4%</b>	<b>1.0</b>

*Rates are for Tier 1 members only. There is not current retirement experience for Tier 2 members who have different eligibility conditions. Separate retirement rates apply for Tier 2 members.*

**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**NORMAL RETIREMENT ASSUMPTION**

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Graph II(a)



**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**EARLY RETIREMENT ASSUMPTION**

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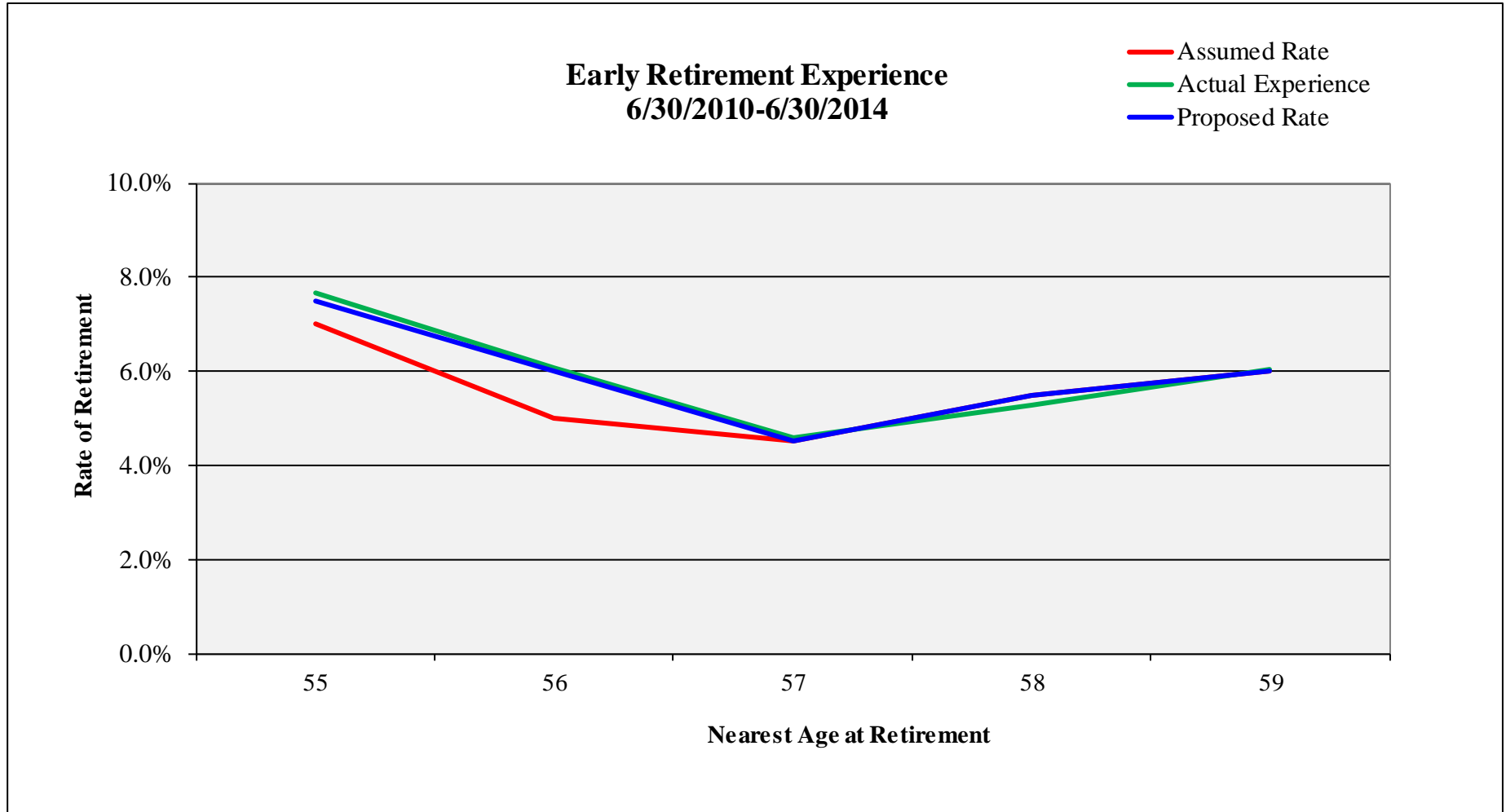
Table II(b)

Nearest Age @ Retirement	Actual Experience			Current Assumptions			Proposed Assumptions		
	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate	Actual / Expected	Expected Retirements	Proposed Rate	Actual / Expected
55	6,052	463	7.7%	424	7.0%	1.1	454	7.5%	1.0
56	5,734	349	6.1%	287	5.0%	1.2	344	6.0%	1.0
57	5,607	258	4.6%	252	4.5%	1.0	252	4.5%	1.0
58	5,478	289	5.3%	301	5.5%	1.0	301	5.5%	1.0
59	5,465	330	6.0%	328	6.0%	1.0	328	6.0%	1.0
<b>Totals:</b>	<b>28,336</b>	<b>1,689</b>	<b>6.0%</b>	<b>1,592</b>	<b>5.6%</b>	<b>1.1</b>	<b>1,679</b>	<b>5.9%</b>	<b>1.0</b>

**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**EARLY RETIREMENT ASSUMPTION**

---

**Graph II(b)**



# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

## TURNOVER ASSUMPTION

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### **Turnover**

Turnover experience during the last four years was considered in the analysis shown on the following pages. The “Exposure” column shows the number of employees at various years of service throughout the experience period.

The “Turnover” column shows the number of employees at various years of service that have gone from active status for reasons other than retirement and death. This includes members moving to inactive status as well as members terminating and receiving a refund of contributions.

Typically, we would consider a status change from active to inactive a termination in developing turnover rates. However, because some of these participants return to active status and accrue additional benefits, we have considered this in our analysis of turnover experience. The “Net Turnover” column shows the number of employees by years of service that have gone from inactive to active status between the experience study period of June 30, 2010, and June 30, 2014. While these participants are not necessarily the same exact participants that went to inactive status during the experience study period, we believe that using this data helps us develop proposed net effective turnover rates.

There were less terminations than expected under the current assumptions. Based on our analysis, we recommend maintaining service-based rates and making the following changes to the turnover rates:

- Decrease rates at certain years of service for members with less than 10 years of service and increase rates at certain years for members with more than 10 years of service; and
- Maintain a pattern of decreasing termination rates.

In addition, we recommend continuing to assume that members that are eligible for a deferred benefit elect the option that is more valuable – return of contributions or a deferred benefit. This will provide a level of conservatism in the valuation.

The table and graph on the following pages show termination experience by service, including the impact of members returning from inactive to active status.

- Table and Graph III – Termination Experience by Service

**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**TURNOVER ASSUMPTION**

**Table III**

Service BOY	Actual Experience					Current Assumptions			Proposed Assumptions		
	Exposures	Turnover	Actual Rate	Net Turnover <sup>1</sup>	Actual Rate	Expected Turnover	Assumed Rate	Actual / Expected <sup>1</sup>	Expected Turnover	Proposed Rate	Actual / Expected <sup>2</sup>
0	4,694	1,108	23.60%	422	8.99%	1,033	22.00%	0.4	939	20.00%	0.4
1	16,997	3,608	21.23%	3,169	18.64%	3,739	22.00%	0.8	3,399	20.00%	0.9
2	17,462	2,999	17.17%	2,550	14.60%	2,794	16.00%	0.9	2,619	15.00%	1.0
3	18,416	3,024	16.42%	2,602	14.13%	2,578	14.00%	1.0	2,578	14.00%	1.0
4	16,808	2,417	14.38%	2,107	12.54%	2,017	12.00%	1.0	2,017	12.00%	1.0
5	15,106	1,736	11.49%	1,428	9.45%	1,586	10.50%	0.9	1,511	10.00%	0.9
6	13,480	1,423	10.56%	1,185	8.79%	1,213	9.00%	1.0	1,213	9.00%	1.0
7	10,934	1,005	9.19%	829	7.58%	820	7.50%	1.0	820	7.50%	1.0
8	9,729	827	8.50%	676	6.95%	632	6.50%	1.1	657	6.75%	1.0
9	9,020	654	7.25%	529	5.86%	541	6.00%	1.0	541	6.00%	1.0
10	8,624	543	6.30%	441	5.11%	474	5.50%	0.9	453	5.25%	1.0
11	8,220	482	5.86%	410	4.99%	370	4.50%	1.1	370	4.50%	1.1
12	7,542	399	5.29%	324	4.30%	302	4.00%	1.1	302	4.00%	1.1
13	6,645	322	4.85%	249	3.75%	246	3.70%	1.0	246	3.70%	1.0
14	5,779	240	4.15%	202	3.50%	185	3.20%	1.1	185	3.20%	1.1
15	5,190	237	4.57%	188	3.62%	156	3.00%	1.2	156	3.00%	1.2
16	4,840	216	4.46%	173	3.57%	126	2.60%	1.4	145	3.00%	1.2
17	4,481	161	3.59%	122	2.72%	103	2.30%	1.2	134	3.00%	0.9
18	4,240	194	4.58%	161	3.80%	89	2.10%	1.8	127	3.00%	1.3
19	4,255	188	4.42%	163	3.83%	85	2.00%	1.9	128	3.00%	1.3
20	3,993	154	3.86%	129	3.23%	68	1.70%	1.9	100	2.50%	1.3
21	3,788	167	4.41%	146	3.85%	57	1.50%	2.6	95	2.50%	1.5
22	3,572	142	3.98%	118	3.30%	54	1.50%	2.2	89	2.50%	1.3
23	3,142	105	3.34%	94	2.99%	47	1.50%	2.0	79	2.50%	1.2
24	2,770	115	4.15%	104	3.75%	42	1.50%	2.5	69	2.50%	1.5
25	2,572	115	4.47%	109	4.24%	39	1.50%	2.8	51	2.00%	2.1
26	2,347	109	4.64%	101	4.30%	35	1.50%	2.9	47	2.00%	2.1
27	2,012	108	5.37%	104	5.17%	30	1.50%	3.5	40	2.00%	2.6
28	1,569	77	4.91%	75	4.78%	24	1.50%	3.1	31	2.00%	2.4
29	379	80	21.11%	80	21.11%	6	1.50%	13.3	8	2.00%	10.0
<b>Totals:</b>	<b>218,606</b>	<b>22,955</b>	<b>10.50%</b>	<b>18,990</b>	<b>8.69%</b>	<b>19,491</b>	<b>8.92%</b>	<b>1.0</b>	<b>19,149</b>	<b>8.76%</b>	<b>1.0</b>

<sup>1</sup> Reflects actual turnover net of inactive members who returned to active service.

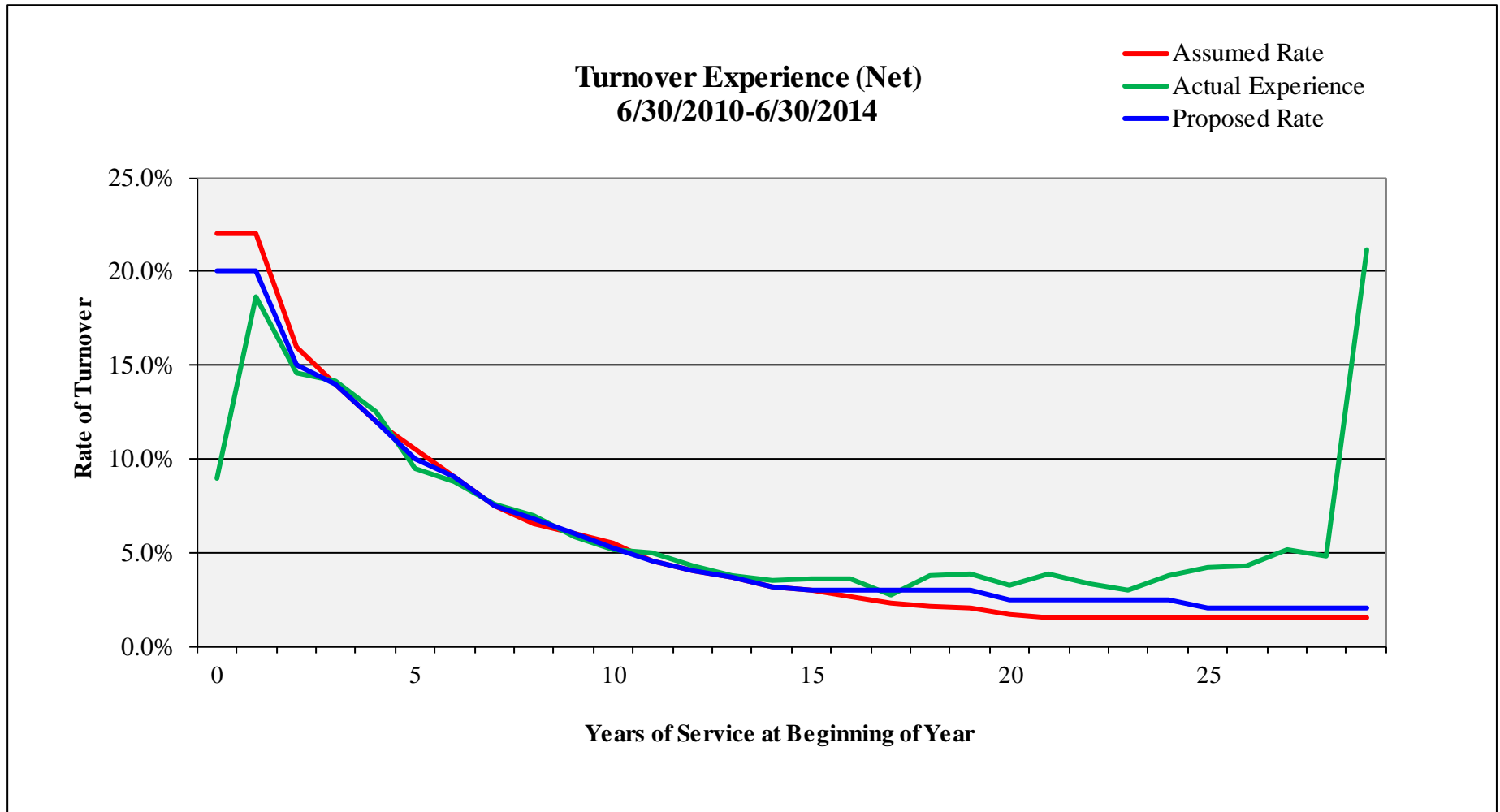
<sup>2</sup> Actual to expected ratio based on net turnover.



**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**TURNOVER ASSUMPTION**

---

**Graph III**



# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

## DISABILITY ASSUMPTION

---

### **Disability**

Disability experience during the last four years was considered in the analysis shown on the following pages. The “Exposure” column shows the number of employees in five-year age-bands throughout the experience period.

There were fewer disabilities than expected under the current actuarial assumptions and distinct disability incidence patterns for males and females. We recommend decreasing the current disability rates and using separate rates for males and females to reflect the observed difference in the disability incidence patterns.

The tables and graphs on the following pages show experience for disability.

- Table and Graph IV(a) – Male Disability Experience
- Table and Graph IV(b) – Female Disability Experience

The disability experience reflected on the following pages does not include disability experience for the SMP. The SMP disability assumption was separately studied and a separate report was issued.

**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**DISABILITY ASSUMPTION**

Table IV(a)

Male

Age @ Disablement	Actual Experience			Current Assumptions			Proposed Assumptions		
	Exposures	Disabilities	Actual Rate	Expected Disabilities	Assumed Rate	Actual / Expected	Expected Disabilities	Proposed Rate	Actual / Expected
Under 20	8	0	0.00%	0	0.05%	0.0	0	0.04%	0.0
20-25	630	0	0.00%	0	0.06%	0.0	0	0.05%	0.0
25-29	5,126	1	0.02%	4	0.07%	0.3	3	0.05%	0.4
30-34	10,069	7	0.07%	8	0.08%	0.9	6	0.06%	1.2
35-39	11,018	4	0.04%	13	0.11%	0.3	8	0.07%	0.5
40-44	12,682	12	0.09%	21	0.17%	0.6	14	0.11%	0.8
45-49	13,705	20	0.15%	31	0.23%	0.6	23	0.17%	0.9
50-54	15,978	35	0.22%	48	0.30%	0.7	37	0.23%	0.9
55-59	16,054	42	0.26%	60	0.37%	0.7	45	0.28%	0.9
60-64	13,508	35	0.26%	60	0.45%	0.6	43	0.31%	0.8
65+	9,356	24	0.26%	50	0.53%	0.5	33	0.36%	0.7
<b>Totals:</b>	<b>108,134</b>	<b>180</b>	<b>0.17%</b>	<b>295</b>	<b>0.27%</b>	<b>0.6</b>	<b>212</b>	<b>0.20%</b>	<b>0.9</b>

*Disability rates vary by age. Average rates for the five-year age bands are shown in the table above.*

**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS  
DISABILITY ASSUMPTION**

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**Graph IV(a)**



**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS  
DISABILITY ASSUMPTION**

Table IV(b)

**Female**

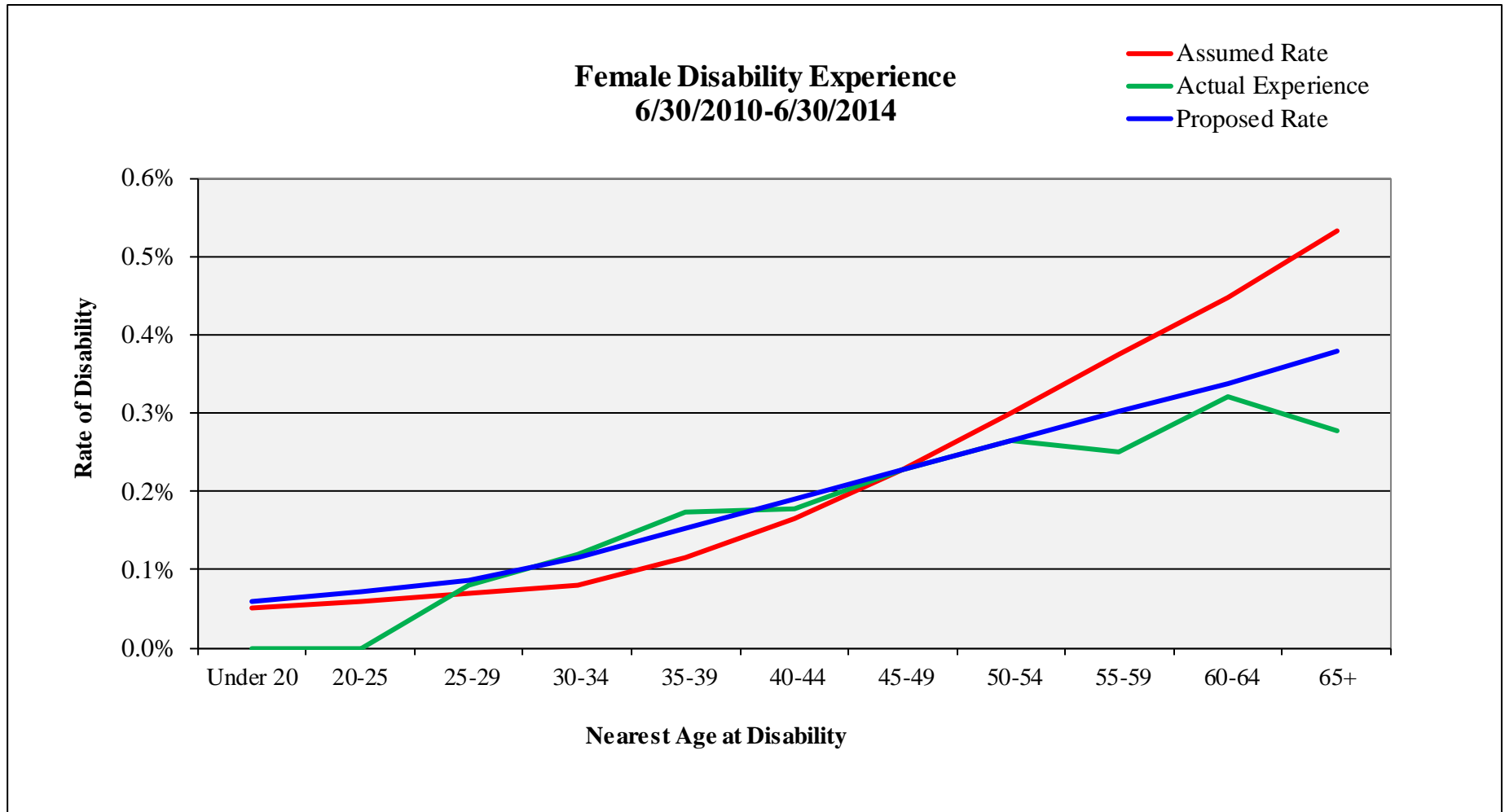
Age @ Disablement	Actual Experience			Current Assumptions			Proposed Assumptions		
	Exposures	Disabilities	Actual Rate	Expected Disabilities	Assumed Rate	Actual / Expected	Expected Disabilities	Proposed Rate	Actual / Expected
Under 20	3	0	0.00%	0	0.05%	0.0	0	0.06%	0.0
20-25	831	0	0.00%	0	0.06%	0.0	1	0.07%	0.0
25-29	7,547	6	0.08%	5	0.07%	1.2	7	0.09%	0.9
30-34	14,248	17	0.12%	11	0.08%	1.5	16	0.11%	1.0
35-39	15,045	26	0.17%	17	0.12%	1.5	23	0.15%	1.1
40-44	16,988	30	0.18%	28	0.17%	1.1	32	0.19%	0.9
45-49	19,819	45	0.23%	45	0.23%	1.0	45	0.23%	1.0
50-54	23,821	63	0.26%	72	0.30%	0.9	63	0.26%	1.0
55-59	23,110	58	0.25%	86	0.37%	0.7	70	0.30%	0.8
60-64	16,850	54	0.32%	75	0.45%	0.7	57	0.34%	1.0
65+	9,022	25	0.28%	48	0.53%	0.5	34	0.38%	0.7
<b>Totals:</b>	<b>147,284</b>	<b>324</b>	<b>0.22%</b>	<b>389</b>	<b>0.26%</b>	<b>0.8</b>	<b>347</b>	<b>0.24%</b>	<b>0.9</b>

*Disability rates vary by age. Average rates for the five-year age bands are shown in the table above.*

**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS  
DISABILITY ASSUMPTION**

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**Graph IV(b)**



# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

## MORTALITY ASSUMPTIONS

---

### **Mortality**

Post-retirement mortality is an important component in cost calculations and should be updated from time to time to reflect current and expected future longevity improvements. Pre-retirement mortality is a relatively minor component in cost calculations. The frequency of pre-retirement deaths is so low that mortality assumptions based on actual experience can only be produced for very large retirement systems.

The trend of mortality improvement has been a long and relatively constant one in the United States over the past century. While most experts agree that overall mortality will improve in the near future, there are differing opinions on the long-term trend in mortality improvement. In order to allow for expected future mortality improvements, we recommend adopting generational mortality tables based on the mortality tables recently released by the Society of Actuaries (SOA) in which mortality rates are projected to improve based on birth year.

#### *The New Mortality Tables and Projection Scale*

The Society of Actuaries (SOA) released updated mortality tables in late 2014 which reflect the improvement in longevity of the studied group of private pension plan participants, and which also reflects future improvements for future generations of participants. The new mortality table, which is an update to the RP-2000 mortality table (published in 2000), is called the RP-2014 table. The mortality improvement scale is called the MP-2014 improvement scale. The mortality improvement scale is applied to the RP-2014 table to show the improvements in mortality that are expected to occur with each new generation of participants.

#### *Mortality Improvement Observations at a National Level*

The updated mortality and mortality improvement tables show that among males age 65, overall longevity rose 2.0 years, from age 84.6 in 2000 to 86.6 in 2014. (Saying it another way, men aged 65 in the year 2000 were expected to live to be 84.6 years old. Men aged 65 in the year 2014 were expected to live to be 86.6 years old). For women age 65, overall longevity rose 2.4 years from age 86.4 in 2000 to age 88.8 in 2014.

#### *Service Retirees and Beneficiaries*

We reviewed the mortality experience separately for active members, service retirees and disabled members during the four-year study period. The results are shown on the following pages.

We recommend changing from the RP2000 mortality table, sex distinct, with rates projected to 2017, and rates multiplied by 0.80 for males and 0.85 for females, to the RP-2014 White Collar Healthy Annuitant mortality tables, sex distinct, with rates set forward one year for males and females and generational mortality improvement using the MP-2014 2-dimensional mortality improvement scales recently released by the SOA. This assumption provides a margin for mortality improvements.

# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

## MORTALITY ASSUMPTIONS

---

### *Active Participants*

We recommend changing the pre-retirement mortality assumption from a percentage of post-retirement mortality to the RP-2014 White Collar Employee mortality tables, sex distinct, with rates multiplied by 110% for males and 90% for females for ages younger than 60, and rates multiplied by 80% for males and 90% for females for ages 60 and older and generational mortality improvement using the MP-2014 2-dimensional mortality improvement scales recently released by the SOA. This assumption provides a margin for mortality improvements.

### *Disabled Participants*

We recommend changing from the same assumption used for service retirees to the RP 2014 Disabled Retiree mortality tables, sex distinct, with rates set forward nine years for males and ten years for females and generational mortality improvement using the MP-2014 2-dimensional mortality improvement scales recently released by the SOA.

### *A Note about Mortality Rates*

The recommended mortality assumptions include generational mortality improvements, which means that the probability of a 60-year-old retired male dying in any particular year is higher for a 60-year old born in 1994 than a 60-year old born in 1954.

The use of generational mortality tables is an emerging trend in the actuarial industry, and is based on the assumption that life expectancy increases from generation to generation. Simply put, this means that the life expectancy of someone born in 1994 is greater than that of someone born in 1954. Adopting a generational mortality table tends to increase liabilities, as future increases in life expectancy imply longer payment of retirement benefits. Should the assumption of increased life expectancy prove true, actuarial valuations that continue to use static mortality tables may be required to update their tables to reflect the improved life expectancy, resulting in liability increases in the future. To the extent that future mortality improvements can be reflected in a current valuation, retirement systems can begin to fund for the increased liabilities, thereby reducing (or eliminating) future contribution rate increases that would eventually occur with the use of static tables.

Critics of generational mortality tables point to recent trends in declining health in the United States, such as increases in the incidence of childhood obesity and diabetes, as evidence against the premise of continued mortality improvements in the future.

We believe that the recommended mortality tables contain a sufficient level of conservatism to cover any increases in life expectancy in the near future. We will continue to monitor the use and acceptance of generational mortality tables by public retirement systems and keep the Board apprised of emerging trends.



## **STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**

### **MORTALITY ASSUMPTIONS**

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The following tables and graphs contain the mortality experience for the experience study period:

- Table and Graph V(a) – Post-Retirement Mortality Experience
- Table and Graph V(b) – Pre-Retirement Mortality Experience
- Table and Graph V(c) – Disabled Mortality Experience

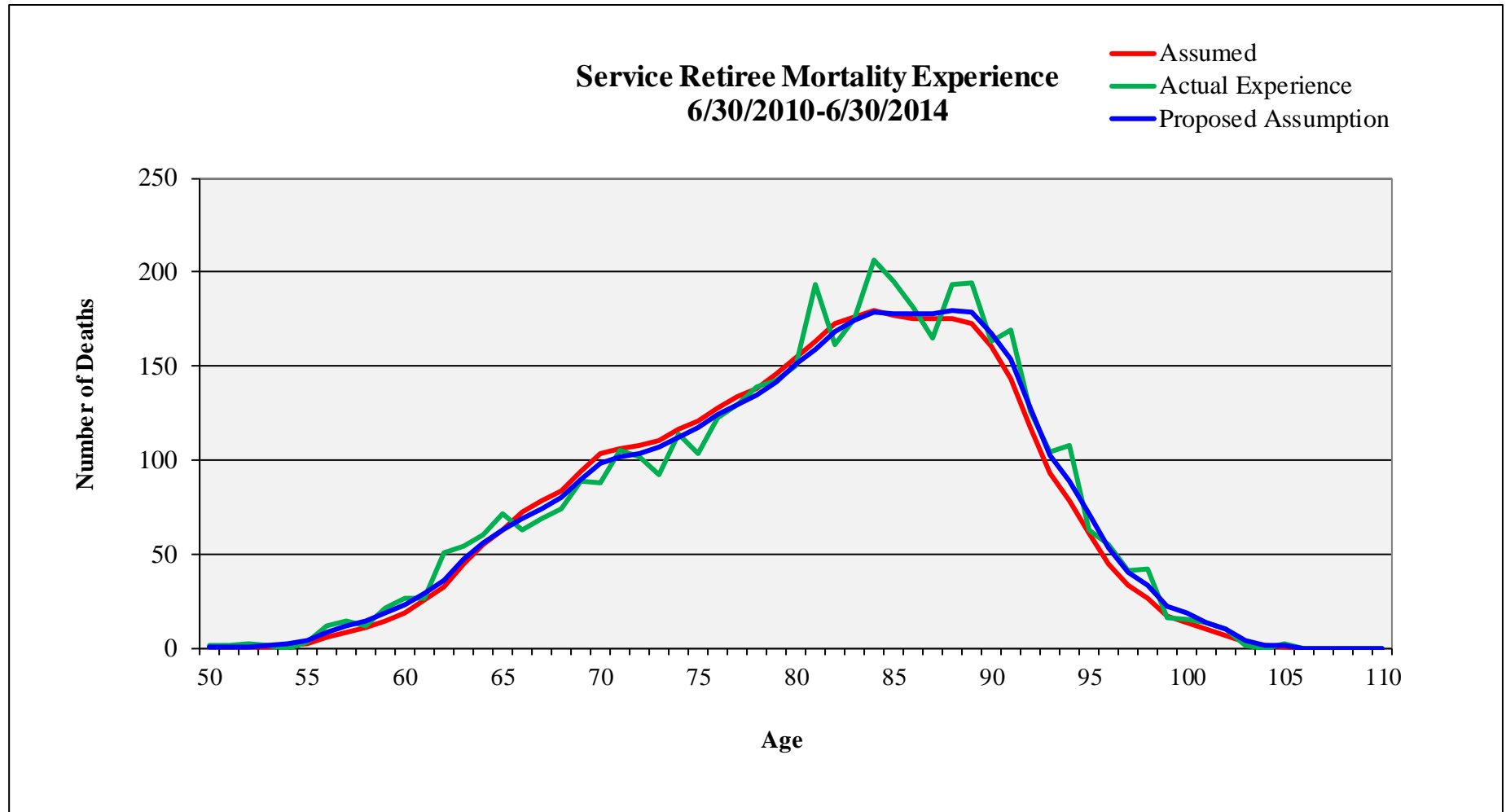
**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**MORTALITY ASSUMPTIONS**

Table V(a)

Male Service Retiree Mortality Experience									
	Actual Experience			Current Assumptions			Proposed Assumptions		
Age	Exposures	Deaths	Actual Rate	Expected Deaths	Assumed Rate	Actual / Expected	Expected Deaths	Proposed Rate	Actual / Expected
Under 50	27	0	0.000%	0	0.117%	0.00	0	0.268%	0.00
50-54	578	1	0.173%	1	0.173%	1.00	2	0.346%	0.50
55-59	5,506	27	0.490%	17	0.309%	1.59	26	0.472%	1.04
60-64	13,344	108	0.809%	77	0.577%	1.40	89	0.667%	1.21
65-69	18,466	197	1.067%	189	1.024%	1.04	189	1.024%	1.04
70-74	16,608	283	1.704%	281	1.692%	1.01	284	1.710%	1.00
75-79	12,953	371	2.864%	391	3.019%	0.95	385	2.972%	0.96
80-84	9,461	539	5.697%	522	5.517%	1.03	502	5.306%	1.07
85-89	5,190	528	10.173%	502	9.672%	1.05	505	9.730%	1.05
90-94	2,016	335	16.617%	314	15.575%	1.07	335	16.617%	1.00
95-99	373	90	24.129%	83	22.252%	1.08	96	25.737%	0.94
100+	33	9	27.273%	9	27.273%	1.00	12	36.364%	0.75
<b>Totals:</b>	<b>84,555</b>	<b>2,488</b>	<b>2.942%</b>	<b>2,386</b>	<b>2.822%</b>	<b>1.04</b>	<b>2,425</b>	<b>2.868%</b>	<b>1.03</b>
Female Service Retiree Mortality Experience									
Under 50	30	0	0.000%	0	0.094%	0.00	0	0.204%	0.00
50-54	1,012	4	0.395%	2	0.198%	2.00	3	0.296%	1.33
55-59	8,538	35	0.410%	25	0.293%	1.40	30	0.351%	1.17
60-64	18,358	109	0.594%	100	0.545%	1.09	102	0.556%	1.07
65-69	21,192	169	0.797%	201	0.948%	0.84	185	0.873%	0.91
70-74	16,715	218	1.304%	262	1.567%	0.83	237	1.418%	0.92
75-79	10,831	264	2.437%	275	2.539%	0.96	262	2.419%	1.01
80-84	7,580	346	4.565%	323	4.261%	1.07	327	4.314%	1.06
85-89	4,981	400	8.031%	373	7.488%	1.07	387	7.770%	1.03
90-94	2,254	335	14.862%	276	12.245%	1.21	305	13.531%	1.10
95-99	573	127	22.164%	98	17.103%	1.30	125	21.815%	1.02
100+	114	30	26.316%	24	21.053%	1.25	36	31.579%	0.83
<b>Totals:</b>	<b>92,178</b>	<b>2,037</b>	<b>2.210%</b>	<b>1,959</b>	<b>2.125%</b>	<b>1.04</b>	<b>1,999</b>	<b>2.169%</b>	<b>1.02</b>
<b>Grand Totals:</b>	<b>176,733</b>	<b>4,525</b>	<b>2.560%</b>	<b>4,345</b>	<b>2.459%</b>	<b>1.04</b>	<b>4,424</b>	<b>2.503%</b>	<b>1.02</b>

# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS MORTALITY ASSUMPTIONS

Graph V(a)



**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**MORTALITY ASSUMPTIONS**

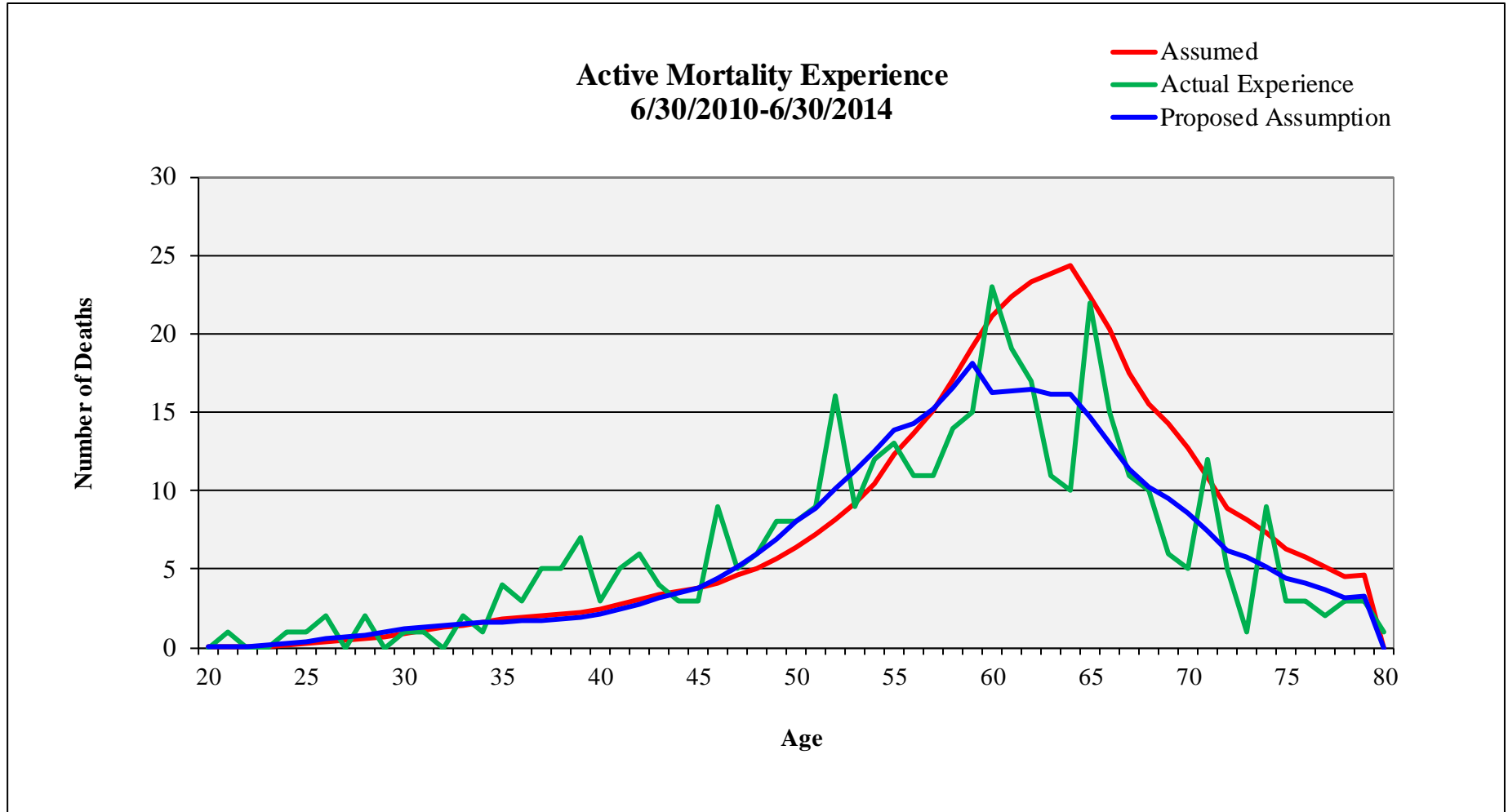
Table V(b)

Male Active Mortality Experience									
	Actual Experience			Current Assumptions			Proposed Assumptions		
Age	Exposures	Deaths	Actual Rate	Expected Deaths	Assumed Rate	Actual / Expected	Expected Deaths	Proposed Rate	Actual / Expected
Under 30	6,957	6	0.086%	2	0.024%	3.66	2	0.035%	2.44
30-39	22,720	16	0.070%	10	0.046%	1.54	9	0.040%	1.76
40-49	27,174	27	0.099%	22	0.081%	1.22	21	0.077%	1.29
50-59	32,611	70	0.215%	60	0.185%	1.16	70	0.214%	1.01
60-69	20,106	86	0.428%	116	0.579%	0.74	81	0.403%	1.06
70-79	2,997	27	0.901%	50	1.656%	0.54	36	1.186%	0.76
<b>Totals:</b>	<b>112,565</b>	<b>232</b>	<b>0.206%</b>	<b>261</b>	<b>0.231%</b>	<b>0.89</b>	<b>219</b>	<b>0.194%</b>	<b>1.06</b>
<b>Less than 60:</b>	<b>89,462</b>	<b>119</b>	<b>0.133%</b>	<b>95</b>	<b>0.106%</b>	<b>1.26</b>	<b>102</b>	<b>0.114%</b>	<b>1.17</b>
Female Active Mortality Experience									
Age	Exposures	Deaths	Actual Rate	Expected Deaths	Assumed Rate	Actual / Expected	Expected Deaths	Proposed Rate	Actual / Expected
Under 30	9,954	1	0.010%	1	0.009%	1.08	1	0.014%	0.70
30-39	31,070	13	0.042%	6	0.019%	2.19	7	0.022%	1.94
40-49	37,907	25	0.066%	16	0.043%	1.54	19	0.051%	1.29
50-59	47,743	48	0.101%	58	0.122%	0.82	59	0.124%	0.81
60-69	23,693	58	0.245%	89	0.374%	0.66	59	0.249%	0.98
70-79	2,380	19	0.798%	25	1.039%	0.77	16	0.683%	1.17
<b>Totals:</b>	<b>152,747</b>	<b>164</b>	<b>0.107%</b>	<b>195</b>	<b>0.127%</b>	<b>0.84</b>	<b>162</b>	<b>0.106%</b>	<b>1.01</b>
<b>Less than 60:</b>	<b>126,674</b>	<b>87</b>	<b>0.069%</b>	<b>81</b>	<b>0.064%</b>	<b>1.07</b>	<b>87</b>	<b>0.068%</b>	<b>1.00</b>
<b>Grand Totals:</b>	<b>265,312</b>	<b>396</b>	<b>0.149%</b>	<b>455</b>	<b>0.172%</b>	<b>0.87</b>	<b>381</b>	<b>0.143%</b>	<b>1.04</b>
<b>Less than 60:</b>	<b>216,136</b>	<b>206</b>	<b>0.095%</b>	<b>176</b>	<b>0.081%</b>	<b>1.17</b>	<b>189</b>	<b>0.087%</b>	<b>1.09</b>

# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

## MORTALITY ASSUMPTIONS

Graph V(b)



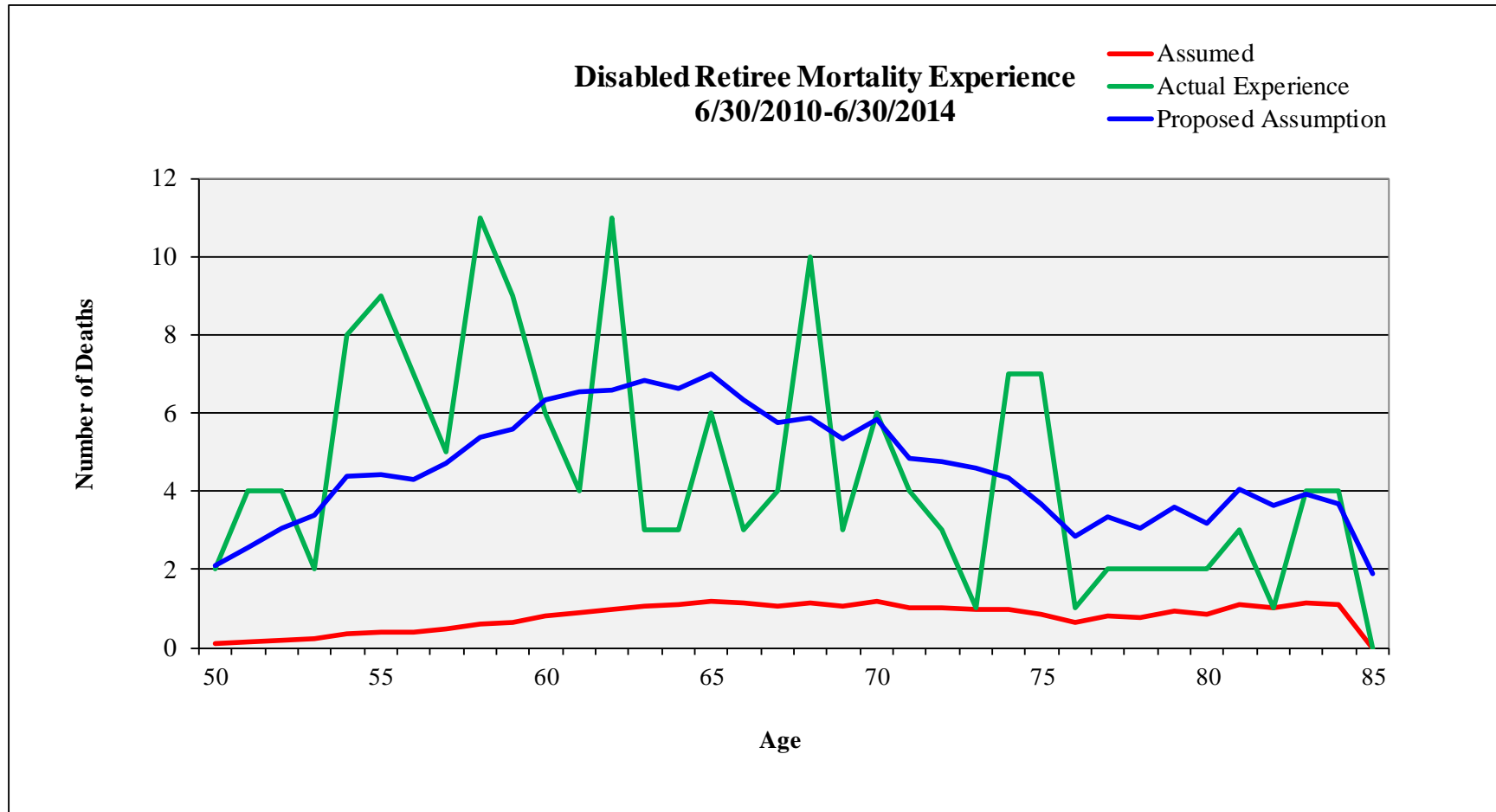
**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**MORTALITY ASSUMPTIONS**

Table V(c)

Male Disabled Retiree Mortality Experience									
Age	Actual Experience			Current Assumptions			Proposed Assumptions		
	Exposures	Deaths	Actual Rate	Expected Deaths	Assumed Rate	Actual / Expected	Expected Deaths	Proposed Rate	Actual / Expected
25-29	1	0		0	0.000%		0	0.000%	
30-34	15	0	0.000%	0	0.000%		0	0.000%	
35-39	27	2	7.407%	0	0.000%		0	0.000%	
40-44	61	3	4.918%	0	0.000%		1	1.639%	3.00
45-49	118	3	2.542%	0	0.000%		3	2.542%	1.00
50-54	227	4	1.762%	0	0.000%		6	2.643%	0.67
55-59	297	19	6.397%	1	0.337%	19.00	10	3.367%	1.90
60-64	407	19	4.668%	2	0.491%	9.50	14	3.440%	1.36
65-69	233	11	4.721%	3	1.288%	3.67	15	6.438%	0.73
70-74	127	11	8.661%	2	1.575%	5.50	12	9.449%	0.92
75-79	56	5	8.929%	2	3.571%	2.50	8	14.286%	0.63
80-84	34	6	17.647%	2	5.882%	3.00	8	23.529%	0.75
Other	8	2	25.000%	0	0.000%		1	12.500%	2.00
<b>Totals:</b>	<b>1,611</b>	<b>85</b>	<b>5.276%</b>	<b>12</b>	<b>0.745%</b>	<b>7.08</b>	<b>78</b>	<b>4.842%</b>	<b>1.09</b>
Female Disabled Retiree Mortality Experience									
25-29	12	1	8.333%	0	0.000%		0	0.000%	
30-34	34	3	8.824%	0	0.000%		0	0.000%	
35-39	72	2	2.778%	0	0.000%		1	1.389%	2.00
40-44	117	2	1.709%	0	0.000%		2	1.709%	1.00
45-49	227	6	2.643%	0	0.000%		4	1.762%	1.50
50-54	493	16	3.245%	1	0.203%	16.00	9	1.826%	1.78
55-59	619	22	3.554%	2	0.323%	11.00	15	2.423%	1.47
60-64	654	14	2.141%	3	0.459%	4.67	19	2.905%	0.74
65-69	286	15	5.245%	3	1.049%	5.00	15	5.245%	1.00
70-74	145	11	7.586%	3	2.069%	3.67	12	8.276%	0.92
75-79	75	4	5.333%	2	2.667%	2.00	9	12.000%	0.44
80-84	64	7	10.938%	3	4.688%	2.33	11	17.188%	0.64
Other	23	4	17.391%	0	0.000%		1	4.348%	4.00
<b>Totals:</b>	<b>2,821</b>	<b>107</b>	<b>3.793%</b>	<b>17</b>	<b>0.603%</b>	<b>6.29</b>	<b>98</b>	<b>3.474%</b>	<b>1.09</b>
<b>Grand Totals:</b>	<b>4,432</b>	<b>192</b>	<b>4.332%</b>	<b>29</b>	<b>0.654%</b>	<b>6.62</b>	<b>176</b>	<b>3.971%</b>	<b>1.09</b>

STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS  
MORTALITY ASSUMPTIONS

Graph V(c)



## STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

### OTHER VALUATION ASSUMPTIONS

#### Plan Election Percentage

Historically, members have been able to elect to participate in one of the two defined benefit plans, the Traditional Plan and the Portable Plan, or a defined contribution plan, the Self-Managed Plan (SMP).

Below is a summary of the election percentage for the SMP over the experience study period for all new members. The SMP election rate has been increasing over the experience study period. In addition, the SMP election rate by payroll is higher than the SMP election rate by member count. This means that higher paid members are electing SMP in higher rates than lower paid members.

Fiscal Year End	SMP Election	Total	SMP % of		SMP % of		SMP Payroll	Total Payroll	SMP % of Total
			Total	Total with Elections	Total	Total			
2011	576	4,999	12%	3,805	15%	\$26,313,040	\$158,945,724	17%	
2012	905	5,980	15%	4,757	19%	49,647,414	219,476,815	23%	
2013	1,182	6,490	18%	5,324	22%	63,653,331	226,530,240	28%	
2014	1,206	6,062	20%	4,691	26%	61,439,095	198,297,074	31%	
<b>Total</b>	<b>3,869</b>	<b>23,531</b>	<b>16%</b>	<b>18,577</b>	<b>21%</b>	<b>201,052,880</b>	<b>803,249,854</b>	<b>25%</b>	

Below is a summary of the election percentage for the SMP over the experience study period for new members with salaries greater than or equal to \$100,000.

Fiscal Year End	SMP Election	Total	SMP % of		SMP % of	
			Total	Total with Elections	Total	Total
2011	49	146	34%	126	39%	
2012	90	204	44%	190	47%	
2013	112	188	60%	182	62%	
2014	125	177	71%	168	74%	
<b>Total</b>	<b>376</b>	<b>715</b>	<b>53%</b>	<b>666</b>	<b>56%</b>	

Members hired on or after January 1, 2011, are subject to a different benefit package than members hired before January 1, 2011. This benefit package includes a cap on pay of \$106,800 in 2011, which increases by the lesser of one-half of the percentage increase in the Consumer Price Index and 3 percent. The pay cap was \$110,631 in 2014.

The current SMP election percentage assumption for future hires is 15 percent. As a result of the changes in benefit provisions to the defined benefit plans under Public Act 96-0889, which provides a less valuable benefit for future hires than is provided to current members, participation in the SMP has been increasing, in particular for new hires.

Due to the increasing trend of members electing SMP, in particular higher paid members, we are recommending that the SMP election percentage increase from 15 percent to 30 percent.



# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

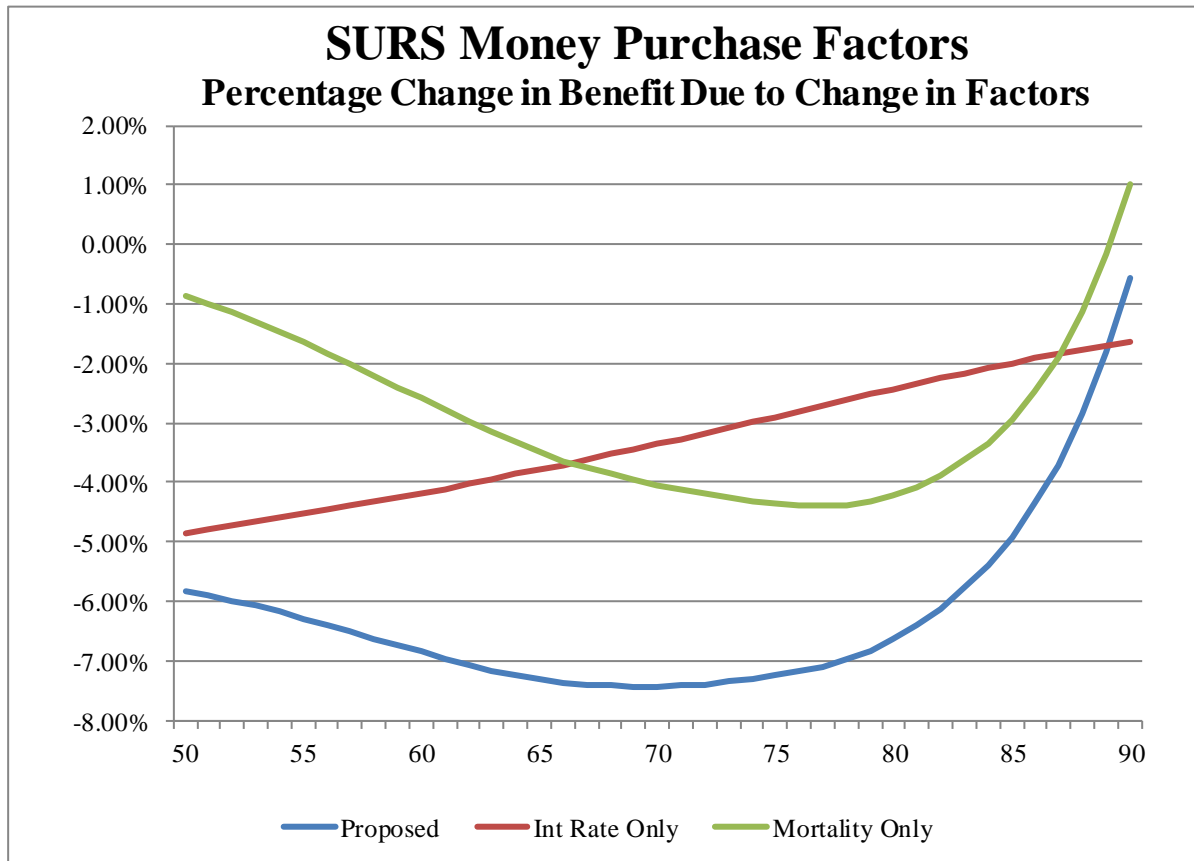
## OTHER VALUATION ASSUMPTIONS

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### Money Purchase Factors

The money purchase factors, which apply to Rule 2 benefit calculations, by statute, are to be updated each time there is a change in the investment return assumption or the post retirement mortality assumption. The investment return assumption was decreased from 7.75 percent to 7.25 percent first effective with the valuation as of July 1, 2014. Based on the recommendations in this experience study, GRS is recommending a change in the post-retirement mortality assumption to be first effective with the next valuation as of July 1, 2015. The Board has adopted an effective date of January 2, 2016, for the new money purchase factors. These factors apply only to members hired before July 1, 2005 that are eligible for the money purchase benefit formula.

Below is a graph illustrating the impact of the change in a member's benefit as a result to the change in the money purchase factors based on the proposed assumptions. The money purchase benefit is calculated such that the money purchase balance is sufficient to pay benefits for the assumed lifetime of the retiree based on assumed future earnings. Because the assumed future earnings are lower under the new assumptions (7.25 percent compared to 7.75 percent) and the life expectancies at most ages are higher under the new assumptions, a decrease in the benefit amount would be required.



## STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS OTHER VALUATION ASSUMPTIONS

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Below is a table summarizing the money purchase benefit under the old factors and the factors under the proposed new assumptions. In addition, the table shows the benefit under each set of factors if the member continued working one additional year and retired with a higher money purchase balance.

Immediate Monthly Benefit			Monthly Benefit 1 Year Later			Inc in Monthly Benefit 1 Year Later	
Age	Current Factors	Proposed	Age	Current Factors	Proposed	Current to Current	Current to Proposed
50	\$1,351	\$1,272	51	\$1,537	\$1,447	\$186	\$95
55	\$1,413	\$1,324	56	\$1,612	\$1,509	\$199	\$96
60	\$1,501	\$1,398	61	\$1,719	\$1,599	\$218	\$99
65	\$1,625	\$1,506	66	\$1,869	\$1,731	\$244	\$106
70	\$1,802	\$1,668	71	\$2,084	\$1,930	\$282	\$128
75	\$2,064	\$1,915	76	\$2,407	\$2,234	\$342	\$169

Although a member would have a lower benefit under the updated money purchase factors, a member would still accrue a higher benefit by working one additional year compared to retiring immediately before the change in the money purchase factors.

In addition, a member eligible for the money purchase formula will receive the greater of the money purchase formula benefit and the general formula benefit. Therefore, all money purchase eligible members may not be affected and the impact for a member may be lower than the example shown above.

The annuity factors are based on member ages in the year 2018. Because the proposed mortality assumption is a generational mortality table, each cohort of retirees based on birth year would have a slightly different factor. In order to have one set of factors that will apply until the next experience study, we have calculated factors based on the mid-point of the expected timeframe in which the factors are expected to be effective.

### **Load for Reciprocal Benefits, Service Purchases, and Refunds of Excess Contributions**

During the last experience study, we recommended including a liability load of 10 percent on the liabilities for service retirees whose benefits have not been finalized. Historically, there had been liability losses on these members due to finalized benefits that were higher than the preliminary estimates.

Beginning in the 2013 actuarial valuation, SURS provided additional data for members whose benefits have not been finalized to help improve the liability measurement. In the 2014 valuation, the losses for these members was significantly reduced.

Because there is only one year of data to analyze how the new data has improved the liability measurement for members whose benefits have not been finalized, we recommend no additional changes to the methodology.

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**SECTION III**

**ECONOMIC ASSUMPTION ANALYSIS  
COMPLETED MAY 2014**

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# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

## ECONOMIC ASSUMPTIONS

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Economic assumptions reflect the effects of economic forces on the projections of retirement benefits payable from the plan and in the discounting of those benefits to present value.

These assumptions are based, at their core, on the assumed level of price inflation. Each economic assumption is then developed from expected spreads over price inflation. Since price inflation is relatively volatile and is subject to a number of influences not based on recent history, these assumptions are less reliably based on recent past experience than are the demographic assumptions.

The key economic assumptions are:

1. Assumed Rate of Inflation – The rate of price inflation (as measured by the Consumer Price Index for all Urban consumers) which underlies the remainder of the economic assumptions.
2. Assumed Rate of Investment Return – The rate at which projected future benefits under the system are reduced to present value.
3. Rate of General Annual Pay Increases – This reflects inflationary forces on increases in pay for individual members.

### **Inflation**

By “inflation,” we mean price inflation, as measured by annual increases in the Consumer Price Index (CPI). This inflation assumption underlies all of the other economic assumptions we employ. It not only impacts investment return, but also salary increase rates and the payroll growth assumption. The current annual inflation assumption is 2.75 percent.

Over the five-year period from June 2008 through June 2013, the CPI-U has increased at an average rate of 1.31 percent. However, the assumed inflation rate is only weakly tied to past results.

The following table shows the average inflation over various periods, ending June 2013.

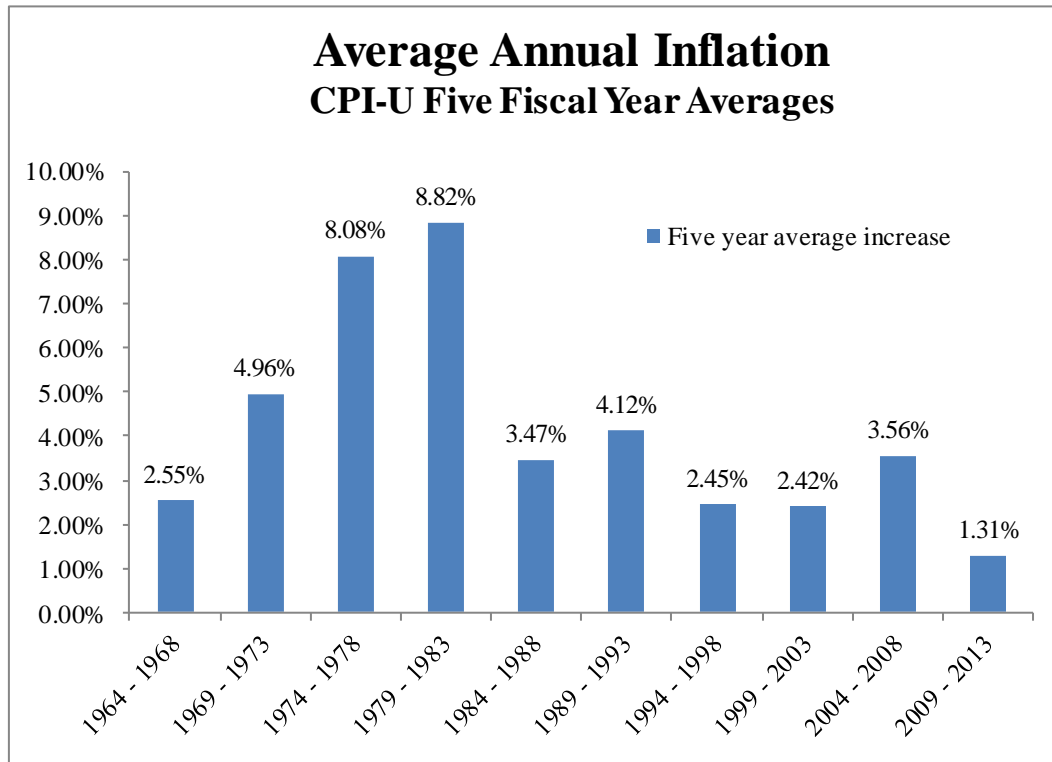
Fiscal Year	Annual Increase in CPI-U
2008-09	-1.43%
2009-10	1.05%
2010-11	3.56%
2011-12	1.66%
2012-13	1.75%
3-Year Average	2.32%
5-Year Average	1.31%
10-Year Average	2.43%
20-Year Average	2.43%
25-Year Average	2.77%
30-Year Average	2.88%
40-Year Average	4.25%
50-Year Average	4.15%

# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

## ECONOMIC ASSUMPTIONS

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The graph below shows the average inflation over 5-year periods over the last 50 years:



We surveyed the inflation assumption used by investment consulting firms. In our sample of eight firms, the inflation assumption ranged from 2.20 percent to 3.00 percent, with an average of 2.46 percent.

In the Social Security Administration's 2013 Trustees Report, the Office of the Chief Actuary is projecting a long-term average annual inflation rate of 2.8 percent under the intermediate cost assumption. (The inflation assumption is 1.8 percent and 3.8 percent respectively in the low cost and high cost projection scenarios.)

Therefore, we believe a reasonable long-term inflation assumption will likely fall in the range of 2.50 percent to 3.50 percent, although we recognize that inflation may fall outside this range over the next few years. We are recommending the inflation assumption be maintained at 2.75 percent. This is close to the average of 2.77 percent over the last 25 years and consistent with the assumption used by the SSA Office of the Chief Actuary for the intermediate cost projections.

### Investment Return

#### ASOP 27

Actuaries are required to comply with Actuarial Standard of Practice No. 27 (ASOP 27) in setting economic assumptions for retirement plans, including the assumed investment return rate.

In a public retirement system like SURS, it is ultimately the Retirement Board's responsibility to approve the actuarial assumptions used in the actuarial valuations. It is the actuary's duty to

# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

## ECONOMIC ASSUMPTIONS

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provide the Board with information needed to make those decisions and to make recommendations to the Board. Although the Board is the ultimate decision-making body, we are still bound by ASOP 27 in providing advice or recommendations to the Board.

The current standard applicable to valuations with measurement dates before September 30, 2014, requires the actuary to identify the components of each assumption, to evaluate relevant data, and to set a best-estimate range. Then the actuary selects a point within this best-estimate range. Alternatively, the actuary may simply set the assumption without specifying a best-estimate range. All economic assumptions are required to be individually reasonable and consistent in the aggregate.

The best-estimate range is “the narrowest range within which the actuary reasonably anticipates that the actual results, compounded over the measurement period, are more likely than not to fall.” That is, there is a 50 percent likelihood that the compound rate of return will fall within the best estimate range. This is equivalent to establishing a confidence interval that ranges from the 25<sup>th</sup> to 75<sup>th</sup> percentile.

According to the revised ASOP No. 27 applicable to valuations with a measurement date on or after September 30, 2014, each economic assumption selected by the actuary should be reasonable. For this purpose, an assumption is reasonable if it has the following characteristics:

- It is appropriate for the purpose of the measurement;
- It reflects the actuary’s professional judgment;
- It takes into account historical and current economic data that is relevant as of the measurement date;
- It reflects the actuary’s estimate of future experience, the actuary’s observation of the estimates inherent in market data, or a combination thereof; and
- It has no significant bias (i.e., it is not significantly optimistic or pessimistic).

Also according to the revised ASOP No. 27, the actuary should recognize the uncertain nature of the items for which assumptions are selected and, as a result, may consider several different assumptions reasonable for a given measurement. The actuary should also recognize that different actuaries will apply different professional judgment and may choose different reasonable assumptions. As a result, a range of reasonable assumptions may develop both for an individual actuary and across actuarial practice.

### **Real Return**

The allocation of assets within the universe of investment options will significantly impact the overall performance. Therefore, it is meaningful to identify the range of expected returns based on the fund’s targeted allocation of investments and an overall set of capital market assumptions.

## STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS ECONOMIC ASSUMPTIONS

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Based on information provided by SURS as of April 24, 2014, following is a table with the System's current target asset allocation:

<b>Asset Category</b>	<b>Current Target</b>
U.S. Equity	26%
Non-U.S. Equity	21%
Global Equity	8%
Core Fixed Income	19%
Emerging Market Debt	3%
Treasury-Inflation Protected Securities	4%
Private Equity	6%
Real Estate	6%
REITS	4%
Opportunity Fund/ Infrastructure	1%
Commodities	2%
<b>Total</b>	<b>100%</b>

We reviewed capital market assumptions developed and published by eight independent investment consulting firms.

These investment consulting firms periodically issue reports that describe their capital market assumptions, that is, their estimates of expected returns, volatility and correlations among the different asset classes. While some of these assumptions may be based upon historical analysis, many of these firms also incorporate forward looking adjustments to better reflect near-term and long-term expectations. The estimates for core investments (i.e., fixed income, equities and real estate) are generally based on anticipated returns produced by passive index funds.

Given the System's current target asset allocation and the capital market assumptions from the investment consultants, the development of the average nominal return, net of investment expenses, is provided in the following table.

## STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS ECONOMIC ASSUMPTIONS

Investment Consultant	Investment Consultant Expected Nominal Return	Investment Consultant Inflation Assumption	Expected Real Return (2)-(3)*	Actuary Inflation Assumption	Expected Nominal Return (4)+(5)	Plan Incurred Expense Assumption	Expected Nominal Return Net of Expenses (6)-(7)**	Standard Deviation of Expected Return (1-Year)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	7.22%	3.00%	4.22%	2.75%	6.97%	0.35%	6.62%	12.50%
2	7.12%	2.75%	4.37%	2.75%	7.12%	0.35%	6.77%	12.40%
3	7.20%	2.50%	4.70%	2.75%	7.45%	0.35%	7.10%	13.10%
4	7.07%	2.22%	4.84%	2.75%	7.59%	0.35%	7.24%	12.00%
5	7.73%	2.20%	5.53%	2.75%	8.28%	0.35%	7.93%	13.50%
6	7.87%	2.26%	5.61%	2.75%	8.36%	0.35%	8.01%	12.20%
7	7.88%	2.25%	5.63%	2.75%	8.38%	0.35%	8.03%	14.40%
8	8.50%	2.50%	6.00%	2.75%	8.75%	0.35%	8.40%	13.50%
<b>Average</b>	<b>7.57%</b>	<b>2.46%</b>	<b>5.11%</b>	<b>2.75%</b>	<b>7.86%</b>	<b>0.35%</b>	<b>7.51%</b>	<b>12.95%</b>

\*Average real rate of return is 4.76% net of investment expenses.

\*\*Based on arithmetic average.

Based on each firm's assumptions, we estimated the expected real return of SURS' portfolio (col. (4)). Next, based on the actuary's recommended inflation and investment expense assumption, we estimated the nominal return net of investment expenses (col. (8)). As the table shows, the average one-year nominal return (net of expenses) of the eight firms is 7.51 percent, which is 0.24 percentage points less than the current assumption of 7.75 percent.

In addition to examining the expected one-year return, it is important to review anticipated volatility of the investment portfolio and understand the range of long-term net returns that could be expected to be produced by the investment portfolio. Therefore, the following table provides the 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> percentiles of the 20-year geometric average of the expected nominal return, net of expenses. The table also shows the probability of exceeding the current 7.75 percent assumption as well as four alternate assumptions of 7.50 percent, 7.25 percent, 7.00 percent and 6.75 percent.



**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**ECONOMIC ASSUMPTIONS**

Investment Consultant	Distribution of 20-Year Average Geometric Net Nominal Return			Probability of exceeding 7.75% *	Probability of exceeding 7.50%	Probability of exceeding 7.25%	Probability of exceeding 7.00%	Probability of exceeding 6.75%
	25th	50th	75th					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	4.0%	5.9%	7.8%	25.1%	28.1%	31.2%	34.4%	37.8%
2	4.2%	6.0%	7.9%	26.9%	29.9%	33.1%	36.4%	39.9%
3	4.4%	6.3%	8.3%	30.8%	33.8%	37.0%	40.3%	43.7%
4	4.8%	6.6%	8.4%	32.8%	36.3%	39.8%	43.4%	47.1%
5	5.1%	7.1%	9.1%	41.0%	44.3%	47.6%	50.9%	54.2%
6	5.5%	7.3%	9.1%	43.6%	47.3%	51.0%	54.7%	58.3%
7	5.0%	7.1%	9.2%	41.6%	44.6%	47.8%	50.9%	54.1%
8	5.6%	7.5%	9.6%	47.3%	50.6%	54.0%	57.3%	60.6%
<b>Average</b>	<b>4.8%</b>	<b>6.7%</b>	<b>8.7%</b>	<b>36.1%</b>	<b>39.4%</b>	<b>42.7%</b>	<b>46.0%</b>	<b>49.5%</b>

*\*Plan's current return assumption net of expenses.*

As the analysis shows, there is a 50 percent likelihood that the 20-year average net real return will be between 4.8 percent and 8.7 percent. This becomes the best-estimate range under ASOP 27 applicable to valuations with measurement dates before September 30, 2014. However, none of the capital market assumptions provided by the investment consulting firms indicate there is more than a 50 percent chance of exceeding the current assumption of 7.75 percent over the next 20 years. Furthermore, the average results of all eight firms indicate there is about a 36 percent chance that the System will produce an average return that exceeds 7.75 percent over the next 20 years.

**Recommendation**

Based on our analysis of the expected investment return and the current target asset allocation, we recommend lowering the long-term investment return assumption to either 7.25 percent or 7.00 percent. We recommend that the assumed investment return be reviewed before the next experience review if warranted. Also, any significant changes in the target asset allocation may warrant an additional review of the rate of return assumption. We believe that this assumption can be supported by the revised Actuarial Standard of Practice No. 27. Under the Standard, all economic assumptions must be selected to be consistent with the purpose of the measurement. The purpose of the measurement is to determine the contribution rate which will lead to the accumulation of assets to pay benefits when due. The assumption of 7.25 percent or 7.00 percent is below the arithmetic mean of 7.51 percent as disclosed above, to account for future volatility of future investment returns.

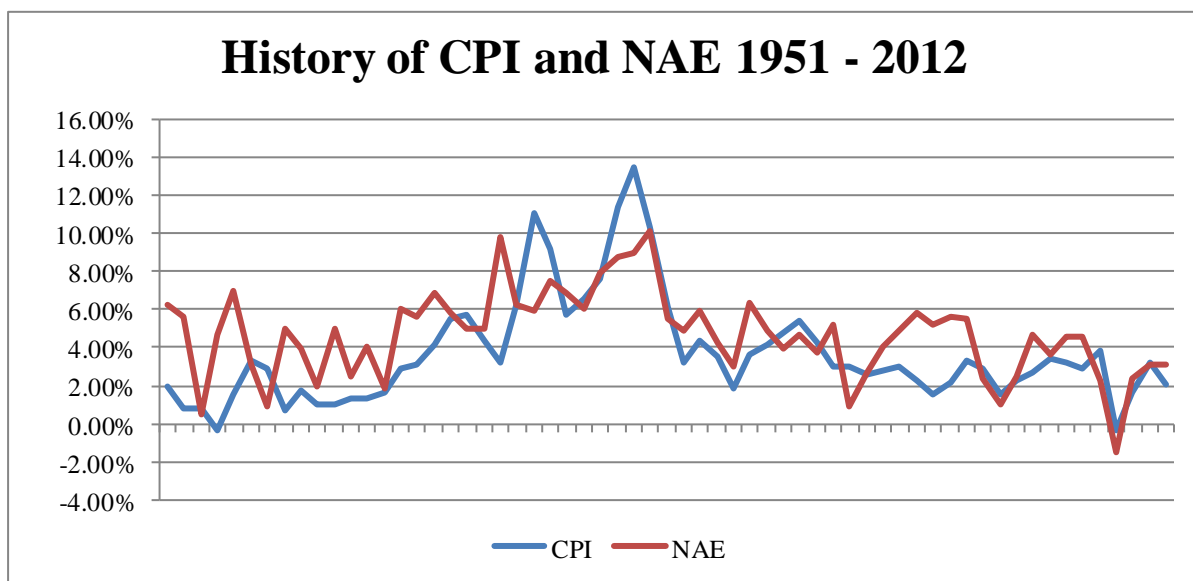
# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

## ECONOMIC ASSUMPTIONS

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### General Wage Increase and Payroll Growth Assumption

The SURS assumptions make a distinction between price inflation (currently assumed to be 2.75 percent) and the rate of payroll growth (currently assumed to be 3.75 percent). The National Average Earnings (NAE) series published in connection with the operation of the Social Security program is a useful proxy for measuring general changes in wage levels in the economy. Increases in NAE typically exceed increases in the Consumer Price Index (CPI), although there are periods where the patterns are reversed. The economic argument for wages exceeding prices in the long run is that CPI is based on the prices of a fixed basket of goods whereas wages reflect innovations, real productivity growth, labor supply and demand and other factors in addition to pure price inflation.



Over the last 61 years, NAE has exceeded CPI 41 times and the averages over that period are 4.6 percent for NAE and 3.6 percent for CPI. The last 25 years has had fewer cases of high inflation, but the distinction between prices and wages still appears. Over the last 25 years, the average increase in NAE is 3.6 percent and the average increase in CPI is 2.9 percent.

As with the investment return assumption, past experience does not dictate future expectations. Current expectations are mixed on whether price and wage inflation will remain low in the short term, particularly due to the after effects of recent federal government spending. For a long term view, the 2013 Annual Report from the Trustees of the Social Security Administration (SSA) assumes an intermediate average CPI of 2.8 percent over the next 75 years and an intermediate growth assumption for average wages in covered employment of 3.9 percent. The SSA report provides alternate “Low-cost” assumptions of 1.8 percent CPI/3.5 percent wages and “High-cost” assumptions of 3.8 percent CPI/4.3 percent wages.

With ongoing pressure on the ability of states to sustain across the board increases in wages consistent with historical norms, we do not believe there is justification to increase the assumption for productivity increases; in other words, to increase the assumed gap between price increase and wage growth. *We recommend maintaining the assumption for productivity*

## STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS ECONOMIC ASSUMPTIONS

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*increases of 1.00 percent.* Combining the recommendation with a 2.75 percent inflation assumption, implies a wage growth assumption of 3.75 percent. These assumptions are summarized below:

	<b>Present Assumption</b>
<b>Price Inflation</b>	2.75%
<b>Productivity Increases</b>	1.00%
<b>Total Wage Inflation</b>	3.75%

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**SECTION IV**

**COST IMPACT OF RECOMMENDED  
CHANGES**

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**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**COST IMPACT OF RECOMMENDED CHANGES**

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The impact of adopting the recommended assumptions is summarized in the table below and on the following pages. The recommended assumptions increase the actuarial liability and contribution requirements and decrease the funded ratio.

	Dollars in Millions		
	Valuation as of 6/30/14	Proposed Assumptions	Change
Actuarial Accrued Liability	\$ 37,430	\$ 38,320	\$ 890
Actuarial Value of Assets	15,845	15,845	-
Unfunded Actuarial Accrued Liability	21,585	22,475	890
Funded Ratio	42.33%	41.35%	-0.98%
<b>Illustrated Employer Contributions (FY 2016)</b>			
Annual Required Contribution (GASB 25/27 ARC) <sup>1</sup>	\$ 1,879	\$ 1,944	\$ 65
Old Law Statutory Contribution (Level % reach 90% Funded in 2045)	1,647	1,702	54
Deficit Contribution (from ARC)	232	242	11

<sup>1</sup> Based on a level percentage of capped payroll.

**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**COST IMPACT OF RECOMMENDED CHANGES**

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	<b>Dollars in Millions</b>		
	<b>Valuation as of 6/30/14</b>	<b>Proposed Assumptions</b>	<b>Change</b>
<b>Actuarial Accrued Liability</b>			
<b>1. Active Members</b>	\$10,667.3	\$10,755.4	\$88.1
<b>2. Benefit Recipients</b>			
a. Retirement	\$22,854.9	\$23,667.3	\$812.4
b. Survivor	1,214.7	1,236.1	21.4
c. Disability	319.1	243.2	(75.9)
Total - Benefit Recipients	\$24,388.6	\$25,146.5	\$757.9
<b>3. Other Inactive</b>	\$ 2,373.6	\$ 2,418.4	\$ 44.8
<b>4. Grand Total</b>	\$37,429.5	\$38,320.3	\$890.8
		<b>Actuarial Results</b>	
<b>Actuarial Value of Assets</b>	\$15,844.7	\$15,844.7	\$ 0.0
<b>Unfunded Actuarial Accrued Liability</b>	\$21,584.8	\$22,475.6	\$890.8
<b>Funded Ratio</b>	42.33%	41.35%	-0.98%

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**SECTION V**

**RECOMMENDED ACTUARIAL ASSUMPTIONS**

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## STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS RECOMMENDED ACTUARIAL ASSUMPTIONS

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**Rate of Investment Return.** For all purposes under the system the rate of investment return is assumed to be 7.25% per annum beginning with the **June 30, 2014**, valuation. The most recent assumption was 7.75%.

**Price Inflation (Increase in Consumer Price Index “CPI”).** The assumed rate is 2.75% per annum.

**Effective Rate of Interest.** The assumed rate credited to member accounts is 7.00% per annum.

**Cost of living adjustment “COLA.”** The assumed rate is 3.00% per annum for members hired before January 1, 2011, based on the benefit provision of 3.00% annual compound increases. The assumed rate is 1.375% for members hired on or after January 1, 2011, based on the benefit provision of increases equal to ½ of the increase in CPI with a maximum increase of 3.00%.

**Annual Compensation Increases.** Each member’s compensation is assumed to increase by 3.75% each year, 2.75% reflecting salary inflation and 1.00% reflecting standard of living increases. That rate is increased for members with less than 35 years of service, as follows:

<u>Service Year</u>	<u>Total Increase</u>
0	15.00%
1	12.00%
2	9.00%
3	7.25%
4	6.50%
5	6.00%
6	5.75%
7	5.50%
8	5.25%
9	5.00%
10	4.75%
11	4.50%
12-13	4.25%
14-33	4.00%
34+	3.75%

**Payroll Growth.** The assumed rate of total payroll growth is 3.75%.



## STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS RECOMMENDED ACTUARIAL ASSUMPTIONS

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### *Mortality.*

The mortality assumptions are as follows:

	<b>Male Set Forward</b>	<b>Female Set Forward</b>	<b>Male Multiplier</b>	<b>Female Multiplier</b>
RP-2014 White Collar Employee, sex distinct (pre-retirement)	None	None	110% pre 60, 80% at ages 60+	90% pre 60, 90% at ages 60+
RP-2014 White Collar Healthy Annuitant, sex distinct (non-disabled post-retirement)	1 year	1 year	100%	100%
RP-2014 Disabled Annuitant, sex distinct (disabled post retirement)	9 years	10 years	100%	100%

Mortality improvement is projected using the 2-dimensional mortality improvement scales released by the Society of Actuaries in 2014. The assumptions are generational mortality tables and include a margin for improvement.

### Future Life Expectancy (years) in 2014

Age	Postretirement		Disabled - Retiree	
	Male	Female	Male	Female
35	51.78	53.89	29.29	34.12
40	46.55	48.67	25.89	30.08
45	41.41	43.52	22.74	26.32
50	36.38	38.45	19.73	22.67
55	31.50	33.45	16.77	19.04
60	26.74	28.54	13.86	15.52
65	22.13	23.81	11.08	12.31
70	17.72	19.31	8.55	9.53
75	13.66	15.13	6.34	7.19

**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**RECOMMENDED ACTUARIAL ASSUMPTIONS**

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*Disability.* A table of disability incidence with sample rates follows:

<b>Age</b>	<b>Male</b>	<b>Female</b>	<b>Age</b>	<b>Male</b>	<b>Female</b>
20	0.042%	0.060%	50	0.206%	0.249%
21	0.043%	0.064%	51	0.219%	0.257%
22	0.044%	0.067%	52	0.231%	0.264%
23	0.045%	0.071%	53	0.244%	0.272%
24	0.046%	0.074%	54	0.256%	0.279%
25	0.047%	0.078%	55	0.264%	0.287%
26	0.048%	0.081%	56	0.271%	0.294%
27	0.049%	0.085%	57	0.279%	0.302%
28	0.050%	0.088%	58	0.286%	0.309%
29	0.051%	0.092%	59	0.294%	0.317%
30	0.054%	0.099%	60	0.301%	0.324%
31	0.056%	0.107%	61	0.309%	0.332%
32	0.059%	0.114%	62	0.316%	0.339%
33	0.061%	0.122%	63	0.324%	0.347%
34	0.064%	0.129%	64	0.331%	0.354%
35	0.067%	0.137%	65	0.339%	0.362%
36	0.071%	0.144%	66	0.346%	0.369%
37	0.074%	0.152%	67	0.354%	0.377%
38	0.078%	0.159%	68	0.361%	0.384%
39	0.081%	0.167%	69	0.369%	0.392%
40	0.091%	0.174%	70	0.369%	0.392%
41	0.101%	0.182%	71	0.369%	0.392%
42	0.111%	0.189%	72	0.369%	0.392%
43	0.121%	0.197%	73	0.369%	0.392%
44	0.131%	0.204%	74	0.369%	0.392%
45	0.144%	0.212%	75	0.369%	0.392%
46	0.156%	0.219%	76	0.369%	0.392%
47	0.169%	0.227%	77	0.369%	0.392%
48	0.181%	0.234%	78	0.369%	0.392%
49	0.194%	0.242%	79	0.369%	0.392%

Disability rates apply during the retirement eligibility period.

**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**RECOMMENDED ACTUARIAL ASSUMPTIONS**

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**Retirement.** Upon eligibility, active members are assumed to retire as follows:

<b>Age</b>	<b>Members Hired Before January 1, 2011 and Eligible for</b>		<b>Members Hired on or after January 1, 2011 and Eligible for</b>	
	<b>Normal Retirement</b>	<b>Early Retirement</b>	<b>Normal Retirement</b>	<b>Early Retirement</b>
Under 50	50.0%			
50	45.0%			
51	45.0%			
52	45.0%			
53	40.0%			
54	40.0%			
55	38.0%	7.5%		
56	36.0%	6.0%		
57	30.0%	4.5%		
58	30.0%	5.5%		
59	30.0%	6.0%		
60	11.0%			
61	11.0%			
62	13.0%			35.0%
63	13.0%			15.0%
64	13.0%			15.0%
65	17.0%			15.0%
66	17.0%			15.0%
67	15.0%		50.0%	
68	15.0%		35.0%	
69	15.0%		30.0%	
70-74	15.0%		15.0%	
75-79	20.0%		20.0%	
80+	100.0%		100.0%	

Members that retire are assumed to elect the most valuable option on a present value basis – refund of contributions (or portable lump sum retirement, if applicable) or a retirement annuity.

## STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS RECOMMENDED ACTUARIAL ASSUMPTIONS

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**General Turnover.** A table of termination rates based on experience in the 2010-2014 period. The assumption is a table of turnover rates by years of service. A sample of these rates follows:

<u>Years of Service</u>	<u>Termination Rates</u>
0	20.00%
1	20.00%
2	15.00%
3	14.00%
4	12.00%
5	10.00%
6	9.00%
7	7.50%
8	6.75%
9	6.00%
10	5.25%
11	4.50%
12	4.00%
13	3.70%
14	3.20%
15	3.00%
16	3.00%
17	3.00%
18	3.00%
19	3.00%
20	2.50%
21	2.50%
22	2.50%
23	2.50%
24	2.50%
25	2.00%
26	2.00%
27	2.00%
28	2.00%
29	2.00%

Part time members with less than 3 years of service (all members classified as part time for valuation purposes) are assumed to terminate at the valuation date.

Members that terminate with at least 5 years of service (10 years of service for Tier 2 members) are assumed to elect the most valuable option on a present value basis – refund of contributions or a deferred benefit.

Termination rate for 29 years of service used for Tier 2 members until retirement eligibility is met.

**STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS**  
**RECOMMENDED ACTUARIAL ASSUMPTIONS**

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**Operational Expenses.** The amount of operational expenses incurred in the latest fiscal year are supplied by SURS staff and incorporated in the Normal Cost.

**Marital Status.** Members are assumed to be married in the following proportions:

<u>Age</u>	<u>Males</u>	<u>Females</u>
20	25 %	40 %
30	70	75
40	80	80
50	85	80
60	85	70

**Spouse Age.** The female spouse is assumed to be 3 years younger than the male spouse.

**Benefit Commencement Age.** Inactive members eligible for a deferred benefit are assumed to commence benefits at their earliest normal retirement age. For Tier 1 members this is age 62 with at least 5 years of service, age 60 with at least 8 years of service, or immediately if at least 30 years of service. For Tier 2 members, this is age 67 with 10 or more years of service.

**Load on Final Average Salary.** No load is assumed to account for higher than assumed pay increases in final years of employment before retirement.

**Load on Liabilities for Service Retirees With Non-finalized Benefits.** A load of 10% on liabilities for service retirees whose benefits have not been finalized as of the valuation date is assumed to account for finalized benefits that on average are 10% higher than 100% of the preliminary estimated benefit.

**Valuation of Inactives.** An annuity benefit is estimated based on information provided by staff for Tier 1 inactive members with five or more years of service and Tier 2 members with 10 or more years of service.

**Self Managed Plan Election Percentage.** 30%.

December 3, 2012

Board of Trustees  
State Universities Retirement System of Illinois  
1901 Fox Drive  
Champaign, Illinois 61820

**Re: Experience Study on the assumption for the Money Purchase Effective Rate of Interest (ERI)**

Dear Members of the Board:

At your request, on behalf of the State Universities Retirement System of Illinois (“SURS”), we have reviewed the methodology used to calculate the Money Purchase Effective Rate of Interest (“ERI”) for purposes of crediting member contribution balances. The understood purpose of the analysis is to recognize the Comptroller’s method for determining the Money Purchase ERI and to adequately reflect the anticipated future Money Purchase ERIs in the annual actuarial valuations commencing in 2013. This information is intended for use by the System and those designated or approved by the Staff or Board.

**Background:**

Members hired before July 1, 2005, are eligible for the money purchase benefit if it is more valuable than the formula benefit. The money purchase account balance is the sum of the member contributions for retirement benefits (6.5 percent of pay) accumulated with interest at the ERI, plus an imputed employer contribution match at \$1.40 per dollar of member contribution accumulated with interest at the ERI. This amount is converted into an annuity using a life annuity factor that takes into account neither the automatic 50% spousal survivor benefit nor the automatic annual increases in order to calculate the retirement benefit under the money purchase formula.

In order to value all future liabilities in the plan during the annual actuarial valuation, the actuary makes an assumption about the future interest rate to be used in crediting the money purchase accounts.

The actual Money Purchase ERI, or Effective Rate of Interest, is set by the Comptroller’s office each year. Beginning with the Money Purchase ERI for fiscal year 2006, the State Comptroller determined the rate for purposes of crediting member contributions balances for the Rule 2 (money purchase formula). The SURS Board of Trustees determined the ERI for years prior to fiscal year 2006 for all purposes, including money purchase, and continues to certify the ERI for purposes of calculating service purchases, refunds for excess contributions and for lump sum portable retirements and refunds. This experience study only examines the Money Purchase ERI.

For the purpose of estimating future benefits and liabilities, the actuarial valuation procedure has been to assume that the Money Purchase ERI for the account balances is the expected long-term rate of return of the trust. Over the 15 year period between fiscal years 1995 and 2009, the average ERI was 8.70 percent compared to the expected long-term rate of return of 8.50 percent. However, the Money Purchase ERI has been lower beginning in fiscal year 2010 and is expected to be lower in the future.

### **Changes to the process for declaring the ERI:**

Since 2006, the ERI declared by the Comptroller's Office has drifted away from the expected long-term rate of return of the fund. In 2010, the Comptroller's Office formalized a process using outside actuarial expertise, and the process has within it an apparent downward trend toward a rate that is lower than the long-term expected rate of return used in the annual actuarial valuation.

### **Methodology Used for Rate Determined by the State Comptroller**

We have reviewed the report prepared by Segal, dated March 1, 2011, and have summarized our understanding of the methodology and criteria used by Segal.

The criteria used by Segal (Page 1-2) was based on:

1. The Plan's "expected (long-term) investment experience" (a.k.a. the Expected Rate of Return, or ERoR)
2. A forward looking adjustment (which may be positive or negative) to account for the difference between the Plan's "past...investment experience" and past ERIs. This adjustment is based on:
  - a. The historical SURS investment experience and ERIs
  - b. The characteristics of Money Purchase Formula-eligible participants
  - c. Actuarial assumptions
  - d. Adjustment and ERI calculation methodologies as described in the report
  - e. The current plan provisions

Segal calculated an expected rate of return of 7.50%, which compares to the assumed long-term rate of return of 7.75% used by SURS.

Segal then calculated an adjustment of -0.80% to the ERoR, which resulted in a calculated effective rate of return of 6.70% (which was then rounded to the certified rate of 6.75% for fiscal year 2012).

Segal performed two calculations to determine the downward adjustment of 0.80%:

1. Present value of future benefits for money purchase eligible active members assuming
  - a. historical rates of interest applied to member accounts were equal to the historical investment earnings and
  - b. future ERIs are equal to the projected ERoR of 7.50% as shown in the report.
2. Present value of future benefits for money purchase eligible active members assuming
  - a. historical rates of interest applied to member accounts were equal to the actual ERIs granted and
  - b. future ERIs are equal to the projected ERoR of 7.50% as shown in the report.

Segal calculated that the results of 1 were lower than the results of 2, which means that members on average would have lower account balances if the actual rates of investment earnings had been credited. Segal then calculated that a downward adjustment of 0.80% to the ERI in each future year (compared to the assumed rate) would result in benefits (as measured by the present value) that on average are equal to those that would have been provided if actual rates of investment earnings were credited.

The following table shows this recent pattern in the ERI:

<b>Fiscal Years Ending June 30,</b>	<b>Assumed overall Rate of Return - Valuation</b>	<b>ERI assumption for money purchase accounts used in the valuation</b>	<b>ERI “Legacy” approved by the Board of Trustees</b>	<b>ERI declared by the Comptroller’s Office for use in the money purchase plan</b>
2013	7.75%	TBD	7.50%	6.50%
2012	7.75%	7.75%	7.50%	6.75%
2011	7.75%	7.75%	7.50%	7.00%
2010	8.50%	8.50%	8.00%	7.50%
2009	8.50%	8.50%	8.50%	8.50%
2008	8.50%	8.50%	8.50%	8.00%
2007	8.50%	8.50%	8.50%	8.00%
2006	8.50%	8.50%	8.50%	8.50%
2005	8.50%	8.50%	8.00%	N/A

**Analysis**

Segal employs a method that looks at a members’ account balance and “trues up” the account balance to what it would have been had it been granted the market value rate of return. In order to reflect the more recent and severe market downturns, the Money Purchase ERI will be at a rate lower than the assumed rate of return for a long time. Segal stated in their actuarial audit report of SURS dated May 30, 2012 “Based on Segal’s analysis of the ERI, which is performed for the IOC, we expect the ERI to trend downward for the next few years and remain at least 1% below the valuation interest rate for the foreseeable future.”

In order to verify this based on our understanding of Segal’s method, GRS calculated the average trust return and the average ERI. The average trust return is based on the geometric average of the return on plan assets from hire date through fiscal year 2012. The average ERI is based on the geometric average of the credited ERIs from hire date through fiscal year 2012. The annual rates used in these averages can be found in Exhibit IV.



We have reviewed the relationship of the average trust return and average ERI based on hire date, as shown below:

Year Hired	Average Annual Return through FY 2012 based on actual trust earnings	Average Annual Return through FY 2012 based on declared ERI rate	Return differential (trust minus ERI)
2005	6.06%	7.78%	-1.72%
2000	4.98%	8.40%	-3.42%
1995	8.21%	8.45%	-0.24%
1990	8.03%	8.36%	-0.33%

### **Observations:**

The net negative return differentials shown above indicate that the expectation for future Money Purchase ERIs will be lower than the assumed rate of return. The negative return differentials imply that the cumulative return for the given time period is higher for the ERI returns than the actual trust returns - hence the expectation that the Comptroller's Office will keep the declared ERI returns lower, allowing the return differential to approach zero.

The returns at the end of a member's career (when the account balance is highest) more significantly impact his account balance than those at the beginning of his career (when the account balance is lowest). Exhibit III illustrates the differential of the trust returns and ERI crediting, given the value of the account balances at each point in time. Assuming investment returns of 7.75 percent in years beginning in fiscal year 2013 and Money Purchase ERI of 7.00 percent in future years beginning in fiscal year 2014, the members hired in 1991 and 1996 are expected to receive credited interest that is higher under the ERI crediting basis than the average trust return after 30 year careers and members hired in 2001 and 2005 would be expected to receive credited interest that is lower under the ERI crediting basis than the average trust return after 30 year careers. If the members hired in 2001 and 2005 worked for a shorter period of time, such as 15 or 20 years, they would also be expected to receive higher interest crediting based on assumed future ERI of 7.00 percent than the assumed average trust return.

When looking at Exhibits I and II, it can be seen that most of the population was hired between 1989 and 2005. Those periods also have cumulative trust returns that are less than the cumulative ERI annual returns, meaning Segal's method of "truing up" member account balances would dictate a return lower than the assumed rate of return, so that the ERI annual returns for the bulk of the population will match the trust annual returns.

Based on this analysis, we recommend the long-term assumption for the ERI for crediting the money purchase accounts be reduced, from 7.75% per year to 7.00% per year. We recognize that the ERI declared by the Comptroller's Office will likely be less than 7.00 percent in the near-term. However, we believe it is prudent to take a measured approach to the change in the assumption and review it again in a few years as there is additional experience on trust returns and the expectation for future ERI declared by the Comptroller's Office.

### Comparison of the Former Method and the Comptroller's Method

Although the statute references the factors to be considered in setting the Rule 2 Money Purchase ERI, the statute is vague about the exact methods to be used. This lack of specificity in detail can mean that different methods may exist which may be equally valid. In this case, the previous method gave an equal weight to all return years and did not look at the population to test whether particular cohorts were “trued up” to the actual market returns. Segal presumably looks at the hire dates of members and attempts to bring into balance their money purchase account balances with the actual trust earnings achieved during their time of participation. Both methods would be very similar if there were very little volatility in the asset returns. However, with the greater volatility in recent years, it matters when a member was hired (the shorter the period of employment the more the Rule 2 ERI needs to decrease to get the total Money Purchase account balance to match the actual trust returns). Since the Money Purchase population is comprised of so many members hired after 1988, there is an expectation that the Comptroller's office will declare rates lower than the assumed rate of return (this can be observed on Exhibit I where the negative differentials start for those members hired in 1988 and continue through the current date.)

### A review of selected examples

Exhibit III illustrates four different examples of the trust return vs. ERI returns.

	2012 Money Purchase Balance based on “trust”	2012 Money Purchase Balance based on “ERI”	Difference between Trust balance and ERI balance
Example 1 – Hired 1991	\$481,487	\$559,881	(\$78,394)
Example 2 – Hired 1996	\$331,129	\$393,908	(\$62,778)
Example 3 – Hired 2001	\$197,805	\$216,217	(\$18,413)
Example 4 – Hired 2005	\$112,331	\$119,568	(\$7,237)

The “trust” earnings balance is the estimated money purchase plan account balance the member would have had, had the member been credited with the actual trust earnings as illustrated in Exhibit IV. The ERI balance is the estimated money purchase plan account balance the member would have had, had the member been credited with the ERI declared rate as illustrated in Exhibit IV.

### Impacts of the change in assumption

As an assumption change, this will only affect the valuation and the liability and funding results. **This will not impact the actual benefits earned by the members.** This change in assumption will reduce the liabilities of the plan, since the assumption of a lower long-term rate of interest in the money purchase account will produce a lower assumed money purchase balance and therefore a lower future retirement benefit. A change in the assumed ERI credited to member accounts does not affect the factors used to convert the money purchase account balance to an annuity. (These

factors are impacted by the assumed long-term rate of investment return and the mortality assumption.)

The illustrated impact of this change based on the results of the actuarial valuation as of June 30, 2012, is as follows. These results assume that the assumed ERI remains at 7.75 percent for all other purposes (except for Rule 2 money purchase formula benefit calculations). We recommend that this change be first reflected in the actuarial valuation as of June 30, 2013.

	Dollars in Millions		
	2012 Valuation	Assumed 7.00% Money Purchase ERI	Change
Actuarial Accrued Liability	\$33,170.2	\$32,939.2	-\$231.0
Actuarial Value of Assets	13,949.9	13,949.9	0.0
Unfunded Liability	19,220.3	18,989.3	-231.0
Funded Ratio	42.1%	42.4%	0.3%
Estimated FY 2013 ARC	1,510.6	1,486.5	-24.1
FY 2013 Statutory Contribution <sup>1</sup>	1,442.8	1,442.8	0.0
FY 2014 Statutory Contribution <sup>1</sup>	1,551.8	1,528.7	-23.1

<sup>1</sup> Includes SMP.

The undersigned actuaries are independent of the plan sponsor. To the best of our knowledge, this actuarial statement is complete and accurate, and has been prepared in accordance with generally accepted actuarial principles and practices.

The undersigned are members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

Sincerely,



Leslie Thompson, FSA, EA, MAAA  
Senior Consultant



Amy Williams, ASA, MAAA  
Consultant

AW:kb

cc: Bill Mabe, State Universities Retirement System of Illinois  
Dan Allen, State Universities Retirement System of Illinois  
Phyllis Walker, State Universities Retirement System of Illinois  
Kristen Brundirks, Gabriel, Roeder, Smith & Company  
Lance Weiss, Gabriel, Roeder, Smith & Company

**State Universities Retirement System of Illinois**  
**Distribution of Members Eligible for Money Purchase Benefit**

Year Hired	Currently Active	Average Annualized Through FY2012*		
		Trust ROR	ERI Credited ROR	Differential
2005	1,377	6.06%	7.78%	-1.7%
2004	2,719	7.22%	7.80%	-0.6%
2003	2,376	6.78%	7.92%	-1.1%
2002	2,523	5.54%	8.11%	-2.6%
2001	2,844	4.26%	8.27%	-4.0%
2000	2,402	4.98%	8.40%	-3.4%
1999	2,016	5.43%	8.48%	-3.0%
1998	2,049	6.22%	8.51%	-2.3%
1997	1,669	7.11%	8.51%	-1.4%
1996	1,608	7.75%	8.48%	-0.7%
1995	1,452	8.21%	8.45%	-0.2%
1994	1,581	7.81%	8.43%	-0.6%
1993	1,353	7.97%	8.41%	-0.4%
1992	1,293	8.08%	8.39%	-0.3%
1991	2,701	7.95%	8.37%	-0.4%
1990	1,243	8.03%	8.36%	-0.3%
1989	1,042	8.39%	8.32%	0.1%
1988	906	8.13%	8.31%	-0.2%
1987	823	8.43%	8.29%	0.1%
1986	846	9.05%	8.28%	0.8%
1985	835	9.60%	8.27%	1.3%
1984	693	9.05%	8.26%	0.8%
1983	246	10.02%	8.26%	1.8%
1982	211	9.71%	8.25%	1.5%
1981	174	9.43%	8.24%	1.2%
1980	142	9.18%	8.23%	0.9%
1979	114	9.08%	8.23%	0.9%
1978	94	8.96%	8.19%	0.8%
1977	67	8.82%	8.14%	0.7%
1976	59	9.05%	8.08%	1.0%
1975	43	9.25%	8.06%	1.2%
1974	39	8.54%	8.05%	0.5%
1973	22	8.32%	8.05%	0.3%
1972	21	8.42%	7.96%	0.5%
Before 1972	147			
Total	37,730			

\*Based on the geometric average of the rates shown on Exhibit IV from hire date through FY 2012.

**State Universities Retirement System of Illinois  
Distribution of Members Eligible for Money Purchase Benefit**

Age	Years of Service									Totals
	Under 1	1-4	5-9	10-14	15-19	20-24	25-29	30 & Over		
Under 20	-	-	-	-	-	-	-	-	-	-
	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
20-24	-	-	1	-	-	-	-	-	-	1
	\$ -	\$ -	\$ 34,902	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 34,902
25-29	1	7	137	20	-	-	-	-	-	165
	\$ 7,957	\$ 276,058	\$ 4,840,162	\$ 618,109	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,742,285
30-34	2	56	838	593	10	-	-	-	-	1,499
	\$ 42,921	\$ 1,637,841	\$ 38,101,036	\$ 28,463,579	\$ 474,143	\$ -	\$ -	\$ -	\$ -	\$ 68,719,519
35-39	-	78	1,017	1,457	319	13	-	-	-	2,884
	\$ -	\$ 1,929,718	\$ 48,623,616	\$ 77,295,396	\$ 17,039,177	\$ 829,115	\$ -	\$ -	\$ -	\$ 145,717,023
40-44	2	103	1,164	1,741	1,043	345	29	-	-	4,427
	\$ 40,816	\$ 2,912,294	\$ 59,972,009	\$ 102,340,136	\$ 65,207,476	\$ 20,324,282	\$ 1,640,477	\$ -	\$ -	\$ 252,437,490
45-49	1	104	1,083	1,877	1,314	1,082	440	11	-	5,912
	\$ 4,032	\$ 2,208,896	\$ 48,327,396	\$ 108,117,376	\$ 87,678,396	\$ 74,502,849	\$ 27,236,844	\$ 733,909	\$ -	\$ 348,809,696
50-54	2	81	1,054	2,039	1,561	1,487	1,027	202	-	7,453
	\$ 14,816	\$ 1,687,056	\$ 46,185,322	\$ 109,470,673	\$ 103,286,603	\$ 110,350,538	\$ 76,005,514	\$ 14,431,540	\$ -	\$ 461,432,064
55-59	3	96	1,002	1,889	1,447	1,521	916	298	-	7,172
	\$ 30,311	\$ 2,498,017	\$ 42,013,616	\$ 97,867,520	\$ 89,631,441	\$ 113,559,564	\$ 84,161,938	\$ 28,134,786	\$ -	\$ 457,897,193
60-64	2	59	810	1,245	1,066	1,026	601	326	-	5,135
	\$ 34,993	\$ 1,674,596	\$ 30,038,672	\$ 63,086,656	\$ 62,085,286	\$ 67,645,402	\$ 56,970,260	\$ 36,291,412	\$ -	\$ 317,827,277
65 & Over	-	32	523	759	604	573	249	342	-	3,082
	\$ -	\$ 261,561	\$ 15,358,719	\$ 30,893,009	\$ 28,498,223	\$ 30,837,407	\$ 21,790,192	\$ 41,128,390	\$ -	\$ 168,767,501
<b>Total Count</b>	<b>13</b>	<b>616</b>	<b>7,629</b>	<b>11,620</b>	<b>7,364</b>	<b>6,047</b>	<b>3,262</b>	<b>1,179</b>	<b>-</b>	<b>37,730</b>
<b>Total Payroll</b>	<b>\$ 175,845</b>	<b>\$ 15,086,037</b>	<b>\$ 333,495,449</b>	<b>\$ 618,152,455</b>	<b>\$ 453,900,745</b>	<b>\$ 418,049,157</b>	<b>\$ 267,805,225</b>	<b>\$ 120,720,038</b>	<b>\$ -</b>	<b>\$ 2,227,384,951</b>

**State Universities Retirement System of Illinois  
Illustration of Growth of Money Purchase Balances (Employee and Employer Portion) Assuming a 30-Year Career**

Fiscal Year	Trust Return	Credited ERI	Example 1				Example 2				Example 3				Example 4			
			Illustrated Balances				Illustrated Balances				Illustrated Balances				Illustrated Balances			
			Salary	Trust Rate	ERI	% Diff	Salary	Trust Rate	ERI	% Diff	Salary	Trust Rate	ERI	% Diff	Salary	Trust Rate	ERI	% Diff
1991	5.40%	8.00%	\$35,000	\$5,460	\$5,460													
1992	10.20%	8.00%	39,200	12,132	12,012													
1993	11.20%	8.00%	43,120	20,218	19,700													
1994	0.70%	8.00%	46,785	27,658	28,574													
1995	16.50%	8.00%	50,177	40,049	38,688													
1996	18.50%	8.00%	53,439	55,794	50,119		\$45,000	\$7,020	\$7,020									
1997	21.40%	8.50%	56,779	76,592	63,237		50,400	16,385	15,479									
1998	17.80%	9.00%	60,185	99,614	78,317		55,440	27,950	25,521									
1999	11.50%	9.50%	63,646	120,998	95,686		60,152	40,548	37,329									
2000	14.00%	10.00%	67,146	148,413	115,729		64,513	56,289	51,126									
2001	-8.80%	10.00%	70,504	146,351	138,301		68,707	62,053	66,957		\$50,000	\$7,800	\$7,800					
2002	-6.10%	10.00%	74,029	148,972	163,679		73,001	69,656	85,041		56,000	16,060	17,316					
2003	2.90%	9.00%	77,730	165,418	190,536		77,381	83,748	104,766		61,600	26,136	28,484					
2004	17.00%	8.00%	81,617	206,272	218,512		81,830	110,751	125,913		66,836	41,005	41,189					
2005	10.40%	8.00%	85,698	241,093	249,361		86,331	135,736	149,453		71,682	56,452	55,667	\$55,000	\$8,580	\$8,580		
2006	11.70%	8.50%	89,768	283,305	284,561		90,648	165,758	176,298		76,341	74,966	72,307	61,600	19,193	18,919		
2007	18.30%	8.00%	94,032	349,818	321,995		95,180	210,940	205,250		81,112	101,338	90,746	67,760	33,276	31,003		
2008	-4.50%	8.00%	98,499	349,442	363,120		99,939	217,038	237,261		85,979	110,191	111,418	73,520	43,248	44,952		
2009	-19.70%	8.50%	103,178	296,698	410,081		104,936	190,652	273,798		90,923	102,667	135,072	78,850	47,029	61,074		
2010	15.00%	7.50%	108,079	358,063	457,698		110,183	236,438	311,521		95,923	133,031	160,167	83,975	67,183	78,754		
2011	23.80%	7.00%	112,672	460,859	507,313		115,417	310,716	351,332		100,720	180,405	187,091	89,223	97,092	98,186		
2012	0.50%	6.75%	117,460	481,487	559,881	16.3%	120,899	331,129	393,908	19.0%	105,756	197,805	216,217	9.3%	94,577	112,331	119,568	6.4%
2013	7.75%	6.50%	122,453	537,905	615,376	14.4%	126,642	376,548	439,268	16.7%	111,043	230,457	247,594	7.4%	100,015	136,639	142,942	4.6%
2014	7.75%	7.00%	127,657	599,507	678,366	13.2%	132,657	426,425	490,711	15.1%	116,596	266,507	283,115	6.2%	105,516	163,689	169,408	3.5%
2015	7.75%	7.00%	133,082	666,729	746,613	12.0%	138,958	481,150	546,738	13.6%	122,425	306,259	322,031	5.1%	110,792	193,658	198,550	2.5%
2016	7.75%	7.00%	138,738	740,044	820,519	10.9%	144,864	541,038	607,609	12.3%	128,241	350,000	364,579	4.2%	116,331	226,815	230,597	1.7%
2017	7.75%	7.00%	144,635	819,960	900,518	9.8%	151,021	606,528	673,700	11.1%	134,332	398,081	411,055	3.3%	122,148	263,448	265,793	0.9%
2018	7.75%	7.00%	150,782	907,029	987,076	8.8%	157,439	678,094	745,420	9.9%	140,713	450,883	461,780	2.4%	128,255	303,873	304,407	0.2%
2019	7.75%	7.00%	157,190	1,001,846	1,080,693	7.9%	164,130	756,251	823,204	8.9%	147,397	508,821	517,099	1.6%	134,668	348,431	346,723	-0.5%
2020	7.75%	7.00%	163,870	1,105,052	1,181,906	7.0%	171,106	841,553	907,520	7.8%	154,398	572,340	577,382	0.9%	141,065	397,441	393,000	-1.1%
2021	7.75%	7.00%					178,378	934,600	998,874	6.9%	160,960	641,806	642,908	0.2%	147,765	451,294	443,561	-1.7%
2022	7.75%	7.00%					185,959	1,036,041	1,097,805	6.0%	167,801	717,723	714,089	-0.5%	154,784	510,415	498,757	-2.3%
2023	7.75%	7.00%					193,862	1,146,577	1,204,893	5.1%	174,932	800,636	791,364	-1.2%	162,136	575,266	558,963	-2.8%
2024	7.75%	7.00%					202,101	1,266,964	1,320,764	4.2%	182,367	891,135	875,209	-1.8%	169,838	646,344	624,585	-3.4%
2025	7.75%	7.00%					210,690	1,398,022	1,446,085	3.4%	190,117	989,856	966,132	-2.4%	177,056	724,056	695,927	-3.9%
2026	7.75%	7.00%									198,197	1,097,489	1,064,680	-3.0%	184,581	808,965	773,437	-4.4%
2027	7.75%	7.00%									206,621	1,214,777	1,171,441	-3.6%	192,425	901,678	857,596	-4.9%
2028	7.75%	7.00%									215,402	1,342,525	1,287,044	-4.1%	200,604	1,002,852	948,921	-5.4%
2029	7.75%	7.00%									224,557	1,481,602	1,412,168	-4.7%	209,129	1,113,197	1,047,970	-5.9%
2030	7.75%	7.00%									234,100	1,632,945	1,547,540	-5.2%	218,017	1,233,481	1,155,339	-6.3%
2031	7.75%	7.00%													227,283	1,364,532	1,271,669	-6.8%
2032	7.75%	7.00%													236,942	1,507,246	1,397,648	-7.3%
2033	7.75%	7.00%													247,012	1,662,591	1,534,018	-7.7%
2034	7.75%	7.00%													257,511	1,831,614	1,681,571	-8.2%

**Exhibit IV**

**State Universities Retirement System of Illinois  
Analysis of Fund Rate of Return and the ERI Credited Rate**

Fiscal Year	Trust Rate of Return	ERI Credited Rate	Average Annualized Through FY2012*			
			Years in Average	Trust Rate of Return	ERI Credited Rate	Trust Rate Minus ERI
2012	0.50%	6.75%	1	0.5%	6.7%	-6.3%
2011	23.80%	7.00%	2	11.5%	6.9%	4.7%
2010	15.00%	7.50%	3	12.7%	7.1%	5.6%
2009	-19.70%	8.50%	4	3.5%	7.4%	-3.9%
2008	-4.50%	8.00%	5	1.9%	7.5%	-5.7%
2007	18.30%	8.00%	6	4.4%	7.6%	-3.2%
2006	11.70%	8.50%	7	5.5%	7.7%	-2.3%
2005	10.40%	8.00%	8	6.1%	7.8%	-1.7%
2004	17.00%	8.00%	9	7.2%	7.8%	-0.6%
2003	2.90%	9.00%	10	6.8%	7.9%	-1.1%
2002	-6.10%	10.00%	11	5.5%	8.1%	-2.6%
2001	-8.80%	10.00%	12	4.3%	8.3%	-4.0%
2000	14.00%	10.00%	13	5.0%	8.4%	-3.4%
1999	11.50%	9.50%	14	5.4%	8.5%	-3.0%
1998	17.80%	9.00%	15	6.2%	8.5%	-2.3%
1997	21.40%	8.50%	16	7.1%	8.5%	-1.4%
1996	18.50%	8.00%	17	7.7%	8.5%	-0.7%
1995	16.50%	8.00%	18	8.2%	8.5%	-0.2%
1994	0.70%	8.00%	19	7.8%	8.4%	-0.6%
1993	11.20%	8.00%	20	8.0%	8.4%	-0.4%
1992	10.20%	8.00%	21	8.1%	8.4%	-0.3%
1991	5.40%	8.00%	22	8.0%	8.4%	-0.4%
1990	9.60%	8.00%	23	8.0%	8.4%	-0.3%
1989	17.00%	7.50%	24	8.4%	8.3%	0.1%
1988	2.20%	8.00%	25	8.1%	8.3%	-0.2%
1987	16.10%	8.00%	26	8.4%	8.3%	0.1%
1986	26.70%	8.00%	27	9.1%	8.3%	0.8%
1985	25.30%	8.00%	28	9.6%	8.3%	1.3%
1984	-5.10%	8.00%	29	9.1%	8.3%	0.8%
1983	41.90%	8.00%	30	10.0%	8.3%	1.8%
1982	0.90%	8.00%	31	9.7%	8.2%	1.5%
1981	1.20%	8.00%	32	9.4%	8.2%	1.2%
1980	1.30%	8.00%	33	9.2%	8.2%	0.9%
1979	5.90%	8.00%	34	9.1%	8.2%	0.9%
1978	5.10%	7.00%	35	9.0%	8.2%	0.8%
1977	3.80%	6.50%	36	8.8%	8.1%	0.7%
1976	17.80%	6.00%	37	9.0%	8.1%	1.0%
1975	16.80%	7.00%	38	9.2%	8.1%	1.2%
1974	-15.30%	8.00%	39	8.5%	8.1%	0.5%
1973	0.10%	8.00%	40	8.3%	8.1%	0.3%
1972	12.60%	4.50%	41	8.4%	8.0%	0.5%

*\*Based on the geometric average of the rates shown from fiscal year through FY 2012.*