

October 28, 2016 - DRAFT

Ms. Kerrie Vanden Bosch  
Director, Office of Retirement Services  
530 W. Allegan  
Lansing, Michigan 48909

**Re: Separate Actuarial Valuation as of September 30, 2015 for  
University Members of MPSERS (Pension Benefits Only)**

Dear Ms. Vanden Bosch:

We have completed a separate actuarial valuation for current and former employees of the seven Michigan Universities that have withdrawn from the Michigan Public School Employees Retirement System (for their employees hired on or after January 1, 1996) due to the enactment of Act No. 272 of the Public Acts of 1995. This actuarial valuation was prepared as of September 30, 2015, and utilized the same actuarial assumptions and methods used for the 2015 valuation of MPSERS, except that the unfunded actuarial accrued liability for University members is expected to be completely amortized by September 30, 2036.

The purpose of the valuation is to provide the required contribution rates for the fiscal year beginning October 1, 2017 and to evaluate the liabilities and funded status of the System for the affected members in total. This report should not be relied upon for any other purpose.

Select valuation results are presented in the following tables:

Table 1 - Demographic Characteristics - Comparison of University and Non-University MPSERS Members as of September 30, 2015 and September 30, 2014

Table 2 - Contribution Rates for the Indicated Fiscal Years Expressed as a Percentage of Payroll

Table 3 - University Contribution Rates as of September 30, 2015 for the Fiscal Year Beginning October 1, 2017 – Expressed as a Percentage of Payroll and Estimated Dollars

Table 4 - Actuarial Valuation Results as of September 30, 2015

Table 5 - Active University MPSERS Members as of September 30, 2015 by Age and Years of Service

Table 6 - Active University MPSERS Member Statistics by Plan Type

Table 7 - University MPSERS Pensions in Force on September 30, 2015 by Type of Pension, Selected Option, and Pension Amount

Table 8 - Summary of MPSERS Liability Transfers Between Non-University and University from October 1, 2014 through September 30, 2015

Table 9 - Allocation of September 30, 2015 MPSERS Assets Between University and Non-University Members

Table 10 - Unfunded Actuarial Accrued Liability and Actuarial Gain (Loss)

Section 41a of Act 300 of the Public Acts of 1980, as amended, provides for "... the payment schedule for universities being based on and applied to the combined payrolls of the universities' employees who are members and who were hired before January 1, 1996 and the universities' employees who would have been members on or after January 1, 1996, but for the enactment of 1995 PA 272." The total additional payroll for University employees hired since January 1, 1996 was reported to be \$94.1 million for the year ending September 30, 2015. Table 3 converts the employer percentage of payroll contribution rate that is based on payroll *only* for University MPSERS members with future benefit accruals in the defined benefit plan (85.15% for the fiscal year beginning October 1, 2017) into a contribution rate (28.26% for the fiscal year beginning October 1, 2017) based on that payroll plus a percentage (23.99% for the fiscal year beginning October 1, 2017) based on the combined payroll of University employees hired since January 1, 1996 who are not members of MPSERS and of University MPSERS members who elected not to continue future benefit accruals in the defined benefit plan. Therefore, the 2017/2018 employer contribution should be the sum of:

- a) 28.26% of University MPSERS member payroll for those continuing in the defined benefit plan, plus
- b) 23.99% of University non-MPSERS member payroll and University MPSERS member payroll for those who elected the defined contribution plan.

Please note, the amortization component of the employer contribution as a percentage of payroll has been calculated consistently with previously issued University reports. The payroll floor associated with the enactment of Act No. 136 of the Public Acts of 2016 is not reflected in the exhibits of this valuation report. The payroll floor for the fiscal year beginning October 1, 2017 is \$219.2 million. If the payroll floor is used as the basis for determining the amortization component of the employer contribution as a percentage of payroll, the amortization payment as a percentage of payroll for the fiscal year beginning October 1, 2017 would be 20.43%, rather than 23.99%.

The valuation was based upon information furnished by the Office of Retirement Services, concerning Retirement System benefits, financial transactions, and active members, terminated members, retirees and beneficiaries. Data was checked for internal and year-to-year consistency, but was not audited by us. This report may be provided to parties other than the Office of Retirement Services only in its entirety and only with the permission of the Office of Retirement Services.

The valuation summarized in this report involves actuarial calculations that require making assumptions about future events. The assumptions and methods are disclosed fully in the September 30, 2015 actuarial valuation of MPSERS. We believe that the assumptions and methods used in this report are reasonable and appropriate. However, other assumptions and methods could also be reasonable and could result in materially different results. Some of the numbers in this report are rounded. There may be cases where schedules do not add, or where they do not exactly balance to other related schedules due to rounding. The use of rounded numbers for plan liabilities should not imply a lack of precision. In addition, because it is not possible or practical to consider every possible contingency, we may use summary information, estimates or simplifications of calculations to facilitate the modeling of future events. We may also exclude factors or data that we deem to be immaterial.

As noted in the September 30, 2015 actuarial valuation report of MPSERS, we continue to include two service purchase loads in the accrued liability due to questions from the auditor as to how purchased service is reported. We included an \$87,000 load in the accrued liability for purchased service that has been paid for but not reported. We included a \$170,500 load in the accrued liability for amounts included in the plan's reported assets for purchased service that have not yet been paid for by the members.

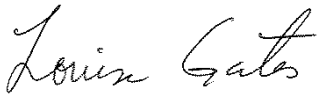
The September 30, 2014 University report dated August 31, 2015 reflected a restatement of the asset values attributable to the University employers. The restatement reflected the inclusion of non-member employer contributions from fiscal year 1997 through fiscal year 2014 and a restatement of the member contributions from fiscal year 2010 through fiscal year 2013. At the direction of ORS staff, the increase in the University assets attributable to non-member employer contributions (and the corresponding cumulative interest credits) was labeled as a credit balance. University employers were given the option of allowing the credit balance to remain in the University assets or to receive a lump sum refund of the credit balance. This report reflects that all University employers elected to receive a refund of the credit balance, totaling \$112,468,242, at the end of fiscal year 2015. Additionally, this report includes an adjustment to the financing of the unfunded actuarial accrued liability to reflect an additional refund to the University employers in the amount of \$2,405,631 in fiscal year 2016, attributable to an "interest true-up" for the actual investment return earned by the credit balance during fiscal year 2015. Note, the fiscal year 2017 employer contributions calculated during the September 30, 2014 valuation on page 2 of this report have been updated to reflect the treatment of the credit balance elected by the University employers (as shown in our University credit balance supplemental valuation letter dated September 1, 2015).

To the best of our knowledge, this report is complete and accurate and the valuation was conducted in accordance with standards of practice prescribed by the Actuarial Standards Board and in compliance with the applicable State statutes. Mita D. Drazilov and Louise M. Gates are Members of the American Academy of Actuaries (MAAA), are independent of the plan sponsor, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. It is our opinion that the actuarial assumptions used for the valuation produce results which are reasonable.

Sincerely,

Handwritten signature of Mita Drazilov in black ink.

Mita D. Drazilov, ASA, MAAA

Handwritten signature of Louise M. Gates in black ink.

Louise M. Gates, ASA, MAAA

MDD:rmn

**TABLE 1**  
**DEMOGRAPHIC CHARACTERISTICS**  
**COMPARISON OF UNIVERSITY AND NON-UNIVERSITY MPERS MEMBERS**  
**AS OF SEPTEMBER 30, 2015 AND SEPTEMBER 30, 2014**

2015	Total	University MPERS Members	Non-University MPERS Members
<b><u>Active Members</u></b>			
Number	194,957	1,515	193,442
Average age	46.1	56.1	46.0
Average service	12.8	25.5	12.7
Reported payroll	\$ 8,005,009,024	\$ 73,014,050	\$ 7,931,994,974
Average annual payroll	\$ 41,060	\$ 48,194	\$ 41,005
<b><u>Inactive Vested Members</u></b>			
Number	22,717	439	22,278
<b><u>Retirees &amp; Beneficiaries</u></b>			
Number	207,651	5,017	202,634
Annual pension	\$ 4,568,852,488	\$ 80,248,165	\$ 4,488,604,323
Average annual pension	\$ 22,003	\$ 15,995	\$ 22,151
2014	Total	University MPERS Members	Non-University MPERS Members
<b><u>Active Members</u></b>			
Number	199,674	1,664	198,010
Average age	46.1	55.5	46.0
Average service	12.7	24.9	12.6
Reported payroll	\$ 7,943,921,654	\$ 76,136,008	\$ 7,867,785,646
Average annual payroll	\$ 39,784	\$ 45,755	\$ 39,734
<b><u>Inactive Vested Members</u></b>			
Number	23,140	469	22,671
<b><u>Retirees &amp; Beneficiaries</u></b>			
Number	204,512	5,008	199,504
Annual pension	\$ 4,431,065,169	\$ 78,551,991	\$ 4,352,513,178
Average annual pension	\$ 21,667	\$ 15,685	\$ 21,817

*The above statistics include only those members entitled to some type of defined benefit from the Retirement System. Active members hired after PA 300 of 2012 who elected the pure defined contribution plan are excluded from the statistics above.*

*The September 30, 2014 inactive counts include 6,161 people (including 45 University people) who elected not to continue future accruals (after the transition date of February 1, 2013) in the defined benefit plan as a result of PA 300.*

*The September 30, 2015 inactive counts include 5,272 people (including 41 University people) who elected not to continue future accruals (after the transition date of February 1, 2013) in the defined benefit plan as a result of PA 300.*

**TABLE 2**  
**CONTRIBUTION RATES FOR THE INDICATED FISCAL YEARS**  
**EXPRESSED AS A PERCENTAGE OF PAYROLL**

<b>Total - All MPERS Members</b>			
<b>Valuation Date</b>	<b>September 30, 2015</b>	<b>September 30, 2014</b>	<b>September 30, 2013</b>
<b>Fiscal Year Beginning</b>	<b>October 1, 2017</b>	<b>October 1, 2016</b>	<b>October 1, 2015</b>
Total Normal Cost	8.29 %	8.28 %	8.79 %
Member Contributions	<u>4.69</u>	<u>4.63</u>	<u>4.59</u>
Employer Normal Cost	3.60 %	3.65 %	4.20 %
Amortization Payment	<u>22.18</u>	<u>22.30</u>	<u>21.18</u>
Total Employer Contribution	N/A	N/A	N/A
Projected Active Member Payroll			
For Fiscal Year (in millions)			
Normal Cost \$	\$8,864.0	\$8,797.9	\$8,948.9
Amortization \$	\$9,136.4	\$9,028.8	\$9,146.7
<b>University MPERS Members</b>			
<b>Valuation Date</b>	<b>September 30, 2015</b>	<b>September 30, 2014</b>	<b>September 30, 2013</b>
<b>Fiscal Year Beginning</b>	<b>October 1, 2017</b>	<b>October 1, 2016</b>	<b>October 1, 2015</b>
Total Normal Cost	7.41 %	7.40 %	7.98 %
Member Contributions	<u>3.14</u>	<u>3.10</u>	<u>3.11</u>
Employer Normal Cost	4.27 %	4.30 %	4.87
Amortization Payment	<u>80.88</u>	<u>74.57</u>	<u>60.13</u>
Total Employer Contribution	85.15 %	78.87 %	65.00 %
Projected Active Member Payroll <sup>(1)</sup>			
For Fiscal Year (in millions)			
Normal Cost \$	\$55.4	\$59.0	\$61.6
Amortization \$	\$55.4	\$59.0	\$61.6
<b>Non-University MPERS Members</b>			
<b>Valuation Date</b>	<b>September 30, 2015</b>	<b>September 30, 2014</b>	<b>September 30, 2013</b>
<b>Fiscal Year Beginning</b>	<b>October 1, 2017</b>	<b>October 1, 2016</b>	<b>October 1, 2015</b>
Total Normal Cost	8.30 %	8.29 %	8.80 %
Member Contributions	<u>4.70</u>	<u>4.64</u>	<u>4.60</u>
Employer Normal Cost	3.60 %	3.65 %	4.20 %
Amortization Payment	<u>21.82</u>	<u>21.96</u>	<u>20.92</u>
Total Employer Contribution	N/A	N/A	N/A
Projected Active Member Payroll <sup>(2)</sup>			
For Fiscal Year (in millions)			
Normal Cost \$	\$8,808.6	\$8,738.9	\$8,887.3
Amortization \$	\$9,081.0	\$8,969.8	\$9,085.1

<sup>(1)</sup> Payroll for University members of MPERS with future defined benefit accruals.

<sup>(2)</sup> Payroll for Non-University members of MPERS and University members of MPERS with future defined contribution accruals.

**TABLE 3**  
**UNIVERSITY CONTRIBUTION RATES AS OF SEPTEMBER 30, 2015**  
**FOR THE FISCAL YEAR BEGINNING OCTOBER 1, 2017**  
**EXPRESSED AS A PERCENTAGE OF PAYROLL AND ESTIMATED DOLLARS**

	Using Only Payroll of University Members of MPSERS with Future Defined Benefit Accruals		Also Using Payroll of University Non-Members Hired Since January 1, 1996 and University Members of MPSERS with Future Defined Contribution Accruals For Amortization Payment	
	Percentage of Pay	Dollar Amount (In Millions)	Percentage of Pay	Dollar Amount (In Millions)
Normal Cost	7.41 %	\$ 4.104	7.41 %	\$ 4.104
Member Contributions	<u>3.14</u>	<u>1.739</u>	<u>3.14</u>	<u>1.739</u>
Employer Normal Cost	4.27 %	\$ 2.365	4.27 %	\$ 2.365
Amortization Payment	<u>80.88</u>	<u>44.791</u>	<u>23.99</u>	<u>44.791</u>
Total Employer Contribution	85.15 %	\$ 47.156	28.26 %	\$ 47.156
Projected Payroll				
For Normal Cost		\$ 55.380		\$ 55.380
For Amortization Payment		\$ 55.380		\$ 186.727

*This exhibit does not reflect the payroll floor associated with SB 343 (see page 2).*

MPERS Annual Actuarial Valuation – University Supplement

**TABLE 4**  
**ACTUARIAL VALUATION RESULTS**  
**AS OF SEPTEMBER 30, 2015**

	Total All MPERS Members	University MPERS Members	Non-University MPERS Members
(1) Fiscal Year Ending September 30,	2018	2018	2018
(2) Total Normal Cost of Benefits (as a % of member pay)	8.29%	7.41%	8.30%
(3) Member Contribution % (weighted average)	4.69%	3.14%	4.70%
(4) Employer Normal Cost % = (2) - (3)	3.60%	4.27%	3.60%
(5) Projected Active Member Payroll for Fiscal Year - Normal Cost \$	\$8,864,012,151	\$55,380,165	\$8,808,631,986
(6) Employer Normal Cost \$ = (4) x (5) <sup>1</sup>	320,213,722	2,364,733	317,848,989
(7) Actuarial Accrued Liability - Total	67,727,577,579	1,048,157,881	66,679,419,698
Active employees	19,380,066,284	273,561,709	19,106,504,575
Inactive vested members <sup>2</sup>	1,710,754,031	22,226,078	1,688,527,953
Other inactive members <sup>3</sup>	98,723,413	2,498,960	96,224,453
Retirees and surviving beneficiaries	46,538,033,851	749,871,134	45,788,162,717
(8) Funding Value of Assets	41,006,352,969	474,583,901	40,531,769,068
(9) Unfunded Actuarial Accrued Liabilities (UAAL) = (7) - (8)	26,721,224,610	573,573,980	26,147,650,630
(10) Amortization Period (years)	Multiple Periods	19	Multiple Periods
(11) Amortization Factor (level percent of payroll payments)	N/A	12.80955763	N/A
(12) Amortization Payment %	22.18%	80.88%	21.82%
(13) Projected Active Member Payroll for Fiscal Year - Amortization \$	\$9,136,370,130	\$55,380,165	\$9,080,989,965
(14) Amortization Payment \$ = (12) x (13)	2,026,446,895	44,791,477	1,981,655,418
(15) Total Computed Employer Contribution % = (4) + (12)	N/A	85.15%	N/A
(16) Total Computed Employer Contribution \$ = (6) + (14)	\$ 2,346,660,617	\$ 47,156,210	\$ 2,299,504,407

<sup>1</sup> The formula in line (6) only applies to the University column. This is because of the effect of the Pension Plus provisions and the multiple amortization periods on the Total and Non-University columns.

<sup>2</sup> Includes pending refunds of employee contributions for former employees who terminated without a vested benefit.

<sup>3</sup> Includes liabilities for employees who transferred to the DC pension plan in connection with PA 300.



**TABLE 5**  
**ACTIVE UNIVERSITY MPSERS MEMBERS AS OF SEPTEMBER 30, 2015**  
**BY AGE AND YEARS OF SERVICE**

Age	Years of Service							Total Count	Total Pay	Average Pay
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 & up			
35 - 39		1	1	3				5	\$ 203,151	\$ 40,630
40 - 44	5	13	14	20	27	2		81	3,610,154	44,570
45 - 49	12	14	9	23	56	62	6	182	8,144,334	44,749
50 - 54	7	15	13	23	64	126	77	325	15,074,004	46,382
55 - 59	14	11	9	25	75	126	183	443	20,854,590	47,076
60 - 64	11	11	7	14	38	94	171	346	17,834,560	51,545
65 - 69	9	5	2	5	14	25	29	89	4,812,612	54,074
70 & Over	7	4	3	2	5	6	17	44	2,480,645	56,378
Total	65	74	58	115	279	441	483	1,515	\$ 73,014,050	\$ 48,194

*The September 30, 2015 active statistics exclude 41 University people who elected not to continue future accruals (after the transition date of February 1, 2013) in the defined benefit plan as a result of PA 300.*

*As of September 30, 2015, the total University payroll (MPSERS members and Non-MPSERS members) was reported to be \$168.4 million.*

**TABLE 6**  
**ACTIVE UNIVERSITY MPSERS MEMBER STATISTICS**  
**BY PLAN TYPE**

	September 30, 2014	September 30, 2015
<b>Basic Members</b>		
Number	760	680
Average Age	56.4 years	56.9 years
Average Service	28.3 years	28.9 years
Reported Payroll	\$ 36,678,266	\$ 34,411,171
Average Annual Pay	\$ 48,261	\$ 50,605
<b>MIP Members</b>		
Number	904	835
Average Age	54.8 years	55.4 years
Average Service	21.9 years	22.7 years
Reported Payroll	\$ 39,457,742	\$ 38,602,879
Average Annual Pay	\$ 43,648	\$ 46,231
<b>Total</b>		
Number	1,664	1,515
Average Age	55.5 years	56.1 years
Average Service	24.9 years	25.5 years
Reported Payroll	\$ 76,136,008	\$ 73,014,050
Average Annual Pay	\$ 45,755	\$ 48,194

*The September 30, 2014 total active count excludes 45 University people who elected not to continue future accruals (after the transition date of February 1, 2013) in the defined benefit plan as a result of PA 300.*

*The September 30, 2015 total active count excludes 41 University people who elected not to continue future accruals (after the transition date of February 1, 2013) in the defined benefit plan as a result of PA 300.*

*As of September 30, 2015, the total University payroll (MPSERS members and Non-MPSERS members) was reported to be \$168.4 million.*

**TABLE 7**

**UNIVERSITY MPERS PENSIONS IN FORCE ON SEPTEMBER 30, 2015  
BY TYPE OF PENSION, SELECTED OPTION, AND PENSION AMOUNT**

Amount of Monthly Benefit	Number of Retirees	Type of Retirement*						Selected Option**				Opt 1E 2E,3E,4E
		1	2	3	4	5	6	Opt. 1	Opt. 2	Opt. 3	Opt. 4	
\$ 1 - 200	373	308	62	0	2	0	1	168	115	58	7	25
201 - 400	565	449	70	5	33	0	8	289	145	83	9	39
401 - 600	590	456	72	6	40	0	16	284	163	78	13	52
601 - 800	520	411	48	4	39	0	18	244	123	87	19	47
801 - 1,000	477	406	35	3	27	0	6	232	94	82	23	46
1,001 - 1,200	410	345	33	2	22	0	8	173	90	84	29	34
1,201 - 1,400	343	293	35	1	8	0	6	125	98	66	27	27
1,401 - 1,600	273	242	21	0	4	0	6	107	64	49	25	28
1,601 - 1,800	250	227	19	0	2	0	2	95	54	51	21	29
1,801 - 2,000	192	173	13	0	3	0	3	81	42	38	17	14
Over 2,000	1,024	913	95	0	4	0	12	377	303	209	79	56
Totals	5,017	4,223	503	21	184	0	86	2,175	1,291	885	269	397

\* Type of Retirement

- 1 – Normal retirement for age & service
- 2 – Survivor payment – normal retirement
- 3 – Duty disability retirement (including survivors)
- 4 – Non-duty disability retirement (including survivors)
- 5 – Survivor payment – duty death in service
- 6 – Survivor payment – non-duty death in service

\*\* Selected Option

- Opt. 1 – Straight life allowance
- Opt. 2 – 100% survivor option
- Opt. 3 – 50% survivor option
- Opt. 4 – 75% survivor option
- Opt. 1E, 2E, 3E, 4E – Equated retirement options

**TABLE 8**  
**SUMMARY OF MPSERS LIABILITY TRANSFERS BETWEEN NON-UNIVERSITY &**  
**UNIVERSITY**  
**FROM OCTOBER 1, 2014 THROUGH SEPTEMBER 30, 2015**

<b>Transfers between segments</b>	
<b>Transfers to University</b>	
a) 8 Non-University actives as of 10/1/2014 who transferred to University actives by 10/1/2015	\$ 1,500,624
b) 1 Non-University terminated vested as of 10/1/2014 who transferred to University actives by 10/1/2015	22,755
c) 0 Non-University pensioners as of 10/1/2014 who transferred to University actives by 10/1/2015	0
d) 0 Non-University actives as of 10/1/2014 who transferred to University terminated vesteds by 10/1/2015	0
e) 1 Non-University terminated vesteds as of 10/1/2014 who transferred to University terminated vesteds by 10/1/2015	50,140
f) 0 Non-University pensioners as of 10/1/2014 who transferred to University terminated vesteds by 10/1/2015	0
g) 0 Non-University actives as of 10/1/2014 who transferred to University pensioners by 10/1/2015	0
h) 12 Non-University terminated vested as of 10/1/2014 who transferred to University pensioners by 10/1/2015	950,043
i) 5 Non-University pensioners as of 10/1/2014 who transferred to University pensioners by 10/1/2015	253,446
<b>j) Total Transfers into University</b>	<b>\$ 2,777,008</b>
<b>Transfers from University</b>	
k) 13 University actives as of 10/1/2014 who transferred to Non-University actives by 10/1/2015	\$ 2,613,096
l) 1 University terminated vesteds as of 10/1/2014 who transferred to Non-University actives by 10/1/2015	525
m) 0 University pensioners as of 10/1/2014 who transferred to Non-University actives by 10/1/2015	0
n) 1 University actives as of 10/1/2014 who transferred to Non-University terminated vesteds by 10/1/2015	187,462
o) 5 University terminated vested as of 10/1/2014 who transferred to Non-University terminated vesteds by 10/1/2015	420,628
p) 0 University pensioners as of 10/1/2014 who transferred to Non-University terminated vesteds by 10/1/2015	0
q) 1 University actives as of 10/1/2014 who transferred to Non-University pensioners by 10/1/2015	44,229
r) 0 University terminated vested as of 10/1/2014 who transferred to Non-University pensioners by 10/1/2015	0
s) 1 University pensioners as of 10/1/2014 who transferred to Non-University pensioners by 10/1/2015	35,730
<b>t) Total Transfers from University</b>	<b>\$ 3,301,670</b>
<b>u) Total Net Transfers (j - t)</b>	<b>\$ (524,662)</b>

**TABLE 9**

**ALLOCATION OF SEPTEMBER 30, 2015 MPSERS ASSETS BETWEEN UNIVERSITY AND NON-UNIVERSITY MEMBERS**

	Total MPSERS Assets	MPSERS University Assets	MPSERS Non-University Assets
1. Beginning of Year Assets			
a) Market Value	\$ 43,773,188,964	\$ 638,804,892	\$ 43,134,384,072
b) Valuation Assets	39,625,615,493	578,054,268	39,047,561,225
2. End of Year Assets at Market Value	42,382,360,872	495,345,725	41,887,015,147
3. Net Additions to Market Value			
a) Member Contributions	395,722,292	2,545,277 <sup>4</sup>	393,177,015
b) Employer Contributions	1,967,610,696	34,224,462 <sup>5</sup>	1,933,386,234
c) Investment Income <sup>1</sup>	938,143,040	13,562,373	924,580,667
d) Benefit Payments	(4,530,914,738)	(80,444,371)	(4,450,470,367)
e) Contribution Refunds / Transfers	(24,433,815)	0	(24,433,815)
f) Administrative Expenses <sup>1</sup>	(24,487,325)	(354,004)	(24,133,321)
g) Transfers from (to) stabilization subaccount	0	0	0
h) University Employer Contribution Refund <sup>3</sup>	(112,468,242)	(112,468,242)	0
i) Transfers in (out)	0	(524,662)	524,662
j) Audit Adjustment <sup>1</sup>	0	0	0
k) Total Additions to Market Value	(1,390,828,092)	(143,459,167)	(1,247,368,925)
4. Average Market Value of Assets = (1a) + .5 x [(5a) + (5c)] + (5f)	42,677,181,182	616,967,576	42,060,213,606
5. Summary of Net Additions to Market Value			
a) Net Contributions = (3a) + (3b) + (3e) + (3g)	2,338,899,173	36,769,739	2,302,129,434
b) Net Investment Income = (3c) + (3f)	913,655,715	13,208,369	900,447,346
c) Benefit Payments = (3d)	(4,530,914,738)	(80,444,371)	(4,450,470,367)
d) University Employer Contribution Refund = (3h) <sup>3</sup>	(112,468,242)	(112,468,242)	0
e) Transfers in (out) = (3i)	0	(524,662)	524,662
f) Audit Adjustment = (3j)	0	0	0
g) Total Additions to Market Value	(1,390,828,092)	(143,459,167)	(1,247,368,925)
6. Average Valuation Assets = (1b) + .5 x [(5a) + (5c)] + (5f)	38,529,607,711	556,216,952	37,973,390,759
7. Imputed Income at Valuation Rate = Discount Rate <sup>2</sup> x (6)	3,080,913,202	44,497,356	3,036,415,846
8. Gain (Loss) from Investments = (5b) – (7)	(2,167,257,487)	(31,288,987)	(2,135,968,500)
9. Portion of Gains (Losses) recognized from prior years			
a) From this year = .2 x (8)	(433,451,498)	(6,257,797)	(427,193,701)
b) From one year ago	644,579,078	9,405,612	635,173,466
c) From two years ago	372,032,865	5,598,491	366,434,374
d) From three years ago	432,010,928	6,379,197	425,631,731
e) From four years ago	<u>(410,863,292)</u>	<u>(6,425,690)</u>	<u>(404,437,602)</u>
f) Total	604,308,081	8,699,813	595,608,268
10. Change in Valuation Assets = (5a) + (5c) + (5d) + (5e) + (5f) + (7) + (9f)	1,380,737,476	(103,470,367)	1,484,207,843
11. End of Year Assets			
a) Market Value = (2)	42,382,360,872	495,345,725	41,887,015,147
b) Valuation Assets = (1b) + (10)	41,006,352,969	474,583,901	40,531,769,068
12a. Actuarial Rate of Return	9.56%	9.56%	9.56%
12b. Market Rate of Return	2.14%	2.14%	2.14%

<sup>1</sup> Allocated in proportion to average market value (i.e., item 4).

<sup>2</sup> Discount rate is 8% for Non-Hybrid groups and 7% for the Hybrid group.

<sup>3</sup> The University Employer Contribution Refund occurred at the end of the fiscal year.

<sup>4</sup> Excludes 3% member health contributions.

<sup>5</sup> Includes non-member employer contributions.

**TABLE 10**

**UNFUNDED ACTUARIAL ACCRUED LIABILITY AND ACTUARIAL GAIN (LOSS)**

	Unfunded Actuarial Accrued Liability as of September 30, 2015		
	All MPERS Members	University MPERS Members	Non-University MPERS Members
1. Actuarial accrued liability	\$67,727,577,579	\$1,048,157,881	\$66,679,419,698
2. Valuation assets	<u>41,006,352,969</u>	<u>474,583,901</u>	<u>40,531,769,068</u>
3. Unfunded (overfunded) actuarial accrued liability = (1) - (2)	26,721,224,610	573,573,980	26,147,650,630
	Derivation of Actuarial Gain (Loss)		
	All MPERS Members	University MPERS Members	Non-University MPERS Members
4. Unfunded Actuarial Accrued Liability (UAAL) - Previous Valuation	\$ 26,478,975,786	\$ 460,619,116	\$ 26,018,356,670
5. Total Normal Cost (employer plus member) for Year Ending 9/30/2015	666,309,609	5,403,040	660,906,569
6. Total Contributions (employer plus member) for Year Ending 9/30/2015	2,363,332,988	36,769,739	2,326,563,249
7. Interest on:			
a. UAAL: Discount Rate <sup>1</sup> x (4)	2,118,435,920	36,849,529	2,081,586,391
b. Normal Cost and Contributions: Discount Rate* / 2 x [(5) - (6)]	<u>(67,968,239)</u>	<u>(1,254,668)</u>	<u>(66,713,571)</u>
c. Net Total: (a) + (b)	2,050,467,681	35,594,861	2,014,872,820
8. Change in UAAL due to Benefit Changes	0	0	0
9. Change in UAAL due to Assumption Changes	0	0	0
10. Expected UAAL Current Year: (4) + (5) - (6) + (7c) + (8) + (9)	26,832,420,088	464,847,278	26,367,572,810
11. Actual UAAL Current Year	26,721,224,610	573,573,980	26,147,650,630
12. Experience Gain/(Loss): (10) - (11)	111,195,478 <sup>2</sup>	(108,726,702) <sup>2</sup>	219,922,180
13. Actuarial accrued liability at start of year	66,104,591,279	1,038,673,384	65,065,917,895
14. Gain (loss) as percent of pension actuarial accrued liabilities at start of year	0.17%	(10.47)%	0.34%
15. Portion of gain (loss) due to investment performance	604,308,081	8,699,813	595,608,268

<sup>1</sup> Discount rate is 8% for Non-Hybrid groups and 7% for the Hybrid group.

<sup>2</sup> Please note that row 12 above includes the refund of University employer contributions totaling \$112,468,242.