



Commission on Government Forecasting and Accountability

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MONTHLY BRIEFING FOR THE MONTH ENDED: NOVEMBER 2018

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SPECIAL PENSION BRIEFING

STATE RETIREMENT SYSTEMS OVERVIEW

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CGFA staff has reviewed the State-funded retirement systems' FY 2018 actuarial reports, which were issued prior to November 1st, pursuant to P.A. 97-0694, the State Actuary Law. Under the State Actuary Law, the systems must annually submit a proposed certification for the following fiscal year prior to November 1st of the current calendar year. The State Actuary then must issue a preliminary report concerning the systems' proposed certification by January 1st. The State Actuary's report must identify any recommended changes in actuarial assumptions based upon the review of the retirement systems' actuarial assumptions.

Using the actuarial (smoothed) value of assets, the total unfunded liabilities of the State systems totaled \$133.7 billion on June 30, 2018, led by the Teachers' Retirement System (TRS), whose unfunded liabilities amounted to \$75.3 billion. As the largest of the State systems, TRS accounts for approximately 56.3% of the total assets and liabilities of the five State systems combined. The State Employees' Retirement System (SERS) had unfunded liabilities of \$30.4 billion, approximately 22.8% of the total unfunded liabilities of the five systems, followed by the State Universities Retirement System (SURS) with unfunded liabilities of \$25.9 billion, which represents 19.4% of the total unfunded liabilities. Table 1, on the following page, provides a summary of the financial condition of each of the five State retirement systems, showing their respective liabilities and assets as well as their accumulated unfunded liabilities and funded ratios.

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SPECIAL PENSION BRIEFING:
State Retirement Systems Overview

TABLE 1

Summary of Financial Condition FY 2018				
State Retirement Systems Combined				
Assets at Actuarial Value / With Asset Smoothing (P.A. 96-0043)				
(\$ in Millions)				
System	Accrued Liability	Actuarial Assets	Unfunded Liability	Funded Ratio
TRS	\$127,019.3	\$51,730.9	\$75,288.4	40.7%
SERS	\$47,925.7	\$17,479.6	\$30,446.1	36.5%
SURS	\$45,258.8	\$19,337.2	\$25,921.5	42.7%
JRS	\$2,721.9	\$1,012.7	\$1,709.1	37.2%
GARS	\$375.8	\$57.6	\$318.2	15.3%
TOTAL	\$223,301.4	\$89,618.0	\$133,683.4	40.1%

A more realistic valuation of the true financial position of the State retirement systems would be based upon the market value of the assets, as shown in Table 2 below. Based upon the market value of assets, the combined unfunded liabilities of the State systems totaled \$133.5 billion on June 30, 2018. TRS, whose unfunded liabilities amounted to \$75.0 billion, again represents approximately 56.2% of the combined total unfunded balance. Table 2 provides a summary of the financial condition of each of the five State retirement systems, showing their respective liabilities and assets as well as their accumulated unfunded liabilities and funded ratios.

TABLE 2

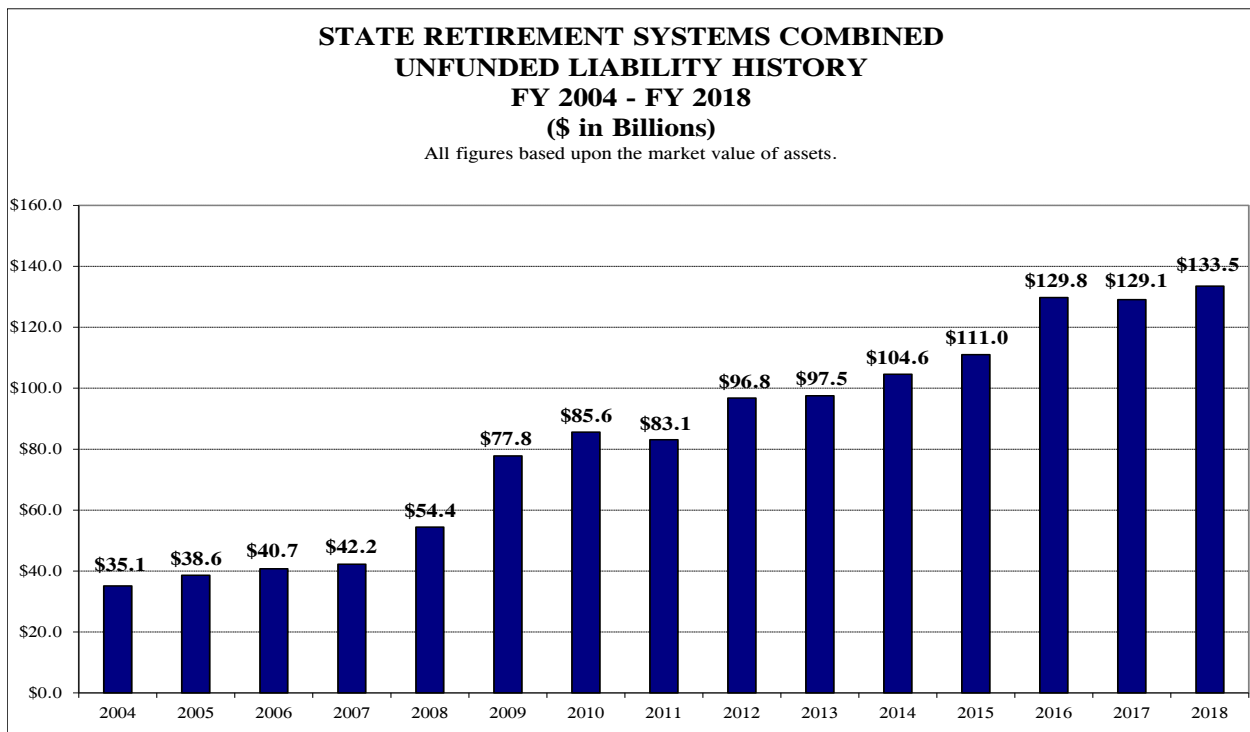
Summary of Financial Condition FY 2018				
State Retirement Systems Combined				
Assets at Market Value / Without Asset Smoothing (P.A. 96-0043)				
(\$ in Millions)				
System	Accrued Liability	Market Assets	Unfunded Liability	Funded Ratio
TRS	\$127,019.3	\$51,969.5	\$75,049.8	40.9%
SERS	\$47,925.7	\$17,462.3	\$30,463.4	36.4%
SURS	\$45,258.8	\$19,267.7	\$25,991.1	42.6%
JRS	\$2,721.9	\$1,012.3	\$1,709.5	37.2%
GARS	\$375.8	\$56.8	\$319.0	15.1%
TOTAL	\$223,301.4	\$89,768.7	\$133,532.7	40.2%

The funded ratios of the respective systems may be compared to the aggregate funded ratio. The combined funded ratio based on both the actuarial and market value of assets for FY 2018 is approximately 40% as shown in Tables 1 and 2 (the 15-year history of the systems' cumulative funded ratio is shown in Chart 5). GARS has the poorest funded ratio, followed by SERS and the Judges' Retirement System (JRS).

Chart 1 below shows a 15-year history of the cumulative unfunded State pension liability and is based upon calculations performed by the retirement systems' actuaries using the *market value* of assets for all years, including FY 2018. The aggregate unfunded liability has been growing significantly over the past decade. One of the main drivers continues to be actuarially insufficient State contributions determined by the current pension funding policy under P.A. 88-0593. As the actuaries for the State retirement systems have noted in the respective annual actuarial valuation reports, the funding plan under P.A. 88-0593 produces employer (State) contributions that are actuarially insufficient, meaning if all other actuarial assumptions are met, unfunded liabilities will increase due to the State contributing an amount that is not sufficient to stop the growth in the unfunded liability. Hence, there is a distinction between contributions that are statutorily sufficient and contributions that are considered actuarially sufficient (the annual reports of the State Actuary have noted this distinction as well).

Other reasons for an increase in unfunded liability would be the results of poor investment performance, unfavorable actuarial experiences or actuarial assumptions changes, including a reduction in assumed investment returns. Further details on the main factors affecting unfunded liability can be found in Charts 3 and 4.

CHART 1



In FY 2015, TRS and SURS changed several actuarial assumptions, such as rates of salary increases, mortality rates, retirement rates, etc. These changes resulted in a hike in unfunded

liability, along with continued actuarially insufficient State contributions. All the systems, excluding SURS, changed their actuarial assumptions in FY 2016, including lowering their respective assumed investment rates, and these changes led to a significant increase in the combined unfunded liability of \$9.67 billion, accounting for 71% of the \$13.61 billion increase over the combined FY 2015 unfunded liability.

In FY 2017, the combined unfunded liability on a market value basis slightly decreased for the first time in the past 6 years, mainly caused by outstanding investment returns from all the systems. Actuarial assumptions remained unchanged for all the five State systems in FY 2017. The unfunded liability grew to \$133.5 billion in FY 2018. Along with the actuarially insufficient state contributions under the funding plan, SURS’ reduced investment return assumption and the five systems’ unfavorable actuarial experiences from demographic and other factors were the main drivers behind the growth in unfunded liability. Especially, TRS’ unfavorable demographic experience comprises approximately 86% of the aggregate actuarial loss from demographics and other factors. Details on the factors affecting the unfunded liability in FY 2018 can be found in Chart 3.

Table 3 below shows the historical change in the investment return assumptions for each of the 5 State systems. Only SURS changed its assumed investment rate from 7.25% to 6.75% in FY 2018.

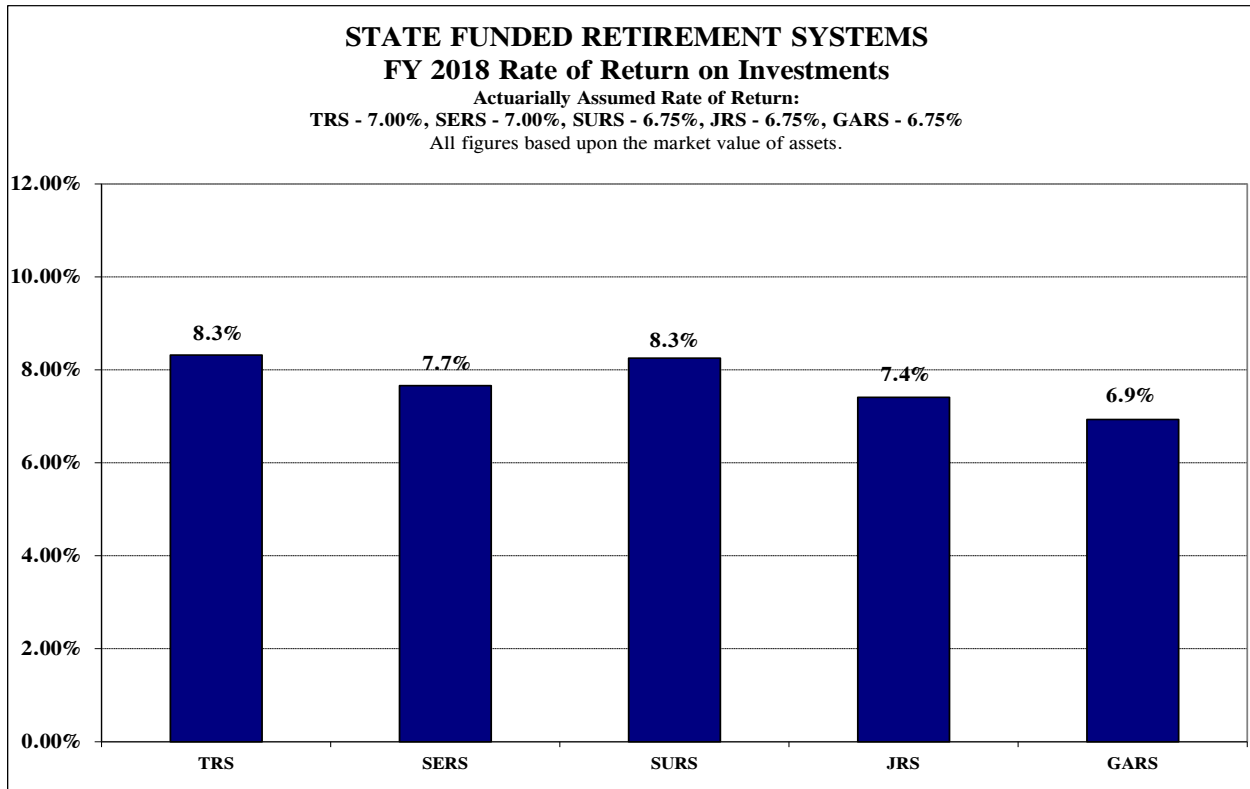
TABLE 3

Historical Change in Investment Rate Assumptions						
System	Prior to FY 10	FY 10	FY 12	FY 14	FY 16	FY 18
TRS	8.50%	8.50%	8.00%	7.50%	7.00%	7.00%
SERS	8.50%	7.75%	7.75%	7.25%	7.00%	7.00%
SURS	8.50%	7.75%	7.75%	7.25%	7.25%	6.75%
JRS	8.00%	7.00%	7.00%	7.00%	6.75%	6.75%
GARS	8.00%	7.00%	7.00%	7.00%	6.75%	6.75%

NOTE: The years associated with investment rate assumption changes above reflect the actuarial valuation year, not the fiscal year in which the State contribution was calculated using the new rate.

Chart 2 on the following page shows market investment return rates experienced by each of the systems in FY 2018. All the five systems experienced decent investment returns exceeding their actuarially assumed investment rates.

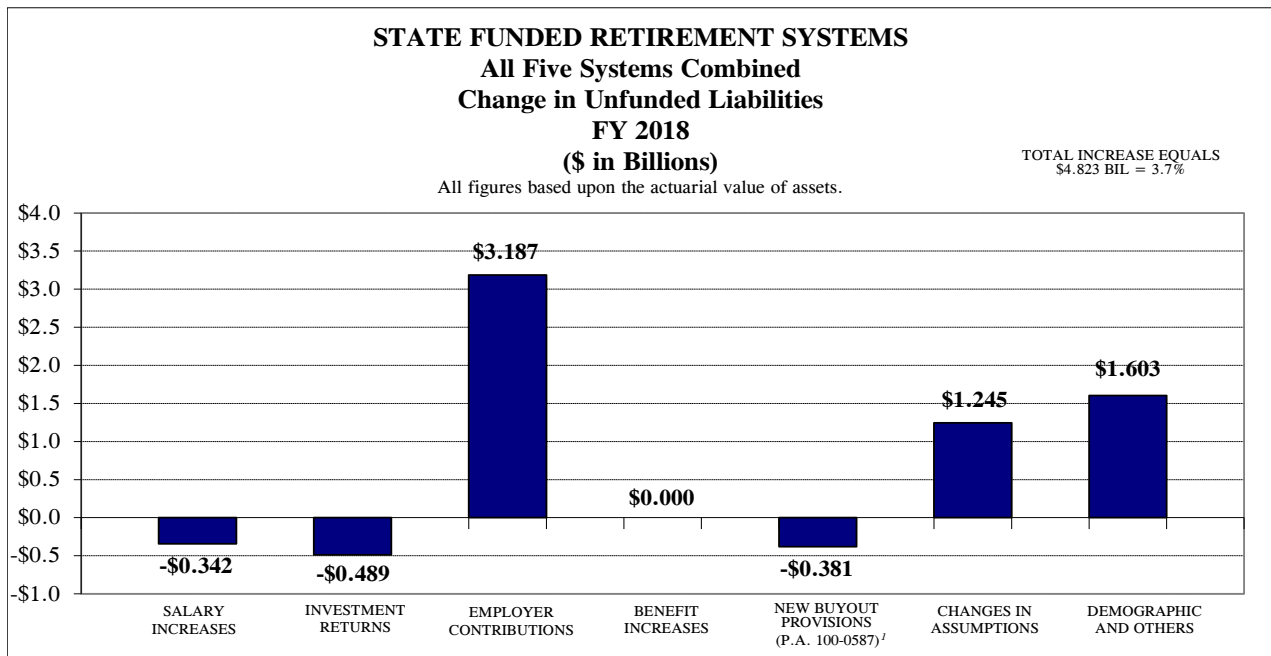
CHART 2



To reduce the impact of volatile investment performance from year-to-year, asset smoothing was implemented as of the FY 2009 actuarial valuation reports of the state systems with the adoption of P.A. 96-0043. Asset smoothing is a technique that averages the annual fluctuation in investment performance over a period of 5 years. Actuarial assumption smoothing, a somewhat similar technique, was implemented pursuant to P.A. 100-0023, effective July 6, 2017. Actuarial assumption smoothing aims to smooth out the annual variation in the required State contribution due to any actuarial assumptions over a 5-year period in equal annual amounts, beginning in a fiscal year in which the change first applies to the required State contribution.

Chart 3 below outlines the factors that have caused the unfunded liability to change for FY 2018 only.

CHART 3



¹ P.A. 100-0587 created voluntary pension accelerated payments (pension buyout plans) for TRS, SURS, and SERS. SURS and SERS have not modeled any assumptions as to the number of takers of the buyout plans in their respective 2018 valuations. TRS used "the same assumptions as the Illinois legislation" in their 2018 valuation. Under TRS' assumption, "22% of eligible inactive vested members are assumed to elect the inactive vested buyout, while 25% of eligible Tier 1 members are assumed to elect the COLA buyout". (More information on the pension buyout plans is discussed on page 10.)

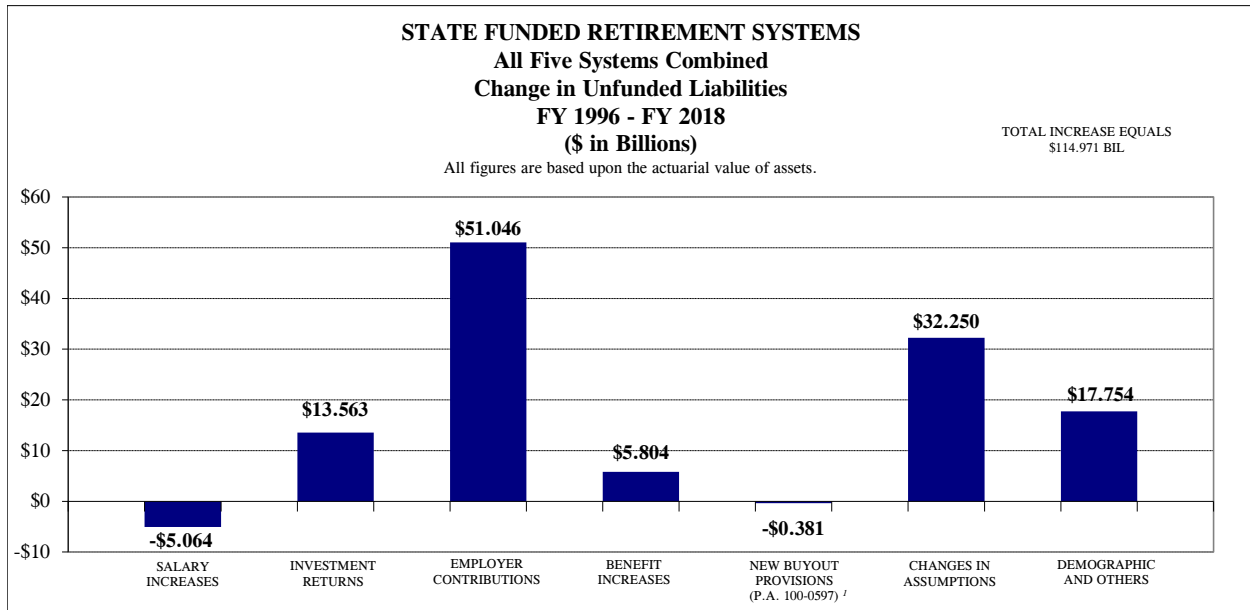
At the end of FY 2017, the aggregate unfunded liability based on the actuarial value of assets was \$128.860 billion. The unfunded liability based on the actuarial value of assets stood at \$133.683 billion as of the end of FY 2018. It grew by \$4.823 billion during FY 2018, an increase of 3.7% over FY 2017. The primary reason for the increase was, again, actuarially insufficient State contributions, which increased the unfunded liability by \$3.187 billion, accounting for 66.1% of the total increase.

There were two more factors that worsened the unfunded liability. One was an actuarial loss that resulted from unfavorable experience from demographic and other factors, largely due to TRS' unfavorable retirement experience. This brought the combined unfunded liability up by \$1.603 billion. The other factor was the cumulative effect of the change in assumptions, which increased the unfunded liability by \$1.245 billion. It is worth noting that SURS was the only system that generated a loss by altering actuarial assumptions, although the other four systems also changed their actuarial assumptions in their 2018 actuarial valuations. It means TRS, SERS, JRS, and GARS realized gains by changing their actuarial assumptions, but these gains were eroded mainly by the impact of SURS' reduced investment assumption rate from 7.25% to 6.75%. However, actuarial gains from three components helped lessen the effect of actuarial losses; lower-than-expected salary increases, higher-than-expected investment returns and an

estimated gain from TRS due to the new pension buyout plans decreased the unfunded liability by \$342 million, \$489 million, and \$381 million, respectively.

Chart 4 below shows the change in the unfunded liability since the enactment of P.A. 88-0593 in FY 1996, which created the 50-year funding policy that governs annual State contributions to the five State systems.

CHART 4



¹ P.A. 100-0587 created voluntary pension accelerated payments (pension buyout plans) for TRS, SURS, and SERS. SURS and SERS have not modeled any assumptions as to the number of takers of the buyout plans in their respective 2018 valuations. TRS used "the same assumptions as the Illinois legislation" in their 2018 valuation. Under TRS' assumption, "22% of eligible inactive vested members are assumed to elect the inactive vested buyout, while 25% of eligible Tier 1 members are assumed to elect the COLA buyout." (More information on the pension buyout plans is discussed on page 10.)

From FY 1996 through FY 2018, the unfunded liability increased by \$114.971 billion to \$133.683 billion. Actuarially insufficient State contributions contributed the most to the increase in unfunded liability, accounting for approximately 44.4% of the total increase of \$114.971 billion. Assumption changes caused a \$32.250 billion increase, or 28.1% of the total increase. "Demographic and other factors" and investment returns that didn't meet assumed rates were the next factors that served to worsen the unfunded liability over time. The only factors resulting in an actuarial gain as of June 30, 2018, were salary increases being less than assumed and an estimated gain from TRS due to the new pension buyout plans pursuant to P.A. 100-0587.

CHART 5

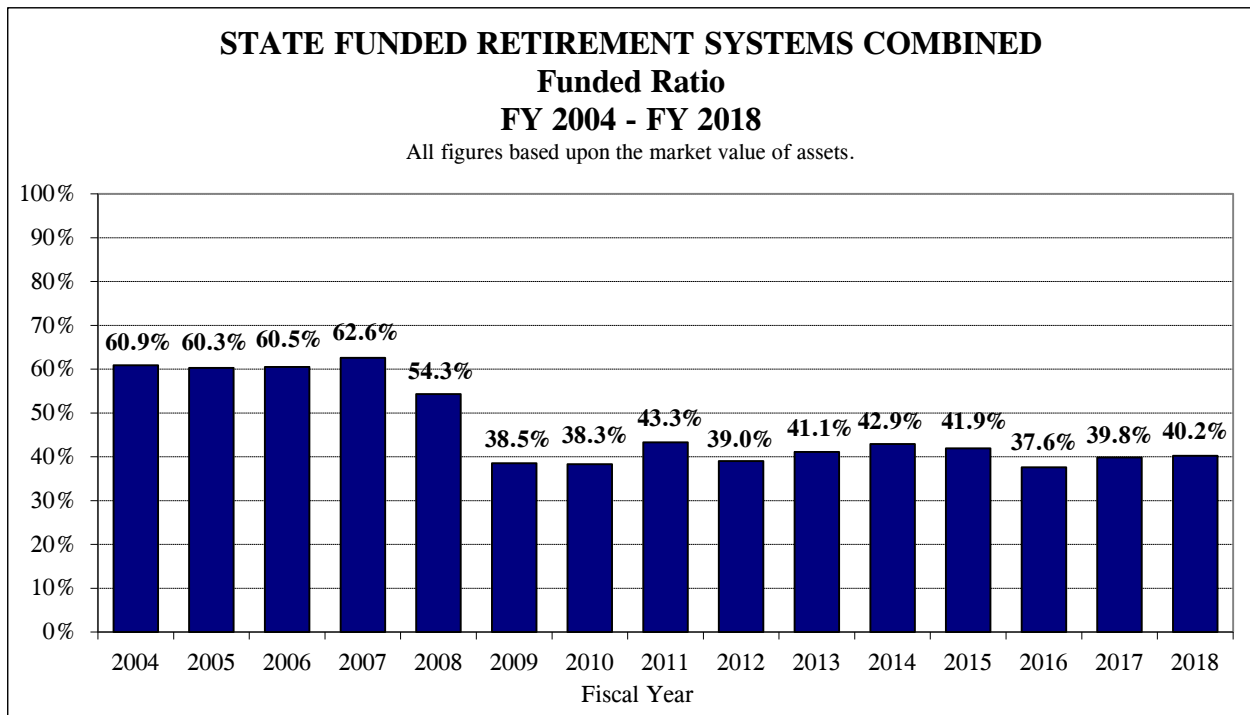


Chart 5 above shows the systems’ funded ratio based on the market value of assets, without the asset smoothing method.

The funded ratio at any single point in time is less important than the trend over time. In FY 2004, the State sold \$10 billion in pension obligation bonds and used part of the proceeds to pay all of the contributions for FY 2004. The bond sale generated \$7.3 billion to reduce unfunded liabilities of the state-funded retirement systems. In the wake of the bond sale, the funded ratio remained relatively stable from FY 2004 through FY 2007. In FY 2008 and FY 2009, the funded ratio fell significantly due to much lower than expected investment revenues and actuarially insufficient employer contributions. The funded ratio remained relatively stable in FY 2010 due in large part to higher-than-expected investment returns. FY 2011 also saw exceptionally strong investment returns, which caused the funding ratio to increase.

However, these gains were largely erased by poor investment returns in FY 2012. As previously mentioned, actuarially insufficient State contributions and TRS’ change in investment return assumption from 8.5% to 8.0% played a significant role in lowering the FY 2012 cumulative funded ratio of the five State systems to 39.0%. Higher-than-expected investment returns were the largest driver of the slight upticks in the funding ratio for FY 2013 and 2014. In FY 2015, losses resulting from actuarially insufficient employer contributions and assumption changes such as mortality rates exceeded gains resulting from the favorable investment returns. Therefore, the FY 2015 funded ratio decreased to 41.9% from 42.9%. The FY 2016 combined funded ratio dropped to 37.6% due to the actuarial assumptions changes by TRS, SERS, JRS, and GARS including lowering their respective assumed investment rates, along with lower-than-projected investment returns as well as actuarially insufficient employer contributions. Fortunately, all the systems experienced satisfactory investment performances in FY 2017, well above the respective systems’ assumed rates of return. This gain largely helped

to push the funded ratio up to 39.8%. FY 2018 was another good year in terms of investment performances although it was not as excellent as FY 2017. Reasonably great investment returns helped the funded ratio on a market basis slightly grow in FY 2018 even with the components that hindered the ratio from improving such as the continued actuarially unsatisfactory State contributions, the SURS' reduced investment rate assumption and unfavorable experiences from demographic and other factors.

Optional Hybrid Plan for TRS, SERS, and SURS under P.A. 100-0023, Effective July 6, 2017

Current Tier 2 employees and newly hired employees who first begin participation on or after *the implementation date* of the hybrid plan are eligible to elect the Tier 3 hybrid plan. In the case of SERS participants, only those who are not covered by Social Security would be eligible for the hybrid plan. The optional hybrid plan consists of a Defined Benefit (DB) plan and a Defined Contribution (DC) plan. *The implementation date* is the earliest date on which eligible employees are allowed to begin to participate in the Tier 3 hybrid plan by the Board of respective systems. According to the systems' FY 2018 valuations, the Tier 3 hybrid plan under SERS would be expected to be available in FY 2020. SURS noted additional clarifications should be made by the General Assembly for them to implement the hybrid plan. TRS does not mention the exact implementation date in their FY 2018 actuarial valuation.

Each system made assumptions regarding the Tier 3 hybrid plan in their respective 2018 valuations as follows:

- TRS: the hybrid plan was not mentioned, and the 2018 valuation appears not to take into account the hybrid plan.
- SURS: additional clarifications are needed for SURS to implement the Tier 3 hybrid plan, and "0%" of new participants are assumed to choose the hybrid plan.
- SERS: those who are eligible for the hybrid plan are assumed to remain in or choose the Tier 2 plan.

Significant Legislative Changes in FY 2018

The following changes were made by P.A. 100-0587, effective June 4, 2018.

Voluntary Pension Buyout for Vested, Inactive Tier 1 Members

Until June 30, 2021, an eligible member in SERS, SURS, or TRS may irrevocably elect to receive an accelerated pension benefit payment equal to 60% of the present value of a member's pension benefit in lieu of receiving any pension benefit. An eligible member means a person who:

- 1) Is an inactive Tier 1 member in a DB plan;
- 2) Has enough credits to receive a retirement annuity (i.e. vested);

- 3) Has not received any retirement annuity; and
- 4) Has not elected the compounded 3% COLA buyout option.

The accelerated pension payments would be paid from the proceeds of the State Pension Obligation Acceleration Bonds.

Each system made assumptions regarding the pension buyout plan in their respective 2018 valuations as follows:

- TRS: the “same assumptions as the Illinois legislation” were used. Under TRS’ assumption, “22% of eligible inactive vested members are assumed to elect the inactive vested buyout.”
- SURS: “0%” of eligible members are assumed to elect the buyout plan.
- SERS: “zero percent” of eligible members are assumed to elect the buyout plan. Assumptions would be developed in the future as SERS will monitor participation in the buyout plan.

Voluntary Compounded 3% COLA Buyout for Tier 1 Members

An eligible member in SERS, SURS, or TRS may irrevocably elect to receive an accelerated pension benefit payment equal to 70% of the difference of the present value of the 3% compounded COLA and the present value of a reduced COLA (simple 1.5%) in exchange for receiving a simple 1.5% COLA. An eligible member means a person who:

- 1) Is a Tier 1 member in a DB plan;
- 2) Has submitted an application for retirement;
- 3) Meets age and service requirements to receive a retirement annuity;
- 4) Has not received any retirement annuity; and
- 5) Has not elected the pension buyout option, which is the other voluntary buyout option mentioned above.

The accelerated pension benefit payments would be paid from the proceeds of the State Pension Obligation Acceleration Bonds.

Each system made assumptions regarding the COLA buyout plan in their respective 2018 valuations as follows:

- TRS: the “same assumptions as the Illinois legislation” was used. Under TRS’ assumption, “25% of eligible retiring Tier 1 members are assumed to elect the automatic annual increase (COLA) buyout.”
- SURS: “0%” of eligible members are assumed to elect the buyout plan.
- SERS: “zero percent” of eligible members are assumed to elect the buyout plan.

Assumptions would be developed in the future as SERS will monitor participation in the buyout plan.

Teachers' Final Salary Spiking Cap of 3%

For purposes of determining the final average salary, a teacher's annual salary increase with the same employer under SURS or TRS is now capped at 3% for academic years beginning on or after July 1, 2018 and for salary under a contract or collective bargaining agreement on or after June 4, 2018 (the effective date of P.A. 100-0587). Prior to the enactment of P.A. 100-0587, the final salary cap was 6%. If a teacher's full-time equivalent annual salary increases more than 3% with the same employer, the (local) employer would have to make a payment equal to the present value of the increase in benefits resulting from the salary increase in excess of 3%.

Recertification of FY 2019 State Contributions

Between June 15, 2019, and June 30, 2019, each System shall recalculate and recertify State contributions for FY 2019, taking into account all changes made by P.A. 100-0587.

State Pension Obligation Acceleration Bonds

The State Pension Obligation Acceleration Bonds of \$1 billion would be authorized to be issued for the accelerated pension benefit payments for SERS, SURS, and TRS.

Table 4 on the following page shows the FY 2019 State contributions based on the five systems' final certification letters for FY 2019 and the FY 2020 estimated State contributions. FY 2020 projected State contributions were certified by the boards of trustees of the five systems and based on the FY 2018 preliminary actuarial valuation reports. The FY 2019 State contributions to the five systems are \$8.5 billion (please note that pursuant to P.A. 100-0587, the five systems are required to recertify FY 2019 State contributions between June 15, 2019, and June 30, 2019, to reflect changes made by the Act). The FY 2020 State contributions are projected to be \$9.2 billion, an increase of \$685.7 million or 8% increase over FY 2019.

TABLE 4

FY 2019 Pension Appropriation by Fund ¹			
(\$ in Millions)			
The five pension systems will recertify FY 2019 State contributions between June 15, 2019 and June 30, 2019 pursuant to P.A. 100-0587 to reflect the changes made by the act. ²			
System	General Funds	Other State Funds	Total
TRS	4,466.2	\$0.0	\$4,466.2
SURS	1,440.2	\$215.0	\$1,655.2
SERS	1,465.2	\$788.9	\$2,254.1
GARS	23.2	\$0.0	\$23.2
JRS	140.5	\$0.0	\$140.5
Total	\$7,535.2	\$1,003.9	\$8,539.1
¹ The certified FY 2019 State contributions on the final certification letters of the five pension systems may not be identical to State contributions appropriated by P.A. 100-0586 (FY 2019 appropriation bill). If the appropriated contributions are lower than the final certified contributions, the pension systems could receive the remaining portion via the Continuing Appropriation Act (40 ILCS 15).			
² P.A. 100-0587 created two voluntary pension buyouts and decreased the Final Average Salary (FAS) cap in TRS and SURS from 6% to 3%.			
FY 2020 Estimated Pension Appropriation by Fund			
(\$ in Millions)			
System	General Funds	Other State Funds	Total ²
TRS	4,813.6	\$0.0	\$4,813.6
SURS	1,640.9	\$215.0	\$1,855.9
SERS	1,550.5	\$834.9	\$2,385.4
GARS	25.8	\$0.0	\$25.8
JRS	144.2	\$0.0	\$144.2
Total	\$8,174.9	\$1,049.9	\$9,224.8
² The amounts shown above in the "Total" column reflect the State systems' preliminary FY 2020 certification. Also, pursuant to P.A. 97-0694, the State Actuary Law, the State Actuary is required to conduct review of the systems' actuarial assumptions/methods, used to perform actuarial valuations and to determine the State contributions, and then to recommend changes in the assumptions/method before finalizing the systems' certifications of the annual State contributions.			
* This chart is meant to be an estimate only insofar as the FY 2020 appropriation by fund is concerned.			
The SURS "Other State Funds" amount assumes that SURS will receive a FY 2020 appropriation from the State Pension Fund in the same amount that SURS is expected to receive from the State Pension Fund in FY 2019. SURS' historical appropriation from the State Pension Fund varies from year to year. SERS' FY 2020 estimated appropriation includes a total of \$94.02 million in 2003 POB debt service. Of this amount, according to SERS, \$61.11 million comes from General Revenue Fund (GRF) and \$32.9 million comes from the other state funds. The SERS "Other State Funds" amount is based upon a SERS' historical assumption that 65% of SERS' FY 2020 appropriation will come from GRF, while 35% will come from other state funds.			
Total FY 2019 Pension Appropriation: \$ 8,539.1 Million			
Total FY 2020 Estimated Pension Appropriation: \$ 9,224.8 Million			
Total Estimated Increase, FY 2020 over FY 2019: \$ 685.7 Million			
Total Estimated GF Increase, FY 2020 over FY 2019: \$ 639.7 Million			

The following pages include pension funding projections for the five State retirement systems based on the respective retirement systems' FY 2018 actuarial valuations. These projections were generated by the retirement systems' respective actuaries.

FUNDING PROJECTIONS FOR THE STATE RETIREMENT SYSTEMS All Five Systems Combined Projections Based on the Retirement Systems' FY 2018 Actuarial Valuations (\$ in Millions)								
Fiscal Year	Annual Payroll	Total State Contribution*	State Contribution as a % of Payroll	Total Employee Contribution	Accrued Liabilities	Actuarial Value of Assets	Unfunded Liabilities	Funded Ratio
2019	\$19,613.9	\$8,539.1	43.5%	\$1,496.7	\$229,348.2	\$92,482.0	\$136,866.2	40.3%
2020	\$20,066.5	\$9,224.8	46.0%	\$1,528.9	\$235,784.5	\$96,542.2	\$139,242.3	40.9%
2021	\$20,602.5	\$9,549.6	46.4%	\$1,567.9	\$242,145.7	\$102,124.6	\$140,021.2	42.2%
2022	\$21,157.1	\$9,914.5	46.9%	\$1,608.5	\$248,535.3	\$107,190.8	\$141,344.5	43.1%
2023	\$21,729.0	\$10,133.2	46.6%	\$1,649.4	\$254,817.1	\$112,121.6	\$142,695.5	44.0%
2024	\$22,296.5	\$10,378.3	46.5%	\$1,690.9	\$260,970.3	\$117,119.8	\$143,850.5	44.9%
2025	\$22,875.7	\$10,624.3	46.4%	\$1,733.1	\$266,969.2	\$122,171.8	\$144,797.4	45.8%
2026	\$23,474.1	\$10,949.9	46.6%	\$1,775.6	\$272,798.7	\$127,321.1	\$145,477.6	46.7%
2027	\$24,087.8	\$11,240.1	46.7%	\$1,820.7	\$278,426.9	\$132,573.9	\$145,853.0	47.6%
2028	\$24,710.8	\$11,515.2	46.6%	\$1,865.0	\$283,834.0	\$137,912.7	\$145,921.3	48.6%
2029	\$25,364.5	\$11,810.8	46.6%	\$1,912.3	\$289,016.9	\$143,378.5	\$145,638.4	49.6%
2030	\$26,035.4	\$12,095.7	46.5%	\$1,960.6	\$293,949.0	\$148,961.7	\$144,987.3	50.7%
2031	\$26,724.8	\$12,396.1	46.4%	\$2,010.7	\$298,603.8	\$154,682.2	\$143,921.6	51.8%
2032	\$27,434.1	\$12,730.6	46.4%	\$2,062.3	\$302,963.5	\$160,597.7	\$142,365.8	53.0%
2033	\$28,158.6	\$13,097.0	46.5%	\$2,114.7	\$307,009.8	\$166,767.8	\$140,242.0	54.3%
2034	\$28,901.4	\$14,457.3	50.0%	\$2,168.8	\$310,794.1	\$174,195.0	\$136,599.2	56.0%
2035	\$29,663.4	\$14,840.4	50.0%	\$2,223.9	\$314,244.9	\$182,015.7	\$132,229.2	57.9%
2036	\$30,441.5	\$15,232.3	50.0%	\$2,279.0	\$317,355.2	\$190,281.3	\$127,073.8	60.0%
2037	\$31,245.4	\$15,638.0	50.0%	\$2,336.8	\$320,118.2	\$199,059.3	\$121,058.9	62.2%
2038	\$32,069.7	\$16,054.2	50.1%	\$2,396.4	\$322,520.9	\$208,410.9	\$114,110.0	64.6%
2039	\$32,906.7	\$16,476.5	50.1%	\$2,455.4	\$324,584.9	\$218,429.8	\$106,155.1	67.3%
2040	\$33,752.5	\$16,904.4	50.1%	\$2,515.2	\$326,295.5	\$229,176.3	\$97,119.2	70.2%
2041	\$34,606.9	\$17,337.6	50.1%	\$2,576.2	\$327,678.4	\$240,748.1	\$86,930.4	73.5%
2042	\$35,476.1	\$17,778.3	50.1%	\$2,637.8	\$328,776.0	\$253,264.9	\$75,511.1	77.0%
2043	\$36,357.0	\$18,225.1	50.1%	\$2,699.8	\$329,642.4	\$266,857.2	\$62,785.2	81.0%
2044	\$37,243.3	\$18,673.8	50.1%	\$2,761.9	\$330,344.0	\$281,672.3	\$48,671.7	85.3%
2045	\$38,137.2	\$19,125.4	50.1%	\$2,824.2	\$330,952.7	\$297,859.4	\$33,093.3	90.0%

* Pursuant to TRS' preliminary FY 2020 certification letter dated October 31, 2018, the FY 2020 required State Contribution includes \$500,000 for minimum benefit reimbursements.

FUNDING PROJECTIONS FOR THE TEACHERS RETIREMENT SYSTEM
Projections Based on the Retirement System's FY 2018 Preliminary Actuarial Valuation
Actuarially Assumed Rate of Return: 7.00%
(\$ in Millions)

Fiscal Year	Annual Payroll	Total State Contribution*	State Contribution as a % of Payroll	Total Employee Contribution	Accrued Liabilities	Actuarial Value of Assets	Unfunded Liabilities	Funded Ratio
2019	\$10,649.7	\$4,466.2	41.9%	\$958.5	\$130,426.1	\$53,434.6	\$76,991.5	41.0%
2020	\$10,954.6	\$4,813.6	43.9%	\$985.9	\$134,278.7	\$55,856.3	\$78,422.4	41.6%
2021	\$11,319.5	\$5,075.9	44.8%	\$1,018.8	\$138,146.5	\$59,192.7	\$78,953.7	42.8%
2022	\$11,694.3	\$5,311.6	45.4%	\$1,052.5	\$142,146.1	\$62,254.9	\$79,891.1	43.8%
2023	\$12,078.2	\$5,422.1	44.9%	\$1,087.0	\$146,160.1	\$65,263.6	\$80,896.5	44.7%
2024	\$12,453.8	\$5,548.1	44.5%	\$1,120.8	\$150,185.7	\$68,361.6	\$81,824.0	45.5%
2025	\$12,836.0	\$5,703.7	44.4%	\$1,155.2	\$154,213.3	\$71,574.1	\$82,639.3	46.4%
2026	\$13,225.0	\$5,879.8	44.5%	\$1,190.2	\$158,230.0	\$74,922.6	\$83,307.5	47.4%
2027	\$13,620.2	\$6,060.6	44.5%	\$1,225.8	\$162,211.6	\$78,407.1	\$83,804.4	48.3%
2028	\$14,014.7	\$6,227.9	44.4%	\$1,261.3	\$166,137.9	\$82,009.3	\$84,128.6	49.4%
2029	\$14,425.8	\$6,405.6	44.4%	\$1,298.3	\$169,996.2	\$85,743.2	\$84,253.0	50.4%
2030	\$14,844.5	\$6,574.7	44.3%	\$1,336.0	\$173,767.9	\$89,602.8	\$84,165.2	51.6%
2031	\$15,271.9	\$6,751.0	44.2%	\$1,374.5	\$177,430.7	\$93,593.1	\$83,837.6	52.7%
2032	\$15,708.1	\$6,949.7	44.2%	\$1,413.7	\$180,962.4	\$97,738.5	\$83,223.9	54.0%
2033	\$16,149.4	\$7,167.9	44.4%	\$1,453.4	\$184,339.5	\$102,061.3	\$82,278.2	55.4%
2034	\$16,595.0	\$7,994.3	48.2%	\$1,493.6	\$187,542.9	\$107,197.7	\$80,345.2	57.2%
2035	\$17,049.5	\$8,215.0	48.2%	\$1,534.5	\$190,552.4	\$112,576.2	\$77,976.2	59.1%
2036	\$17,513.9	\$8,440.6	48.2%	\$1,576.3	\$193,359.2	\$118,222.6	\$75,136.5	61.1%
2037	\$17,994.1	\$8,673.8	48.2%	\$1,619.5	\$195,947.3	\$124,169.9	\$71,777.4	63.4%
2038	\$18,482.3	\$8,911.1	48.2%	\$1,663.4	\$198,291.6	\$130,440.0	\$67,851.6	65.8%
2039	\$18,971.2	\$9,148.8	48.2%	\$1,707.4	\$200,396.3	\$137,082.4	\$63,313.9	68.4%
2040	\$19,456.3	\$9,384.8	48.2%	\$1,751.1	\$202,228.0	\$144,109.8	\$58,118.3	71.3%
2041	\$19,939.6	\$9,620.0	48.2%	\$1,794.6	\$203,791.2	\$151,565.8	\$52,225.5	74.4%
2042	\$20,428.9	\$9,857.8	48.3%	\$1,838.6	\$205,103.0	\$159,514.4	\$45,588.6	77.8%
2043	\$20,919.6	\$10,096.3	48.3%	\$1,882.8	\$206,196.1	\$168,030.1	\$38,166.0	81.5%
2044	\$21,411.1	\$10,334.4	48.3%	\$1,927.0	\$207,117.5	\$177,204.0	\$29,913.5	85.6%
2045	\$21,904.8	\$10,572.7	48.3%	\$1,971.4	\$207,921.3	\$187,129.2	\$20,792.1	90.0%
2046	\$22,408.5	\$1,050.2	4.7%	\$2,016.8	\$208,677.3	\$187,809.6	\$20,867.7	90.0%

* Total State Contributions for FY 2020 includes a \$500,000 minimum benefit reimbursements

FUNDING PROJECTIONS FOR THE STATE EMPLOYEES' RETIREMENT SYSTEM
Projections Based on the Retirement System's FY 2018 Actuarial Valuation
Actuarially Assumed Rate of Return: 7.00%
(\$ in Millions)

Fiscal Year	Annual Payroll	Total State Contribution	State Contribution as a % of Payroll	Total Employee Contribution	Accrued Liabilities	Actuarial Value of Assets	Unfunded Liabilities	Funded Ratio
2019	\$4,308.0	\$2,254.1	52.3%	\$243.0	\$49,507.0	\$18,339.0	\$31,168.0	37.0%
2020	\$4,394.0	\$2,385.4	54.3%	\$247.0	\$51,056.0	\$19,363.0	\$31,693.0	37.9%
2021	\$4,484.0	\$2,359.0	52.6%	\$251.0	\$52,569.0	\$20,694.0	\$31,875.0	39.4%
2022	\$4,572.0	\$2,405.0	52.6%	\$255.0	\$54,037.0	\$21,928.0	\$32,109.0	40.6%
2023	\$4,662.0	\$2,453.0	52.6%	\$258.0	\$55,450.0	\$23,114.0	\$32,336.0	41.7%
2024	\$4,753.0	\$2,501.0	52.6%	\$262.0	\$56,798.0	\$24,278.0	\$32,520.0	42.7%
2025	\$4,846.0	\$2,549.0	52.6%	\$266.0	\$58,072.0	\$25,414.0	\$32,658.0	43.8%
2026	\$4,945.0	\$2,601.0	52.6%	\$269.0	\$59,268.0	\$26,530.0	\$32,738.0	44.8%
2027	\$5,048.0	\$2,656.0	52.6%	\$274.0	\$60,383.0	\$27,631.0	\$32,752.0	45.8%
2028	\$5,156.0	\$2,712.0	52.6%	\$278.0	\$61,420.0	\$28,720.0	\$32,700.0	46.8%
2029	\$5,274.0	\$2,775.0	52.6%	\$283.0	\$62,386.0	\$29,814.0	\$32,572.0	47.8%
2030	\$5,398.0	\$2,839.0	52.6%	\$288.0	\$63,277.0	\$30,911.0	\$32,366.0	48.9%
2031	\$5,528.0	\$2,908.0	52.6%	\$294.0	\$64,092.0	\$32,021.0	\$32,071.0	50.0%
2032	\$5,663.0	\$2,979.0	52.6%	\$300.0	\$64,830.0	\$33,156.0	\$31,674.0	51.1%
2033	\$5,801.0	\$3,052.0	52.6%	\$306.0	\$65,491.0	\$34,332.0	\$31,159.0	52.4%
2034	\$5,947.0	\$3,476.0	58.4%	\$313.0	\$66,079.0	\$35,806.0	\$30,273.0	54.2%
2035	\$6,099.0	\$3,564.0	58.4%	\$320.0	\$66,595.0	\$37,365.0	\$29,230.0	56.1%
2036	\$6,253.0	\$3,654.0	58.4%	\$326.0	\$67,037.0	\$39,020.0	\$28,017.0	58.2%
2037	\$6,413.0	\$3,748.0	58.4%	\$333.0	\$67,411.0	\$40,791.0	\$26,620.0	60.5%
2038	\$6,580.0	\$3,846.0	58.4%	\$341.0	\$67,726.0	\$42,702.0	\$25,024.0	63.1%
2039	\$6,754.0	\$3,947.0	58.4%	\$348.0	\$67,990.0	\$44,775.0	\$23,215.0	65.9%
2040	\$6,936.0	\$4,053.0	58.4%	\$356.0	\$68,214.0	\$47,037.0	\$21,177.0	69.0%
2041	\$7,122.0	\$4,162.0	58.4%	\$365.0	\$68,407.0	\$49,516.0	\$18,891.0	72.4%
2042	\$7,312.0	\$4,273.0	58.4%	\$374.0	\$68,579.0	\$52,238.0	\$16,341.0	76.2%
2043	\$7,508.0	\$4,388.0	58.4%	\$383.0	\$68,738.0	\$55,231.0	\$13,507.0	80.4%
2044	\$7,706.0	\$4,504.0	58.4%	\$392.0	\$68,893.0	\$58,525.0	\$10,368.0	85.0%
2045	\$7,907.0	\$4,621.0	58.4%	\$401.0	\$69,049.0	\$62,146.0	\$6,903.0	90.0%

Note: Pursuant to P.A. 93-0589, the FY 2020 State Contribution includes \$94.02 million for debt service for the 2003 Pension Obligation Bonds authorized by P.A. 93-0002. State contribution amounts shown for FY 2021 - 2045 do not include debt service as these amounts are not known until the annual SERS preliminary certification letters are issued pursuant to P.A. 97-0694 (State Actuary Law).

FUNDING PROJECTIONS FOR THE STATE UNIVERSITIES RETIREMENT SYSTEM

Projections Based on the Retirement System's FY 2018 Actuarial Valuation

Actuarially Assumed Rate of Return: 6.75%

(\$ in Millions)

Fiscal Year	Annual Payroll*	Total State Contribution**	State Contribution as a % of Payroll	Total Employee Contribution	Accrued Liabilities	Actuarial Value of Assets	Unfunded Liabilities	Funded Ratio
2019	\$4,486.6	\$1,655.2	36.9%	\$280.4	\$46,243.9	\$19,582.3	\$26,661.5	42.4%
2020	\$4,551.0	\$1,855.9	40.8%	\$281.3	\$47,211.2	\$20,135.5	\$27,075.7	42.7%
2021	\$4,632.7	\$1,940.0	41.9%	\$283.4	\$48,131.6	\$20,975.2	\$27,156.4	43.6%
2022	\$4,724.8	\$2,019.6	42.7%	\$286.4	\$49,000.3	\$21,679.8	\$27,320.5	44.2%
2023	\$4,822.6	\$2,080.7	43.1%	\$289.7	\$49,809.5	\$22,357.5	\$27,452.0	44.9%
2024	\$4,923.4	\$2,151.7	43.7%	\$293.3	\$50,551.1	\$23,039.9	\$27,511.2	45.6%
2025	\$5,027.0	\$2,194.2	43.6%	\$297.0	\$51,218.7	\$23,695.3	\$27,523.4	46.3%
2026	\$5,136.9	\$2,291.2	44.6%	\$301.3	\$51,813.5	\$24,336.2	\$27,477.3	47.0%
2027	\$5,251.5	\$2,344.9	44.7%	\$305.8	\$52,330.8	\$24,963.8	\$27,366.9	47.7%
2028	\$5,371.0	\$2,396.7	44.6%	\$310.7	\$52,767.6	\$25,576.7	\$27,190.9	48.5%
2029	\$5,494.1	\$2,450.7	44.6%	\$315.8	\$53,126.5	\$26,183.6	\$26,943.0	49.3%
2030	\$5,620.7	\$2,502.2	44.5%	\$321.2	\$53,403.4	\$26,782.6	\$26,620.8	50.2%
2031	\$5,750.8	\$2,556.5	44.5%	\$326.6	\$53,594.2	\$27,377.9	\$26,216.3	51.1%
2032	\$5,886.8	\$2,619.6	44.5%	\$332.3	\$53,704.6	\$27,989.4	\$25,715.3	52.1%
2033	\$6,029.7	\$2,691.9	44.6%	\$338.4	\$53,739.2	\$28,636.3	\$25,102.8	53.3%
2034	\$6,178.4	\$2,795.4	45.2%	\$344.7	\$53,763.9	\$29,423.6	\$24,340.3	54.7%
2035	\$6,331.1	\$2,866.7	45.3%	\$351.3	\$53,725.5	\$30,274.2	\$23,451.2	56.4%
2036	\$6,487.4	\$2,939.7	45.3%	\$358.0	\$53,627.2	\$31,201.3	\$22,425.8	58.2%
2037	\$6,647.9	\$3,014.6	45.3%	\$364.9	\$53,472.1	\$32,218.7	\$21,253.5	60.3%
2038	\$6,813.4	\$3,091.9	45.4%	\$372.0	\$53,262.5	\$33,340.1	\$19,922.4	62.6%
2039	\$6,983.6	\$3,171.5	45.4%	\$379.3	\$53,007.0	\$34,586.2	\$18,420.9	65.3%
2040	\$7,158.3	\$3,253.2	45.4%	\$386.8	\$52,712.9	\$35,976.1	\$16,736.8	68.3%
2041	\$7,339.1	\$3,338.0	45.5%	\$394.6	\$52,391.2	\$37,534.1	\$14,857.1	71.6%
2042	\$7,524.4	\$3,424.7	45.5%	\$402.6	\$52,056.9	\$39,287.9	\$12,768.9	75.5%
2043	\$7,713.9	\$3,513.3	45.5%	\$410.8	\$51,722.3	\$41,264.1	\$10,458.2	79.8%
2044	\$7,905.9	\$3,603.1	45.6%	\$419.0	\$51,397.5	\$43,487.2	\$7,910.3	84.6%
2045	\$8,099.9	\$3,693.8	45.6%	\$427.2	\$51,094.6	\$45,985.2	\$5,109.5	90.0%

* Payroll projections include SMP payroll. 30% of new SURS members are assumed to enter SMP.

** State Contribution Only. Includes Self-Managed Plan (SMP) Contributions. Excludes estimated \$46.0 million in Federal/Trust Funds for FY 2019 through FY 2025.

FUNDING PROJECTIONS FOR THE JUDGES' RETIREMENT SYSTEM
Projections Based on the Retirement System's FY 2018 Actuarial Valuation
Actuarially Assumed Rate of Return: 6.75%
(\$ in Millions)

Fiscal Year	Annual Payroll	Total State Contribution	State Contribution as a % of Payroll	Total Employee Contribution	Accrued Liabilities	Actuarial Value of Assets	Unfunded Liabilities	Funded Ratio
2019	\$159.4	\$140.5	88.1%	\$13.7	\$2,793.0	\$1,066.9	\$1,726.1	38.2%
2020	\$157.0	\$144.2	91.9%	\$13.6	\$2,858.8	\$1,124.4	\$1,734.4	39.3%
2021	\$156.7	\$147.8	94.3%	\$13.6	\$2,918.0	\$1,194.1	\$1,723.9	40.9%
2022	\$156.6	\$151.1	96.5%	\$13.6	\$2,971.5	\$1,254.8	\$1,716.7	42.2%
2023	\$156.8	\$150.7	96.1%	\$13.5	\$3,018.0	\$1,309.2	\$1,708.8	43.4%
2024	\$157.1	\$151.1	96.2%	\$13.7	\$3,057.9	\$1,359.5	\$1,698.4	44.5%
2025	\$157.7	\$151.6	96.2%	\$13.8	\$3,090.3	\$1,405.3	\$1,684.9	45.5%
2026	\$158.3	\$152.3	96.2%	\$14.0	\$3,115.7	\$1,447.3	\$1,668.4	46.5%
2027	\$159.2	\$153.1	96.2%	\$14.1	\$3,134.0	\$1,485.2	\$1,648.9	47.4%
2028	\$160.2	\$153.5	95.8%	\$13.9	\$3,145.7	\$1,518.9	\$1,626.8	48.3%
2029	\$161.7	\$154.3	95.4%	\$14.1	\$3,150.7	\$1,549.2	\$1,601.5	49.2%
2030	\$163.3	\$154.9	94.9%	\$14.4	\$3,149.0	\$1,576.1	\$1,572.9	50.0%
2031	\$165.0	\$155.7	94.3%	\$14.6	\$3,141.5	\$1,600.3	\$1,541.2	50.9%
2032	\$167.2	\$157.5	94.2%	\$15.2	\$3,127.7	\$1,623.2	\$1,504.6	51.9%
2033	\$169.3	\$159.9	94.4%	\$15.8	\$3,108.5	\$1,646.2	\$1,462.3	53.0%
2034	\$171.8	\$165.2	96.2%	\$16.5	\$3,084.2	\$1,673.1	\$1,411.1	54.2%
2035	\$174.6	\$167.9	96.2%	\$17.1	\$3,055.7	\$1,702.3	\$1,353.4	55.7%
2036	\$177.7	\$170.9	96.2%	\$17.7	\$3,023.4	\$1,734.9	\$1,288.5	57.4%
2037	\$180.9	\$174.0	96.2%	\$18.3	\$2,987.5	\$1,771.8	\$1,215.7	59.3%
2038	\$184.3	\$177.2	96.2%	\$19.0	\$2,948.9	\$1,814.2	\$1,134.7	61.5%
2039	\$188.0	\$180.8	96.2%	\$19.6	\$2,908.0	\$1,863.6	\$1,044.5	64.1%
2040	\$191.9	\$184.6	96.2%	\$20.2	\$2,865.5	\$1,921.2	\$944.3	67.0%
2041	\$196.0	\$188.5	96.2%	\$20.8	\$2,822.3	\$1,988.7	\$833.6	70.5%
2042	\$200.3	\$192.7	96.2%	\$21.4	\$2,778.7	\$2,067.5	\$711.2	74.4%
2043	\$204.8	\$196.9	96.2%	\$22.0	\$2,735.5	\$2,159.2	\$576.4	78.9%
2044	\$209.5	\$201.5	96.2%	\$22.6	\$2,693.4	\$2,265.3	\$428.1	84.1%
2045	\$214.4	\$206.1	96.2%	\$23.3	\$2,652.7	\$2,387.6	\$265.2	90.0%

FUNDING PROJECTIONS FOR THE GENERAL ASSEMBLY RETIREMENT SYSTEM
Projections Based on the Retirement System's FY 2018 Actuarial Valuation
Actuarially Assumed Rate of Return: 6.75%
(\$ in Millions)

Fiscal Year	Annual Payroll	Total State Contribution	State Contribution as a % of Payroll	Total Employee Contribution	Accrued Liabilities	Actuarial Value of Assets	Unfunded Liabilities	Funded Ratio
2019	\$10.2	\$23.2	227.6%	\$1.2	\$378.3	\$59.2	\$319.1	15.7%
2020	\$10.0	\$25.8	257.8%	\$1.2	\$379.9	\$63.0	\$316.8	16.6%
2021	\$9.7	\$26.9	277.6%	\$1.1	\$380.6	\$68.5	\$312.2	18.0%
2022	\$9.5	\$27.1	286.2%	\$1.1	\$380.5	\$73.3	\$307.2	19.3%
2023	\$9.3	\$26.7	286.6%	\$1.1	\$379.5	\$77.3	\$302.2	20.4%
2024	\$9.2	\$26.4	287.4%	\$1.1	\$377.6	\$80.7	\$296.9	21.4%
2025	\$9.0	\$25.8	287.1%	\$1.0	\$374.9	\$83.2	\$291.8	22.2%
2026	\$9.0	\$25.6	286.0%	\$1.0	\$371.6	\$85.2	\$286.4	22.9%
2027	\$8.9	\$25.4	285.0%	\$1.0	\$367.5	\$86.7	\$280.8	23.6%
2028	\$8.9	\$25.1	283.1%	\$1.0	\$362.8	\$87.7	\$275.1	24.2%
2029	\$8.9	\$25.1	281.6%	\$1.0	\$357.5	\$88.6	\$268.9	24.8%
2030	\$9.0	\$25.0	279.2%	\$1.0	\$351.7	\$89.3	\$262.4	25.4%
2031	\$9.0	\$24.9	276.9%	\$1.0	\$345.4	\$89.9	\$255.5	26.0%
2032	\$9.0	\$24.9	276.3%	\$1.0	\$338.7	\$90.6	\$248.1	26.8%
2033	\$9.1	\$25.3	277.1%	\$1.1	\$331.6	\$92.0	\$239.6	27.7%
2034	\$9.2	\$26.4	287.7%	\$1.1	\$324.2	\$94.6	\$229.6	29.2%
2035	\$9.3	\$26.8	287.7%	\$1.1	\$316.4	\$98.0	\$218.4	31.0%
2036	\$9.5	\$27.2	287.5%	\$1.1	\$308.5	\$102.4	\$206.0	33.2%
2037	\$9.6	\$27.6	287.7%	\$1.1	\$300.3	\$107.9	\$192.4	35.9%
2038	\$9.7	\$28.0	287.5%	\$1.1	\$291.9	\$114.6	\$177.3	39.3%
2039	\$9.9	\$28.4	287.7%	\$1.1	\$283.5	\$122.7	\$160.9	43.3%
2040	\$10.0	\$28.8	287.7%	\$1.2	\$275.1	\$132.2	\$142.8	48.1%
2041	\$10.2	\$29.2	287.5%	\$1.2	\$266.7	\$143.5	\$123.2	53.8%
2042	\$10.5	\$30.1	287.6%	\$1.2	\$258.5	\$157.1	\$101.4	60.8%
2043	\$10.6	\$30.5	287.7%	\$1.2	\$250.4	\$172.8	\$77.6	69.0%
2044	\$10.8	\$30.9	287.5%	\$1.2	\$242.6	\$190.8	\$51.9	78.6%
2045	\$11.1	\$31.8	287.4%	\$1.3	\$235.0	\$211.5	\$23.5	90.0%