Public School Teachers' Pension and Retirement Fund of Chicago

Actuarial Valuation Report as of June 30, 2017

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January 2, 2018

Board of Trustees
Public School Teachers' Pension and Retirement Fund of Chicago
203 North LaSalle Street, Suite 2600
Chicago, Illinois 60601

Re: Public School Teachers' Pension and Retirement Fund of Chicago Actuarial Valuation as of June 30, 2017

Dear Members of the Board:

The results of the June 30, 2017, Annual Actuarial Valuation of the Public School Teachers' Pension and Retirement Fund of Chicago (commonly known as the Chicago Teachers' Pension Fund, "CTPF" or "Fund") are presented in this report. The purposes of the actuarial valuation are to measure the Fund's funding status and to determine the contribution requirements for the fiscal year beginning July 1, 2018, and ending June 30, 2019. Gabriel Roeder, Smith & Company ("GRS") has prepared this report exclusively for the Trustees of the Public School Teachers' Pension and Retirement Fund of Chicago; GRS is not responsible for reliance upon this report by any other party. This report may be provided to parties other than CTPF only in its entirety and only with the permission of the Trustees.

The employer's contribution requirement has been determined in accordance with Illinois State Statues, in particular under 40 ILCS Sections 5/17-127, 5/17-127.2, and 5/17-129. Information required by Governmental Accounting Standards Board ("GASB") Statement Nos. 67, 68, 74 and 75 is provided in a separate report. This report should not be relied on for any purpose other than the purpose described.

This actuarial valuation is based on the provisions of CTPF in effect as of June 30, 2017, data on the CTPF membership and information on the asset value of the trust fund as of that date. The actuarial valuation was based upon information furnished by CTPF staff concerning Fund benefits, financial transactions, and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by CTPF.

The actuarial valuation results summarized in this report involve actuarial calculations that require assumptions about future events. Most of the actuarial assumptions used for the June 30, 2017, actuarial valuation are based on an experience review for the five-year period from July 1, 2007, through June 30, 2012, performed by the prior actuary ("Segal Consulting"). Beginning with the June 30, 2017, actuarial valuation, the investment return assumption, general inflation assumption and wage inflation assumption were reduced from 7.75 percent to 7.25 percent, 2.75 percent to 2.50 percent and 3.50 percent to 3.25 percent, respectively. The general inflation assumption also serves as the basis for the determination of annual increases in pension and pensionable salary cap for Tier 2 members. As a result of the change in the general inflation assumption, the assumption regarding future increases in pension and pensionable salary cap was reduced from 1.375 percent to 1.25 percent per year for current and future Tier 2 members.

Pursuant to Public Act 100-0465, effective August 31, 2017, the following funding changes were made beginning with the June 30, 2017, actuarial valuation:

- The Board of Education's dedicated property tax levy capped rate of 0.383 percent was increased to 0.567 percent. Revenue generated from the tax levy will be paid directly to CTPF. This affects the contribution that is assumed to be received annually on March 1.
- Beginning with fiscal years on and after 2018, the State will pay CTPF the normal cost relating to Chicago teacher's pensions and retiree health insurance costs. For fiscal year 2018, the State will pay $221.3 million and in future years CTPF will provide a certified normal cost to the State on an annual basis, which will include the $65 million health insurance subsidy. For fiscal year 2019, GRS has projected this amount to be $226.8 million.
- Provides a continuing appropriation for all amounts contributed by the State to CTPF.

The benefit provisions for members hired on or after January 1, 2011, were changed under Public Act 96-0889. Public Act 100-0023 created a third tier of benefits for new members provided that an adoption by a resolution or ordinance occurs. Given this uncertainty, GRS has not valued the benefits provided under Public Act 100-0023. Members hired on or after this date and the assumed new hires in the projections were valued under Public Act 96-0889 benefit provisions.

To the best of our knowledge the information contained in this report is accurate and fairly presents the actuarial position of CTPF as of the actuarial valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices, with the Actuarial Standards of Practice issued by the Actuarial Standards Board and with applicable statutes.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of the actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements in this report.

Although the statutory contribution requirements were met, in our opinion the statutory funding method generates a contribution requirement that is less than a reasonable actuarially determined contribution ("ADC"). Meeting the statutory requirement does not mean that the undersigned agree that adequate actuarial funding has been achieved. We recommend the adherence to a funding policy, such as the Board policy used to calculate the ADC under GASB Statement Nos. 67 and 68, which funds the normal cost of the plan as well as an amortization payment that seeks to pay off any unfunded accrued liability over a closed period of 30 years, beginning July 1, 2013.

The signing actuaries are independent of plan sponsor.

Lance J. Weiss and Amy Williams are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein

Respectfully submitted,

Gabriel, Roeder, Smith & Company

Lance J. Weiss, EA, MAAA, FCA	Amy Williams, ASA, MAAA, FCA
Senior Consultant and Team Leader	Consultant

LW/AW:rg

Table of Contents

SECTION A

SUMMARY OF THE ACTUARIAL VALUATION

Summary of the Actuarial Valuation

Introduction

The law governing the Public School Teachers' Pension and Retirement Fund of Chicago requires the Actuary, as the technical advisor to the Board of Trustees to determine the amount of Board of Education contributions required for each fiscal year.

> "The Board Shall determine the amount of Board of Education contributions required for each fiscal year on the basis of the actuarial tables and other assumptions adopted by the Board and the recommendations of the actuary, in order to meet the minimum contribution requirements of subsections (a) and (b). Annually, on or before February 28, the Board shall certify to the Board of Education the amount of the required Board of Education contribution for the coming fiscal year. The certification shall include a copy of the actuarial recommendations upon which it is based. (40 ILCS Section 5/17 - 129(c))."

Gabriel, Roeder, Smith & Company has been retained by the CTPF Board of Trustees to perform an actuarial valuation as of June 30, 2017. In this report, we present the results of the actuarial valuation and the appropriation requirements under Public Act 96-0889, Public Act 90-0655, Public Act 91-0357, and Public Act 100-0465 for the fiscal year ending June 30, 2019.

Effective with the fiscal year ending June 30, 2014, GASB Statement No. 67 replaced GASB Statement No. 25 for pension plan financial reporting requirements. Effective with the fiscal year ending June 30, 2015, GASB Statement No. 68 replaced GASB Statement No. 27 for employer financial reporting. Information required by GASB Statement Nos. 67, 68, 74 and 75 is provided in a separate report.

The actuarial valuation was completed based upon membership and financial data provided by the administrative staff of the CTPF. Most of the actuarial assumptions used for the June 30, 2017, actuarial valuation are based on an experience review for the five-year period from July 1, 2007, through June 30, 2012, performed by the prior actuary, Segal Consulting. Beginning with the June 30, 2017, actuarial valuation, the investment return assumption, general inflation assumption and wage inflation assumption were reduced from 7.75 percent to 7.25 percent, 2.75 percent to 2.50 percent and 3.50 percent to 3.25 percent, respectively. The general inflation assumption also serves as the basis for the determination of annual increases in pension and pensionable salary cap for Tier 2 members. As a result of the change in the general inflation assumption, the assumption regarding future increases in pension and pensionable salary cap was reduced from 1.375 percent to 1.25 percent per year for current and future Tier 2 members. The cost method used to determine the benefit liabilities for statutory funding is the Projected Unit Credit Cost Method as required by statute. For actuarial valuation purposes, as well as projection purposes, the actuarial value of assets is based on a four-year smoothing method.

Changes Since Last Valuation

The June 30, 2017, actuarial valuation represents the first actuarial valuation of the CTPF performed by GRS. As part of the transition from the prior actuary, Segal Consulting, GRS performed a replication of the June 30, 2016, actuarial valuation. The accrued liability calculated as part of the June 30, 2016, replication valuation performed by GRS was within 1.2 percent of the results of the June 30, 2016, actuarial valuation performed by Segal Consulting. This deviation is well within a reasonable range. All results prior to June 30, 2017, are taken from the prior actuary's reports.

Summary of the Actuarial Valuation

In past actuarial valuations, employer contributions were assumed to be received on June 30 (at the end of the year). In light of (1) new funding sources provided under Public Act 100-0465, (2) the Memorandum of Understanding between the Board of Trustees of CTPF and the Board of Education regarding early payments resulting from the special tax levy, and recent discussions with CTPF's staff and legal counsel, GRS was directed to change the assumption regarding the timing of future employer contributions. Effective with the June 30, 2017, actuarial valuation, future employer contributions are assumed to occur as follows:

1. Additional Board of Education Contribution (0.58 percent of pay) — June 30th (End of Fiscal Year)
2. Additional State Contribution (0.544 percent of pay) — Monthly (Middle of Year)
3. State Normal Cost Contribution — Monthly (Middle of Year)
4. Board of Education Early Payment of Special Tax Levy — March 1st, annually
    a. 55 percent of prior year's tax levy is assumed to occur each March 1st
        i. This amount is assumed to be $141,625,000 for fiscal year 2018 and increased each year by three percent.
5. Remaining Board of Education Contribution — June 30th (End of Fiscal Year)

Legislative Changes

The following recently passed Public Acts impact CTPF.

Public Act 100-0023 was passed and became effective July 6, 2017. It provides a new benefit plan option ("Tier 3") for new hires based on a hybrid plan comprised of a defined benefit and defined contribution plan. The availability of the Tier 3 benefit plan in relation to CTPF, relies on the adoption of a resolution or ordinance. Given this uncertainty, GRS has not valued the Tier 3 benefit plan as part of the June 30, 2017, actuarial valuation.

Public Act 100-0465 was passed and became effective August 31, 2017. Pursuant to Public Act 100-0465, the following funding components affect CTPF:

1. The Board of Education's dedicated property tax levy capped rate of 0.383 percent was increased to 0.567 percent. Revenue generated from the tax levy will be paid directly to CTPF.
2. Beginning with fiscal years on and after 2018, the State will pay CTPF the normal cost relating to Chicago teacher's pensions and retiree health insurance costs. For fiscal year 2018, the State will pay $221.3 million and in future years CTPF will provide a certified normal cost to the State on an annual basis, which will include the $65 million health insurance subsidy.
3. Provides a continuing appropriation for all amounts contributed by the State to CTPF.

A summary of the CTPF plan provisions is included in Section G of this report.

Assumptions and Methods

Most of the actuarial assumptions used for the June 30, 2017, actuarial valuation are based on an experience review for the five-year period from July 1, 2007, through June 30, 2012, performed by the prior actuary. However, based on discussions with the CTPF staff and CTPF's auditor, GRS performed a review of the economic assumptions including the investment return assumption, wage inflation assumption, and underlying price inflation, and made recommendations for assumption changes to first be implemented in the June 30, 2017, actuarial valuation. As a result, beginning with the June 30, 2017, actuarial valuation, the investment return assumption, general inflation assumption and wage inflation assumption were reduced from 7.75 percent to 7.25 percent, 2.75 percent to 2.50 percent and 3.50 percent to 3.25 percent, respectively. The general inflation assumption also serves as the basis for the determination of annual increases in pension and the pensionable salary cap for Tier 2 members. As a result of the change in the general inflation assumption, the assumption regarding future increases in pension and the pensionable salary cap was reduced from 1.375 percent to 1.25 percent per year for current and future Tier 2 members. GRS will conduct a full experience review of the actuarial assumptions after completion of the June 30, 2017, actuarial valuation.

The net change in the investment return assumption, inflation rate assumption and wage inflation assumption increased the actuarial accrued liability as of June 30, 2017, by $1.07 billion.

Report Highlights

The employer's contribution requirement for FY 2019 is $808.6 million. The 2016 actuarial valuation had projected the statutory contribution would increase, from $784.4 million for FY2018 to $809.8 million for FY 2019. The key reasons for the decrease in the employer's contribution requirement over the projected amount from the prior actuarial valuation are 1) favorable demographic experience; 2) actual fiscal year 2017 investment rate of return greater than the assumed rate of 7.75 percent; and 3) adjusting the timing of when employer contributions are received. Favorable experience offset the increase due to the change in the investment return assumption.

Over the past 10 years, CTPF experienced investment gains on a market value basis (compared to the actuarial assumption) in fiscal years 2010, 2011, 2013, 2014, and 2017. However, CTPF incurred investment losses (or shortfalls in return compared to the actuarial assumption) in fiscal years 2008, 2009, 2012, 2015, and 2016. The market return for the year ending June 30, 2017, was approximately 12.53 percent compared to a return of -0.27 percent in FY 2016. The average market value investment return over the most recent 10 years has been approximately 4.87 percent.

The funded ratio decreased from 50.0 percent as of June 30, 2016, to 49.5 percent as of June 30, 2017, based on the market value of assets, and decreased from 52.5 percent as of June 30, 2016, to 50.1 percent as of June 30, 2017, based on the actuarial value of assets. There are net deferred asset losses of $139.9 million which will be recognized in the actuarial value of assets over the next three years.

The funded ratio and unfunded actuarial accrued liability are useful for assessing the need for and amount of future contributions other than normal cost contributions. They are not appropriate, however, for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.

Experience During 2017

The Fund assets earned approximately 12.53 percent on a market value basis during FY 2017 which was greater than the investment return assumption of 7.75 percent for FY 2017. The Fund assets earned 8.26 percent on an actuarial value of assets basis during FY 2017, due to recognition of net deferred investment losses under the asset smoothing method. However, because 8.26 percent is greater than the assumed rate of investment return of 7.75 percent for FY 2017, there was an asset gain of $98.12 million on the actuarial value of assets.

There was also a net gain of $162.26 million from actuarial liabilities, which is comprised of a loss of approximately $17.96 million from demographic experience, and a gain of $180.22 million from lower than expected pay increases.

The total gain from liabilities for the Fund is calculated as follows (dollars in millions):

1. Actuarial Accrued Liability ("AAL") - Prior Year (Pensions Only)	$	20,246.14
2. Increase in AAL Due to Change in Actuary		238.81
3. Adjusted AAL - Prior Year		20,484.95
4. Total Normal Cost - Prior Year[a]		319.08
5. Benefits and Administrative Expenses Paid in FY 2017		(1,439.27)
6. Interest on the above items, 3, 4 and 5		1,544.99
7. Expected AAL 06/30/2017 (3+4+5+6)		20,909.75
8. Impact of Change in Actuarial Assumptions and Methods		1,074.52
9. Expected AAL 06/30/2017 After Assumption Changes (7+8)		21,984.27
10. Actual AAL 06/30/2017		21,822.01
11. Actuarial (Gain)/Loss on Liabilities (10-9) (Pensions Only)	$	(162.26)

[a]*Total Normal Cost from the previous actuarial valuation includes both employee and employer portion. The employee portion is based on actual contributions.*

CTPF experienced an overall actuarial gain of $260.38 million. The total net actuarial gain is the total of the gain from assets and the net gain from liabilities. The total actuarial gain for the year is as follows (dollars in millions):

1. Actuarial (Gain)/Loss on Assets	$	(98.12)
2. Actuarial (Gain)/Loss on Liabilities		(162.26)
3. Total Actuarial (Gain)/Loss (1+2)		(260.38)

The “behavior” of the population determines the liability gain or loss for the year. There was a gain on salaries, due to lower salary increases than assumed. From the last year to this year, there were losses on retirement and retiree mortality. Active mortality and disability experience was about as expected. There was a gain due to termination experience, and there was a new entrant loss. New entrant losses will occur each year but are offset by additional contributions to the assets. Deviations from other assumptions generated an actuarial gain.

See Table 4 (page 21), Section B, for detail of the gains and losses by source.

Asset Information

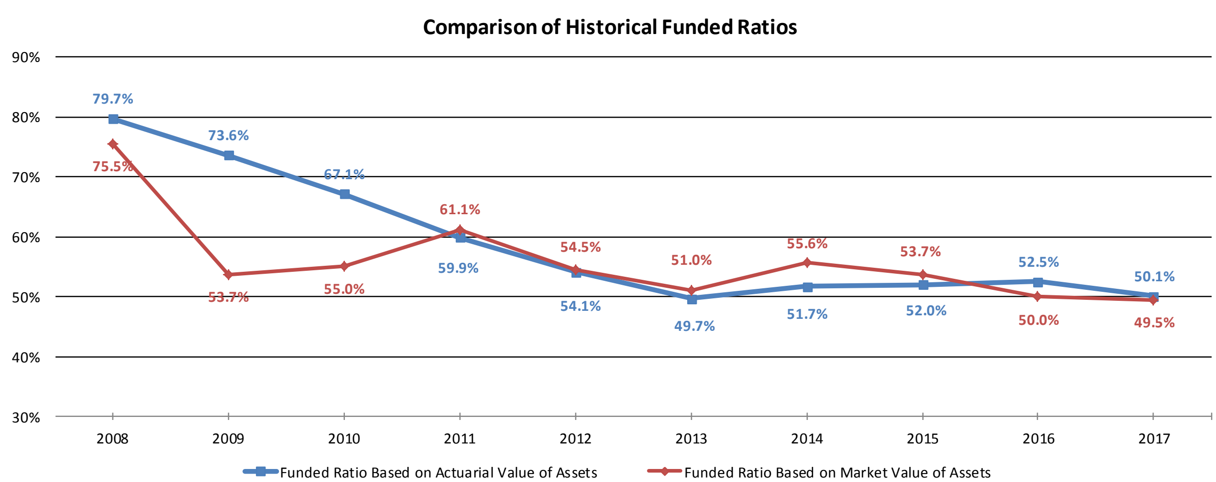
The market value of the assets of the Fund that are available for benefits increased from $10,113.3 million as of June 30, 2016, to $10,793.2 million as of June 30, 2017. The actuarial value of assets as of June 30, 2017, is $10,933.0 million, which is $139.9 million higher than the market value of assets. This difference is due to the continuing recognition of deferred investment gains and losses. Twenty-five percent of these gains and losses are recognized each year. The $139.9 million, which is the value of net deferred losses, will be smoothed into the actuarial value of assets over the next three years. The remaining unrecognized net asset losses from FY 2015 and FY 2016 will be smoothed in over the next one and two years, respectively, and the remaining asset gain from FY 2017 will be smoothed in over the next three years.

The detailed determinations of asset values utilized in this valuation and asset growth in the last year are set out in Section D.

Funding Status

The funding status of CTPF is measured by the Funded Ratio. The Funded Ratio is the ratio of the assets available for benefits compared to the actuarial accrued liability of the Fund. Thus, it reflects the portion of benefits earned to date by CTPF members, which are covered by current Fund assets.
A funding ratio of 100 percent means that all of the benefits earned to date by CTPF members are covered by assets. By monitoring changes in the funding ratio each year we can determine whether or not funding progress is being made.

Below is a comparison of funded ratios determined on a market value basis vs. an actuarial value basis over the last 10 years.



Key Valuation Results

Actuarial Valuation Date:	June 30, 2017	June 30, 2016
Required Employer Contributions for Fiscal Year Ending:	**June 30, 2019**	**June 30, 2018**
Estimated Required Employer Contributions:		
· Required Board of Education Contributions	$ 556,814,000	$ 538,944,000
· Additional Board of Education Contributions (0.58 percent of pay)	12,887,000	12,466,000
· Additional State Contributions (0.544 percent of pay)	12,087,000	11,692,000
· State Contributions Pursuant to P.A. 100-0465 (Normal Cost)[a]	226,782,000	221,300,000
· Total Required Employer Contributions	$ 808,570,000	$ 784,402,000
· Percentage of Projected Capped Payroll	36.392%	34.108%
Actuarially Determined Contribution[b] as of the Actuarial Valuation Date:		
· Annual Amount	$ 855,752,559	$ 754,764,093
· Percentage of Projected Capped Payroll for Upcoming Year	39.89%	33.89%
Membership:		
· Number of		
- Active Members	28,855	29,543
- Members Receiving Payments	28,439	28,298
- Vested Former Members Eligible for Deferred Benefits	6,062	5,715
- Non-vested Former Members Eligible for Refunds Only	22,570	22,042
- Total	85,926	85,598
· Covered Payroll Provided by Fund	$ 2,030,175,116	$ 2,071,040,979
· Projected Capped Payroll for Upcoming Year	$ 2,145,171,999	$ 2,227,208,231
· Projected Capped Payroll for Upcoming Year + 1	$ 2,221,849,230	$ 2,299,737,511
· Annualized Benefit Payments	$ 1,403,989,272	$ 1,361,882,556
Assets:		
· Market Value of Assets (MVA)	$ 10,793,173,927	$ 10,113,297,310
· Actuarial Value of Assets (AVA)	$ 10,933,031,685	$ 10,630,976,553
· Return on Market Value of Assets	12.53%	-0.27%
· Return on Actuarial Value of Assets	8.26%	8.29%
· Ratio – Actuarial Value of Assets to Market Value of Assets	101.30%	105.12%
Actuarial Information as of the Actuarial Valuation Date:		
· Total Normal Cost Amount (Including Admin. Expenses)	$ 349,429,055	$ 319,079,304
· Employer's Normal Cost Amount (Including Admin. Expenses)	$ 156,363,575	$ 131,744,031
· Employer's Normal Cost Amount (Including Admin. Expenses and Health Insurance Subsidy)	$ 221,363,575	$ 196,744,031
· Actuarial Accrued Liability (AAL)	$ 21,822,010,297	$ 20,246,140,298
· Unfunded Actuarial Accrued Liability (UAAL)	$ 10,888,978,612	$ 9,615,163,745
· Funded Ratio based on Actuarial Value of Assets	50.10%	52.51%
· UAAL as % of Covered Payroll	536.36%	464.27%
· Funded Ratio based on Market Value of Assets	49.46%	49.95%

[a] *State Normal Cost contribution represents the projected employer Normal Cost for FY 2019, including $65 million for the health insurance subsidy.*

[b] *The policy adopted by the Board calculates the Actuarially Determined Contribution as the Normal Cost plus a 30-year level percent of payroll closed-period (beginning June 30, 2013) amortization of the Unfunded Accrued Liability. As of June 30, 2017, the remaining amortization period is 26 years. The ADC is used for financial reporting purposes only.*

Appropriation Requirements Under P.A. 90-0655, P.A. 91-0357, P.A. 96-0889 and P.A. 100-0465

The law governing the Fund under P.A. 96-0889 provides that:

For fiscal years 2014 through 2059, the minimum contribution to the Fund to be made by the Board of Education in each fiscal year shall be an amount determined by the Fund to be sufficient to bring the total assets of the Fund up to 90 percent of the total actuarial liabilities of the Fund by the end of fiscal year 2059. In making these determinations, the required Board of Education contribution shall be calculated each year as a level percentage of the applicable employee payrolls over the years remaining to and including fiscal year 2059 and shall be determined under the Projected Unit Credit actuarial cost method. Beginning in fiscal year 2060, the minimum Board of Education contribution for each fiscal year shall be the amount needed to maintain the total assets of the Fund at 90 percent of the total actuarial liabilities of the Fund.

The above calculation provides the basis for calculating the appropriation requirements under P.A. 96-0889. Beginning in State fiscal year 1999, P.A. 90-0655 provides additional State contributions of 0.544 percent of the Fund's total teacher payroll to the Fund to offset the portion of the cost of benefit increases enacted under P.A. 90-0582, except that no additional contributions are required if the Board has certified in the previous fiscal year that the Fund is at least 90 percent funded.

Pursuant to P.A. 91-0357, beginning on and after July 1, 1999, the Board of Education shall make additional contributions of 0.58 percent of the Fund's total teacher payroll to the Fund to offset the portion of the cost of benefit increases enacted under P.A. 90-0582, except that no additional contributions are required if the Board has certified in the previous fiscal year that the Fund is at least 90 percent funded.

Pursuant to P.A. 100-0465, beginning with fiscal year 2018, the State shall contribute for each fiscal year an amount to be determined by the Fund, equal to the employer normal cost for that fiscal year, plus the retiree health insurance reimbursement subsidy. For fiscal year 2018, the State will contribute $221,300,000 for the employer normal cost for fiscal year 2018. In addition, the Board of Education's property tax levy capped rate was increased from 0.383 percent to 0.567 percent, with proceeds dedicated solely for CTPF.

According to Section 17-129(b)(vii) of the Illinois Pension Code, any contribution by the State to or for the benefit of the Fund, shall be a credit against any contribution required to be made by the Board of Education.

Employer Contribution Requirement for Fiscal Year 2019

The funded ratio as of the June 30, 2017, actuarial valuation on an actuarial value basis is 50.1 percent. Therefore, additional contributions by the Board of Education and State will be required for fiscal year 2019. The projected payroll for fiscal year 2019 is $2,221,849,230. Based on the projected payroll for fiscal year 2019, and the additional State and Board of Education contribution rates of 0.544 percent and 0.58 percent of payroll, respectively, the additional State and Board of Education contributions for fiscal year 2019 are as follows:

Development of Additional Contributions under Section 17-127 and 17-127.2 of the Illinois Pension Code	Fiscal Year 2019
Projected Total Capped Payroll	$ 2,221,849,230
Additional State Contributions Under Section 17-127 of Illinois Pension Code	**$ 12,087,000**
(% of Projected Capped Payroll)	**0.544%**
Additional Board of Education Contributions Under Section 17-127.2 of the Illinois Pension Code	**$ 12,887,000**
(% of Projected Capped Payroll)	**0.580%**

Pursuant to P.A. 100-0465, the State shall contribute for each fiscal year an amount to be determined by the Fund, equal to the employer normal cost for that fiscal year, plus the retiree health insurance reimbursement subsidy. The following table provides the development of the State contribution requirement under P.A. 100-0465:

Development of Normal Cost State Contributions under Section 17-127(d)(1) of the Illinois Pension Code	Fiscal Year 2019
Total Normal Cost	$ 345,949,000
Projected Administrative Expenses	15,800,000
Total Normal Cost Including Administrative Expenses	$ 361,749,000
Expected Employee Contributions	199,967,000
Employer Normal Cost	$ 161,782,000
Health Insurance Subsidy	65,000,000
State Contributions Under Section 17-127(d)(1) of the Illinois Pension Code	**$ 226,782,000**

Employer Contribution Requirement for Fiscal Year 2019

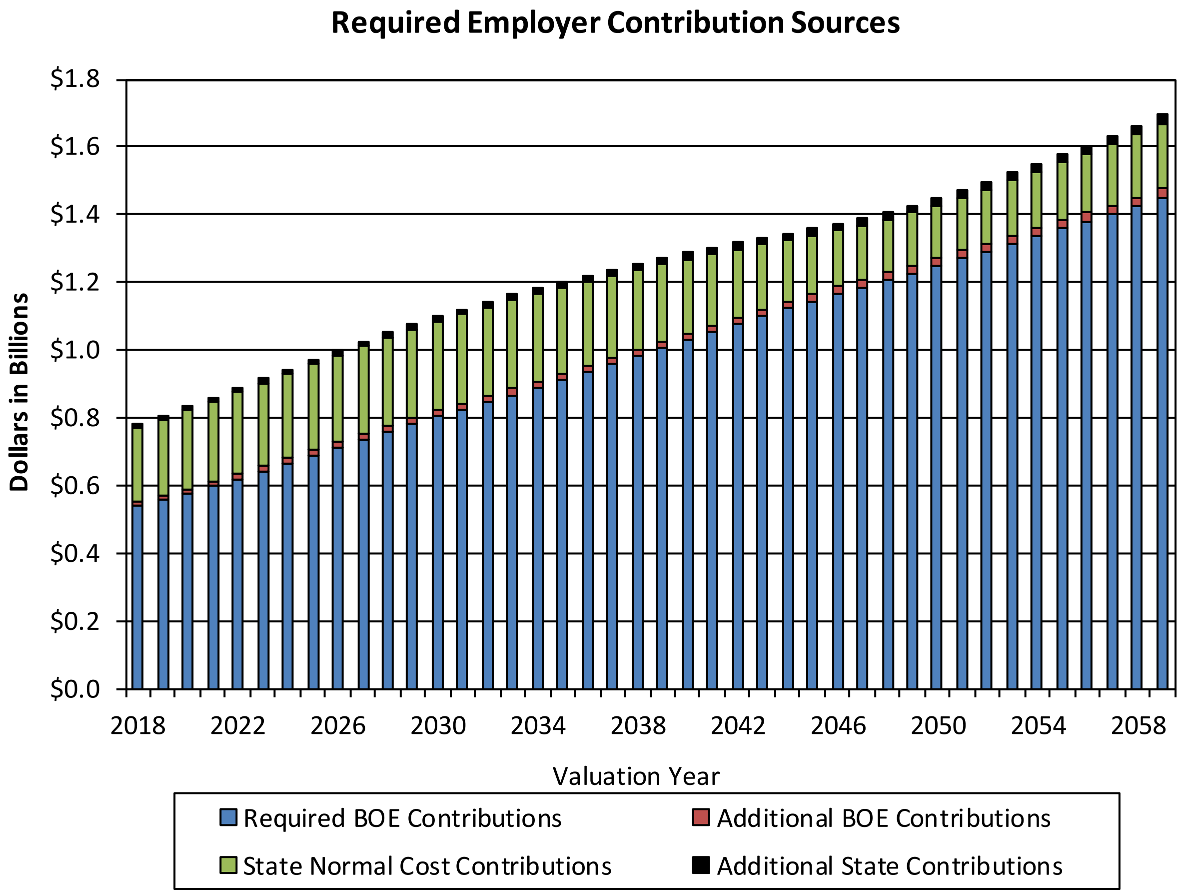
Pursuant to P.A. 96-0889, the Board of Education contribution requirement in each fiscal year shall be an amount determined by the Fund to be sufficient to bring the total assets of the Fund up to 90 percent of the total actuarial liabilities of the Fund by the end of fiscal year 2059. In making these determinations, the required Board of Education contribution shall be calculated each year as a level percentage of the applicable employee payrolls over the years remaining to and including fiscal year 2059 and shall be determined under the Projected Unit Credit actuarial cost method. Based on the funding projections provided in Section C of this report, the Board of Education's required contribution for fiscal year 2019 is equal to $556,814,000, (net of Additional State and Board of Education Contributions).

The fiscal year ending June 30, 2018, and June 30, 2019, certified contribution requirements and projected future year required contribution amounts are shown below:

Fiscal Year Ending June 30,	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contributions
2018	$ 538,944,000	$ 12,466,000	$ 11,692,000	$ 221,300,000	$ 784,402,000
2019	556,814,000	12,887,000	12,087,000	226,782,000	808,570,000
2020	577,613,000	13,316,000	12,490,000	232,099,000	835,518,000
2021	598,467,000	13,744,000	12,891,000	237,287,000	862,389,000
2022	619,977,000	14,178,000	13,298,000	242,154,000	889,607,000
2023	641,955,000	14,617,000	13,709,000	246,829,000	917,110,000
2024	664,861,000	15,060,000	14,126,000	250,905,000	944,952,000
2025	688,307,000	15,502,000	14,540,000	254,307,000	972,656,000
2026	711,837,000	15,936,000	14,947,000	257,180,000	999,900,000
2027	735,723,000	16,364,000	15,349,000	259,329,000	1,026,765,000
2028	759,221,000	16,778,000	15,737,000	261,019,000	1,052,755,000

Employer Contribution Requirement for Fiscal Year 2019

The following graph details the projected employer contribution requirements by Source for fiscal years 2018 through 2059.



Method of Calculation for Appropriation Requirements

The results are based on the Projected Unit Credit actuarial cost method, the data provided and actuarial assumptions used for the June 30, 2017, actuarial valuation. In order to determine projected contribution amounts, the following additional assumptions were used:

- Total employer contributions of $784,402,000 for fiscal year 2018, as provided by the Fund.
- Administrative expenses of $14,330,989 for fiscal year 2017, as provided by the Fund. Administrative expenses are assumed to increase five percent annually in future years.
- New entrants whose average age is 31.78 and average pay is $41,735 (2017 dollars).
- The active member population is assumed to remain level at 28,855 for all years of the 42-year projection. However, recent trends indicate an average decrease in active population over the last nine years of approximately 1.2 percent per year. We will review the assumption regarding the projected active member population during the next experience review.
- Projected benefits for members hired on or after January 1, 2011, are based on the new provisions established in P.A. 96-0889.
- Additional State contributions of 0.544 percent of pay are assumed to occur mid-year.
- State contributions of the employer's normal cost (includes administrative expenses and $65 million health insurance subsidy) are assumed to occur mid-year.
- Additional Board of Education contributions of 0.58 percent of pay are assumed to occur end of year.
- 55 percent of the Board of Education's previous year's special tax levy is assumed to occur March 1st each year. This amount is equal to $141,625,000 in fiscal year 2018 and is assumed to increase three percent per year.
- The remaining Board of Education required contribution is assumed to occur end of year.

The average increase in total uncapped payroll for the 42-year projection period is approximately 2.50 percent per year. It is important to note that benefits for new hires are based on capped payroll which is ultimately projected to grow at 1.25 percent per year. All results in this actuarial valuation assume that employer contributions will be made on capped pay.

Recommendations and Future Considerations

Measuring the statutory contribution against a policy such as the Annual Required Contribution ("ARC") helps evaluate the funding adequacy of the current statutory funding method. Thus, the Board adopted a policy to calculate the Actuarially Determined Contribution ("ADC"). Under this policy, the ADC is calculated as the Normal Cost plus a 30-year level percent of payroll closed-period amortization of the Unfunded Accrued Liability as of June 30, 2013. The remaining amortization period as of June 30, 2017, actuarial valuation is 26 years.

A key objective of the ADC is to accrue costs over the working lifetime of plan members to ensure that benefit obligations are satisfied and intergenerational equity is promoted. Although the ADC is solely an accounting provision, in certain circumstances it could represent a reasonable annual funding target and therefore is used by some plan sponsors as their "de facto" funding requirement. Given there is no requirement that the accounting provision for pension expense must equal the annual funding requirement, some plan sponsors adopt funding policies that differ from the ADC. However, a funding policy that differs significantly from the ADC approach could result in a potential "back-loading," meaning contributions are deferred into the future. Back-loading could result in an underfunding of the fund.

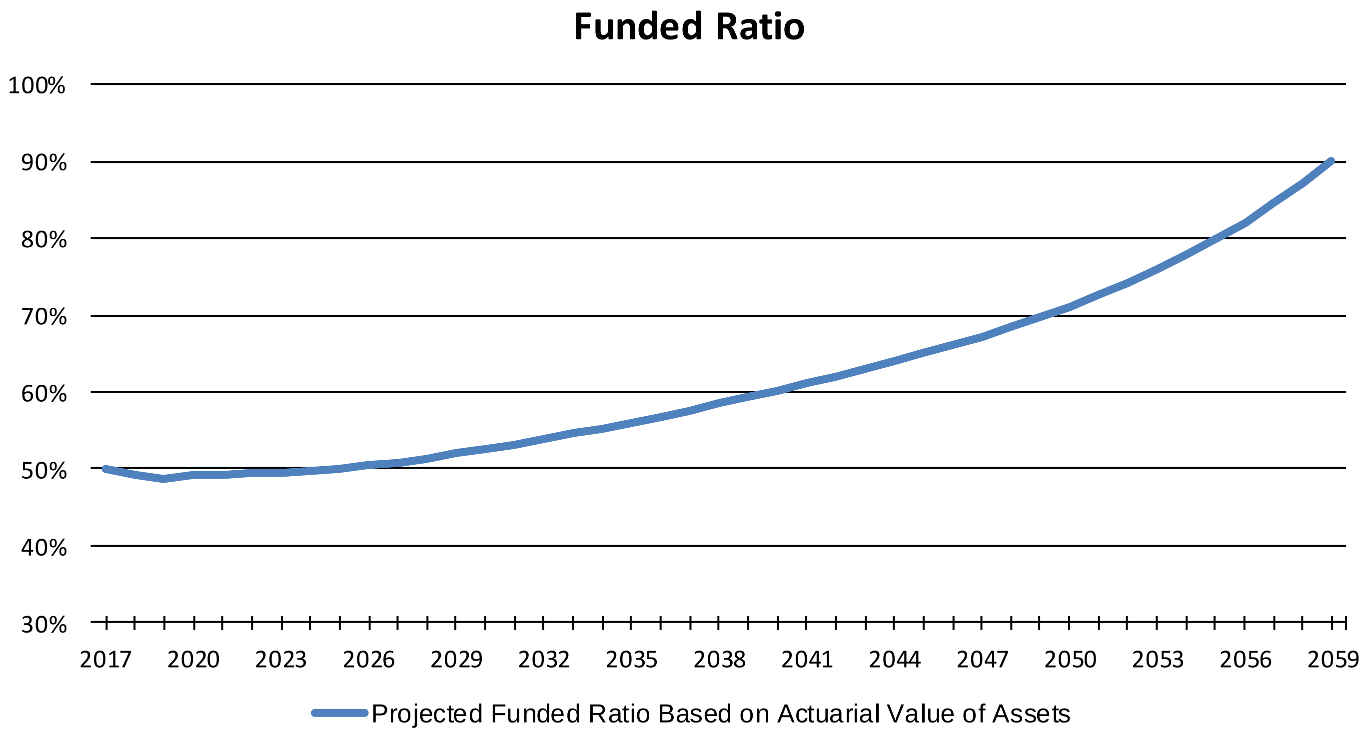
The ADC for fiscal years 2017 and 2018, as well as the statutory employer contribution for fiscal years 2017 and 2018, are shown below as a percentage of projected capped payroll. The ADC for 2017 and statutory employer contribution for 2017 and 2018 are based on the results of the June 30, 2016, actuarial valuation.

Actuarial Valuation Date:	June 30, 2017	June 30, 2016
Actuarially Determined Contributions For Fiscal year Ending:	**June 30, 2018**	**June 30, 2017**
1. Actuarial Accrued Liability	$ 21,822,010,297	$ 20,246,140,298
2. Actuarial Value of Assets[a]	$ 10,933,031,685	$ 10,610,746,831
3. Unfunded Actuarial Accrued Liability (1. – 2.)	$ 10,888,978,612	$ 9,635,393,467
4. Employer Normal Cost (Including Administrative Expenses)[b]	$ 156,363,575	$ 131,744,031
5. Employer Normal Cost Adjusted to the End of the Year	$ 161,932,582	$ 136,753,858
6. Amount to amortize the unfunded liability over a 30-year closed-period, Beginning July 1, 2013, as a Level Percentage of Payroll	$ 693,819,977	$ 618,010,235
7. Actuarially Determined Contribution Requirement [5. + 6.]	$ 855,752,559	$ 754,764,093
8. Projected Capped Payroll For Fiscal Year	$ 2,145,171,999	$ 2,227,208,231
9. Actuarially Determined Contribution as a Percentage of Projected Capped Payroll	39.89%	33.89%
10. Total Required Employer Contribution[b]	$ 719,402,000	$ 680,386,000
11. Total Required Employer Contribution as a Percentage of Projected Capped Payroll	33.54%	30.55%
12. Total Required Employer Contribution as a Percentage of Actuarially Determined Contribution	84.07%	90.15%

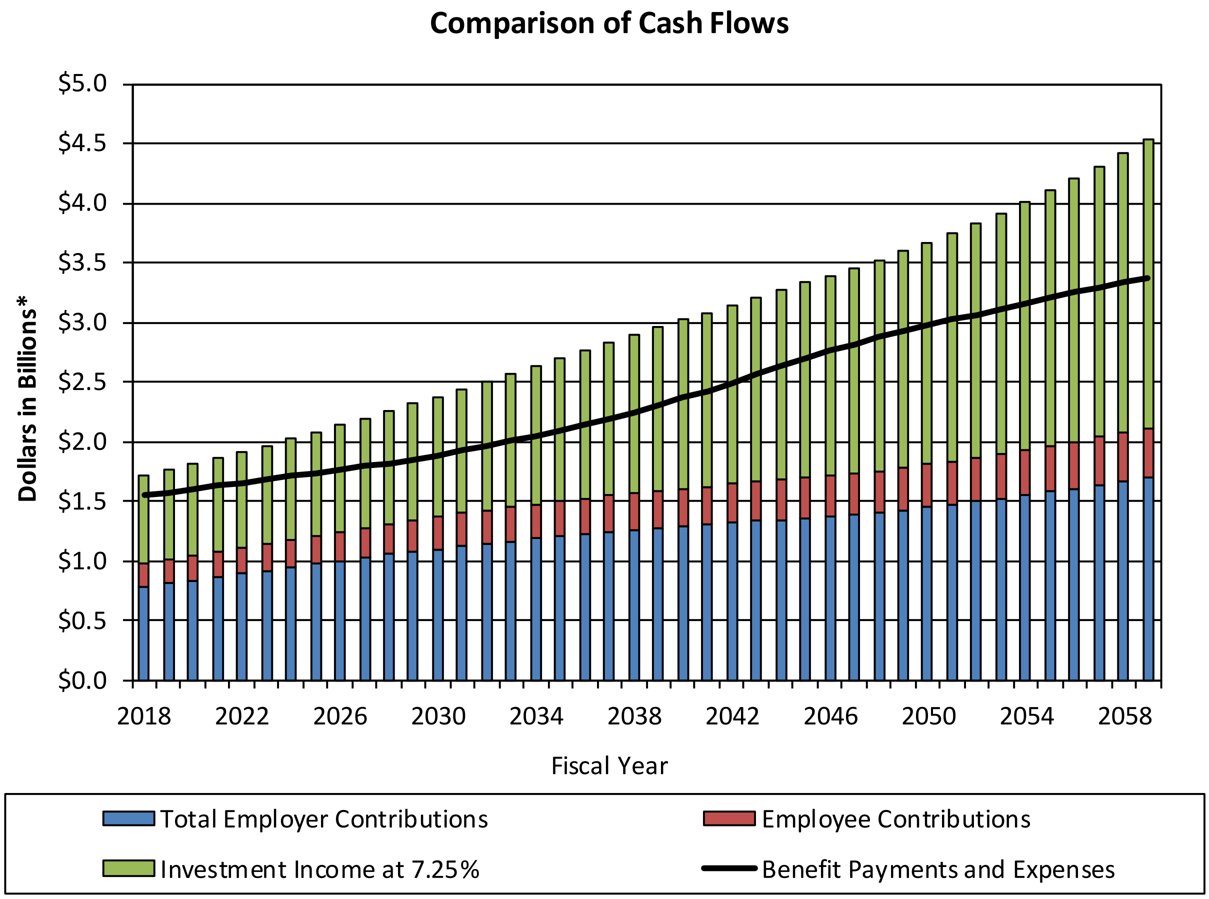
[a] *The actuarial value of assets for fiscal year 2018 include assets previously restricted for OPEB benefits.*
[b] *Excludes Health Insurance Subsidy.*

Recommendations and Future Considerations

The statutory funding policy required for CTPF provides for level percent of pay funding that produces a funding target of 90 percent by 2059, assuming an open group projection. The following graph shows the projected funded ratio. A key observation is that the funded ratio does not grow markedly until after 2033. That is, a majority of the funding occurs between 2034 and 2059. This illustrates how significantly the current funding policy defers or back-loads contributions into the future.



The following graph compares the projected benefits and expenses against employer contributions, employee contributions and investment income. Beginning in 2018, benefit payments exceed employer and employee contributions. From 2018 to 2034, the percentage of investment income needed to pay ongoing benefits decreases from 76.5 percent to 49.7 percent, but then increases to 52.1 percent by 2059. This implies that a lower level of investment income is projected to be available for potential asset growth.



**Future dollar amounts are based on assumed inflationary increases.*

We are concerned about potential cash flow problems for CTPF. This is because the assets in the plan ($10,793,173,927 on a market value basis) are not sufficient to cover current retiree liabilities ($16,113,284,297) and the ratio of assets (Market Value) to retiree benefit payments and expenses is approximately 7.5. This means that approximately seven to eight years of retiree benefit payments can be paid from current assets; the ability to make such payments beyond that period is heavily dependent upon future employer contributions and future investment return.

The calculations in this report were prepared based on the methods required by the statutory funding policy. GRS does not endorse this funding policy because the statutory funding policy defers funding for these benefits into the future and places a higher burden on future generations of taxpayers.

We recommend the following changes:

1. Implementing a funding policy that contributes normal cost plus closed period amortization as a level percentage of capped payroll amortization of the unfunded liability. (Policy which recognizes unfunded liability at the valuation date and not projected liability in the year 2059)
2. Changing the actuarial cost method for calculating liabilities from the Projected Unit Credit to the Entry Age Normal method

<u>Change Funding Policy to a More Actuarially Sound Funding Method</u>

We recommend a funding policy that contributes normal cost plus closed period amortization as a level percentage of capped payroll for paying off the current unfunded accrued liability (i.e., the amortization period declines by one year with each actuarial valuation) such that the funded ratio is projected to be 100 percent funded in 30 years or sooner. A 30-year closed amortization period (at the actuarial valuation as of June 30, 2013) methodology pays off the unfunded accrued liability in full by the end of the 30-year period in 2043. The fiscal year 2018 contribution would be $855.75 million under this funding policy. The current statutory contribution does not comply with this recommendation. Underfunding the Fund creates the risk that ultimately benefit obligations cannot be met from the trust, and will require a greater amount of funding from other City and State resources. In addition, continually underfunding the Fund also creates more of a funding need from contributions and less is available from investment return – thereby creating a more expensive plan.

<u>Change the Actuarial Cost Method to the Entry Age Normal Method</u>

The current actuarial cost method is the Projected Unit Credit method, which is required by statute. The Projected Unit Credit method recognizes costs such that the normal cost for an individual member increases as a percentage of payroll throughout his/her career. The Entry Age Normal cost method is the most commonly used method in the public sector. It is also the method required to be used for financial reporting under GASB Statement Nos. 67 and 68. The Entry Age Normal method recognizes costs as a level percentage of payroll over a member's career. We recommend a change to the Entry Age Normal method.

We recognize that the State Statute governs the funding policy of the Fund. The purpose of these comments is to highlight the difference between the statutory appropriation methodology and an actuarially sound funding policy and to highlight the risks and additional costs of continuing to underfund the Fund.

Future Considerations

Recent changes (such as the addition of a new benefit tier and delaying the 90 percent funding target year from 2045 to 2059) have had the effect of reducing the statutory contribution amounts that would have otherwise been made. However, the change in the investment return assumption and other changes to more closely align the actuarial assumptions with current market expectations have increased the contribution amounts that would otherwise have been made. Assuming the statutory contributions are received (and the actuarial assumptions are met including a 7.25 percent investment rate of return, each year through 2059) CTPF is currently projected to have contributions sufficient to increase the funded ratio from the current level of 50.1 percent to 90.0 percent by 2059.

This is a severely underfunded plan and the ability of the plan to reach 90 percent funding by 2059 is heavily dependent on the State and the Board of Education contributing the statutory contributions each and every year until 2059. Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, we are not able to assess the ability of the State and/or the Board of Education to make contributions when due.

SECTION B

ACTUARIAL DETERMINATIONS

Table 1
Results of Actuarial Valuation as of June 30, 2017

1. Number of Members	
a. Active	28,855
b. Inactive:	
i. Eligible for deferred vested pension benefits	6,062
ii. Eligible for return of contributions only	22,570
c. Current Benefit Recipients:	
i. Retirement annuities	24,837
ii. Survivor annuities	3,135
iii. Disability annuities	467
d. Total	85,926
2. Covered Payroll	
a. Provided by Fund as of the Actuarial Valuation Date	$ 2,030,175,116
b. Projected Capped Payroll for Fiscal Year 2018	2,145,171,999
c. Projected Capped Payroll for Fiscal Year 2019	2,221,849,230
3. Annualized Benefit Payments Currently Being Made	
a. Retirement annuities	$ 1,317,657,163
b. Survivor annuities	69,320,685
c. Disability annuities	17,011,424
d. Total	$ 1,403,989,272
4. Actuarial Accrued Liability—Annuitants	
a. Current Benefit Recipients:	
i. Retirement annuities	$15,310,520,660
ii. Survivor annuities	615,431,551
iii. Disability annuities	187,332,086
b. Total	$16,113,284,297
5. Actuarial Accrued Liability—Inactive Members	
a. Eligible for Deferred Vested Pension Benefits	$ 359,871,936
b. Eligible for Return of Contributions Only	98,895,362
c. Total	$ 458,767,298

Table 1 (Continued)
Results of Actuarial Valuation as of June 30, 2017

	Normal Cost	Actuarial Accrued Liability
6. Active Members		
a. Retirement Benefits	$ 264,101,423	$ 4,459,677,197
b. Withdrawal	56,052,161	597,191,514
c. Death Benefits	7,556,594	107,631,691
d. Disability	6,671,339	85,458,300
e. Administrative Expenses	15,047,538	-
f. Total	$ 349,429,055	$ 5,249,958,702
7. Total Actuarial Accrued Liability (4. + 5. + 6.)		$ 21,822,010,297
8. Market Value of Assets (MVA)		$ 10,793,173,927
9. Unfunded Actuarial Accrued Liability Based on MVA (7. – 8.)		$ 11,028,836,370
10. Funded Percentage Based on MVA (8. ÷ 7.)[a]		49.46%
11. Actuarial Value of Assets (AVA)		$ 10,933,031,685
12. Unfunded Actuarial Accrued Liability Based on AVA (7. – 11.)		$ 10,888,978,612
13. Funded Percentage Based on AVA (11. ÷ 7.)[a]		50.10%
14. Total Normal Cost	$ 349,429,055	
15. Expected Employee Contributions	$ 193,065,480	
16. Annual Employer Normal Cost	$ 156,363,575	
(% of Projected Capped Payroll for Fiscal Year 2018)	7.29%	
17. Health Insurance Subsidy	$ 65,000,000	
18. Annual Employer Normal Cost, including Health Insurance Reimbursement (16. + 17.)	$ 221,363,575	
(% of Projected Capped Payroll for Fiscal Year 2018)	10.32%	

[a] *The funded status measure is appropriate for assessing the need for future contributions. The funded status is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.*

Table 2
Components of Actuarial Accrued Liability and Normal Cost By Tier

Actuarial Valuation Results	Tier 1		Tier 2		Total	
1. Count	20,271		8,584		28,855	
2. Covered Payroll						
a. Provided by Fund as of the Valuation Date	$1,610,349,607		$ 419,825,509		$ 2,030,175,116	
b. Projected Capped Payroll for Fiscal Year 2018	1,693,717,094		451,454,905		2,145,171,999	
c. Projected Capped Payroll for Fiscal Year 2019	1,696,204,614		525,644,616		2,221,849,230	
3. Actuarial Accrued Liability						
a. Retirement Benefits	$ 4,422,272,938		$ 37,404,259		$ 4,459,677,197	
b. Withdrawal	545,053,413		52,138,101		597,191,514	
c. Death Benefits	104,025,970		3,605,721		107,631,691	
d. Disability	81,352,599		4,105,701		85,458,300	
f. Total	$ 5,152,704,920		$ 97,253,782		$ 5,249,958,702	
4. Normal Cost	**Amount**	**% of Payroll**	**Amount**	**% of Payroll**	**Amount**	**% of Payroll**
a. Retirement Benefits	$ 253,325,612	14.96%	$ 10,775,811	2.39%	$ 264,101,423	12.31%
b. Withdrawal	41,777,143	2.47%	14,275,018	3.16%	56,052,161	2.61%
c. Death Benefits	6,527,217	0.39%	1,029,377	0.23%	7,556,594	0.35%
d. Disability	5,508,923	0.33%	1,162,417	0.26%	6,671,340	0.31%
e. Administrative Expenses	11,880,759	0.70%	3,166,779	0.70%	15,047,537	0.70%
f. Total	$ 319,019,654	18.84%	$ 30,409,401	6.74%	$ 349,429,055	16.29%
5. Expected Employee Contributions	$ 152,434,539	9.00%	$ 40,630,941	9.00%	$ 193,065,480	9.00%
6. Annual Employer Normal Cost	$ 166,585,114	9.84%	$ (10,221,540)	-2.26%	$ 156,363,575	7.29%

Actuarial Accrued Liability and Normal Cost are determined under the Projected Unit Credit actuarial cost method.

Table 3
Analysis of Change in Unfunded Actuarial Accrued Liability

In addition to the expected change in the unfunded accrued actuarial liability, changes in membership demographics and fund assets have affected the actuarial valuation results. The increase in the unfunded actuarial accrued liability (UAAL) of $1,273,814,867 was due to the following:

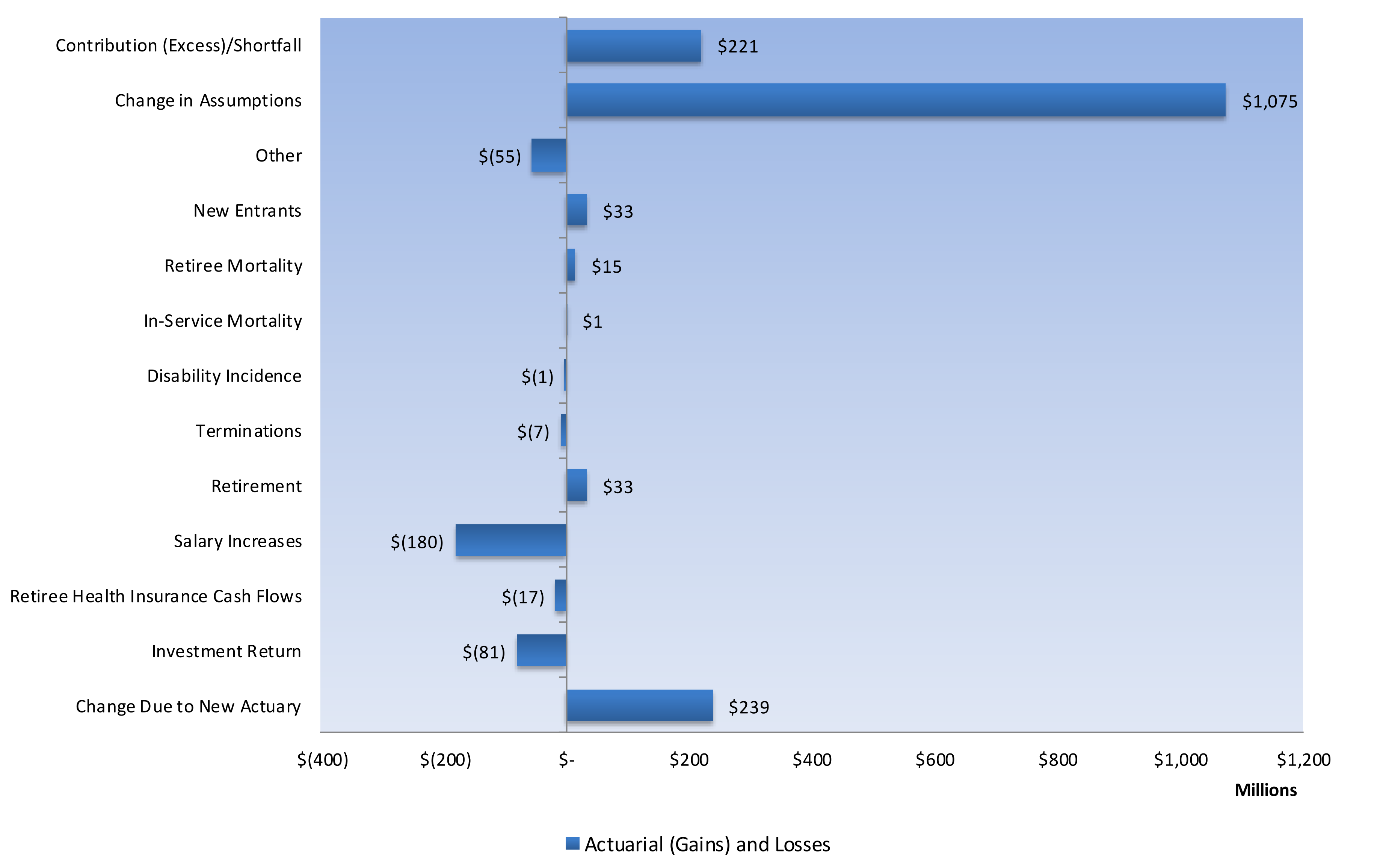
1. Unfunded Actuarial Accrued Liability (UAAL) at 06/30/2016	$	9,615,163,745
2. Change in Unfunded Actuarial Accrued Liability Due to New Actuary	$	238,810,979
3. Adjusted Unfunded Actuarial Accrued Liability	$	9,853,974,724
4. Contributions		
a. Contributions due (Normal Cost plus interest on the UAAL)		
i interest on item 3.	$	763,683,041
ii members contributions		187,538,787
iii employer normal cost (middle of year)		196,540,517
iv interest on ii and iii		14,605,374
v total due	$	1,162,367,719
b. Contributions paid (Actual)		
i member contributions	$	187,538,787
ii employer (end of year)		746,840,000
iii interest on i and ii		7,131,533
iv total paid	$	941,510,320
c. Expected increase in Unfunded Actuarial Accrued Liability	$	220,857,399
5. Expected Unfunded Actuarial Accrued Liability at 06/30/2017	$	10,074,832,123
6. (Gains)/Losses		
a. investment income	$	(80,937,857)
b. retiree health insurance cash flows		(17,178,251)
c. salary increases		(180,217,505)
d. demographic		17,956,258
e. total	$	(260,377,355)
7. Plan Provision Changes	$	-
8. Assumption Changes	$	1,074,523,844
9. Total Change in UAAL (from adjusted value in item 3.)	$	1,035,003,888
10. UAAL at 06/30/2017	$	10,888,978,612

Table 4
Analysis of Financial (Gains) and Losses in Unfunded Actuarial Accrued Liability for Fiscal Year Ending June 30, 2017

	Activity		(Gain)/Loss	% of 06/30/2016 AAL
1.	Actuarial (Gain)/Loss			
	a. Retirements	$	32,846,858	0.16%
	b. Incidence of Disability		(685,126)	0.00%
	c. In-Service Mortality		657,829	0.00%
	d. Retiree Mortality		14,544,206	0.07%
	e. Salary Increases		(180,217,505)	-0.88%
	f. Terminations		(7,478,652)	-0.04%
	g. Investment Return		(80,937,857)	-0.40%
	h. Retiree Health Insurance Cash Flows		(17,178,251)	-0.08%
	i. New Entrant Liability		32,961,135	0.16%
	j. Other		(54,889,992)	-0.27%
	k. Total Actuarial (Gain)/Loss	$	(260,377,355)	-1.28%
2.	Plan Provision Changes	$	-	0.00%
3.	Assumption Changes	$	1,074,523,844	5.25%
4.	Contribution (Excess)/Shortfall[a]	$	220,857,399	1.08%
5.	Total Financial (Gain)/Loss	$	1,035,003,888	5.05%

[a] *Represents the increase in the Unfunded Actuarial Accrued Liability due to actual contributions being less than the Normal Cost plus interest on the beginning of year Unfunded Actuarial Accrued Liability.*

Graph 1
Financial (Gains) and Losses in Unfunded Actuarial Accrued Liability for Fiscal Year Ending June 30, 2017, By Source



SECTION C

ACTUARIAL PROJECTIONS

Table 5

Baseline Projections — Employer Contributions Determined Under Public Act 90-0655, Public Act 91-0357, Public Act 96-0889 and Public Act 100-0465

Investment Return of 7.25% Each Year ($ in Millions)

						Annual Normal Cost				Total Employer Contributions						
Fiscal Year	Actuarial Accrued Liability	Actuarial Value of Assets	Unfunded Liability	Funded Ratio	Pensionable Payroll	Total	Employee Contribution	Employer Normal Cost	Percent of Pay	Required Employer Contribution	Additional State Contributions	State Normal Cost Contributions	Additional Board of Education Contributions	Required Board of Education Contributions	Percent of Pay	Total Expenses
2018	$22,230.1	$10,942.3	$11,287.8	49.22%	$2,145.2	$414.4	$193.1	$221.3	10.32%	$784.4	$11.7	$221.3	$12.5	$538.9	36.57%	$1,548.1
2019	22,651.5	11,048.1	11,603.4	48.77%	2,221.8	426.7	200.0	226.8	10.21%	808.6	12.1	226.8	12.9	556.8	36.39%	1,576.1
2020	23,088.0	11,365.3	11,722.7	49.23%	2,295.9	438.7	206.6	232.1	10.11%	835.5	12.5	232.1	13.3	577.6	36.39%	1,603.0
2021	23,540.5	11,597.2	11,943.3	49.26%	2,369.7	450.6	213.3	237.3	10.01%	862.4	12.9	237.3	13.7	598.5	36.39%	1,629.9
2022	24,010.9	11,856.0	12,154.9	49.38%	2,444.5	462.2	220.0	242.2	9.91%	889.6	13.3	242.2	14.2	620.0	36.39%	1,656.0
2023	24,500.4	12,141.2	12,359.2	49.56%	2,520.1	473.6	226.8	246.8	9.79%	917.1	13.7	246.8	14.6	642.0	36.39%	1,681.8
2024	25,009.1	12,452.6	12,556.5	49.79%	2,596.6	484.6	233.7	250.9	9.66%	945.0	14.1	250.9	15.1	664.9	36.39%	1,708.6
2025	25,536.0	12,792.3	12,743.7	50.10%	2,672.7	494.9	240.5	254.3	9.51%	972.7	14.5	254.3	15.5	688.3	36.39%	1,736.8
2026	26,081.3	13,161.1	12,920.2	50.46%	2,747.6	504.5	247.3	257.2	9.36%	999.9	14.9	257.2	15.9	711.8	36.39%	1,765.7
2027	26,643.1	13,558.6	13,084.5	50.89%	2,821.4	513.3	253.9	259.3	9.19%	1,026.8	15.3	259.3	16.4	735.7	36.39%	1,796.6
2028	27,233.7	13,997.4	13,236.3	51.40%	2,892.8	521.4	260.4	261.0	9.02%	1,052.8	15.7	261.0	16.8	759.2	36.39%	1,816.2
2029	27,838.8	14,463.7	13,375.1	51.96%	2,960.8	528.2	266.5	261.8	8.84%	1,077.5	16.1	261.8	17.2	782.4	36.39%	1,850.5
2030	28,456.7	14,955.7	13,501.0	52.56%	3,023.7	534.2	272.1	262.1	8.67%	1,100.4	16.4	262.1	17.5	804.3	36.39%	1,886.4
2031	29,086.1	15,471.8	13,614.3	53.19%	3,083.4	539.5	277.5	262.0	8.50%	1,122.1	16.8	262.0	17.9	825.4	36.39%	1,924.0
2032	29,724.7	16,011.0	13,713.7	53.86%	3,141.2	543.9	282.7	261.2	8.32%	1,143.2	17.1	261.2	18.2	846.7	36.39%	1,963.5
2033	30,369.5	16,571.6	13,797.9	54.57%	3,197.9	547.3	287.8	259.5	8.11%	1,163.8	17.4	259.5	18.5	868.3	36.39%	2,005.6
2034	31,017.6	17,152.5	13,865.1	55.30%	3,253.1	549.5	292.8	256.8	7.89%	1,183.8	17.7	256.8	18.9	890.5	36.39%	2,049.7
2035	31,665.7	17,751.6	13,914.1	56.06%	3,305.8	550.5	297.5	253.0	7.65%	1,203.1	18.0	253.0	19.2	912.9	36.39%	2,096.2
2036	32,310.2	18,366.8	13,943.4	56.85%	3,356.4	550.4	302.1	248.3	7.40%	1,221.5	18.3	248.3	19.5	935.4	36.39%	2,144.9
2037	32,947.8	18,996.5	13,951.3	57.66%	3,404.9	549.1	306.4	242.6	7.13%	1,239.1	18.5	242.6	19.7	958.2	36.39%	2,195.3

Normal cost includes administrative expenses and health insurance subsidy. The health insurance subsidy is assumed to be $65 million each year.

Total expenses shown include benefit payments, refunds, administrative expenses and health insurance subsidy.

Actuarial accrued liability and assets are measured at the end of the fiscal year. Normal Cost is measured at the middle of the fiscal year.

State contributions, benefit payments, refunds, administrative expenses, and employee contributions are assumed to occur during the middle of the year.

55 percent of the Board of Education's dedicated property tax levy of 0.567 percent is assumed to be paid March 1, each fiscal year. The remaining Board of Education contributions are assumed to occur at the end of the year.

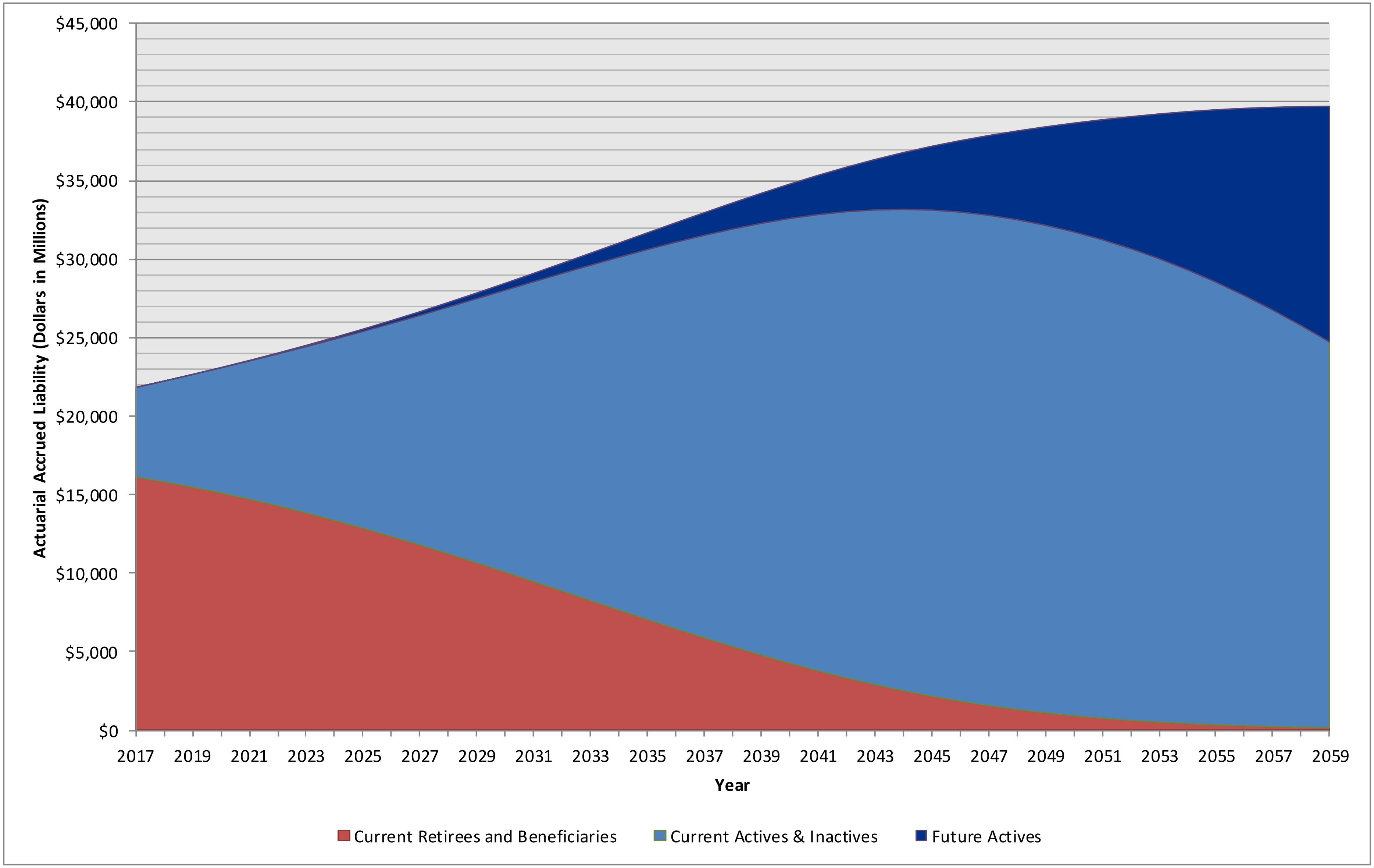
Total payroll is capped for members hired after December 31, 2010, as defined in Public Act 96-0889.

Table 5 (Continued)
Baseline Projections — Employer Contributions Determined Under Public Act 90-0655, Public Act 91-0357, Public Act 96-0889 and Public Act 100-0465
Investment Return of 7.25% Each Year ($ in Millions)

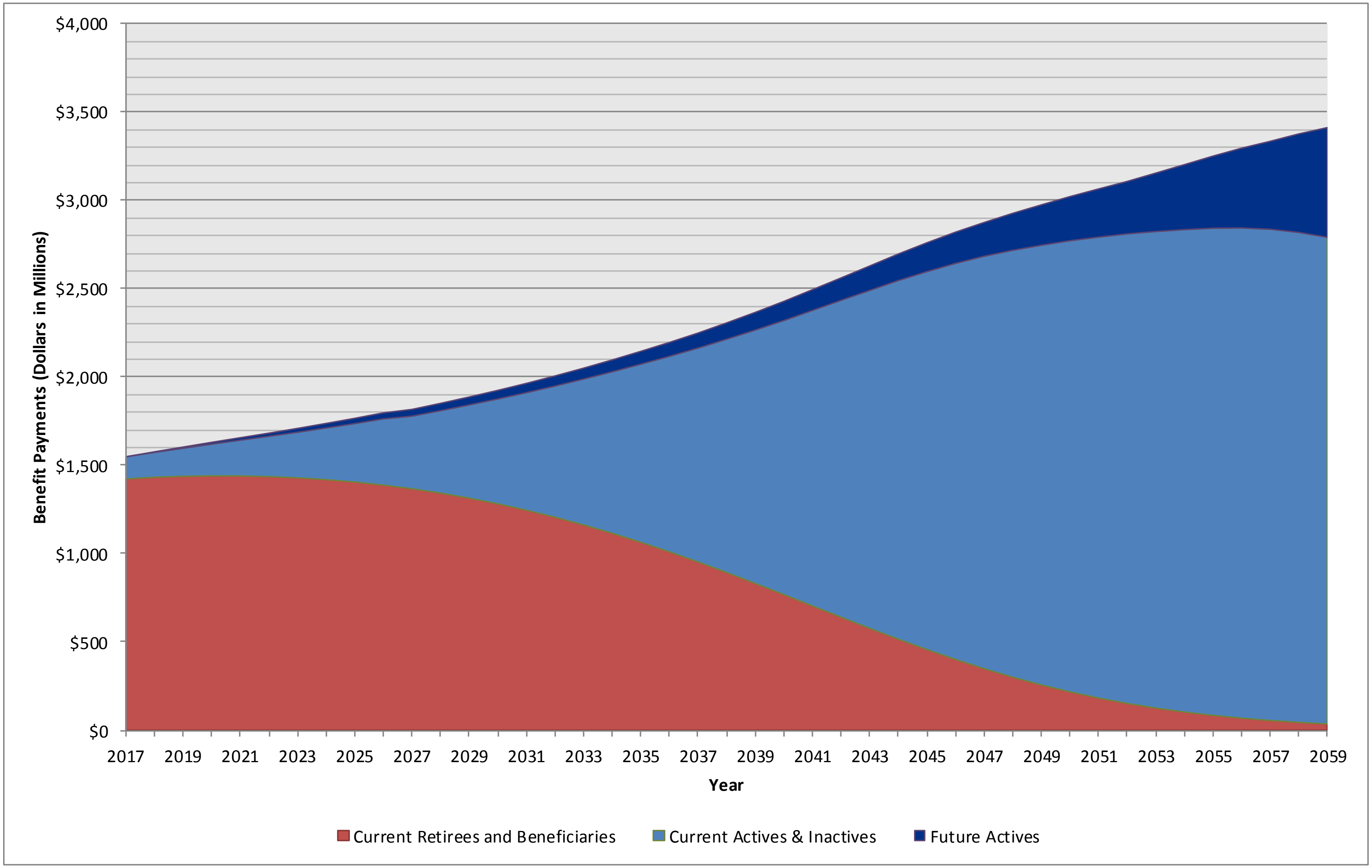
						Annual Normal Cost				Total Employer Contributions						
Fiscal Year	Actuarial Accrued Liability	Actuarial Value of Assets	Unfunded Liability	Funded Ratio	Pensionable Payroll	Total	Employee Contribution	Employer Normal Cost	Percent of Pay	Required Employer Contribution	Additional State Contributions	State Normal Cost Contributions	Additional Board of Education Contributions	Required Board of Education Contributions	Percent of Pay	Total Expenses
2038	$33,573.9	$19,638.1	$13,935.8	58.49%	$3,451.5	$546.5	$310.6	$235.8	6.83%	$1,256.1	$18.8	$235.8	$20.0	$981.4	36.39%	$2,248.4
2039	34,182.0	20,287.3	13,894.7	59.35%	3,496.5	542.6	314.7	227.9	6.52%	1,272.5	19.0	227.9	20.3	1,005.3	36.39%	2,305.8
2040	34,767.6	20,941.2	13,826.4	60.23%	3,539.0	538.0	318.5	219.4	6.20%	1,287.9	19.3	219.4	20.5	1,028.7	36.39%	2,365.4
2041	35,325.5	21,596.5	13,729.0	61.14%	3,580.1	532.5	322.2	210.3	5.87%	1,302.9	19.5	210.3	20.8	1,052.3	36.39%	2,427.7
2042	35,848.6	22,248.8	13,599.8	62.06%	3,619.6	525.9	325.8	200.1	5.53%	1,317.3	19.7	200.1	21.0	1,076.4	36.39%	2,493.9
2043	36,333.8	22,896.4	13,437.4	63.02%	3,657.4	519.5	329.2	190.3	5.20%	1,331.0	19.9	190.3	21.2	1,099.6	36.39%	2,560.6
2044	36,777.9	23,538.5	13,239.4	64.00%	3,695.5	513.2	332.6	180.6	4.89%	1,344.9	20.1	180.6	21.4	1,122.7	36.39%	2,627.9
2045	37,178.2	24,174.2	13,004.0	65.02%	3,733.6	507.7	336.0	171.7	4.60%	1,358.7	20.3	171.7	21.7	1,145.1	36.39%	2,695.9
2046	37,538.6	24,808.3	12,730.3	66.09%	3,773.3	504.6	339.6	165.0	4.37%	1,373.2	20.5	165.0	21.9	1,165.7	36.39%	2,759.4
2047	37,862.0	25,446.7	12,415.3	67.21%	3,818.6	503.9	343.7	160.3	4.20%	1,389.6	20.8	160.3	22.1	1,186.5	36.39%	2,819.6
2048	38,154.3	26,098.2	12,056.1	68.40%	3,869.1	505.9	348.2	157.7	4.08%	1,408.0	21.0	157.7	22.4	1,206.9	36.39%	2,874.2
2049	38,417.9	26,769.1	11,648.8	69.68%	3,925.6	509.5	353.3	156.2	3.98%	1,428.6	21.4	156.2	22.8	1,228.3	36.39%	2,926.1
2050	38,656.5	27,466.7	11,189.8	71.05%	3,985.5	514.9	358.7	156.2	3.92%	1,450.4	21.7	156.2	23.1	1,249.4	36.39%	2,974.1
2051	38,870.9	28,196.1	10,674.8	72.54%	4,049.7	521.7	364.5	157.2	3.88%	1,473.8	22.0	157.2	23.5	1,271.0	36.39%	3,020.9
2052	39,064.5	28,964.4	10,100.1	74.15%	4,116.5	529.9	370.5	159.4	3.87%	1,498.1	22.4	159.4	23.9	1,292.3	36.39%	3,064.2
2053	39,238.4	29,776.8	9,461.6	75.89%	4,186.6	539.7	376.8	163.0	3.89%	1,523.6	22.8	163.0	24.3	1,313.5	36.39%	3,106.6
2054	39,386.1	30,633.5	8,752.6	77.78%	4,260.6	549.4	383.5	166.0	3.90%	1,550.5	23.2	166.0	24.7	1,336.6	36.39%	3,153.8
2055	39,506.0	31,537.0	7,969.0	79.83%	4,334.5	560.2	390.1	170.1	3.92%	1,577.4	23.6	170.1	25.1	1,358.6	36.39%	3,201.7
2056	39,596.9	32,491.3	7,105.6	82.06%	4,411.0	572.2	397.0	175.2	3.97%	1,605.2	24.0	175.2	25.6	1,380.5	36.39%	3,250.1
2057	39,661.5	33,505.3	6,156.2	84.48%	4,490.8	585.3	404.2	181.2	4.03%	1,634.3	24.4	181.2	26.0	1,402.6	36.39%	3,295.0
2058	39,705.3	34,591.1	5,114.2	87.12%	4,573.8	599.7	411.6	188.0	4.11%	1,664.5	24.9	188.0	26.5	1,425.1	36.39%	3,333.9
2059	39,723.7	35,752.4	3,971.3	90.00%	4,660.2	613.8	419.4	194.4	4.17%	1,695.9	25.4	194.4	27.0	1,449.1	36.39%	3,375.8

Normal cost includes administrative expenses and health insurance subsidy. The health insurance subsidy is assumed to be $65 million each year.
Total expenses shown include benefit payments, refunds, administrative expenses and health insurance subsidy.
Actuarial accrued liability and assets are measured at the end of the fiscal year. Normal Cost is measured at the middle of the fiscal year.
State contributions, benefit payments, refunds, administrative expenses, and employee contributions are assumed to occur during the middle of the year.
55 percent of the Board of Education's dedicated property tax levy of 0.567 percent is assumed to be paid March 1, each fiscal year. The remaining Board of Education contributions are assumed to occur at the end of the year.
Total payroll is capped for members hired after December 31, 2010, as defined in Public Act 96-0889.

Graph 2
Projected Actuarial Accrued Liabilities
Actuarial Valuation as of June 30, 2017



Graph 3
Projected Benefit Payments
(Including Administrative Expenses and Health Insurance Subsidy)
Actuarial Valuation as of June 30, 2017



SECTION D

FUND ASSETS

Table 6
Statement of Fiduciary Net Position for Years Ended June 30, 2017, and 2016

	Pension Fund	Health Insurance Fund	Total 2017	Total 2016
Assets:				
Cash	$ 464,086,431	$ -	$ 464,086,431	$ 15,802,244
Prepaid expense	118,703	-	118,703	96,590
Receivables:				
Minimum funding requirement (Employer)	286,143,422	-	286,143,422	24,250,001
Minimum funding requirement (State)	11,170,500	-	11,170,500	-
Employee	15,659,656	-	15,659,656	8,407,998
Accrued investment income	31,013,531	-	31,013,531	29,200,065
Due from brokers	137,159,828	-	137,159,828	99,041,131
Participating teachers' accounts for contributions	4,345,850	-	4,345,850	4,363,847
Other receivables	10,046,636	4,688,003	14,734,639	4,869,656
Total receivables	495,539,423	4,688,003	500,227,426	170,132,698
Investments, at fair value:				
U.S. government and agency fixed income	1,161,296,835	-	1,161,296,835	1,204,557,907
U.S. corporate fixed income	804,984,477	-	804,984,477	792,611,191
Foreign fixed income securities	42,077,396	-	42,077,396	43,278,248
U.S. equities	3,299,443,380	-	3,299,443,380	2,904,397,922
Foreign equities	3,018,577,197	-	3,018,577,197	2,537,878,904
Public REITs	128,631,513	-	128,631,513	237,089,990
Pooled short-term investment funds	353,942,206	-	353,942,206	1,016,270,961
Real estate	738,933,811	-	738,933,811	803,248,475
Infrastructure	241,328,735	-	241,328,735	237,772,092
Private equity	281,130,643	-	281,130,643	287,138,325
Hedge funds	-	-	-	28,041,480
Margin cash	109,981	-	109,981	3,870,883
Total investments	10,070,456,174	-	10,070,456,174	10,096,156,378
Securities lending collateral	941,037,933	-	941,037,933	779,223,423
Capital assets, net of accumulated depreciation	1,176,457	-	1,176,457	1,057,706
Total assets	11,972,415,121	4,688,003	11,977,103,124	11,062,469,039
Liabilities:				
Benefits payable	4,536,065	4,631,741	9,167,806	12,318,929
Refunds payable	13,856,182	-	13,856,182	10,583,451
Accounts and administrative expenses payable	11,120,845	56,262	11,177,107	22,342,034
Employer required contribution payable	10,449,000	-	10,449,000	-
Securities lending collateral payable	940,349,072	-	940,349,072	774,724,709
Due to brokers	198,930,030	-	198,930,030	129,202,606
Total liabilities	1,179,241,194	4,688,003	1,183,929,197	949,171,729
Net Position Restricted for Pension Benefits	$ 10,793,173,927	$ -	$ 10,793,173,927	$ 10,113,297,310

Table 7
Statement of Changes in Fiduciary Net Position for Years Ended June 30, 2017, and 2016

	Pension Fund	Health Insurance Fund	Total 2017	Total 2016
Additions:				
Contributions:				
Employee	$ 187,538,787	$ -	$ 187,538,787	$ 191,882,430
Minimum funding requirement (Employer)	734,654,000	-	734,654,000	622,965,000
Minimum funding requirement (State)	12,186,000	-	12,186,000	12,105,000
Allocation to health insurance fund	(49,000,701)	49,000,701	-	65,000,000
Total contributions	885,378,086	49,000,701	934,378,787	891,952,430
Investment income:				
Net appreciation in fair value	1,027,032,210	-	1,027,032,210	(238,462,924)
Interest	70,805,204	-	70,805,204	72,312,231
Dividends	166,279,885	-	166,279,885	167,076,106
Miscellaneous	503,577	-	503,577	2,350,533
Securities lending income, net	4,501,068	-	4,501,068	4,498,713
Less investment expense:				
Investment advisory and custodial fees	(36,118,005)	-	(36,118,005)	(35,761,822)
Net investment income	1,233,003,939	-	1,233,003,939	(27,987,163)
Miscellaneous	214,119	-	214,119	1,463,050
Total additions	2,118,596,144	49,000,701	2,167,596,845	865,428,317
Deductions:				
Pension benefits	1,389,448,172	-	1,389,448,172	1,346,533,282
Refunds	31,428,981	-	31,428,981	32,134,384
2.2 Legislative refunds	780,389	-	780,389	1,441,215
Refund of insurance premiums	-	48,451,055	48,451,055	66,104,598
Death benefits	3,280,642	-	3,280,642	4,717,517
Total benefits payments	1,424,938,184	48,451,055	1,473,389,239	1,450,930,996
Administrative and miscellaneous expenses	13,781,343	549,646	14,330,989	12,867,490
Total deductions	1,438,719,527	49,000,701	1,487,720,228	1,463,798,486
Net increase	679,876,617	-	679,876,617	(598,370,169)
Net Position Restricted for Pension Benefits				
Beginning of the Year	10,093,067,588	20,229,722	10,113,297,310	10,711,667,479
Transfer of residual assets to Pension Plan	20,229,722	(20,229,722)	-	
End of year	$ 10,793,173,927	$ -	$ 10,793,173,927	$ 10,113,297,310

Table 8
Development of the Actuarial Value of Assets

Year Ending June 30	2017	2018	2019	2020
Beginning of Year:				
(1) Market Value of Assets	$ 10,113,297,310			
(2) Actuarial Value of Assets	10,630,976,553			
End of Year:				
(3) Market Value of Assets	10,793,173,927			
(4) Contributions and Disbursements				
(4a) Actual Employer & Misc. Contributions	747,054,119			
(4b) Employee Contributions	187,538,787			
(4c) Benefit Payouts & Refunds	(1,473,389,239)			
(4d) Administrative Expenses	(14,330,989)			
(4e) Net of Contributions and Disbursements	(553,127,322)			
(5) Total Investment Income				
=(3)-(1)-(4e)	1,233,003,939			
(6) Projected Rate of Return	7.75%			
(7) Projected Investment Income				
=(2)x(6)+([1+(6)]^.5-1)x(4b+4c+4d)	774,458,716			
(8) Investment Income in				
Excess of Projected Income	458,545,223			
(9) Excess Investment Income Recognized				
This Year (4-year recognition)				
(9a) Year Ended June 30, 2017	$ 114,636,306			
(9b) Year Ended June 30, 2016	(195,532,238)	$ 114,636,306		
(9c) Year Ended June 30, 2015	(87,974,761)	(195,532,238)	$ 114,636,306	
(9d) Year Ended June 30, 2014	249,594,431	(87,974,760)	(195,532,237)	114,636,305
(9f) Total Recognized Investment Gain	80,723,738	(168,870,692)	(80,895,931)	114,636,305
(10) Change in Actuarial Value of Assets				
=(4e)+(7)+(9f)	$ 302,055,132			
End of Year:				
(3) Market Value of Assets	**$ 10,793,173,927**			
(11) Actuarial Value of Assets	**$ 10,933,031,685**			
(12) Difference Between Market & Actuarial Values	$ (139,857,758)			
(13) Estimated Actuarial Value Rate of Return	8.26%			
(14) Estimated Market Value Rate of Return	12.53%			
(15) Ratio of Actuarial Value to Market Value	101.30%			

Graph 4
Historical Assets Values From June 30, 2008, — 2017

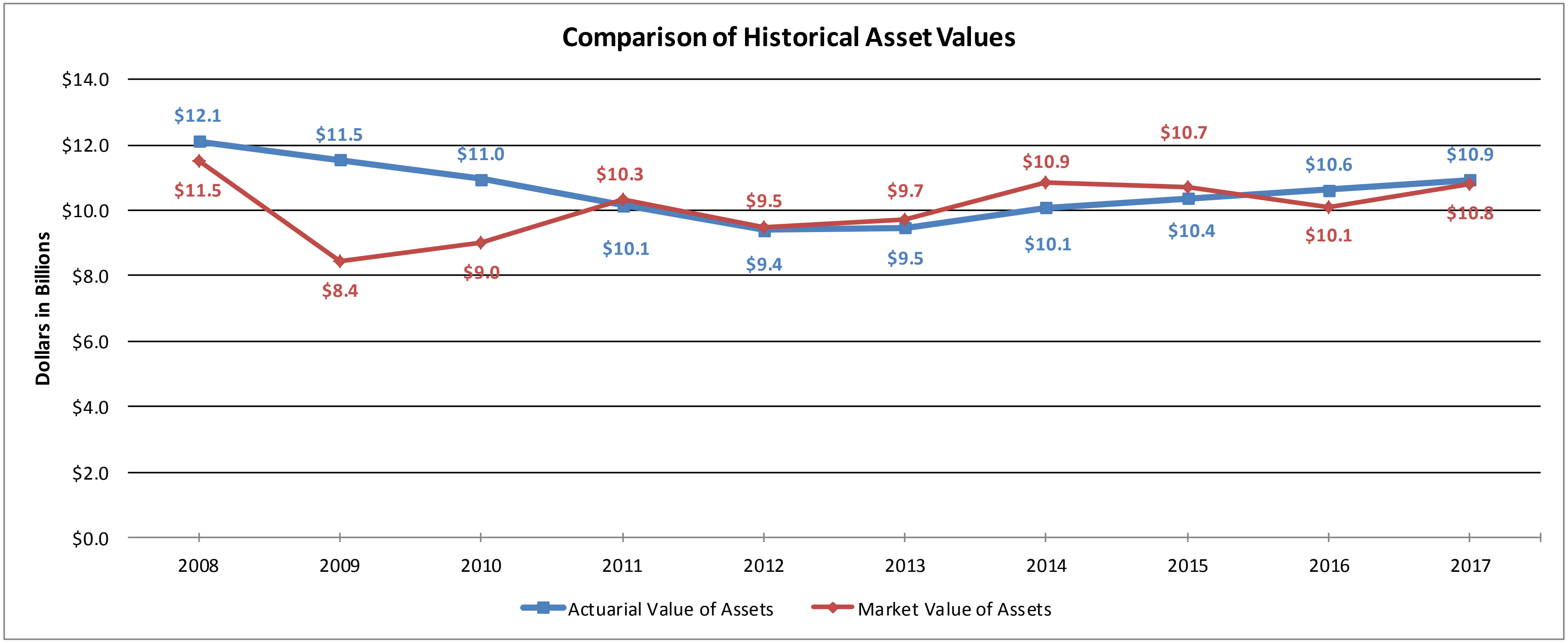
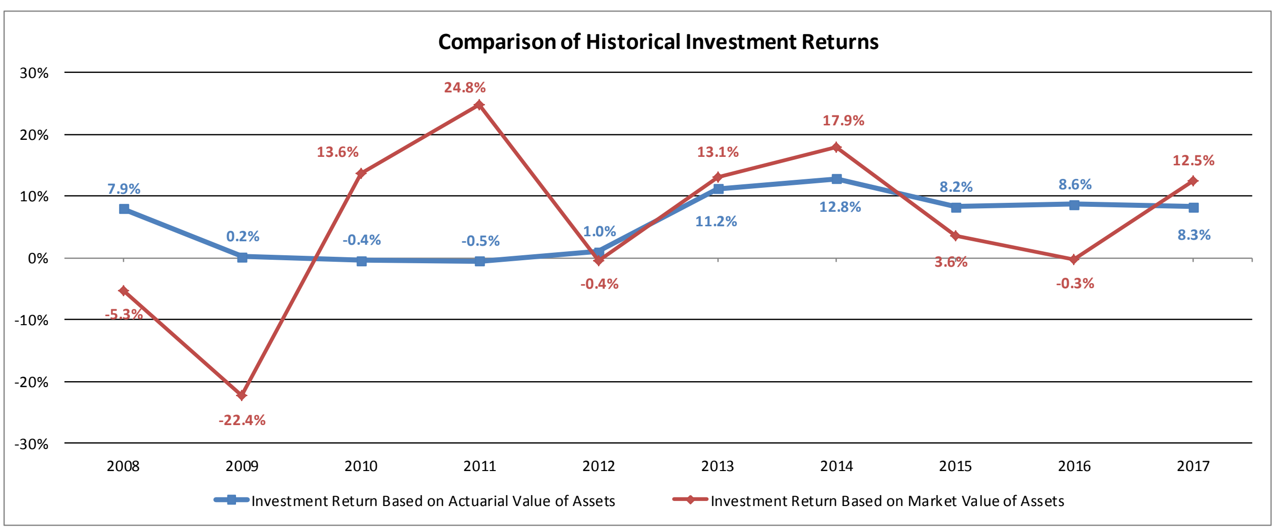


Table 9
Historical Investment Returns

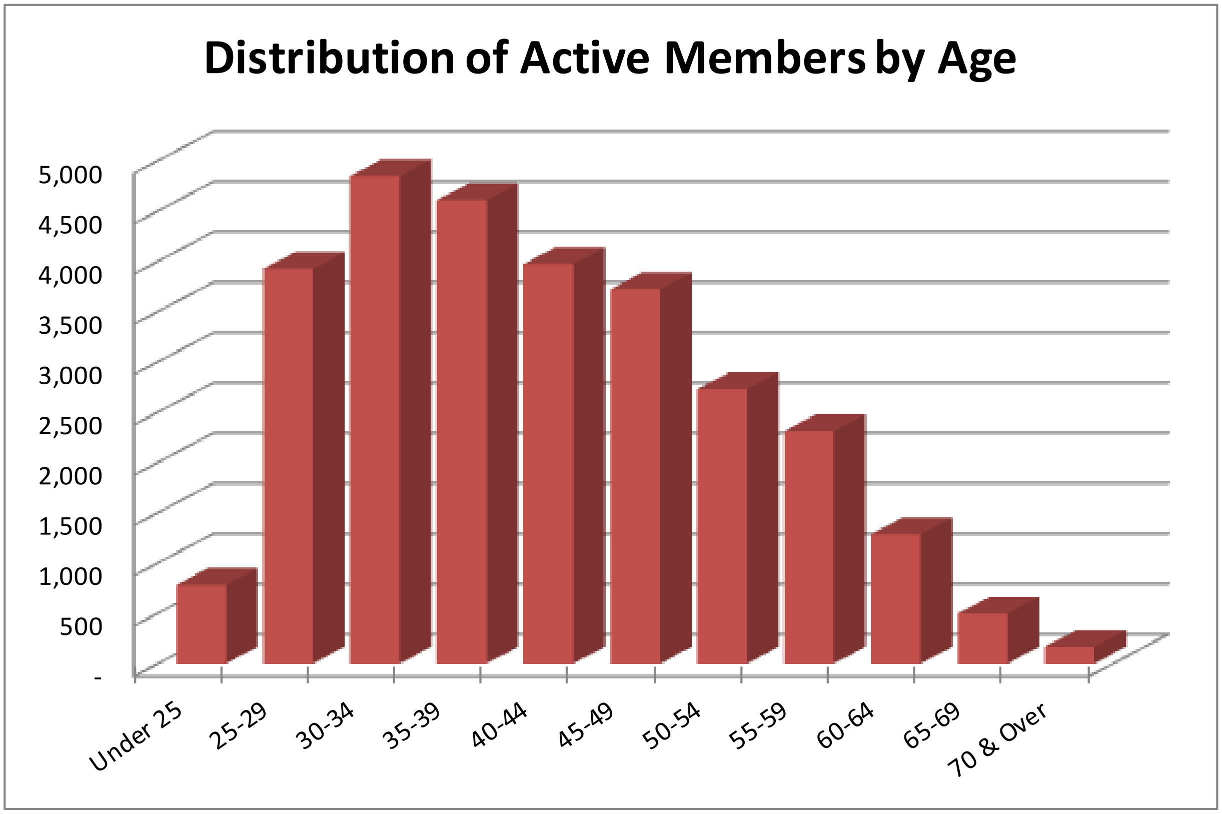
Year Ended June 30,	Market Value Return	Actuarial Value Return
1993	14.3%	n/a
1994	0.4%	n/a
1995	18.7%	n/a
1996	16.3%	n/a
1997	19.8%	n/a
1998	18.2%	n/a
1999	10.7%	n/a
2000	9.5%	n/a
2001	(1.5%)	n/a
2002	(3.3%)	n/a
2003	4.0%	2.3%
2004	15.0%	3.2%
2005	10.8%	6.0%
2006	10.7%	9.6%
2007	17.7%	13.3%
2008	(5.3%)	7.9%
2009	(22.4%)	0.2%
2010	13.6%	(0.4%)
2011	24.8%	(0.5%)
2012	(0.4%)	1.0%
2013	13.1%	11.2%
2014	17.9%	12.8%
2015	3.6%	8.2%
2016	(0.3%)	8.6%
2017	12.5%	8.3%
Average Returns		
Last 10 Years:	**4.9%**	**5.6%**
Last 25 Years:	**8.2%**	**n/a**

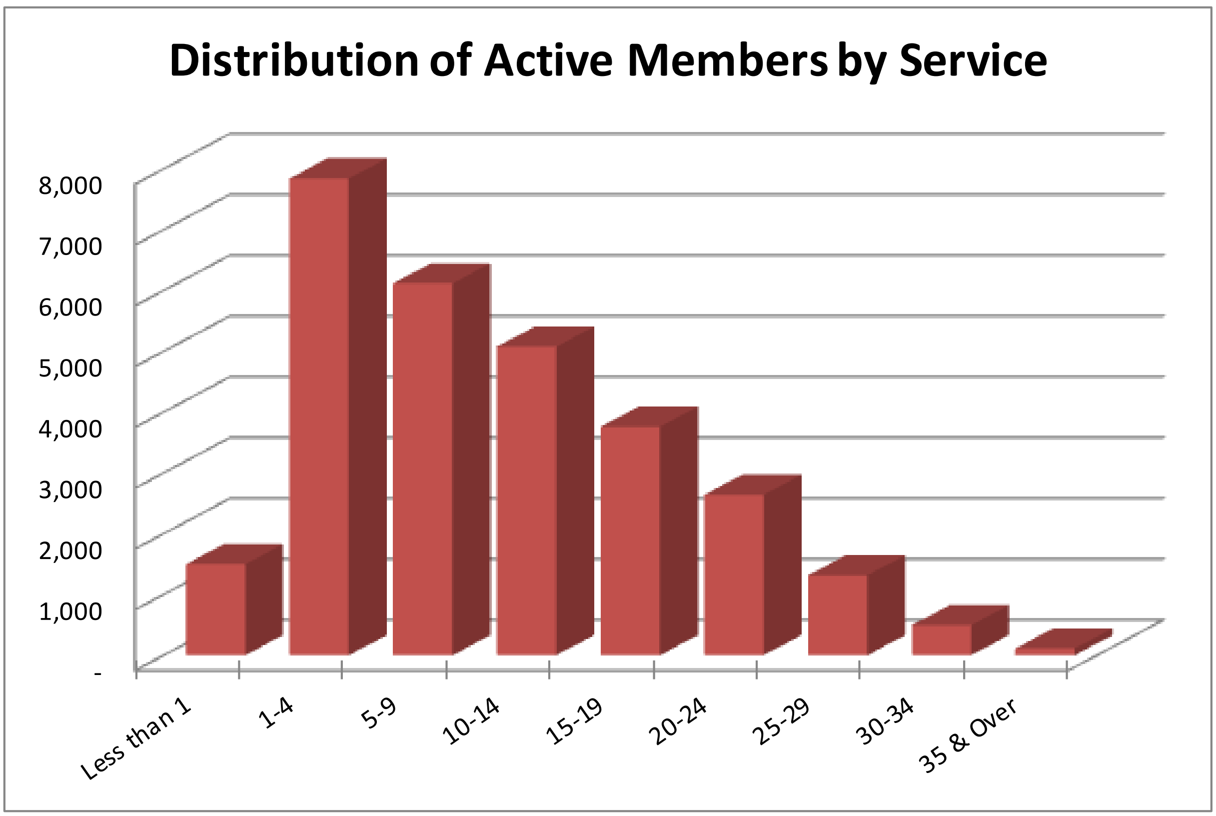


SECTION E

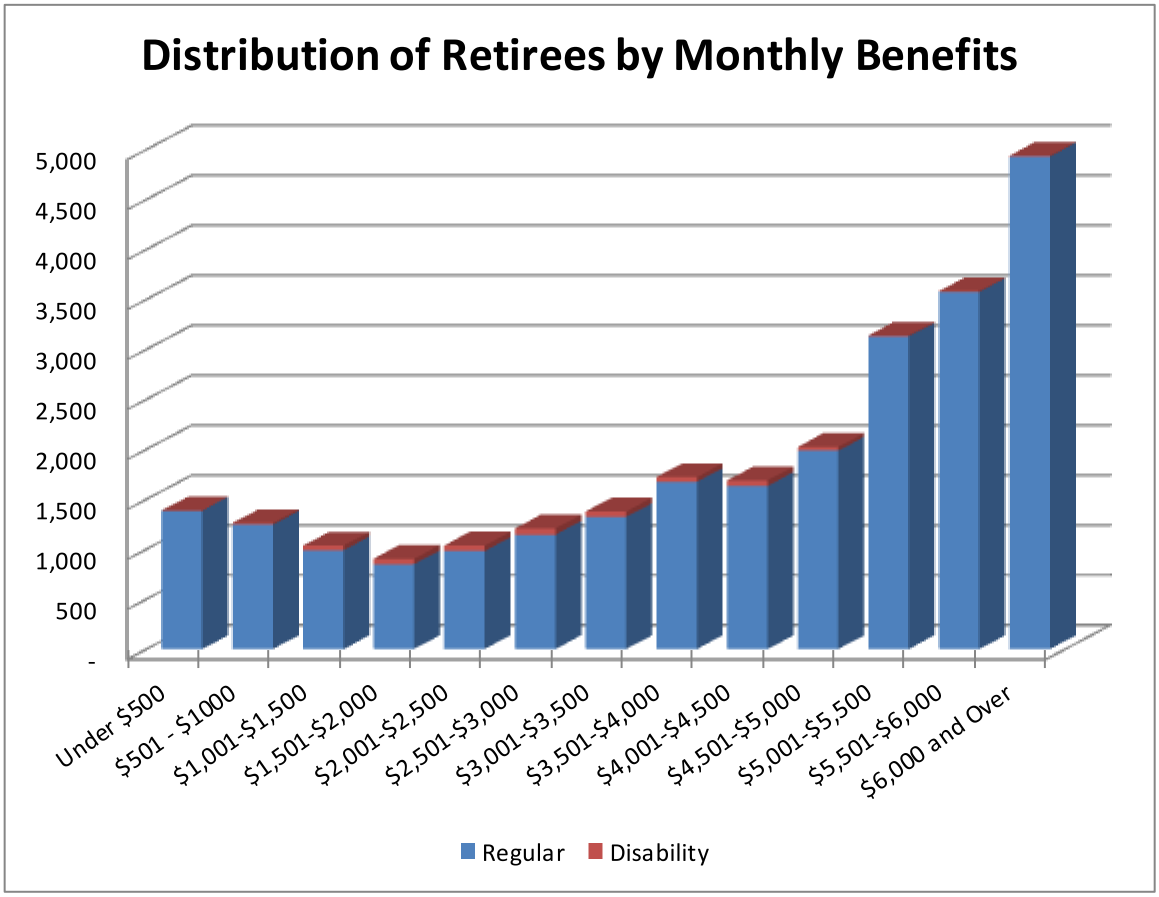
PARTICIPANT DATA

Graph 5
Active Members Classified by Age and Service





Graph 6
Retirees Classified by Benefit Amount and Age



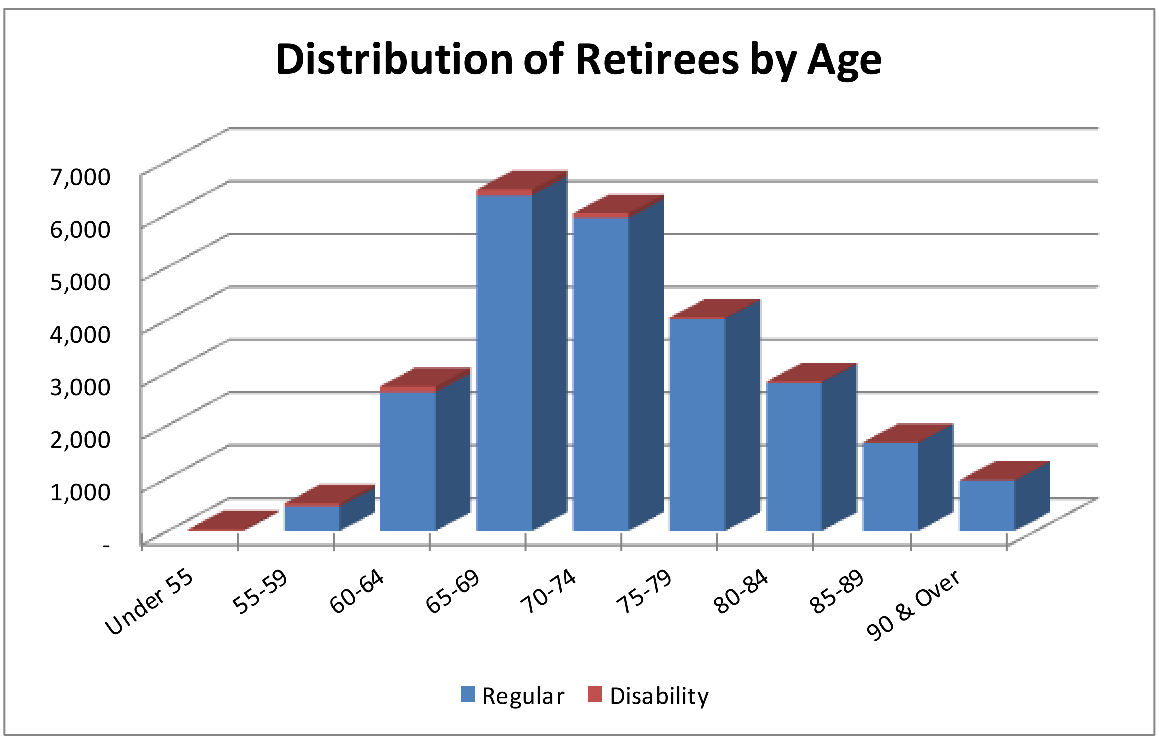


Table 10
Summary of Fund Membership

	Year Ended		Change From Prior Year
	June 30, 2017	June 30, 2016	
Active Members			
Number	28,855	29,543	**-2.3%**
Average Age	41.8	41.5	
Average Service	10.6	10.4	
Total Salary Supplied by Fund	$2,030,175,116	$2,071,040,979	**-2.0%**
Average Annual Salary	$70,358	$70,103	**0.4%**
Total Active Vested Participants	17,800	18,557	**-4.1%**
Male Members	6,961	7,077	**-1.6%**
Female Members	21,894	22,466	**-2.5%**
Tier 1 Members	20,271	21,620	**-6.2%**
Tier 2 Members	8,584	7,923	**8.3%**
Inactive Vested Members			
Number	6,062	5,715	**6.1%**
Average Age	47.2	47	
Average Service	10.1	n/a	
Inactive Non-vested Members			
Number	22,570	22,042	**2.4%**
Retirees			
Number	24,837	24,732	**0.4%**
Average Age	73.7	73.3	
Average Annual Benefit	$53,052	$51,721	**2.6%**
Total Annual Benefit	$1,317,657,163	$1,279,157,562	**3.0%**
Disabled Retirees			
Number	467	476	**-1.9%**
Average Age	67.0	66.6	
Average Annual Benefit	$36,427	$35,447	**2.8%**
Total Annual Benefit	$17,011,424	$16,872,644	**0.8%**
Beneficiaries (Including Children)			
Number	3,135	3,090	**1.5%**
Average Age	76.3	76.0	
Average Annual Benefit	$22,112	$21,311.44	**3.8%**
Total Annual Benefit	$69,320,685	$65,852,350	**5.3%**
Total Members	85,926	85,598	**0.4%**

Table 11
Member Population and Ratio of Non-actives to Actives

Year Ended June 30,	Active Participants	Vested Terminated Participants[a]	Retirees and Beneficiaries	Ratio of Non-Actives to Actives
2008	32,086	3,479	23,920	0.85
2009	31,905	3,056	24,218	0.85
2010	31,012	3,554	24,600	0.91
2011	30,133	4,253	25,199	0.98
2012	30,366	4,245	25,926	0.99
2013	30,969	4,502	27,440	1.03
2014	30,654	4,818	27,722	1.06
2015	29,706	5,464	28,114	1.13
2016	29,543	5,715	28,298	1.15
2017	28,855	6,062	28,439	1.20

[a] *Excludes non-vested terminated participants due a refund of member contributions.*

Table 12
Total Lives and Annual Salaries of Active Members Classified by Age and Years of Service as of June 30, 2017

	Completed Years of Service									
Attained Age	Under 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35 & Over	Total
Under 20	-	-	-	-	-	-	-	-	-	**-**
	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ -**
20-24	187	596	-	-	-	-	-	-	-	**783**
	$ 2,276,597	$ 29,371,764	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 31,648,361**
25-29	336	2,853	737	-	-	-	-	-	-	**3,926**
	$ 3,214,003	$ 150,529,918	$ 45,458,500	$ -	$ -	$ -	$ -	$ -	$ -	**$ 199,202,421**
30-34	239	1,843	2,219	547	-	-	-	-	-	**4,848**
	$ 3,048,036	$ 99,885,132	$ 150,750,603	$ 45,321,989	$ -	$ -	$ -	$ -	$ -	**$ 299,005,759**
35-39	161	915	1,315	1,792	425	-	-	-	-	**4,608**
	$ 1,622,120	$ 48,178,550	$ 91,908,694	$ 152,246,663	$ 39,328,458	$ -	$ -	$ -	$ -	**$ 333,284,485**
40-44	141	530	670	1,110	1,251	272	-	-	-	**3,974**
	$ 1,716,642	$ 27,183,960	$ 46,147,426	$ 95,262,997	$ 117,781,852	$ 27,457,475	$ -	$ -	$ -	**$ 315,550,351**
45-49	131	399	479	644	908	958	203	-	-	**3,722**
	$ 1,193,244	$ 20,180,083	$ 33,449,957	$ 54,465,828	$ 83,429,705	$ 93,690,083	$ 21,220,737	$ -	$ -	**$ 307,629,637**
50-54	97	261	278	382	479	627	509	95	1	**2,729**
	$ 717,431	$ 12,401,367	$ 18,507,276	$ 31,307,456	$ 42,555,649	$ 58,161,086	$ 49,702,025	$ 9,764,349	$ 96,969	**$ 223,213,608**
55-59	87	204	205	307	383	467	371	269	19	**2,312**
	$ 690,752	$ 7,675,442	$ 11,916,695	$ 23,946,685	$ 33,609,152	$ 42,301,857	$ 35,295,116	$ 27,102,095	$ 2,143,799	**$ 184,681,595**
60-64	67	131	116	203	223	240	169	91	47	**1,287**
	$ 335,349	$ 5,174,693	$ 6,358,321	$ 14,985,338	$ 18,918,555	$ 21,875,916	$ 15,961,562	$ 9,237,277	$ 4,759,233	**$ 97,606,245**
65-69	34	74	73	75	70	58	54	29	32	**499**
	$ 125,784	$ 1,793,306	$ 2,551,445	$ 4,231,894	$ 5,447,667	$ 5,238,057	$ 5,143,770	$ 2,804,965	$ 3,306,213	**$ 30,643,101**
70 & Over	18	37	26	16	20	18	9	9	14	**167**
	$ 65,972	$ 457,527	$ 505,874	$ 627,396	$ 1,273,005	$ 1,542,876	$ 926,710	$ 832,753	$ 1,477,441	**$ 7,709,553**
Total	**1,498**	**7,843**	**6,118**	**5,076**	**3,759**	**2,640**	**1,315**	**493**	**113**	**28,855**
	$ 15,005,929	**$ 402,831,742**	**$ 407,554,791**	**$ 422,396,245**	**$ 342,344,044**	**$ 250,267,350**	**$ 128,249,919**	**$ 49,741,439**	**$ 11,783,656**	**$ 2,030,175,116**

Table 13
Reconciliation of Member Data as of June 30, 2017

	Actives	Deferred Vested	Expected Refunds	Retirees	Disabilities	Beneficiaries	Total
Totals as of the June 30, 2016, Actuarial Valuation	29,543	5,715	22,042	24,732	476	3,090	85,598
New Entrants	2,275	-	-	-	-	-	2,275
Rehires — Members with Service	613	(200)	(413)	-	-	-	-
Non-Vested Terminations	(1,658)	(1)	1,659	-	-	-	-
Vested Terminations	(889)	911	(22)	-	-	-	-
Service Retirements	(596)	(194)	(17)	810	(3)	-	-
Disabilities	(12)	(5)	-	(1)	18	-	-
Deaths	(42)	(22)	(40)	(709)	(2)	(194)	(1,009)
New Beneficiaries	-	-	-	-	-	239	239
Refunds and Benefit Terminations	(379)	(178)	(799)	-	(22)	-	(1,378)
Data Adjustments	-	36	160	5	-	-	201
Net Change	(688)	347	528	105	(9)	45	328
Totals as of the June 30, 2017, Actuarial Valuation	28,855	6,062	22,570	24,837	467	3,135	85,926

Table 14
History of Retirees and Beneficiaries Added to Rolls

Fiscal Year	Added to Rolls		Removed from Rolls		Rolls - End of Year		Average Annual Allowances	Increase in Avg. Annual Allowance
	No.	Annual Allowance	No.	Annual Allowance	No.	Annual Allowance		
2007	2,055	$ 104,043,221	537	$ 14,063,967	23,623	$ 854,319,840	$ 36,165	4.60%
2008	881	67,060,461	584	16,543,468	23,920	904,836,833	37,828	4.60%
2009	957	57,109,256	659	19,557,718	24,218	942,388,371	38,913	2.87%
2010	1,080	67,630,266	698	21,855,794	24,600	988,162,843	40,169	3.23%
2011	1,394	86,404,558	795	26,694,342	25,199	1,047,873,059	41,584	3.52%
2012	1,579	96,719,811	852	28,511,983	25,926	1,116,080,887	43,049	3.52%
2013	2,129	130,553,477	615	21,764,846	27,440	1,224,869,518	44,638	3.69%
2014	1,006	70,963,134	724	26,376,522	27,722	1,269,456,130	45,792	2.59%
2015	1,302	85,087,053	910	34,678,799	28,114	1,319,864,384	46,947	2.52%
2016	1,101	78,909,433	917	36,891,261	28,298	1,361,882,556	48,126	2.51%
2017	1,072	79,434,960	931	37,328,244	28,439	1,403,989,272	49,368	2.58%

Table 15
Annuitants Classified by Benefit Type and Amount

Amount of Monthly Benefit	Retirees		Disabled Retirees		Beneficiaries		Total	
	Male	Female	Male	Female	Male	Female	Male	Female
$ 1 - 500	386	999	1	1	168	247	555	1,247
501 - 1000	384	861	5	11	212	365	601	1,237
1,001-1,500	325	664	14	33	149	192	488	889
1,501-2,000	222	626	8	48	171	238	401	912
2,001-2,500	234	746	12	45	144	247	390	1,038
2,501-3,000	257	887	13	51	227	357	497	1,295
3,001-3,500	301	1,021	15	40	42	138	358	1,199
3,501-4,000	309	1,364	13	35	18	77	340	1,476
4,001-4,500	331	1,302	9	47	12	56	352	1,405
4,501-5,000	470	1,516	6	33	8	33	484	1,582
5,001-5,500	765	2,362	3	8	4	17	772	2,387
5,501-6,000	862	2,713	1	6	3	7	866	2,726
6,001-6,500	479	1,469	-	-	-	1	479	1,470
6,501-7,000	237	594	2	2	-	-	239	596
7,001-7,500	191	278	-	1	-	-	191	279
7,501-8,000	121	227	2	1	-	-	123	228
8,001-8,500	100	220	1	-	-	-	101	220
8,501-9,000	85	164	-	-	1	-	86	164
9,001-9,500	76	128	-	-	-	-	76	128
Over $9,500	195	366	-	-	-	1	195	367
Totals	**6,330**	**18,507**	**105**	**362**	**1,159**	**1,976**	**7,594**	**20,845**

Table 16
Initial Year of Retirement Analysis

	Years of Credited Service							
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	Total
Fiscal Year 2013								
Avg Monthly Annuity	$ 275	$ 856	$ 1,645	$ 2,761	$ 3,567	$ 4,422	$ 5,976	$ 4,294
Avg Monthly FAS	$ 5,623	$ 5,491	$ 6,180	$ 7,136	$ 7,495	$ 7,688	$ 8,157	$ 7,535
Number of Retirees	56	114	91	186	380	256	824	1,907
Average Age								63.2
Fiscal Year 2014								
Avg Monthly Annuity	$ 262	$ 758	$ 1,648	$ 2,581	$ 3,477	$ 4,307	$ 5,683	$ 3,217
Avg Monthly FAS	$ 6,555	$ 5,023	$ 6,309	$ 6,657	$ 7,376	$ 7,516	$ 7,823	$ 6,958
Number of Retirees	46	89	74	102	184	120	145	760
Average Age								63.4
Fiscal Year 2015								
Avg Monthly Annuity	$ 275	$ 877	$ 1,606	$ 2,621	$ 3,530	$ 4,254	$ 5,561	$ 3,398
Avg Monthly FAS	$ 6,587	$ 5,377	$ 5,891	$ 6,851	$ 7,555	$ 7,483	$ 7,762	$ 7,077
Number of Retirees	47	104	117	107	269	172	240	1,056
Average Age								63.2
Fiscal Year 2016								
Avg Monthly Annuity	$ 326	$ 840	$ 1,493	$ 2,432	$ 3,440	$ 4,294	$ 5,701	$ 3,286
Avg Monthly FAS	$ 7,267	$ 5,266	$ 5,627	$ 6,515	$ 7,301	$ 7,711	$ 8,026	$ 7,054
Number of Retirees	61	92	77	113	184	123	202	852
Average Age								63.1
Fiscal Year 2017								
Avg Monthly Annuity	$ 323	$ 734	$ 1,578	$ 2,516	$ 3,438	$ 4,301	$ 5,684	$ 3,466
Avg Monthly FAS	$ 6,255	$ 4,332	$ 5,819	$ 6,705	$ 7,268	$ 7,612	$ 7,975	$ 6,961
Number of Retirees	38	80	83	99	167	129	219	815
Average Age								63.7

SECTION F

ACTUARIAL METHODS AND ASSUMPTIONS

Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2013, Actuarial Valuation)

Actuarial Cost Method as Mandated by 40 ILCS 5/17-129, Adopted August 31, 1991

The Projected Unit Credit normal cost method is used. Under this method, the projected pension at retirement age is first calculated and the present value at the individual member's current or attained age is determined. The normal cost for the member for the current year is equal to the actuarial present value divided by the member's projected service at retirement. The normal cost for the plan for the year is the sum of the individual normal costs.

The actuarial liability at any point in time is the present value of the projected pensions at that time less the present value of future normal costs.

For ancillary benefits for active members, in particular death and survivor benefits, termination benefits, and the postretirement increases, the same procedure as outlined above is followed.

Estimated annual administrative expenses are added to the normal cost.

For actuarial valuation purposes, as well as projection purposes, an actuarial value of assets is used.

Actuarial Assumptions

Actuarial assumptions are set by the Board of Trustees. Most of the actuarial assumptions used for the June 30, 2017, actuarial valuation are based on an experience review for the five-year period ending July 1, 2007, through June 30, 2012, performed by the prior actuary (Segal Consulting). Beginning with the June 30, 2017, actuarial valuation, the investment return assumption, general inflation assumption and wage inflation assumption were reduced from 7.75 percent to 7.25 percent, 2.75 percent to 2.50 percent and 3.50 percent to 3.25 percent, respectively. The general inflation assumption also serves as the basis for the determination of annual increases in pension and pensionable salary cap for Tier 2 members. As a result of the change in the general inflation assumption, the assumption regarding future increases in pension and pensionable salary cap was reduced from 1.375 percent to 1.25 percent per year for current and future Tier 2 members. All actuarial assumptions are expectations of future experience, not market measures.

Mortality

Pre and Post-Retirement Healthy Mortality

The RP-2000 Healthy Annuitant mortality table, sex distinct, set back two years with generational mortality improvement from 2004 using Scale AA. This assumption provides a margin for future mortality improvements. No adjustment is made for post-disabled mortality.

Post-Retirement Disabled Mortality

The RP-2000 Disabled mortality table, sex distinct, set back three years.

Interest

7.25 percent per annum, compounded annually, net of investment expenses.

General Inflation

2.50 percent per annum, compounded annually.

This assumption serves as the basis for the determination of annual increases in pension and the pensionable salary cap for Tier 2 members.

Wage Inflation

3.25 percent per annum, compounded annually.

Total Payroll

Unless stated otherwise, total payroll includes employee contributions of seven percent of salary picked up by the Board of Education for employees hired prior to January 1, 2017. All contributions are calculated based on total payroll.

Termination

Select and ultimate termination rates were used. Ultimate rates after the tenth year are shown in the 10+ Years of Service column in the table below. Select rates are as follows:

Termination			
Less Than 10 Years of Service		10+ Years of Service	
Service (Beginning of Year)	Rate (%)	Age	Rate (%)
0	25.00%		
1	15.00%		
2	10.00%		
3	9.00%		
4	8.00%		
5	7.00%		
6	6.00%		
7	5.00%		
8	4.50%		
9	4.00%		
		30	2.50%
		35	2.50%
		40	2.25%
		45	2.00%
		50	2.00%
		55	2.00%

It is assumed that terminated employees will not be rehired. The rates apply only to employees who have not fulfilled the service requirement necessary for retirement at any given age.

Salary Increases

Illustrative rates of increase per individual employee per annum, compounded annually:

Age	Annual Increase
20	15.50%
25	10.50%
30	7.00%
35	7.00%
40	5.50%
45	5.00%
50	4.50%
55	4.00%
60	4.00%
65	4.00%
70	4.00%

The underlying salary increase assumption is based on a wage inflation assumption of 3.25 percent per annum.

Disability

Disability rates, based on recent experience of the Fund, were applied to members with at least ten years of service. All disabilities are assumed to be non-duty disabilities. Sample rates are as follows:

Age	Rate (%)
20	0.05%
25	0.05%
30	0.06%
35	0.07%
40	0.08%
45	0.12%
50	0.16%
55	0.20%
60	0.20%

Retirement

Employees are assumed to retire in accordance with the rates shown below. The rates apply only to employees who have fulfilled the service requirement necessary for retirement at any given age.

Retirement Rates for Tier 1 Employees		
Age	<34 Years of Service Rate (%)	34+ Years of Service Rate (%)
55	5.00%	20.00%
56	5.00%	20.00%
57	5.00%	20.00%
58	5.00%	20.00%
59	7.00%	20.00%
60	9.00%	22.50%
61	11.00%	22.50%
62	12.00%	22.50%
63	13.00%	22.50%
64	14.00%	22.50%
65	15.00%	25.00%
66	16.00%	25.00%
67	17.00%	25.00%
68	18.00%	27.50%
69	19.00%	27.50%
70	20.00%	30.00%
71	20.00%	30.00%
72	20.00%	30.00%
73	20.00%	30.00%
74	20.00%	30.00%
75	100.00%	100.00%

Retirement Rates for Tier 2 Employees	
Age	Rate (%)
62	40.00%
63	25.00%
64	25.00%
65	30.00%
66	25.00%
67	30.00%
68	20.00%
69	20.00%
70	20.00%
71	20.00%
72	20.00%
73	20.00%
74	20.00%
75	100.00%

Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2013, Actuarial Valuation)

Population Projection

For purposes of determining annual appropriation as a percent of total covered payroll, the size of the active group is assumed to remain level at the number of actives as of the actuarial valuation date, or 28,855. New entrants are assumed to enter with an average age and an average pay as disclosed below. New entrants are assumed to have a similar demographic profile of recent new entrants to the Fund. The average increase in payroll for the projection period is 2.50 percent per annum.

New Entrant Profile		
Age Group	No.	Salary
Under 20		
20-24	204	$ 8,556,240
25-29	359	15,333,868
30-34	161	7,063,544
35-39	93	4,237,520
40-44	63	2,752,034
45-49	45	1,636,736
50-54	26	896,540
55-59	27	762,523
60-64	16	311,206
65-69	5	143,263
70 & Over		
Total	**999**	**$ 41,693,474**
Avg. Salary		**$ 41,735**
Avg. Age		**31.78**
Percent Male		**26%**

Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2013, Actuarial Valuation)

Assets

The asset values used for the actuarial valuation were based on asset information contained in the financial statements for the year ended June 30, 2017, prepared by the Fund. The actuarial value of assets was determined by smoothing unexpected gains or losses over a period of four years. The investment gain or loss for a year is calculated as the total investment income on the market value of assets, minus expected investment return on the prior actuarial value of assets. The final actuarial value is equal to the expected actuarial value plus (or minus) 25 percent of the calculated gain (or loss) in the prior four years.

Expenses

Administrative expenses included in the normal cost are based on the previous years' administrative expenses increased by five percent. Future administrative expenses are assumed to increase at five percent per year.

Marriage Assumption

80.0 percent of active participants are assumed to be married. Actual marital status at benefit commencement is used for retirees.

Spouse's Age

The female spouse is assumed to be two years younger than the male spouse.

Total Service at Retirement

A teacher's total service credit at retirement is assumed to be 103.3 percent of the teacher's regular period of service at retirement.

Valuation of Inactive Members Eligible for Deferred Vested Pension Benefits

Benefits for inactive deferred vested members were determined by projecting the accumulated contribution balance to retirement (age 62) with interest at the assumed investment rate of return, converted to an annuity, and then loaded by 35 percent.

Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2013, Actuarial Valuation)

Contribution Timing

Projected employer contributions are assumed to occur based on the following timing:

1. Additional Board of Education Contribution (0.58 percent of pay) — June 30th (End of Year)
2. Additional State Contribution (0.544 percent of pay) — Monthly (Middle of Year)
3. State Normal Cost Contribution — Monthly (Middle of Year)
4. Board of Education Early Payment of Special Tax Levy — March 1st, annually
    a. 55 percent of prior year's tax levy is assumed to occur each March 1st
        i. This amount is assumed to be $141,625,000 if fiscal year 2018 and increased each year by three percent.
5. Remaining Board of Education Contribution — June 30th (End of Year)

Decrement Timing

All decrements are assumed to occur at the beginning of the year.

Decrement Relativity

Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.

Decrement Operation

Turnover decrements do not operate after a member reaches retirement eligibility. Disability decrements do not operate after a member reaches normal retirement eligibility.

Eligibility Testing

Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.

Assumptions as a result of Public Act 96-0889

Members hired after December 31, 2010, are assumed to make contributions on salary up to the final average compensation cap in a given year.

State contributions, expressed as a percentage of pay, are calculated based upon capped pay.

Capped (pensionable) pay was $112,408 for fiscal year 2017 and increases at ½ the annual increase in the Consumer Price Index-U thereafter.

The annual increase in the Consumer Price Index-U is assumed to be 2.50 percent for all years.

Projection Methodology and Appropriation Requirements Under P.A. 90-0655, P.A. 91-0357, P.A. 96-0889, P.A. 99-0521 and P.A. 100-0465

Employer Contributions under P.A. 98-0889

The following is an excerpt from the Illinois Compiled statutes 40 ILCS 5/17-129 (b)(iv)-(b)(vii):

(iv) For fiscal years 2014 through 2059, the minimum contribution to the Fund to be made by the Board of Education in each fiscal year shall be an amount determined by the Fund to be sufficient to bring the total assets of the Fund up to 90% of the total actuarial liabilities of the Fund by the end of fiscal year 2059. In making these determinations, the required Board of Education contribution shall be calculated each year as a level percentage of the applicable employee payrolls over the years remaining to and including fiscal year 2059 and shall be determined under the Projected Unit Credit actuarial cost method.

(v) Beginning in fiscal year 2060, the minimum Board of Education contribution for each fiscal year shall be the amount needed to maintain the total assets of the Fund at 90% of the total actuarial liabilities of the Fund.

(vi) Notwithstanding any other provision of this subsection (b), for any fiscal year, the contribution to the Fund from the Board of Education shall not be required to be in excess of the amount calculated as needed to maintain the assets (or cause the assets to be) at the 90% level by the end of the fiscal year.

(vii) Any contribution by the State to or for the benefit of the Fund, including, without limitation, as referred to under Section 17-127, shall be a credit against any contribution required to be made by the Board of Education under this subsection (b).

Additional State and Employer Contributions under P.A. 90-0655 and P.A. 91-0357

The following is an excerpt from the Illinois Compiled statutes 40 ILCS 5/17-127 (b):

(b) The General Assembly finds that for many years the State has contributed to the Fund an annual amount that is between 20% and 30% of the amount of the annual State contribution to the Article 16 retirement system, and the General Assembly declares that it is its goal and intention to continue this level of contribution to the Fund in the future. Beginning in State fiscal year 1999, the State shall include in its annual contribution to the Fund an additional amount equal to 0.544% of the Fund's total teacher payroll; except that this additional contribution need not be made in a fiscal year if the Board has certified in the previous fiscal year that the Fund is at least 90% funded, based on actuarial determinations. These additional State contributions are intended to offset a portion of the cost to the Fund of the increases in retirement benefits resulting from this amendatory Act of 1998.

The following is an excerpt from the Illinois Compiled statutes 40 ILCS 5/17-127.2 (1)-(2):

Sec. 17-127.2. Additional contributions by employer of teachers. Beginning July 1, 1998, the employer of a teacher shall pay to the Fund an employer contribution computed as follows:

(1) Beginning July 1, 1998 through June 30, 1999, the employer contribution shall be equal to 0.3% of each teacher's salary.

(2) Beginning July 1, 1999 and thereafter, the employer contribution shall be equal to 0.58% of each teacher's salary. The employer may pay these employer contributions out of any source of funding available for that purpose and shall forward the contributions to the Fund on the schedule established for the payment of member contributions. These employer contributions need not be made in a fiscal year if the Board has certified in the previous fiscal year that the Fund is at least 90% funded, based on actuarial determinations. These employer contributions are intended to offset a portion of the cost to the Fund of the increases in retirement benefits resulting from Public Act 90-582.

Board of Education Dedicated Property Tax Levy under P.A. 99-0521 as amended by P.A. 100-0465

The following is an excerpt from the Illinois Compiled statutes 105 ILCS 5/34-53:

Beginning on the effective date of this amendatory Act of the 99th General Assembly, for the purpose of making an employer contribution to the Public School Teachers' Pension and Retirement Fund of Chicago, the board may levy annually for taxable years prior to 2017, upon all taxable property located within the district, a tax at a rate not to exceed 0.383%. Beginning with the 2017 taxable year, for the purpose of making an employer contribution to the Public School Teachers' Pension and Retirement Fund of Chicago, the board may levy annually, upon all taxable property within the district, a tax at a rate of 0.567%. The proceeds from this additional tax shall be paid, as soon as possible after collection, directly to the Public School Teachers' Pension and Retirement Fund of Chicago and not to the Board of Education.

State Contributions under P.A. 100-0465

The following is an excerpt from the Illinois Compiled statutes 40 ILCS 5/17-127 (d)(1)-(d)(2):

(d) In addition to any other contribution required under this Article, including the contribution required under subsection (c), the State shall contribute to the Fund the following amounts:

(1) For State fiscal year 2018, the State shall contribute $221,300,000 for the employer normal cost for fiscal year 2018 and the amount allowed under paragraph (3) of Section 17-142.1 of this Code to defray health insurance costs. Funds to this paragraph (1) shall come from funds appropriated for Evidence-Based Funding pursuant to Section 18-8.15 of the School Code.

(2) Beginning in State fiscal year 2019, the State shall contribute for each fiscal year an amount to be determined by the Fund, equal to the employer normal cost for that fiscal year, plus the amount allowed pursuant to paragraph (3) of Section 17-142.1 to defray health insurance costs.

We calculated the required contribution based on the above legislation; the results are shown in the summary section of this report.

SECTION G

SUMMARY OF PLAN PROVISIONS

Summary of Plan Provisions
(as of June 30, 2017)

It should be noted that the purpose of this Section is to describe the benefit structures of CTPF for which actuarial values have been generated. Many portions of the defined plans are described in a manner which may not be legally complete or precise.

It is not our intent to provide an exhaustive description of all benefits provided under CTPF or the policies and procedures utilized by CTPF staff. A more precise description of the provisions of CTPF can be found in Illinois Compiled Statutes (ILCS) Chapter 40, Articles 1, 17, and 20. In all situations, the plan provisions described in the Statutes govern.

Summary of Plan Provisions
(as of June 30, 2017)

Purpose

The Public School Teachers' Pension and Retirement Fund of Chicago, established in 1895 by the Illinois state legislature, is a defined benefit public employee retirement fund that provides retirement, survivor, and disability benefits to certain teachers and employees of the Chicago Public Schools.

Administration

Responsibility for the operation of the Fund and the direction of its policies is vested in a Board of Trustees of 12 members. The 12 member Board of Trustees is comprised of six members elected by the teacher contributors, three members elected by the annuitants, one member elected by the principal contributors, and two members are appointed by the Board of Education. The administration of the detailed affairs of the Fund is the responsibility of the Executive Director who is appointed by the Board of Trustees. Administrative policies and procedures are designed to ensure an accurate accounting of funds of CTPF and prompt payment of claims for benefits within the applicable statute.

Membership

Any teacher and certain other employees of the Chicago Public Schools, approved charter schools and the Chicago Teachers' Pension Fund are participants of CTPF. Members hired prior to January 1, 2011, participate under the Tier 1 benefit structure. Members hired on and after January 1, 2011, participate under the Tier 2 benefit structure.

Membership Service

Membership service includes all service rendered while a member of the Fund for which credit is allowable. Contributors to the Fund cannot earn more than one year of service credit per fiscal year. Validated service within a fiscal year is determined on a schedule of 170 days.

Member Contributions

Members are required to contribute a percentage of salary as their share of meeting the cost of the various benefits. The total contribution rate of 9.0 percent of salary consists of 7.5 percent towards the retirement pension, 1.0 percent towards the survivor pension, and 0.5 percent towards the post-retirement increase.

As of September 1981, the Board of Education has been paying 7.0 percent of the required teacher contributions for Chicago public school teachers. Charter school contributions may be contributed at various rates by the employers and teachers.

As a result of the collective bargaining agreement between the Board of Education of the City of Chicago and the Chicago Teachers Union, Local No. 1, American Federation of Teachers, AFL-CIO, which became effective December 7, 2016, teachers hired on and after January 1, 2017, will no longer receive the pension pick-up of 7.0 percent from the Board of Education.

Summary of Plan Provisions
(as of June 30, 2017)

Retirement Pension

Qualification of Member

A member is eligible for a retirement pension after (1) completing 20 years of validated service, with the pension payable at age 55 or older, or (2) after completing five years of service with the pension payable at age 62 or older.

Amount of Pension

The pension is based on the member's final average salary and the number of years of service credit that has been established.

Final Average Salary is the average of the highest rates of salary for any four consecutive years of validated service within the last 10 years.

For service earned before July 1, 1998, the amount of the service retirement pension is 1.67 percent of final average salary for the first 10 years, 1.90 percent for each of the next 10 years, 2.10 percent for each of the following 10 years, and 2.30 percent for each year above 30. For service earned after June 30, 1998, the amount of the service retirement pension is 2.2 percent of final average salary for each year of service.

Service earned before July 1, 1998, can be upgraded to the 2.2 percent formula through the payment of additional employee contributions of 1 percent of the teacher's highest salary within the last four years for each year of prior service, up to a maximum of 20 percent, which upgrades all service years. The number of years for which contributions are required is reduced by one for each three full years of service after June 30, 1998. No contribution is required if the member has at least 30 years of service.

The maximum pension payable is 75 percent of final average salary or $1,500 per month, whichever is greater.

Annual Increases in Pension

Postretirement increases of 3.0 percent of the current pension (i.e., increases are compounded) are granted to members effective each January 1, occurring on or after the first anniversary of the pension or the 61st birthday, whichever is later.

Reductions

Except for retirement after 34 years of service, the retirement pension is reduced by ½ of 1.0 percent for each month the member is under age 60.

Survivors Annuity

Qualification of Survivor

A surviving spouse or unmarried minor children is entitled to a pension upon the death of a member while in service or in retirement. Survivor's pensions are conditioned upon marriage having been in effect at least one year prior to death.

Amount of Pension

The minimum survivor's pension upon death of an active or retired member is 50 percent of the deceased member's pension at the date of death. If the surviving spouse is under age 50, and no unmarried minor children under age 18 survive, payment of the survivor's pension is deferred until age 50.

Annual Increases in Pension

Survivor's pensions are subject to annual increases of 3.0 percent per year based on the current amount of pension starting the later of when the member would have attained age 61 and receipt of one year's pension payments.

Death Benefits

Amount and Duration of Payment

Upon the death of a member in service, a refund equal to the total contributions less contributions for survivor's pensions is payable without interest to a designated beneficiary or the estate of the member. The death benefit payable is the lesser of $10,000 and salary earned for the most recent six months.

Upon death of a member after retirement, the death benefit consists of the excess, if any, of the total contributions over the total pension payments paid to the member or his/her beneficiary. Furthermore, the death benefit is the lesser of $10,000 and the most recent salary earned for a six month period less 20% of the death benefit for each year that the member has been on pension, to a minimum of $5,000.

Non-Duty Disability Benefits

Qualification and Amount of Payment

A disability retirement pension is payable in the event of total or permanent disability with 10 or more years of service, irrespective of age. The benefit is the unreduced service retirement pension. However, if the participant has 20 or more and less than 25 years of service and is under age 55, the benefit is reduced by ½ of 1.0 percent for each month that the age of the member is below age 55 down to a minimum age of 50. If total service is 20 years or more and the member has attained age 55, or after 25 years of service, regardless of age, the retirement pension is payable without reduction.

Annual Increases in Annuity

Postretirement increases of 3.0 percent of the current pension (i.e., increases are compounded) are granted to members effective each January 1, occurring on or after the first anniversary of the pension or the 61st birthday, whichever is later.

Duty Disability Benefits

Qualification and Amount of Payment

A disability retirement pension is payable in the event of total or permanent disability from an injury that occurred while working. The disability benefit provided is 75 percent of final average salary until attainment of age 65. At age 65, the disabled retiree shall receive a service retirement pension, which includes service earned while disabled.

Annual Increases in Annuity

Postretirement increases of 3.0 percent of the current pension (i.e., increases are compounded) are granted to members effective each January 1, occurring on or after the first anniversary of the pension or the 61st birthday, whichever is later.

Refunds

Upon termination of employment, a member may obtain a refund of his/her total contributions and those contributions made on his/her behalf, without interest.

A member who is unmarried at the date of retirement is entitled to a refund of the full amount contributed for the survivor’s pension, without interest.

Reversionary Pension

A member can provide a reversionary pension for a surviving beneficiary, by having his/her current pension reduced. If the beneficiary survives the date of the member's retirement, but does not survive the retired member, the member's pension shall be restored to the full amount of pension in place prior to choosing the reversionary pension.

Health Insurance Subsidy

The board may pay each recipient of a retirement, disability, or survivor's pension an amount to be determined by the board, which shall represent partial reimbursement for the cost of the recipient's health insurance coverage, with the total amount of payment not to exceed $65,000,000, or 75% of the total cost of health insurance coverage in any year.

Retirement Systems Reciprocal Act

The Fund complies with the Retirement Systems Reciprocal Act (Chapter 40 Act 5 Article 20 of the Illinois Compiled Statutes) to provide reciprocal benefits if a member has service credit for other public employment in Illinois.

Provisions Applicable to Members Hired on or after January 1, 2011, as a result of Public Act 96-0889

Final Average Compensation

Based on last eight years of service and may not exceed $106,800, as automatically increased by the lesser of 3 percent or one-half of the annual increase in the consumer price index-u during the preceding 12-month calendar year.

Retirement Eligibility

Normal retirement – 67 years old with 10 years of service.
Early Retirement – 62 years old with 10 years of service with a 6.0 percent per year reduction in benefit for each year age is under 67.

Annual Increases in Annuity

Annual increases begin at the later of the first anniversary of retirement or age 67. The annual increases are equal to the lesser of 3.0 percent or one-half of the annual increase in the consumer price index-u during the preceding 12-month calendar year and are not compounded.

Survivor Benefits

Benefit equal to 66.67 percent of the earned retirement benefit at death. Survivor benefits are increased by the lesser of 3.0 percent or one-half of the annual increase in the consumer price index-u during the preceding 12-month calendar year and are not compounded.

Salary and COLA Development for Members Hired on or After January 1, 2011

Year Ending	CPI-U	1/2 CPI-U	COLA	Maximum Annual Pensionable Earnings
2011			3.00%	$106,800.00
2012	3.90%	1.95%	1.95%	$108,882.60
2013	2.00%	1.00%	1.00%	$109,971.43
2014	1.20%	0.60%	0.60%	$110,631.26
2015	1.70%	0.85%	0.85%	$111,571.63
2016	0.00%	0.00%	0.00%	$111,571.63
2017	1.50%	0.75%	0.75%	$112,408.42

SECTION H

GLOSSARY OF TERMS

Glossary of Terms

Actuarial Accrued Liability ("AAL") — The difference between the Actuarial Present Value of Future Benefits, and the Actuarial Present Value of Future Normal Costs.

Actuarial Assumptions — Assumptions about future plan experience that affect costs or liabilities, such as: mortality, withdrawal, disablement and retirement; future increases in salary; future rates of investment earnings; future investment and administrative expenses; characteristics of members not specified in the data, such as marital status; characteristics of future members; future elections made by members; and other items.

Actuarial Cost Method — A procedure for allocating the Actuarial Present Value of Future Benefits between the Actuarial Present Value of future Normal Costs and the Actuarial Accrued Liability.

Actuarial Equivalent — Of equal Actuarial Present Value, determined as of a given date and based on a given set of Actuarial Assumptions.

Actuarial Present Value ("APV") — The amount of funds required to provide a payment or series of payments in the future. It is determined by discounting the future payments with an assumed interest rate and with the assumed probability each payment will be made.

Actuarial Present Value of Future Benefits ("APVFB") — The Actuarial Present Value of amounts which are expected to be paid at various future times to active members, retired members, beneficiaries receiving benefits and inactive, nonretired members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.

Actuarial Valuation — The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB No. 67, such as the Funded Ratio and the Actuarially Determined Contribution ("ADC").

Actuarial Value of Assets — The value of the assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets or a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio, or contribution requirement.

Glossary of Terms

Actuarially Determined Contribution ("ADC")	The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation. The ADC consists of the Employer Normal Cost and Amortization Payment.
Amortization Method	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the rate at which total covered payroll of all active members is assumed to increase.
Amortization Payment	That portion of the plan contribution or ADC which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.
Amortization Period	The period used in calculating the Amortization Payment.
Closed Amortization Period	A specific number of years that is reduced by one each year, and declines to zero with the passage of time. For example if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc.
Employer Normal Cost	The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.
Equivalent Single Amortization Period	For plans that do not establish separate amortization bases (separate components of the UAAL), this is the same as the Amortization Period. For plans that do establish separate amortization bases, this is the period over which the UAAL would be amortized if all amortization bases were combined upon the current UAAL payment.
Experience Gain/Loss	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two actuarial valuations. To the extent that actual experience differs from that assumed, Unfunded Actuarial Accrued Liabilities emerge which may be larger or smaller than projected. Gains are due to favorable experience; e.g., the assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, losses are the result of unfavorable experience; i.e., actual results that produce Unfunded Actuarial Accrued Liabilities which are larger than projected.

Glossary of Terms

Funded Ratio	The ratio of the Actuarial Value of Assets to the Actuarial Accrued Liability.
GASB	Governmental Accounting Standards Board.
GASB Statement No. 67 and GASB Statement No. 68	These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 68, which replaced Statement No. 27 effective with the fiscal year ending June 30, 2015, sets the accounting rules for the employers that sponsor or contribute to public retirement systems. Statement No. 67, which replaced Statement No. 25 effective with fiscal year ending June 30, 2014, sets the rules for the systems themselves.
Normal Cost	The annual cost assigned, under the Actuarial Cost Method, to the current plan year.
Open Amortization Period	An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. In other words, if the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount or in relation to covered payroll.
Unfunded Actuarial Accrued Liability	The difference between the Actuarial Accrued Liability and Actuarial Value of Assets.
Valuation Date	The date as of which the Actuarial Present Value of Future Benefits are determined. The benefits expected to be paid in the future are discounted to this date.

SECTION I

ADDITIONAL PROJECTION DETAILS

Table 17
Additional Projection Details — Actuarial Accrued Liability
($ in Millions)

	Current Inactives		Actives			Grand Totals		
Fiscal Year	Retirees & Beneficiaries	Deferreds	Tier 1	Current Tier 2	Future Tier 2	Current Retirees, Beneficiaries, & Deferreds	Actives	Total
2018	$16,113.28	$458.77	$5,152.71	$97.25	$0.00	$16,572.05	$5,249.96	$21,822.01
2019	15,808.32	475.75	5,823.12	122.87	0.00	16,284.07	5,945.99	22,230.06
2020	15,471.08	493.41	6,532.44	149.02	5.52	15,964.49	6,686.99	22,651.48
2021	15,103.95	511.55	7,280.38	176.37	15.72	15,615.50	7,472.47	23,087.97
2022	14,707.63	530.05	8,066.35	205.77	30.71	15,237.69	8,302.83	23,540.51
2023	14,283.14	548.97	8,889.28	238.99	50.49	14,832.10	9,178.76	24,010.87
2024	13,831.65	568.21	9,747.98	277.36	75.24	14,399.86	10,100.58	24,500.44
2025	13,354.57	587.79	10,640.40	321.01	105.29	13,942.37	11,066.71	25,009.07
2026	12,853.48	607.21	11,563.48	370.69	141.19	13,460.69	12,075.36	25,536.05
2027	12,330.23	626.61	12,513.79	426.96	183.67	12,956.84	13,124.42	26,081.26
2028	11,786.88	645.92	13,487.08	489.75	233.46	12,432.80	14,210.29	26,643.09
2029	11,225.74	679.17	14,479.41	557.99	291.43	11,904.91	15,328.83	27,233.73
2030	10,649.37	712.99	15,484.51	632.05	359.85	11,362.35	16,476.41	27,838.77
2031	10,060.57	747.15	16,496.81	712.29	439.92	10,807.72	17,649.02	28,456.74
2032	9,462.42	781.35	17,510.38	799.09	532.85	10,243.76	18,842.32	29,086.09
2033	8,858.21	815.65	18,518.07	892.83	639.90	9,673.86	20,050.80	29,724.66
2034	8,251.45	849.14	19,512.59	993.78	762.54	9,100.59	21,268.91	30,369.50
2035	7,645.88	881.92	20,485.49	1,102.36	902.01	8,527.80	22,489.85	31,017.65
2036	7,045.42	913.51	21,428.00	1,218.90	1,059.91	7,958.93	23,706.80	31,665.73
2037	6,454.11	943.88	22,330.45	1,343.78	1,237.95	7,397.98	24,912.18	32,310.16
2038	5,876.04	972.43	23,184.00	1,477.37	1,437.91	6,848.48	26,099.28	32,947.76
2039	5,315.32	999.14	23,977.68	1,620.01	1,661.80	6,314.46	27,259.48	33,573.94
2040	4,775.86	1,022.85	24,700.63	1,771.63	1,911.01	5,798.70	28,383.28	34,181.98
2041	4,261.31	1,043.70	25,342.53	1,932.47	2,187.63	5,305.01	29,462.63	34,767.64
2042	3,774.98	1,060.57	25,893.57	2,102.61	2,493.81	4,835.55	30,489.98	35,325.54
2043	3,319.64	1,073.28	26,341.94	2,281.84	2,831.86	4,392.91	31,455.65	35,848.56
2044	2,897.46	1,081.78	26,680.91	2,469.22	3,204.42	3,979.24	32,354.55	36,333.79
2045	2,509.94	1,085.85	26,906.06	2,663.70	3,612.39	3,595.79	33,182.15	36,777.94
2046	2,157.90	1,085.10	27,013.00	2,864.21	4,058.01	3,243.00	33,935.22	37,178.22
2047	1,841.42	1,080.16	27,005.24	3,068.12	4,543.68	2,921.58	34,617.03	37,538.62
2048	1,559.86	1,070.70	26,886.59	3,273.02	5,071.86	2,630.57	35,231.48	37,862.04
2049	1,311.99	1,057.63	26,664.03	3,475.28	5,645.41	2,369.62	35,784.72	38,154.34
2050	1,096.03	1,041.51	26,345.04	3,672.25	6,263.06	2,137.53	36,280.36	38,417.89
2051	909.80	1,022.67	25,938.29	3,859.13	6,926.59	1,932.47	36,724.01	38,656.48
2052	750.79	1,001.32	25,452.04	4,028.76	7,637.99	1,752.10	37,118.79	38,870.89
2053	616.31	977.80	24,894.89	4,176.24	8,399.31	1,594.11	37,470.44	39,064.54
2054	503.62	952.13	24,272.06	4,297.37	9,213.22	1,455.75	37,782.65	39,238.40
2055	410.03	924.38	23,588.48	4,391.42	10,071.75	1,334.41	38,051.65	39,386.06
2056	332.93	894.61	22,848.56	4,455.61	10,974.28	1,227.54	38,278.44	39,505.98
2057	269.91	862.90	22,056.60	4,487.34	11,920.16	1,132.80	38,464.10	39,596.91
2058	218.73	829.36	21,217.18	4,487.60	12,908.63	1,048.09	38,613.41	39,661.50
2059	177.44	794.10	20,334.70	4,459.13	13,939.96	971.55	38,733.79	39,705.34

Table 18
Additional Projection Details — Present Value of Future Benefits
($ in Millions)

	Current Inactives		Actives			Grand Totals		
Fiscal Year	Retirees & Beneficiaries	Deferreds	Tier 1	Current Tier 2	Future Tier 2	Current Retirees, Beneficiaries, & Deferreds	Actives	Total
2018	$16,113.28	$458.77	$9,129.61	$611.69	$0.00	$16,572.05	$9,741.30	$26,313.35
2019	15,808.32	475.75	9,757.97	643.11	78.59	16,284.07	10,479.67	26,763.74
2020	15,471.08	493.41	10,414.92	676.16	166.34	15,964.49	11,257.42	27,221.91
2021	15,103.95	511.55	11,099.90	711.10	262.42	15,615.50	12,073.42	27,688.92
2022	14,707.63	530.05	11,812.05	748.50	366.23	15,237.69	12,926.78	28,164.46
2023	14,283.14	548.97	12,550.17	789.76	477.87	14,832.10	13,817.79	28,649.89
2024	13,831.65	568.21	13,312.79	835.88	597.54	14,399.86	14,746.22	29,146.08
2025	13,354.57	587.79	14,097.97	886.75	726.22	13,942.37	15,710.94	29,653.31
2026	12,853.48	607.21	14,902.99	942.89	864.86	13,460.69	16,710.73	30,171.42
2027	12,330.23	626.61	15,724.81	1,004.63	1,014.40	12,956.84	17,743.85	30,700.69
2028	11,786.88	645.92	16,559.73	1,071.79	1,176.03	12,432.80	18,807.55	31,240.35
2029	11,225.74	679.17	17,404.31	1,143.16	1,350.89	11,904.91	19,898.36	31,803.26
2030	10,649.37	712.99	18,253.42	1,218.96	1,541.77	11,362.35	21,014.15	32,376.50
2031	10,060.57	747.15	19,102.42	1,299.44	1,749.34	10,807.72	22,151.20	32,958.92
2032	9,462.42	781.35	19,946.18	1,384.87	1,974.34	10,243.76	23,305.39	33,549.15
2033	8,858.21	815.65	20,778.63	1,475.51	2,218.25	9,673.86	24,472.39	34,146.25
2034	8,251.45	849.14	21,593.70	1,571.54	2,482.25	9,100.59	25,647.50	34,748.08
2035	7,645.88	881.92	22,384.54	1,673.24	2,767.69	8,527.80	26,825.47	35,353.26
2036	7,045.42	913.51	23,144.11	1,780.81	3,075.62	7,958.93	28,000.54	35,959.46
2037	6,454.11	943.88	23,864.61	1,894.48	3,407.01	7,397.98	29,166.10	36,564.08
2038	5,876.04	972.43	24,539.16	2,014.50	3,763.12	6,848.48	30,316.78	37,165.26
2039	5,315.32	999.14	25,159.06	2,141.02	4,145.52	6,314.46	31,445.61	37,760.07
2040	4,775.86	1,022.85	25,715.64	2,273.99	4,555.83	5,798.70	32,545.46	38,344.16
2041	4,261.31	1,043.70	26,200.49	2,413.51	4,994.82	5,305.01	33,608.81	38,913.82
2042	3,774.98	1,060.57	26,605.99	2,559.58	5,463.95	4,835.55	34,629.52	39,465.07
2043	3,319.64	1,073.28	26,922.91	2,711.99	5,965.24	4,392.91	35,600.14	39,993.05
2044	2,897.46	1,081.78	27,145.80	2,870.02	6,499.65	3,979.24	36,515.46	40,494.70
2045	2,509.94	1,085.85	27,271.14	3,032.79	7,068.11	3,595.79	37,372.04	40,967.83
2046	2,157.90	1,085.10	27,295.08	3,199.51	7,671.57	3,243.00	38,166.16	41,409.16
2047	1,841.42	1,080.16	27,219.60	3,368.14	8,311.08	2,921.58	38,898.82	41,820.40
2048	1,559.86	1,070.70	27,047.01	3,536.87	8,988.08	2,630.57	39,571.96	42,202.52
2049	1,311.99	1,057.63	26,782.26	3,702.79	9,704.54	2,369.62	40,189.59	42,559.20
2050	1,096.03	1,041.51	26,430.94	3,863.83	10,460.96	2,137.53	40,755.73	42,893.26
2051	909.80	1,022.67	25,999.80	4,016.21	11,259.47	1,932.47	41,275.47	43,207.94
2052	750.79	1,001.32	25,495.45	4,154.15	12,101.97	1,752.10	41,751.56	43,503.66
2053	616.31	977.80	24,925.03	4,273.75	12,989.37	1,594.11	42,188.14	43,782.25
2054	503.62	952.13	24,292.59	4,371.49	13,922.77	1,455.75	42,586.85	44,042.60
2055	410.03	924.38	23,602.17	4,446.63	14,898.33	1,334.41	42,947.13	44,281.54
2056	332.93	894.61	22,857.45	4,496.20	15,913.50	1,227.54	43,267.14	44,494.69
2057	269.91	862.90	22,062.19	4,517.07	16,966.79	1,132.80	43,546.06	44,678.87
2058	218.73	829.36	21,220.54	4,509.41	18,056.76	1,048.09	43,786.71	44,834.80
2059	177.44	794.10	20,336.61	4,475.08	19,183.57	971.55	43,995.27	44,966.81

Table 19
Additional Projection Details — Benefit Payments Including Administrative Expenses and Health Insurance Subsidy
($ in Millions)

	Current Inactives		Actives			Grand Totals		
Fiscal Year	Retirees & Beneficiaries	Deferreds	Tier 1	Current Tier 2	Future Tier 2	Current Retirees, Beneficiaries, & Deferreds	Actives	Total
2018	$1,422.52	$15.71	$83.70	$26.16	$0.00	$1,438.23	$109.87	$1,548.10
2019	1,432.32	16.26	98.39	25.93	3.18	1,448.58	127.50	1,576.08
2020	1,437.58	17.02	115.84	25.83	6.72	1,454.61	148.40	1,603.00
2021	1,440.07	17.94	136.15	25.47	10.26	1,458.01	171.88	1,629.90
2022	1,439.53	18.85	159.56	24.03	14.02	1,458.37	197.61	1,655.98
2023	1,435.87	19.85	186.18	21.99	17.92	1,455.72	226.10	1,681.82
2024	1,428.98	20.86	216.42	20.49	21.90	1,449.85	258.80	1,708.65
2025	1,418.77	22.40	250.84	18.89	25.91	1,441.17	295.63	1,736.81
2026	1,405.08	23.77	289.55	17.36	29.93	1,428.85	336.84	1,765.69
2027	1,387.86	25.23	333.00	16.43	34.10	1,413.09	383.53	1,796.62
2028	1,367.00	13.11	380.67	17.03	38.42	1,380.12	436.12	1,816.24
2029	1,342.43	14.89	433.98	17.66	41.60	1,357.32	493.23	1,850.55
2030	1,314.07	16.92	492.07	18.30	45.03	1,331.00	555.40	1,886.40
2031	1,281.89	19.29	555.08	18.96	48.75	1,301.18	622.79	1,923.97
2032	1,245.86	21.57	623.58	19.70	52.79	1,267.43	696.06	1,963.49
2033	1,206.03	24.77	697.08	20.61	57.12	1,230.79	774.81	2,005.61
2034	1,162.40	27.79	775.97	21.61	61.96	1,190.19	859.54	2,049.73
2035	1,115.07	31.24	859.89	22.82	67.16	1,146.31	949.87	2,096.18
2036	1,064.20	34.63	949.14	24.21	72.74	1,098.83	1,046.09	2,144.92
2037	1,010.01	38.50	1,042.24	25.81	78.76	1,048.51	1,146.81	2,195.32
2038	952.80	42.29	1,140.48	27.68	85.14	995.09	1,253.30	2,248.40
2039	893.02	47.06	1,243.25	30.09	92.42	940.07	1,365.75	2,305.83
2040	831.19	51.47	1,349.68	32.82	100.24	882.66	1,482.75	2,365.41
2041	767.93	56.77	1,458.43	36.01	108.60	824.70	1,603.05	2,427.75
2042	703.96	61.98	1,570.55	39.87	117.53	765.94	1,727.95	2,493.89
2043	640.06	66.93	1,681.72	44.87	127.01	706.98	1,853.60	2,560.58
2044	577.03	71.80	1,789.76	51.05	138.28	648.83	1,979.09	2,627.92
2045	515.65	76.74	1,894.77	58.34	150.36	592.39	2,103.47	2,695.86
2046	456.67	80.73	1,990.88	67.83	163.26	537.39	2,221.97	2,759.37
2047	400.78	84.75	2,077.98	79.15	176.93	485.54	2,334.06	2,819.59
2048	348.55	87.58	2,153.68	93.24	191.19	436.13	2,438.11	2,874.25
2049	300.38	89.61	2,217.73	109.10	209.28	389.99	2,536.10	2,926.09
2050	256.55	91.10	2,269.38	128.23	228.81	347.65	2,626.42	2,974.07
2051	217.23	92.22	2,309.21	152.30	249.90	309.45	2,711.42	3,020.87
2052	182.41	92.81	2,337.18	179.04	272.72	275.22	2,788.94	3,064.16
2053	151.95	93.24	2,356.71	207.88	296.86	245.19	2,861.45	3,106.64
2054	125.63	93.45	2,368.13	235.91	330.68	219.08	2,934.72	3,153.81
2055	103.15	93.46	2,371.98	265.32	367.80	196.61	3,005.10	3,201.71
2056	84.17	93.25	2,368.47	296.01	408.17	177.42	3,072.65	3,250.07
2057	68.31	92.80	2,357.48	324.64	451.78	161.11	3,133.90	3,295.01
2058	55.18	92.10	2,339.28	349.57	497.77	147.28	3,186.61	3,333.90
2059	44.43	91.14	2,313.80	368.83	557.55	135.57	3,240.19	3,375.76

Table 20
Additional Projection Details — Active Population, Covered Payroll, Employee Contributions and Normal Costs
($ in Millions)

	Tier 1 Active Members				Current Tier 2 Active Members				Future Tier 2 Active Members			
Fiscal Year	Population	Covered Payroll	Employee Contributions	Normal Cost	Population	Covered Payroll	Employee Contributions	Normal Cost	Population	Covered Payroll	Employee Contributions	Normal Cost
2018	20,271	$1,693.72	$152.43	$370.34	8,584	$451.45	$40.63	$44.09	0	$0.00	$0.00	$0.00
2019	19,178	1,696.20	152.66	375.66	7,634	438.17	39.44	42.58	2,043	87.47	7.87	8.51
2020	18,237	1,700.60	153.05	380.75	6,991	432.40	38.92	41.80	3,627	162.90	14.66	16.18
2021	17,364	1,704.20	153.38	385.41	6,490	430.24	38.72	41.52	5,001	235.29	21.18	23.63
2022	16,536	1,706.14	153.55	389.48	6,083	431.33	38.82	41.70	6,236	307.06	27.64	30.97
2023	15,738	1,705.37	153.48	393.04	5,758	435.86	39.23	42.31	7,359	378.87	34.10	38.29
2024	14,971	1,702.01	153.18	395.73	5,497	443.42	39.91	43.23	8,387	451.18	40.61	45.65
2025	14,224	1,694.65	152.52	397.26	5,280	452.95	40.77	44.39	9,350	525.13	47.26	53.20
2026	13,491	1,682.31	151.41	397.66	5,097	463.75	41.74	45.74	10,267	601.54	54.14	61.07
2027	12,768	1,665.19	149.87	396.77	4,936	475.18	42.77	47.17	11,151	681.06	61.30	69.31
2028	12,054	1,642.88	147.86	394.68	4,788	485.54	43.70	48.64	12,013	764.42	68.80	78.05
2029	11,351	1,615.72	145.42	390.86	4,642	492.92	44.36	50.11	12,862	852.16	76.69	87.27
2030	10,648	1,582.14	142.39	385.54	4,507	496.61	44.70	51.53	13,699	944.96	85.05	97.15
2031	9,954	1,543.16	138.88	378.91	4,378	497.42	44.77	52.91	14,523	1,042.82	93.85	107.69
2032	9,275	1,499.52	134.96	370.77	4,253	496.26	44.66	54.27	15,327	1,145.47	103.09	118.85
2033	8,607	1,450.66	130.56	361.01	4,132	493.77	44.44	55.58	16,116	1,253.42	112.81	130.74
2034	7,949	1,396.43	125.68	349.39	4,012	490.13	44.11	56.89	16,893	1,366.49	122.98	143.25
2035	7,303	1,336.43	120.28	335.87	3,896	485.80	43.72	58.18	17,656	1,483.61	133.52	156.48
2036	6,671	1,270.82	114.37	320.45	3,781	480.72	43.27	59.47	18,404	1,604.89	144.44	170.47
2037	6,051	1,199.78	107.98	303.16	3,668	475.09	42.76	60.73	19,136	1,730.00	155.70	185.17
2038	5,450	1,123.84	101.15	283.82	3,557	468.89	42.20	61.99	19,848	1,858.82	167.29	200.67
2039	4,864	1,042.66	93.84	262.74	3,447	462.25	41.60	63.08	20,543	1,991.63	179.25	216.73
2040	4,300	957.37	86.16	240.29	3,333	454.47	40.90	64.11	21,222	2,127.20	191.45	233.56
2041	3,760	869.20	78.23	216.37	3,219	446.21	40.16	65.02	21,876	2,264.67	203.82	251.10
2042	3,246	778.29	70.05	190.79	3,104	437.31	39.36	65.74	22,504	2,404.04	216.36	269.38
2043	2,755	684.29	61.59	164.92	2,987	427.45	38.47	66.05	23,113	2,545.66	229.11	288.51
2044	2,300	591.57	53.24	139.33	2,859	415.58	37.40	65.98	23,695	2,688.36	241.95	307.88
2045	1,885	501.55	45.14	114.42	2,725	402.26	36.20	65.48	24,244	2,829.75	254.68	327.77
2046	1,510	415.38	37.38	92.29	2,585	387.28	34.85	64.21	24,760	2,970.64	267.36	348.14
2047	1,191	339.09	30.52	72.87	2,427	369.08	33.22	62.22	25,237	3,110.41	279.94	368.85
2048	923	271.82	24.46	56.53	2,258	348.47	31.36	59.42	25,674	3,248.81	292.39	389.95
2049	703	214.65	19.32	43.06	2,076	324.81	29.23	56.00	26,076	3,386.16	304.75	410.47
2050	526	166.77	15.01	32.28	1,888	299.30	26.94	51.60	26,441	3,519.46	316.75	431.06
2051	388	127.71	11.49	23.83	1,679	269.74	24.28	45.93	26,788	3,652.28	328.71	451.93
2052	281	96.34	8.67	17.38	1,445	234.95	21.15	39.40	27,129	3,785.21	340.67	473.15
2053	201	71.71	6.45	12.49	1,202	197.51	17.78	32.48	27,453	3,917.32	352.56	494.77
2054	141	52.55	4.73	8.85	962	159.81	14.38	25.88	27,752	4,048.27	364.34	514.70
2055	98	37.90	3.41	6.16	747	125.55	11.30	19.87	28,010	4,171.06	375.40	534.20
2056	66	26.77	2.41	4.20	561	95.20	8.57	14.73	28,228	4,289.02	386.01	553.25
2057	44	18.47	1.66	2.81	408	70.21	6.32	10.75	28,403	4,402.12	396.19	571.77
2058	28	12.46	1.12	1.81	295	51.55	4.64	7.91	28,531	4,509.82	405.88	589.93
2059	18	8.05	0.72	1.12	218	38.59	3.47	5.85	28,619	4,613.58	415.22	606.87

Normal cost includes administrative expenses and the health insurance subsidy of $65 million annually.
Covered payroll is capped for members hired after December 31, 2010, as defined by Public Act 96-0889.