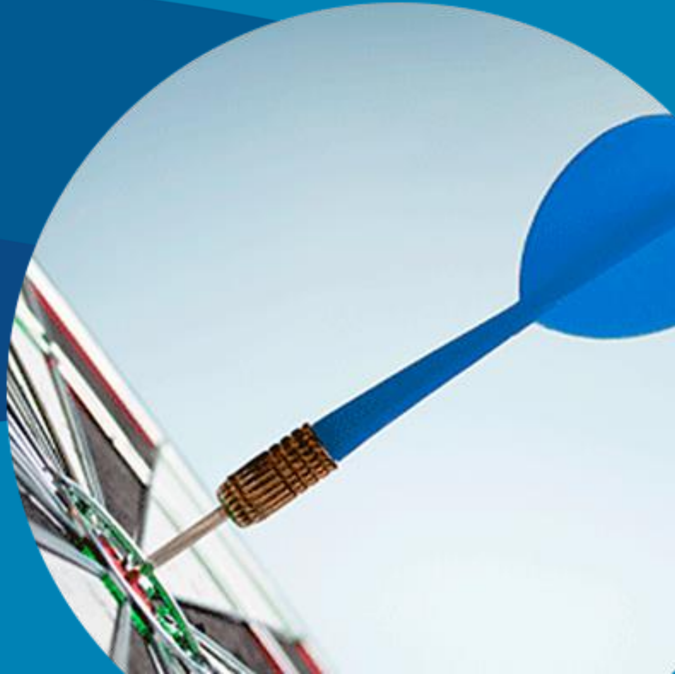
Michigan Public School Employees Retirement System

Pension Actuarial Valuation Results as of September 30, 2018



September 30, 2018 Valuation

- Purpose of the September 30, 2018 valuation is twofold:
  - Determine the employer contribution rate for fiscal year 2021
  - Measure the System's funding progress
- Reflects the Dedicated Gains Policy adopted by the Board of Trustees
  - Investment return assumption reduced from 7.05% to 6.80% for Non-Hybrid portion and from 7.00% to 6.80% for Pension Plus Plan (PPP) portion as a result of the Policy
- Reflects the adoption of new assumptions in conjunction with the Experience Study covering the period October 1, 2012 through September 30, 2017

September 30, 2018 Valuation

- Reflects the provisions of Public Act 181 of 2018
  - Gradual transition from level percent of payroll amortization of unfunded actuarial accrued liability (UAAL) to level dollar amortization
  - 3.50% payroll growth assumption for the September 30, 2018 valuation for amortization purposes only
- Employer contribution rates included in this presentation do not incorporate the “contribution floor” provisions of Public Act 181 of 2018 or Public Act 92 of 2017

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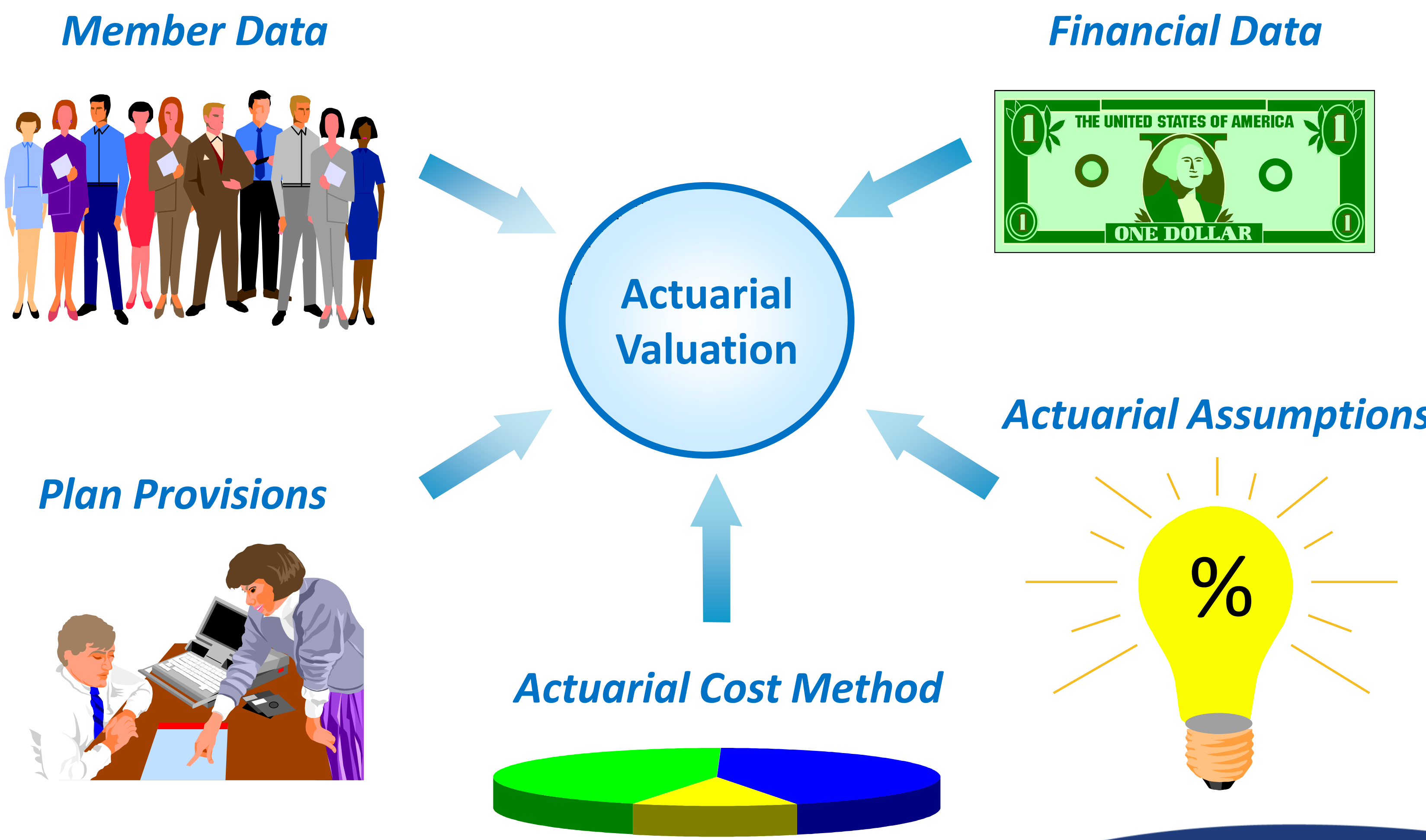
Actuarial Valuation Process



Public Act 181 of 2018

- Brief Summary of Public Act 181 of 2018:
  - Gradual transition from level percent of payroll amortization of UAAL to level dollar amortization
  - The UAAL contribution floor is changing from a rate floor to a dollar floor starting with the employer contributions in fiscal year 2022
- Transition to level dollar amortization accomplished by reducing the payroll growth for amortization purposes according to the following schedule:
  - 3.50% payroll growth for the September 30, 2017 and 2018 valuations
  - Dropping 0.50% each subsequent year starting with the September 30, 2019 valuation
  - Ultimate payroll growth assumption for amortization purposes of 0.00% expected to be reached beginning with the September 30, 2025 valuation

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Dedicated Gains Policy

- Adopted in 2017
- The purpose of the Policy is to reduce the investment return assumption for actuarial valuation purposes if the fiscal year's market value rate of return exceeds a certain amount
- The immediate recognition of the market value return is expected to offset the increase in the computed employer contribution from where it otherwise would have been
- MPSERS specific provisions:
  - The amount of excess investment return for MPSERS does not cover the increase in the employer normal cost contribution for any year
  - It was assumed that the reduction in the investment return assumption would be applicable to the Non-Hybrid and the PPP portions of the pension plan only

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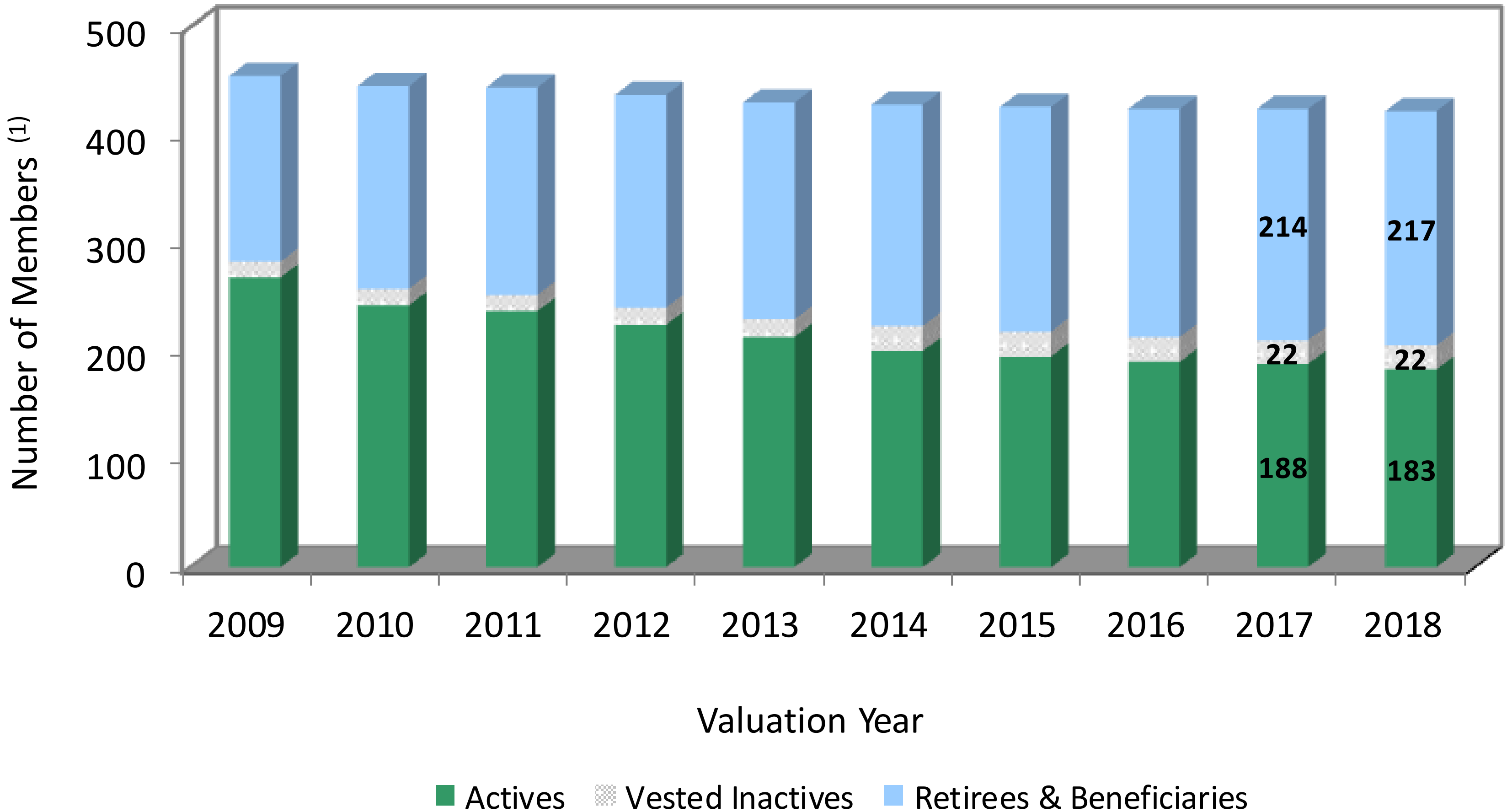
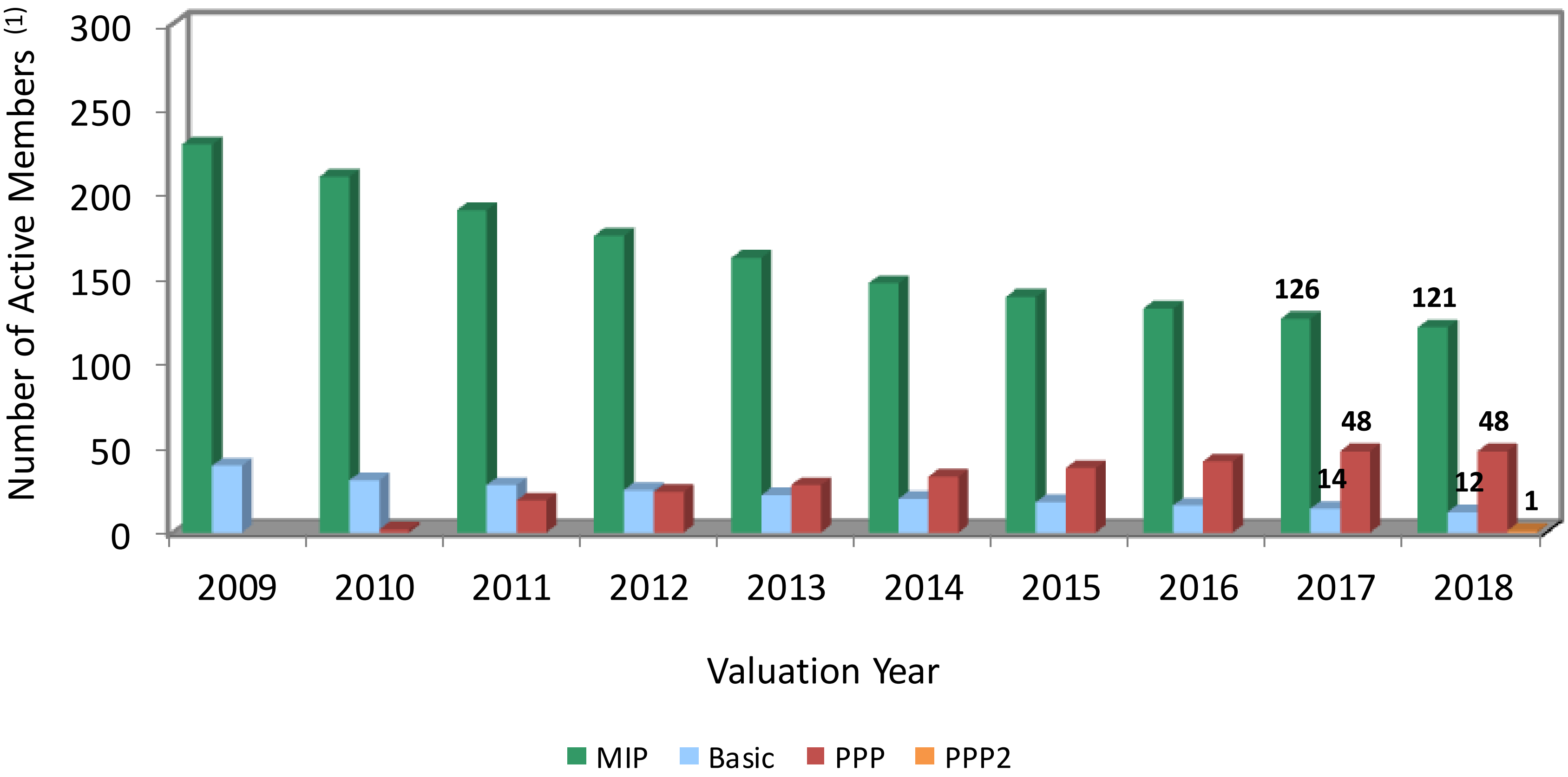
Defined Benefit Plan Membership Data
(Counts in Thousands)



(1) Excludes active members covered exclusively by the pure defined contribution plan. Starting in 2014, active members who elected not to continue in the defined benefit plan as a result of PA 300 are classified as inactive members.

Defined Benefit Plan Active Members by Group
(Counts in Thousands)



(1) Excludes active members covered exclusively by the pure defined contribution plan. Starting in 2014, active members who elected not to continue in the defined benefit plan as a result of PA 300 are classified as inactive members.

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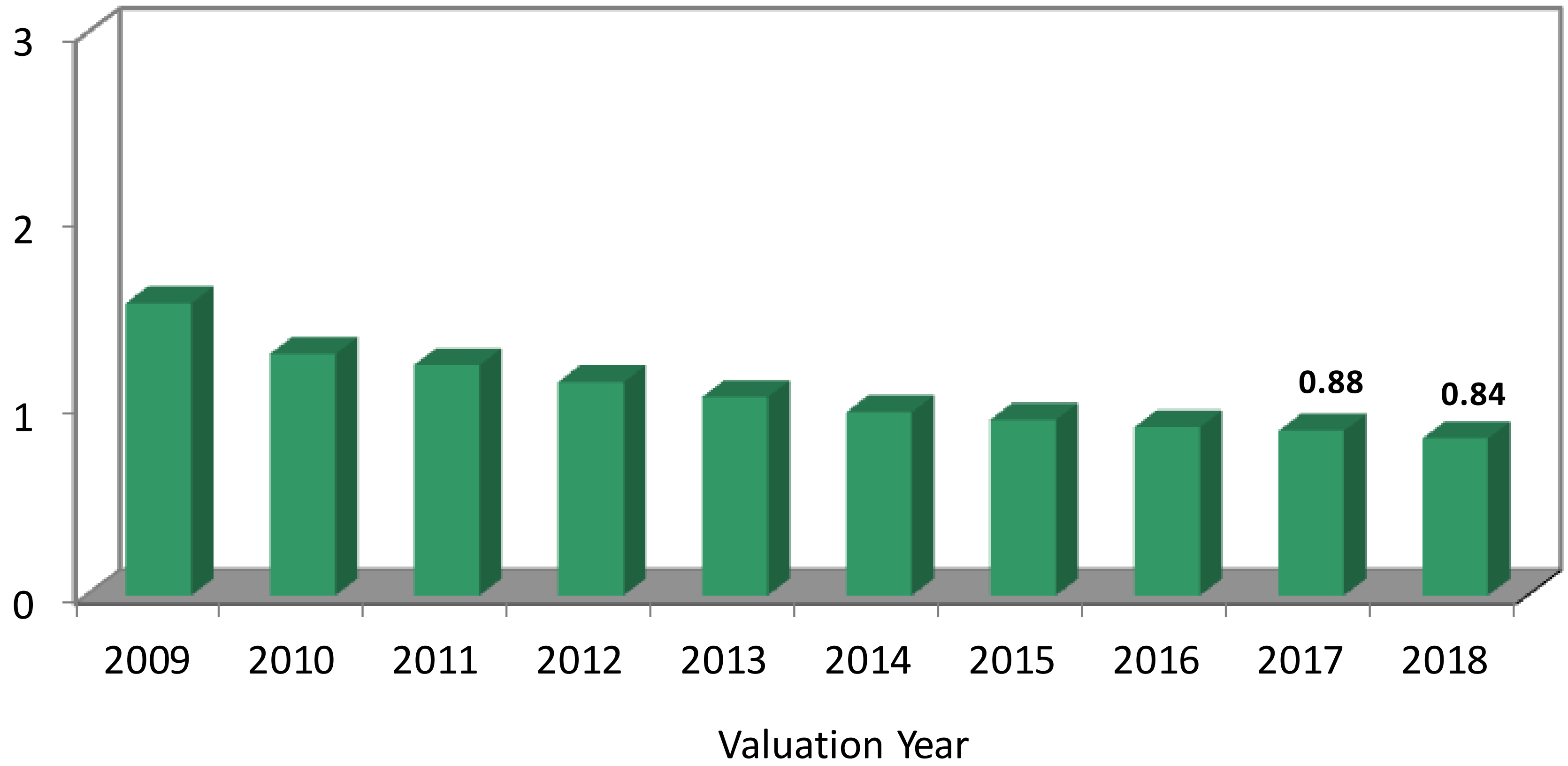
Ratio of Active Members[1] to Pension Benefit Recipients



(1) Excludes active members covered exclusively by the pure defined contribution plan. Starting in 2014, active members who elected not to continue in the defined benefit plan as a result of PA 300 are classified as inactive members.

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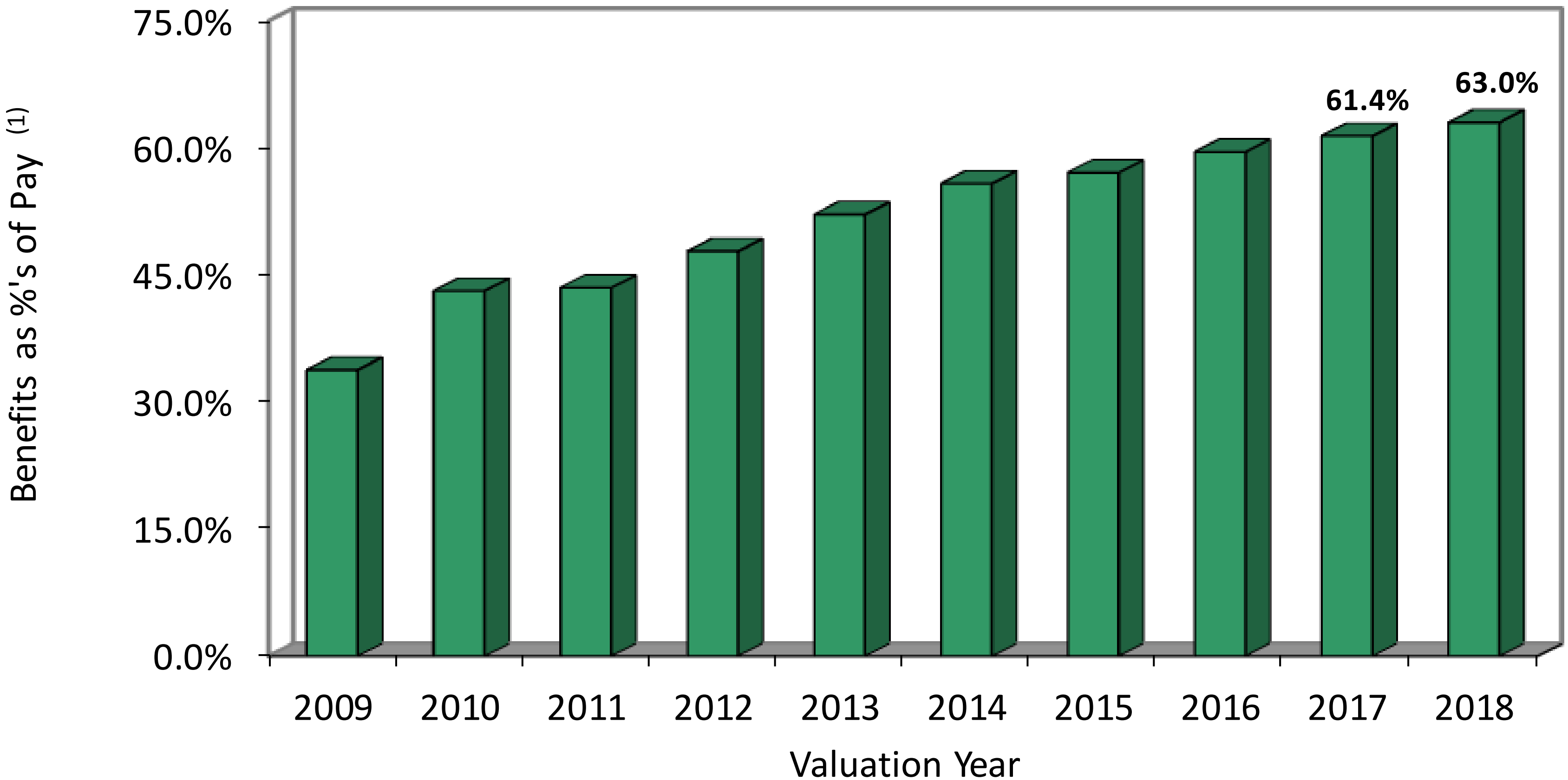
Pension Benefits Expressed as %'s of Active Member Pay



(1) Percentage of defined benefit MPSERS payroll (excludes payroll of those covered exclusively by the pure defined contribution plan and of those who elected not to continue in the defined benefit plan as a result of PA 300).

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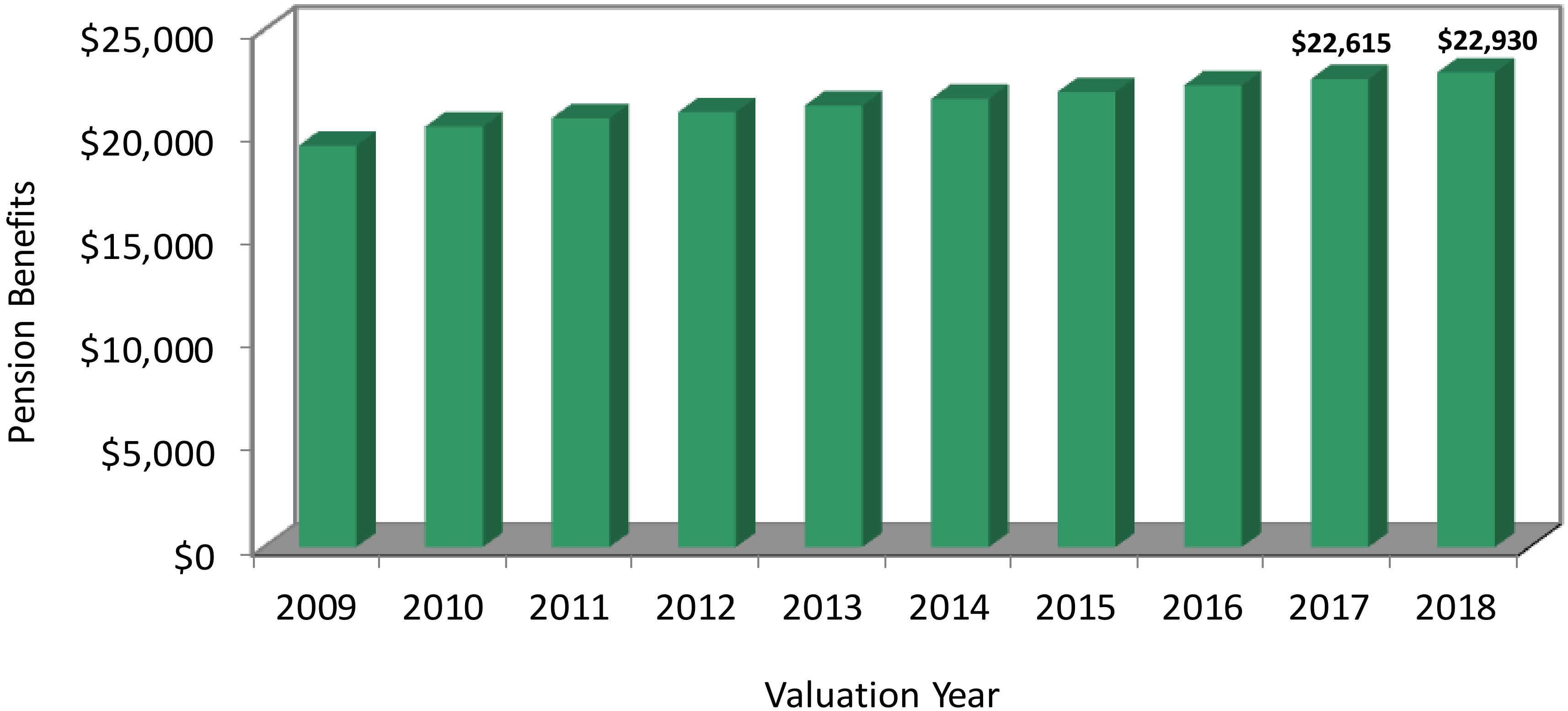
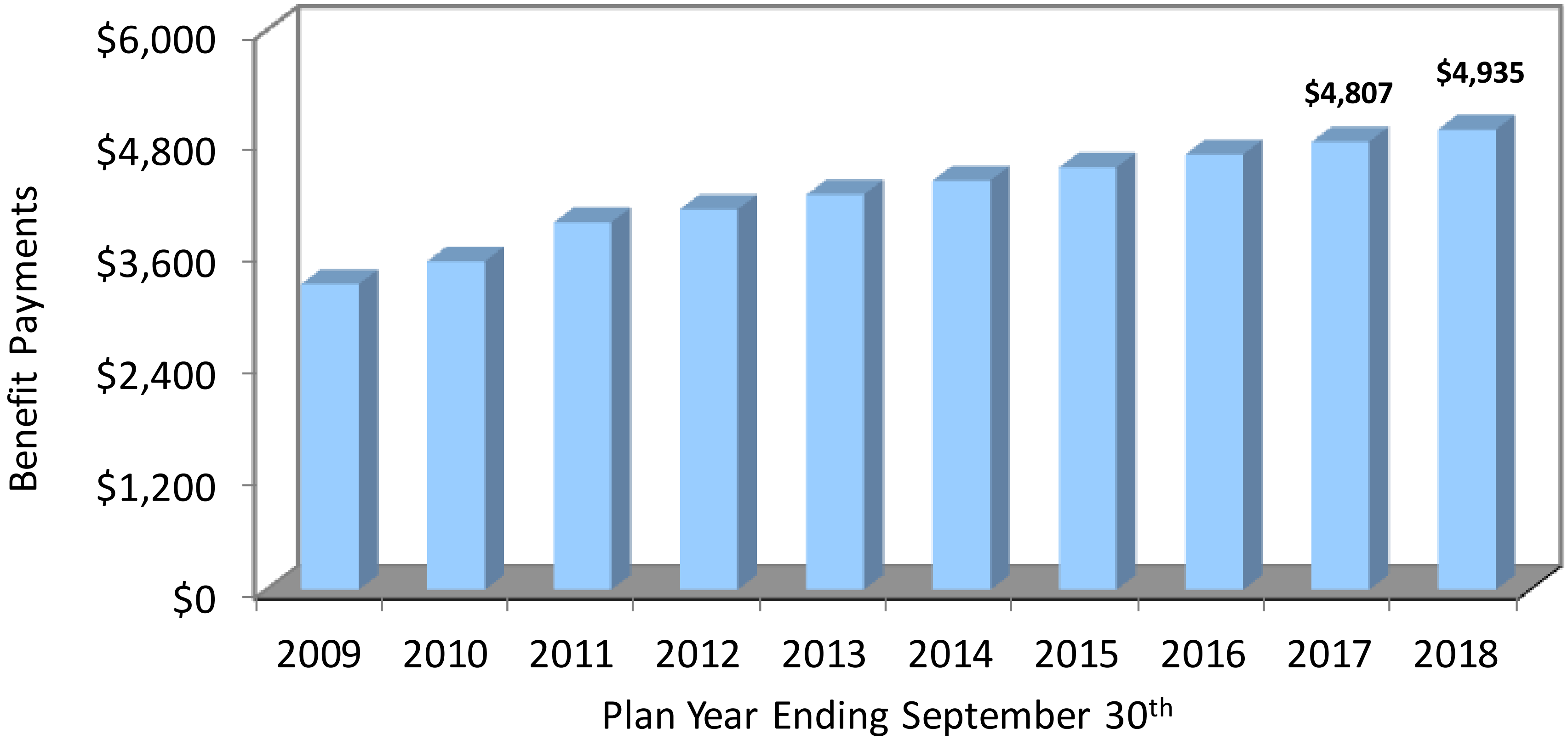
Average Annual Pensions



Total Benefit Payments by Plan Year
(Amounts in Millions)



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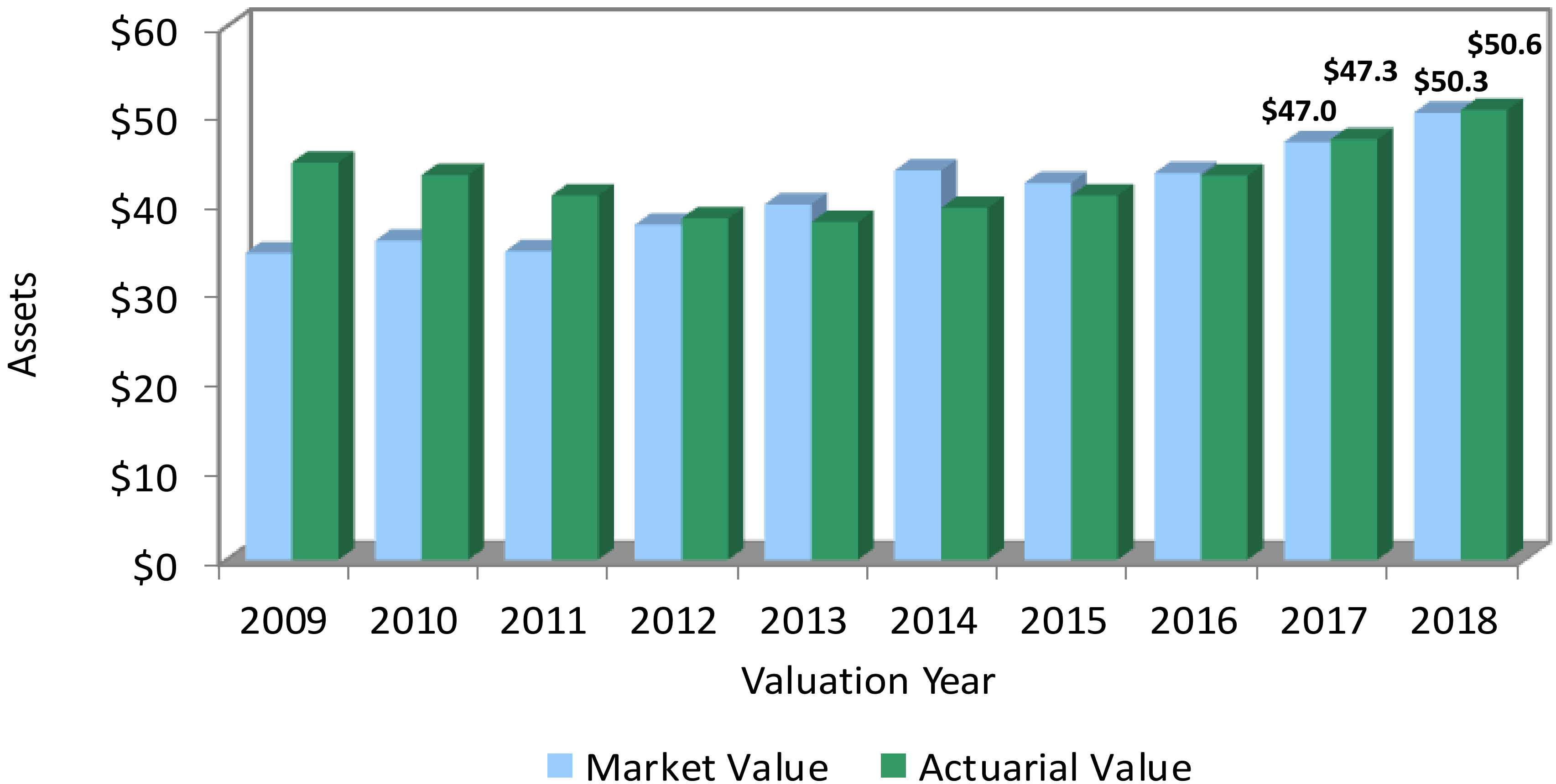
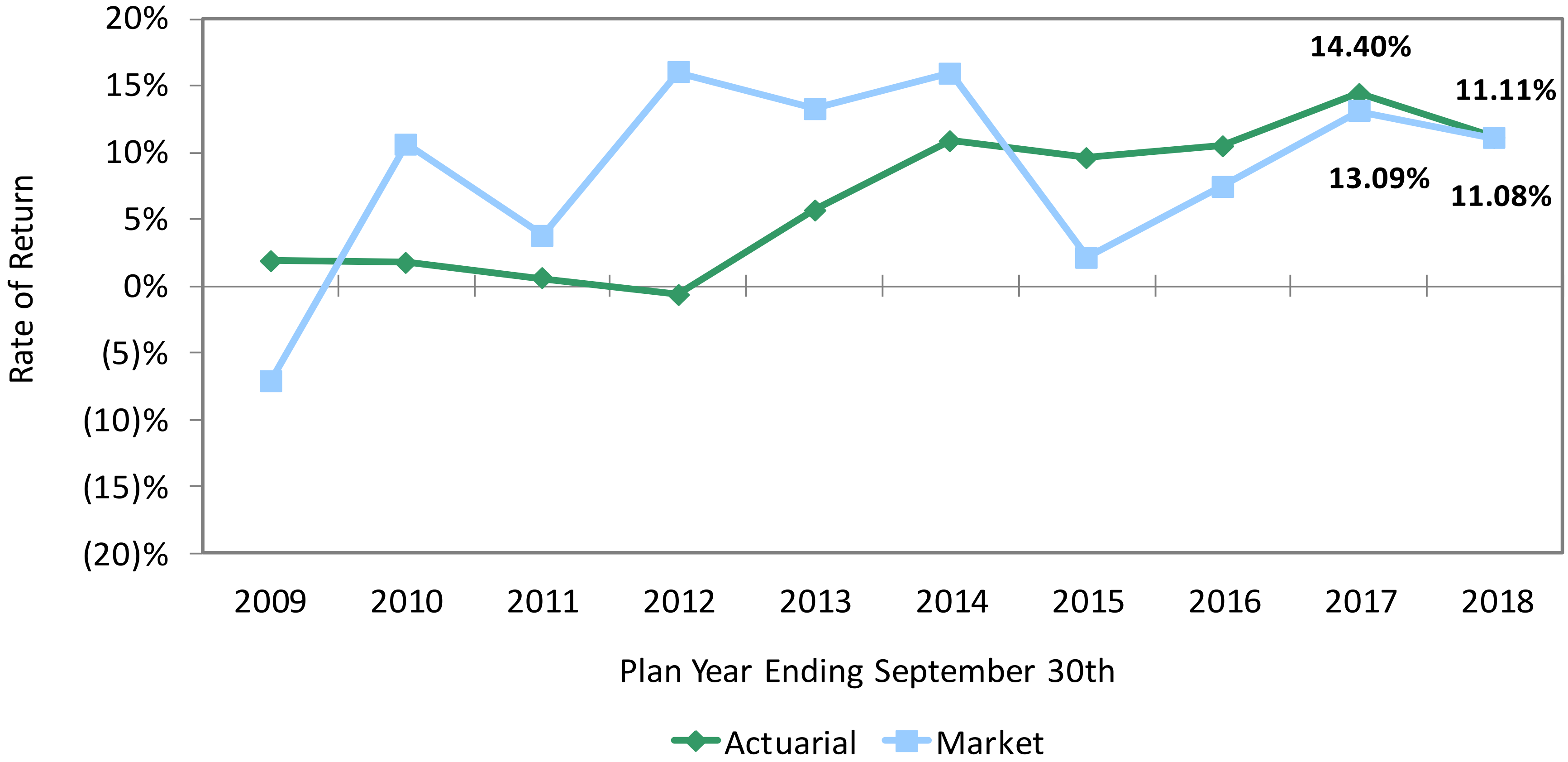
Growth of Pension Assets ($ in Billions)

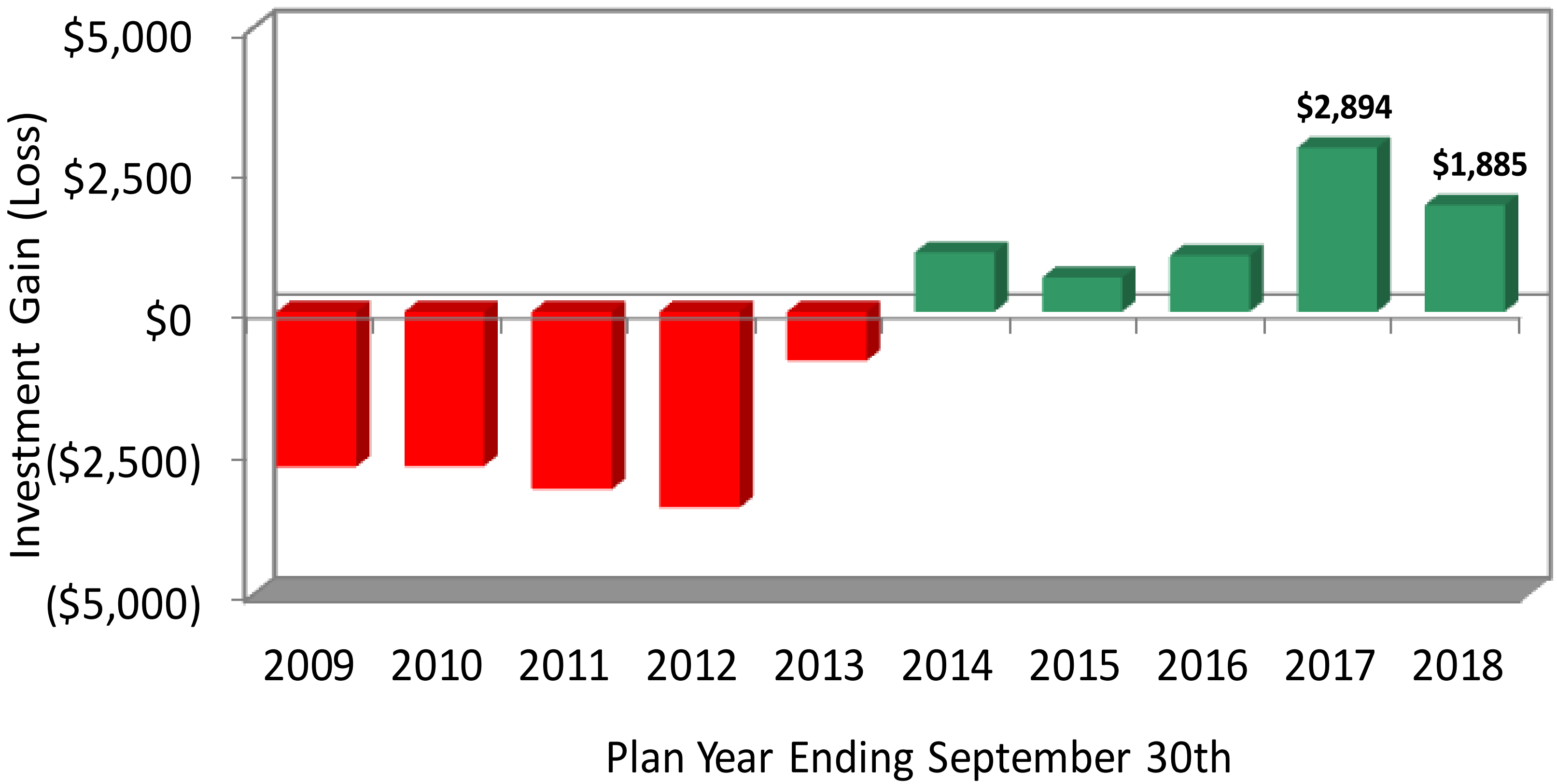


Actuarial & Market Net Rates of Return

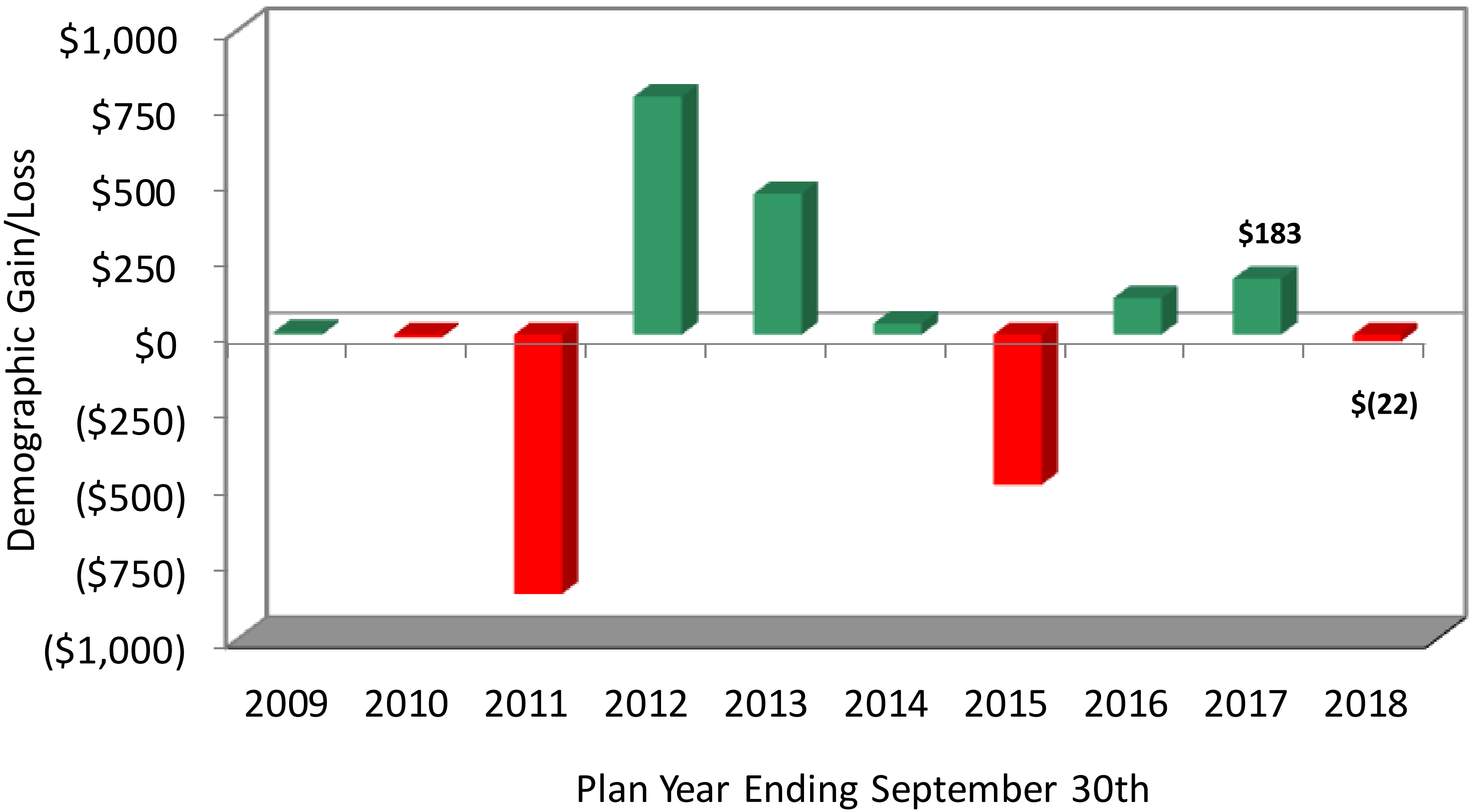


Rates of return shown above are for non-hybrid assets.

Investment Gain/(Loss) ($ in Millions)



Demographic Gain/(Loss) ($ in Millions)



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Gain/(Loss) by Type of Activity
(Amounts in Millions)

Plan Year Ending 9/30	2014	2015	2016	2017	2018
Rehires	$ (12.9)	$ 8.0	$ 6.2	$ 9.1	$ 7.2
Retiree Deaths	(183.8)	(66.5)	(82.2)	(86.7)	(80.9)
Investments	1,047.4	604.3	989.2	2,894.3	1,884.7
Pay Increases	333.0	(132.1)	290.6	386.0	241.6
Withdrawal	(53.6)	(53.0)	(55.4)	(64.6)	(73.0)
Retirements	40.6	12.4	14.8	25.4	24.8
University Refund*	0.0	(112.5)	(2.5)	0.0	0.0
Other	(87.1)	(149.4)	(52.4)	(86.7)	(141.4)
Total	**1,083.6**	**111.2**	**1,108.3**	**3,076.8**	**1,863.0**

* Refund of University employer contributions.

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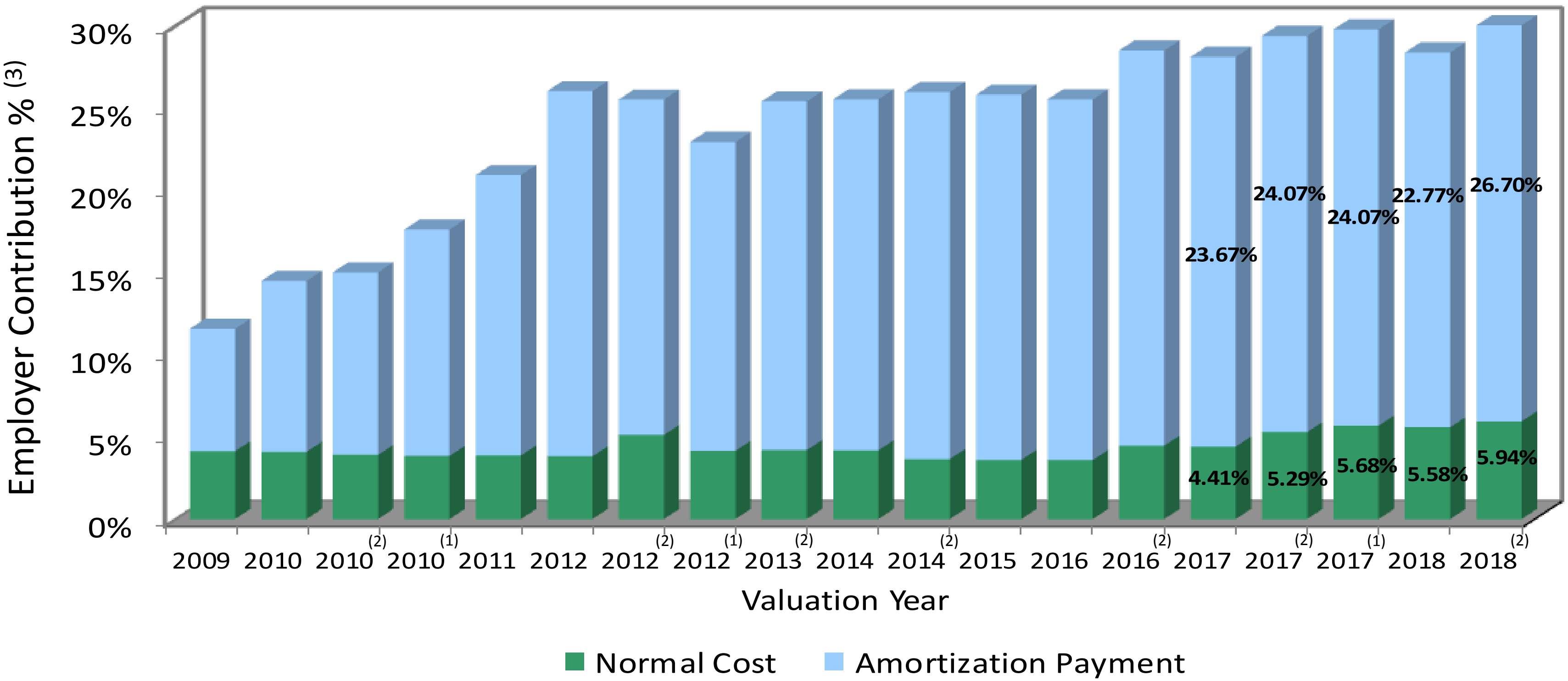
Historical Employer Contribution %'s Valuation as of September 30



(1) Revised benefit provisions.
(2) Reflects actuarial assumptions and/or methods changes.
(3) Starting with the 2012 employer calculated contribution, the normal cost is expressed as a percentage of defined benefit participating active member payroll, while the Amortization Payment is expressed as a percentage of total MPSERS active member payroll (including that of defined benefit and defined contribution active members).

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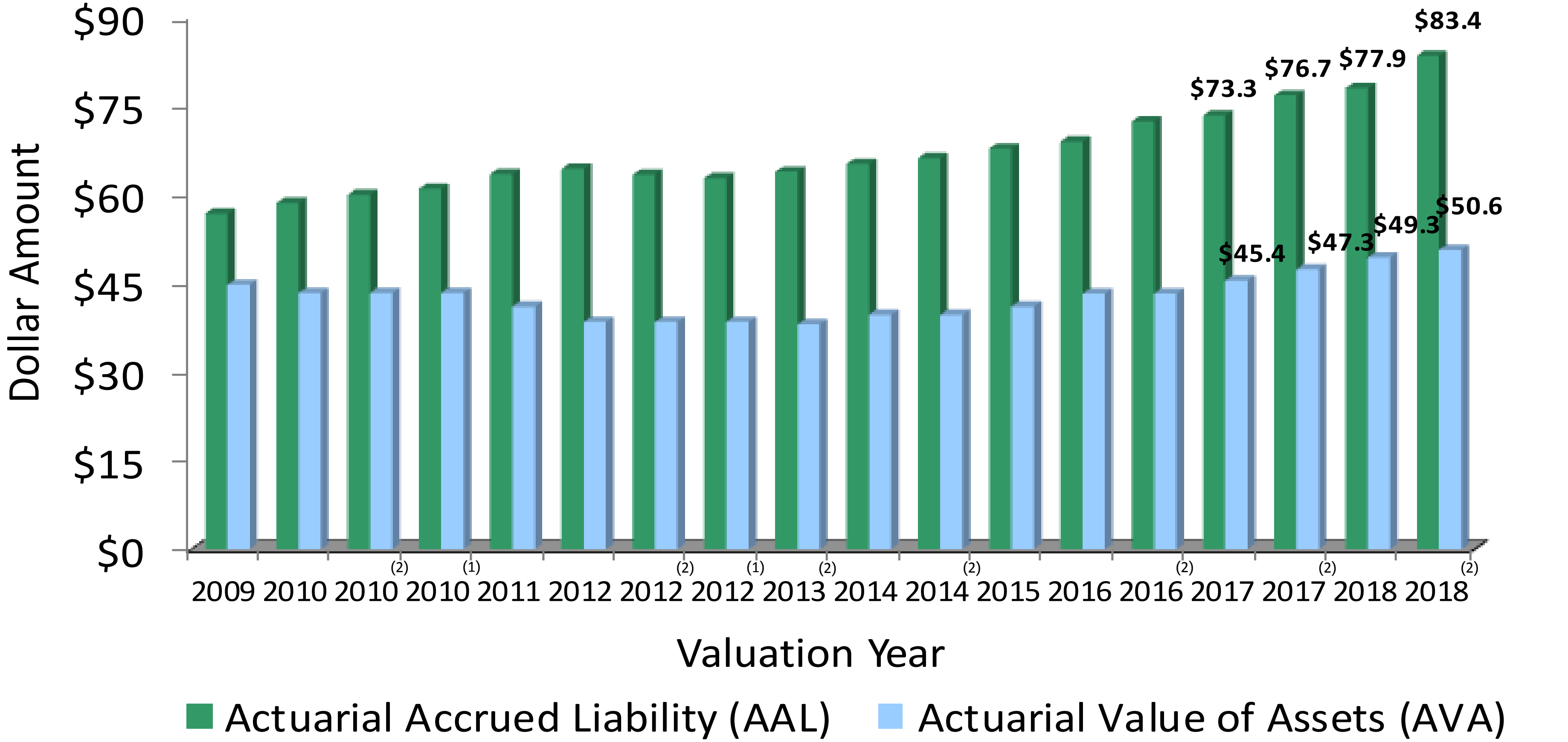
Actuarial Accrued Liability Compared to Actuarial Value of Assets ($ in Billions)



(1) Revised benefit provisions.
(2) Reflects actuarial assumptions and/or methods changes.

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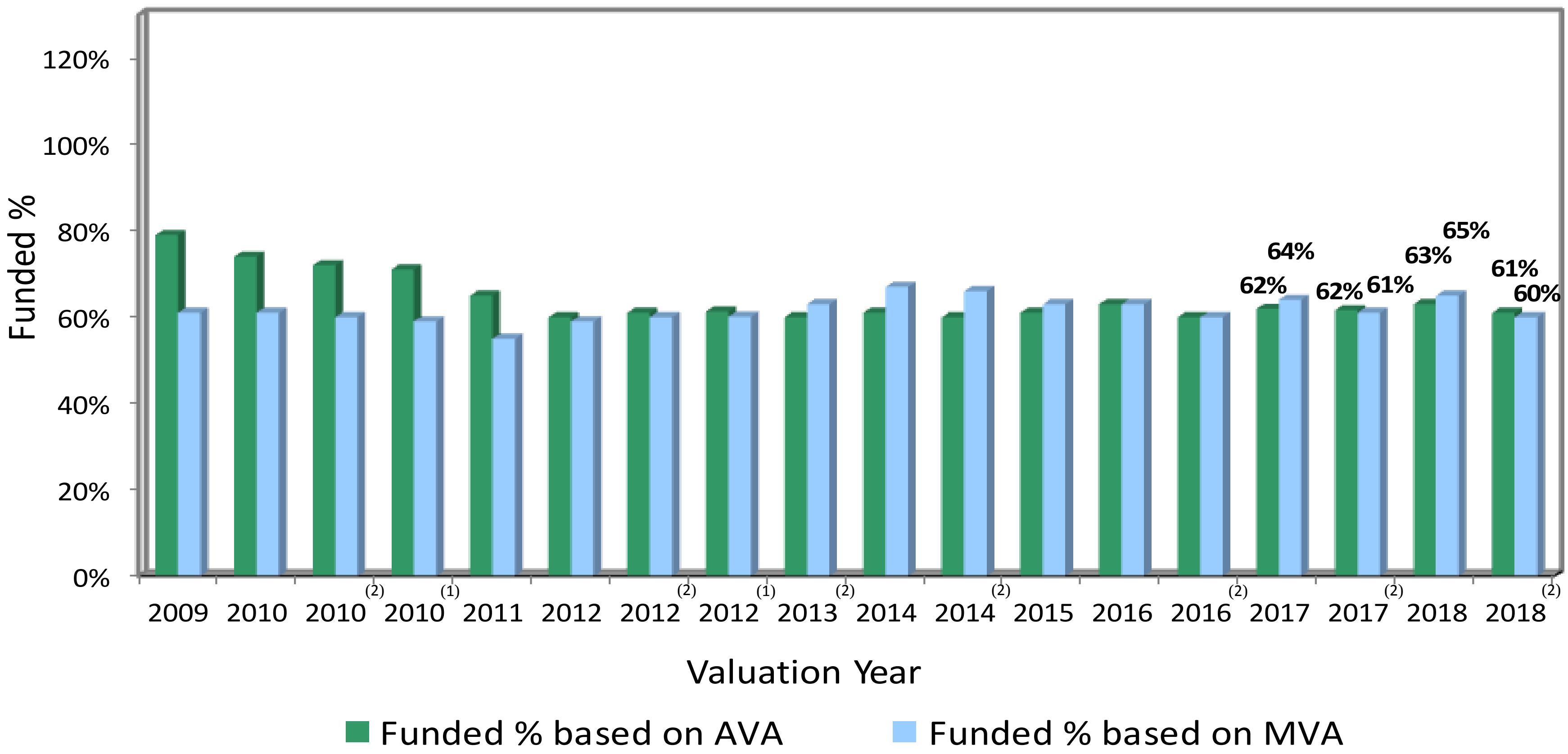
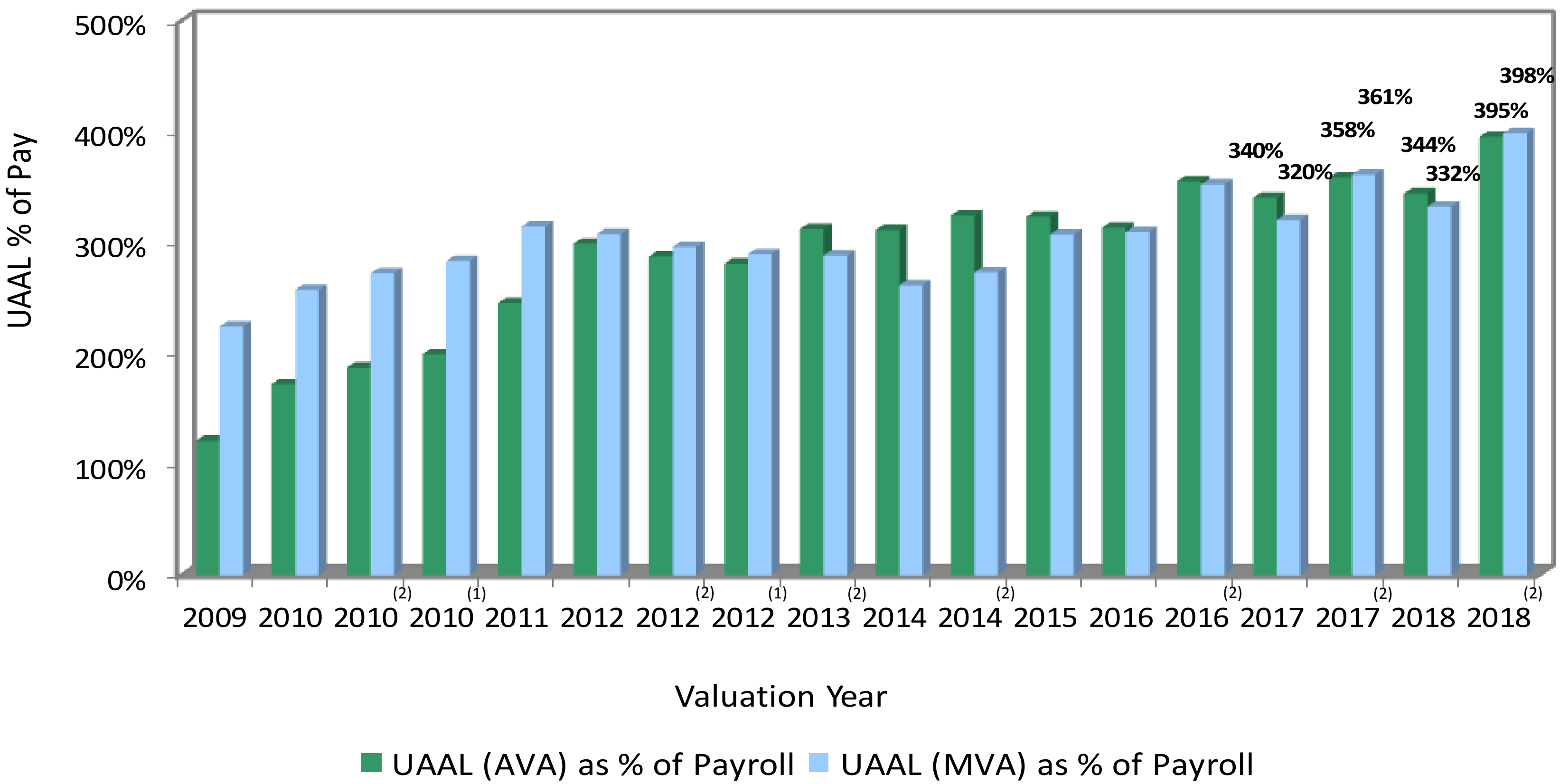
Retirement System Funded % Based on Actuarial Value and Market Value of Assets



(1) Revised benefit provisions.

(2) Reflects actuarial assumptions and/or methods changes.

Unfunded Actuarial Accrued Liability as Percentage of Payroll[3]



(1) Revised benefit provisions.
(2) Reflects actuarial assumptions and/or methods changes.
(3) Percentage of total MPSERS payroll (including both DB and DC active member payroll).

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Disclaimers

- This presentation is intended to be used in conjunction with the September 30, 2018 pension actuarial valuation report issued on March 12, 2019. This presentation should not be relied upon for any purpose other than the purpose described in the valuation report.
- This presentation shall not be construed to provide tax advice, legal advice or investment advice.
- The actuaries submitting this presentation (Mita Drazilov and Louise Gates) are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

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