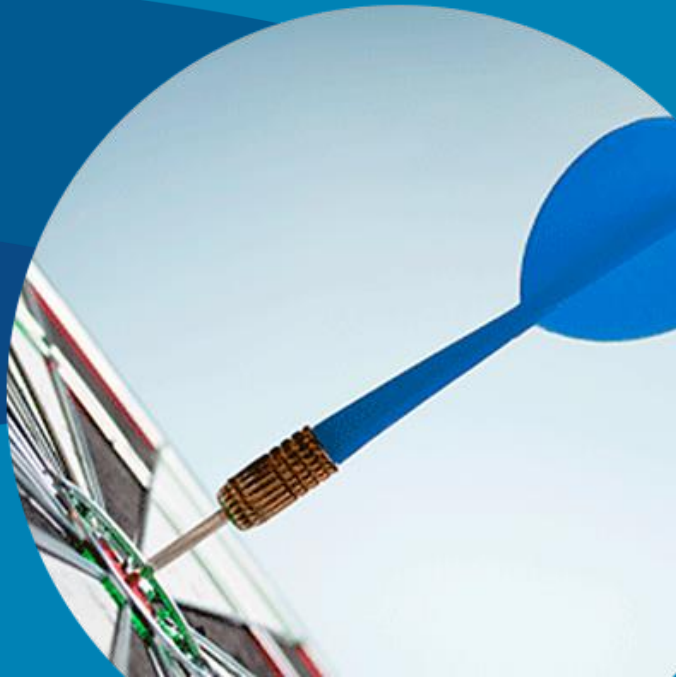
Michigan Public School Employees' Retirement System

Pension Actuarial Valuation Results as of September 30, 2020



September 30, 2020 Valuation

- Purpose of the September 30, 2020 valuation is twofold:
  - Determine the employer contribution rate for fiscal year 2023
  - Measure the System's funding progress
- Reflects the Dedicated Gains Policy adopted by the Board of Trustees
  - Investment return assumption remains 6.80% for Non-Hybrid portion and for Pension Plus Plan (PPP) portion
  - Market rate of return on assets for FY 2020 too low to trigger the provisions of the Dedicated Gains Policy

September 30, 2020 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
  - 2.50% payroll growth assumption for the September 30, 2020 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
- Employer contribution rates included in this presentation are in addition to any reconciliation payments as required by subsection 41(9) of MPSERS statute

Actuarial Valuation Process

Member Data

Financial Data

Actuarial Valuation

Actuarial Assumptions

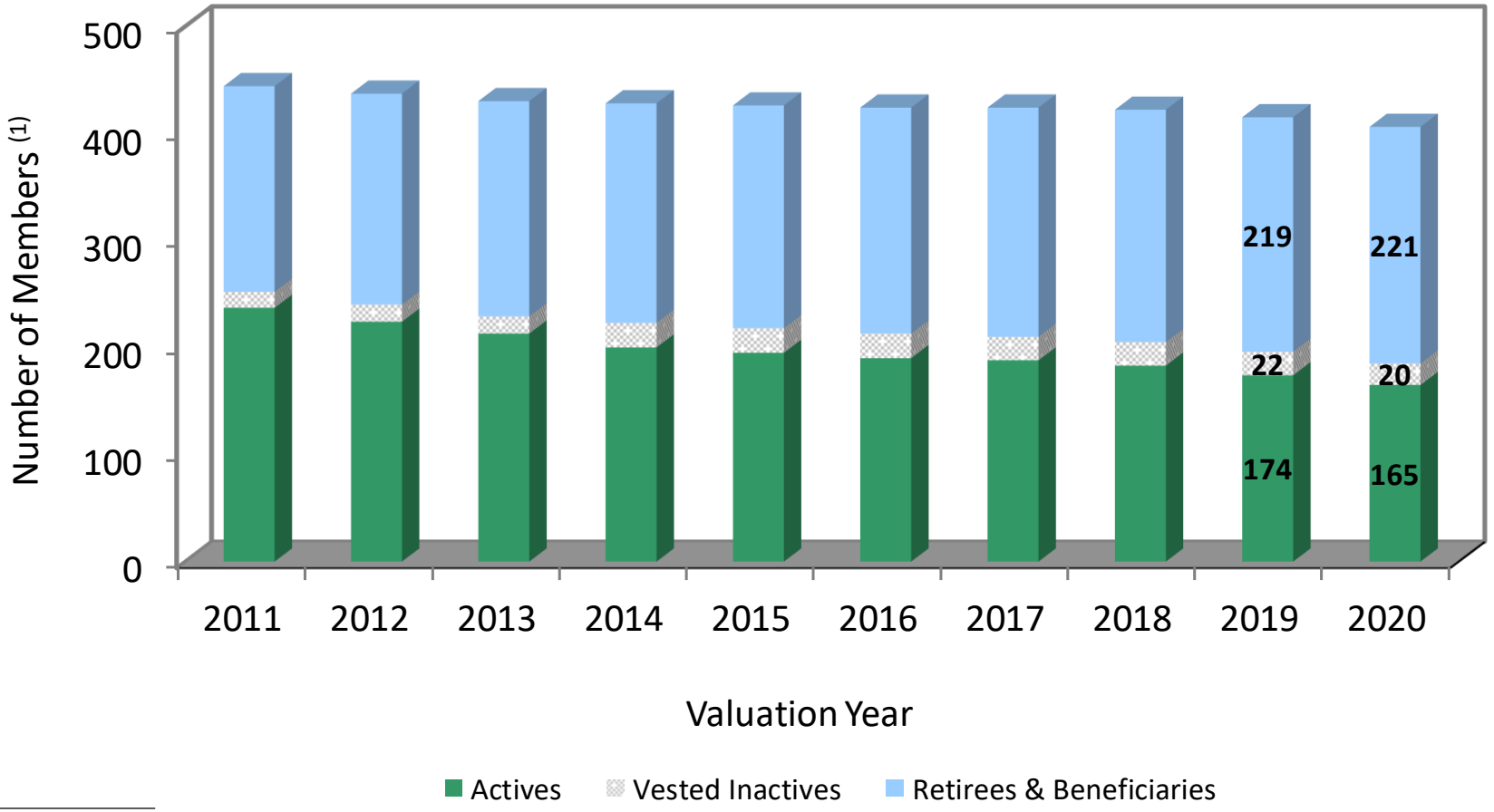
Plan Provisions

Actuarial Cost Method

GRS

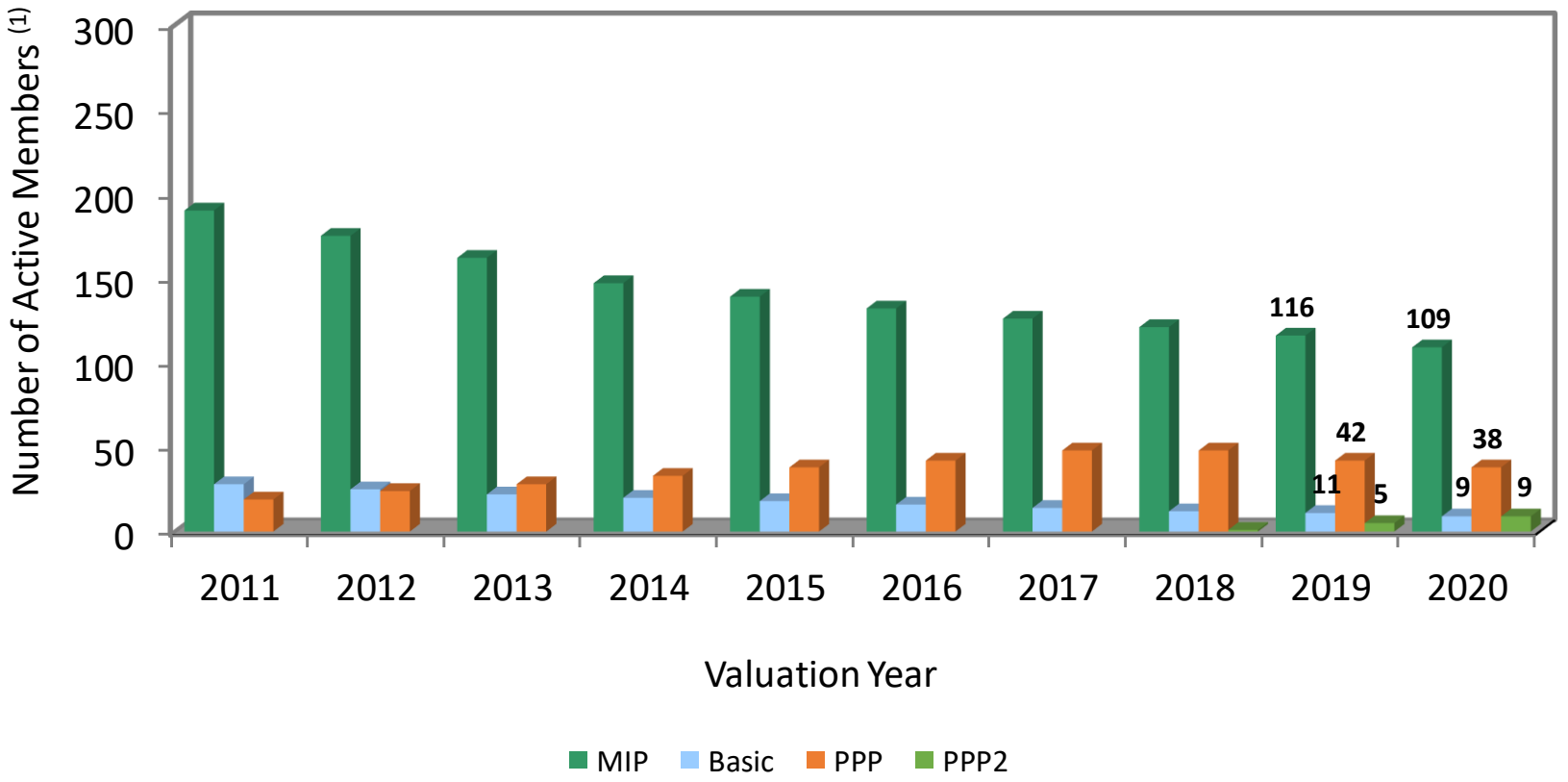
Defined Benefit Plan Membership Data

(Counts in Thousands)



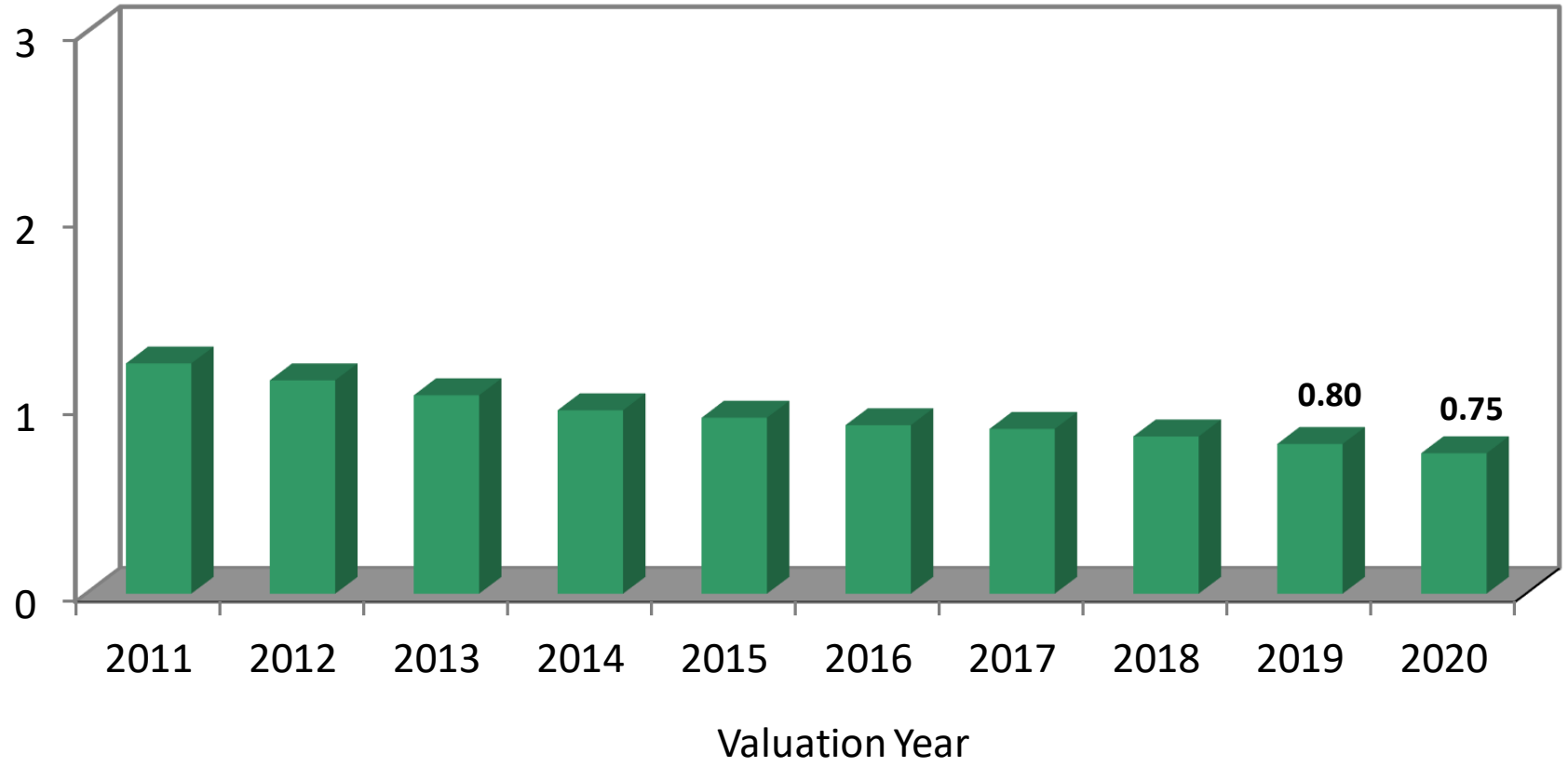
(1) Excludes active members covered exclusively by the pure defined contribution plan. Starting in 2014, active members who elected not to continue in the defined benefit plan as a result of PA 300 are classified as inactive members.

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



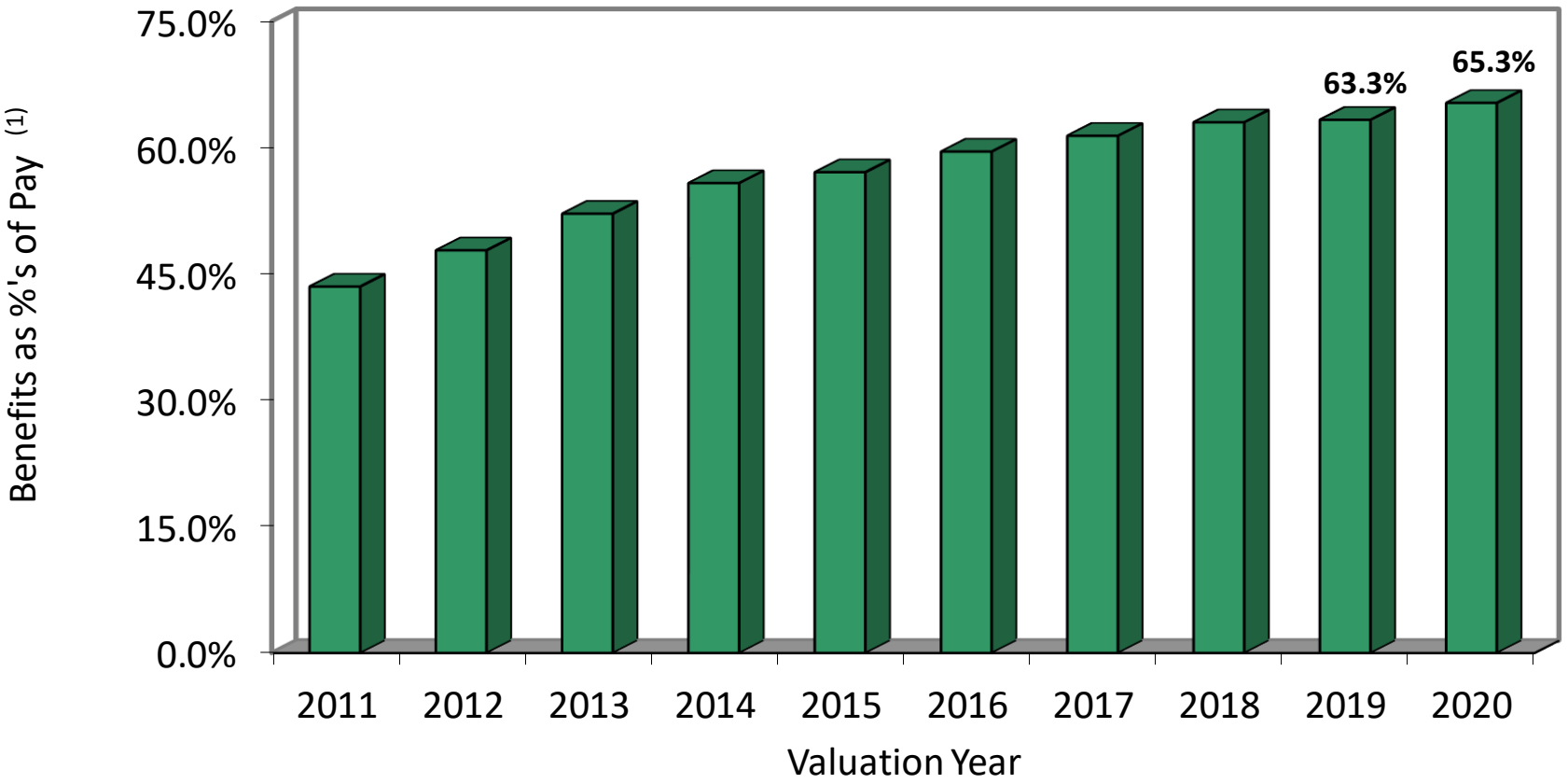
(1) Excludes active members covered exclusively by the pure defined contribution plan. Starting in 2014, active members who elected not to continue in the defined benefit plan as a result of PA 300 are classified as inactive members.

Ratio of Active Members[(1)] to Pension Benefit Recipients



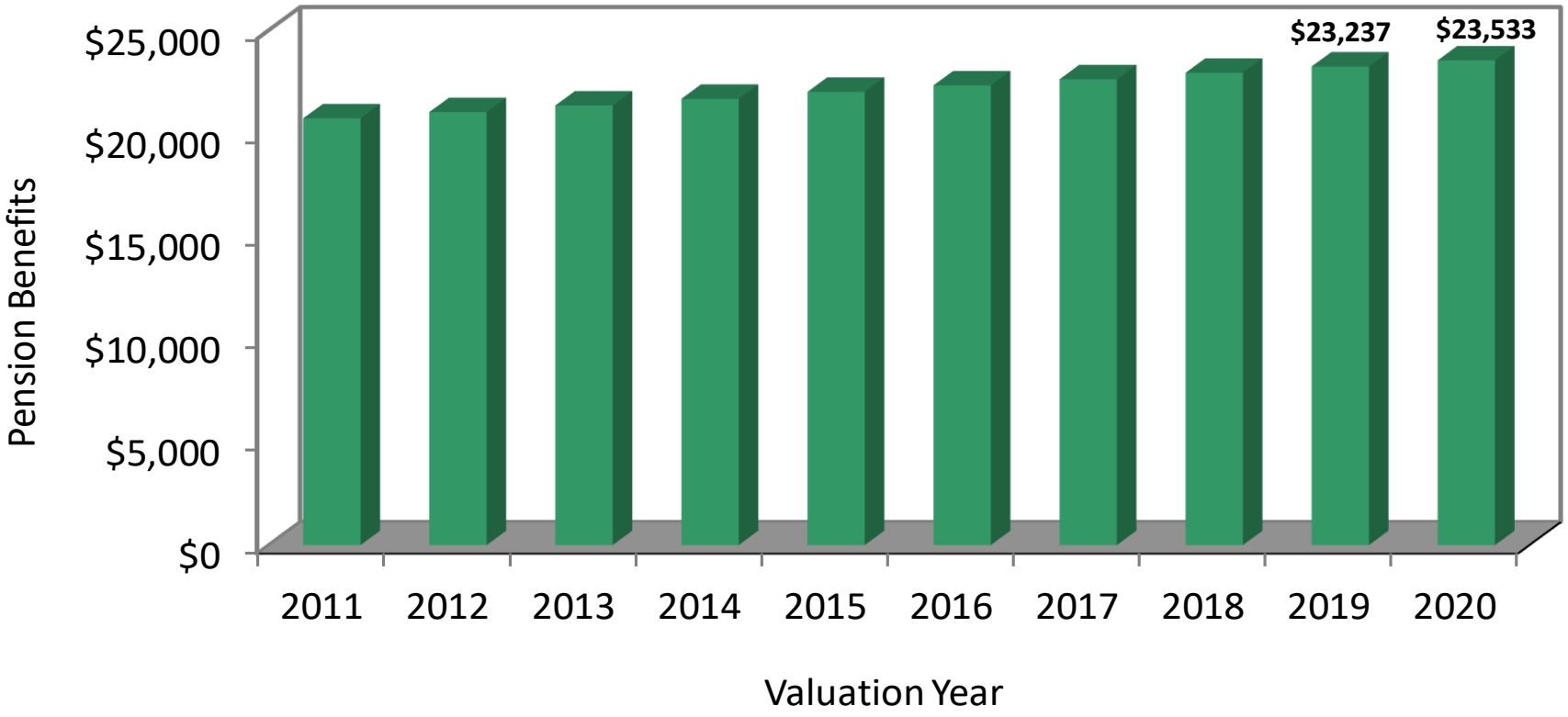
(1) Excludes active members covered exclusively by the pure defined contribution plan. Starting in 2014, active members who elected not to continue in the defined benefit plan as a result of PA 300 are classified as inactive members.

Pension Benefits Expressed as %'s of Active Member Pay

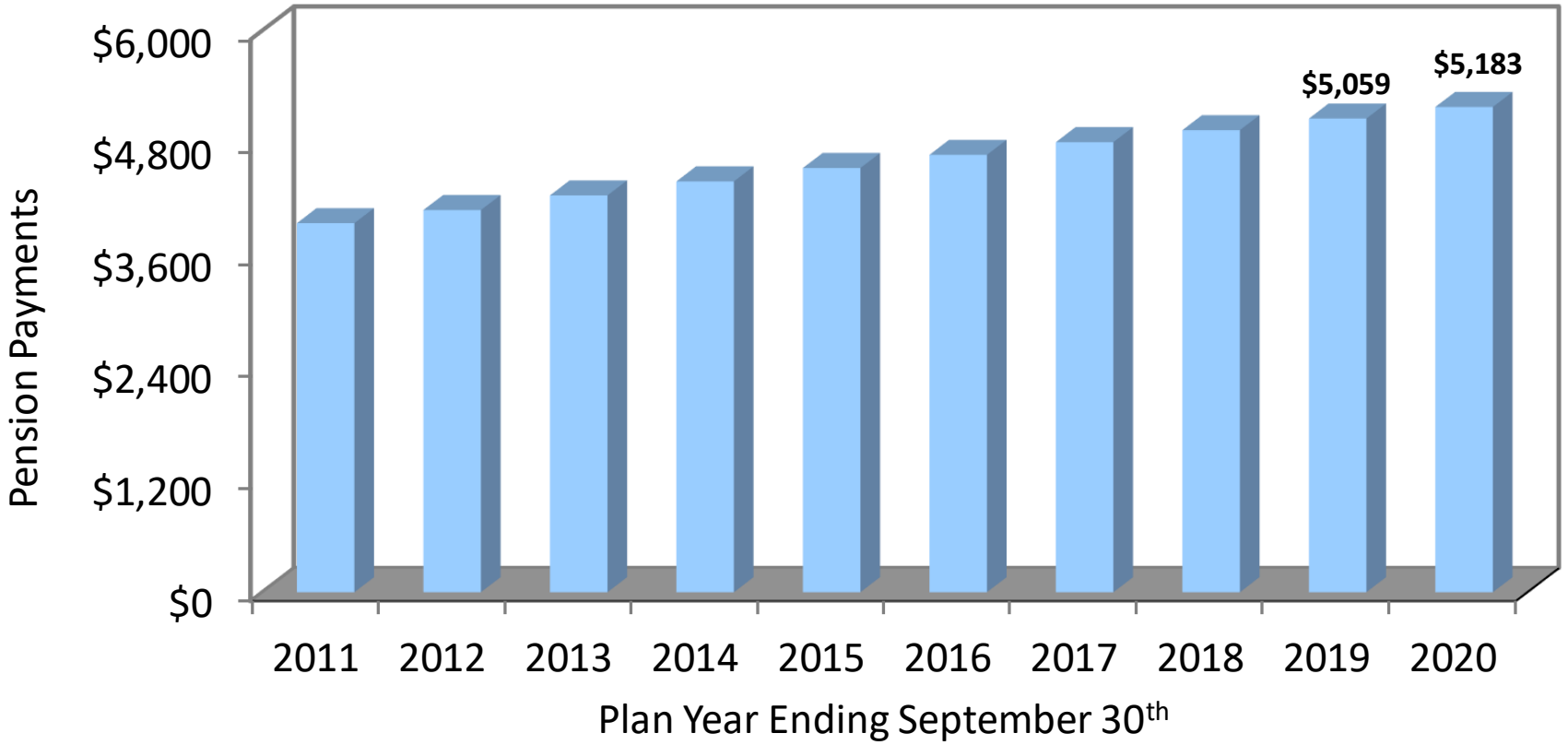


(1) Percentage of defined benefit MPSERS payroll (excludes payroll of those covered exclusively by the pure defined contribution plan and of those who elected not to continue in the defined benefit plan as a result of PA 300).

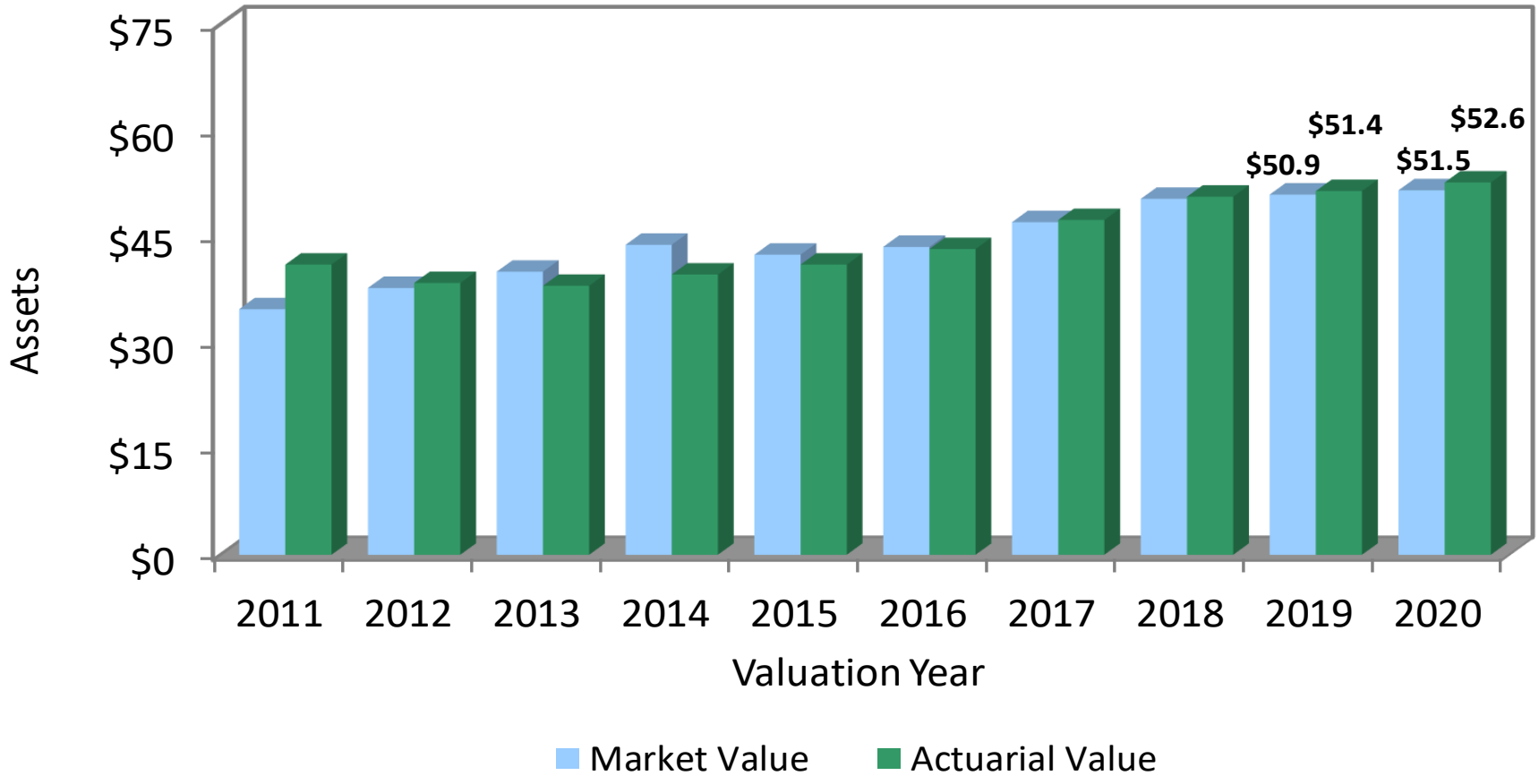
Average Annual Pensions



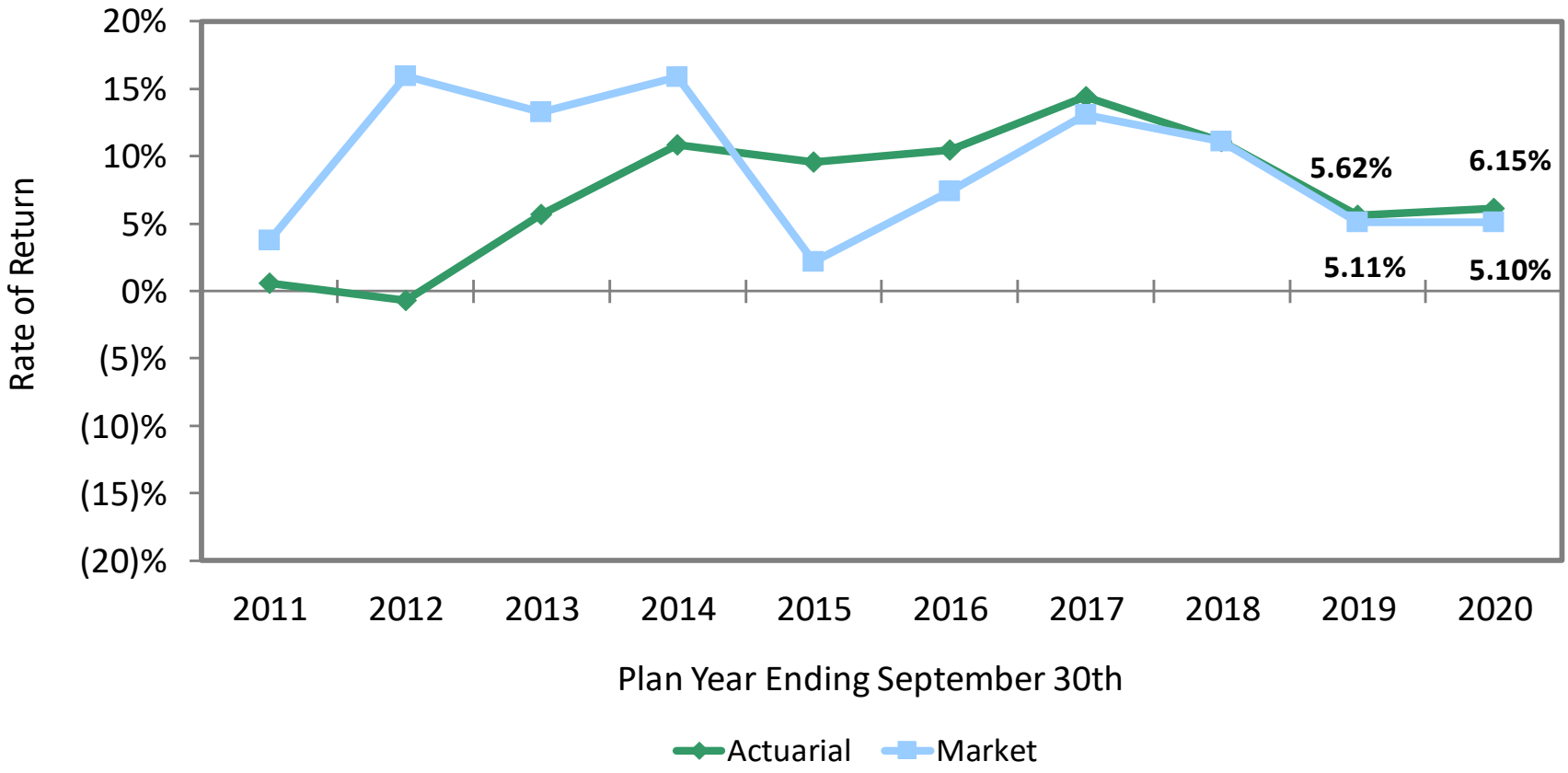
Reported Pension Payments by Plan Year
(Amounts in Millions)



Growth of Pension Assets ($ in Billions)

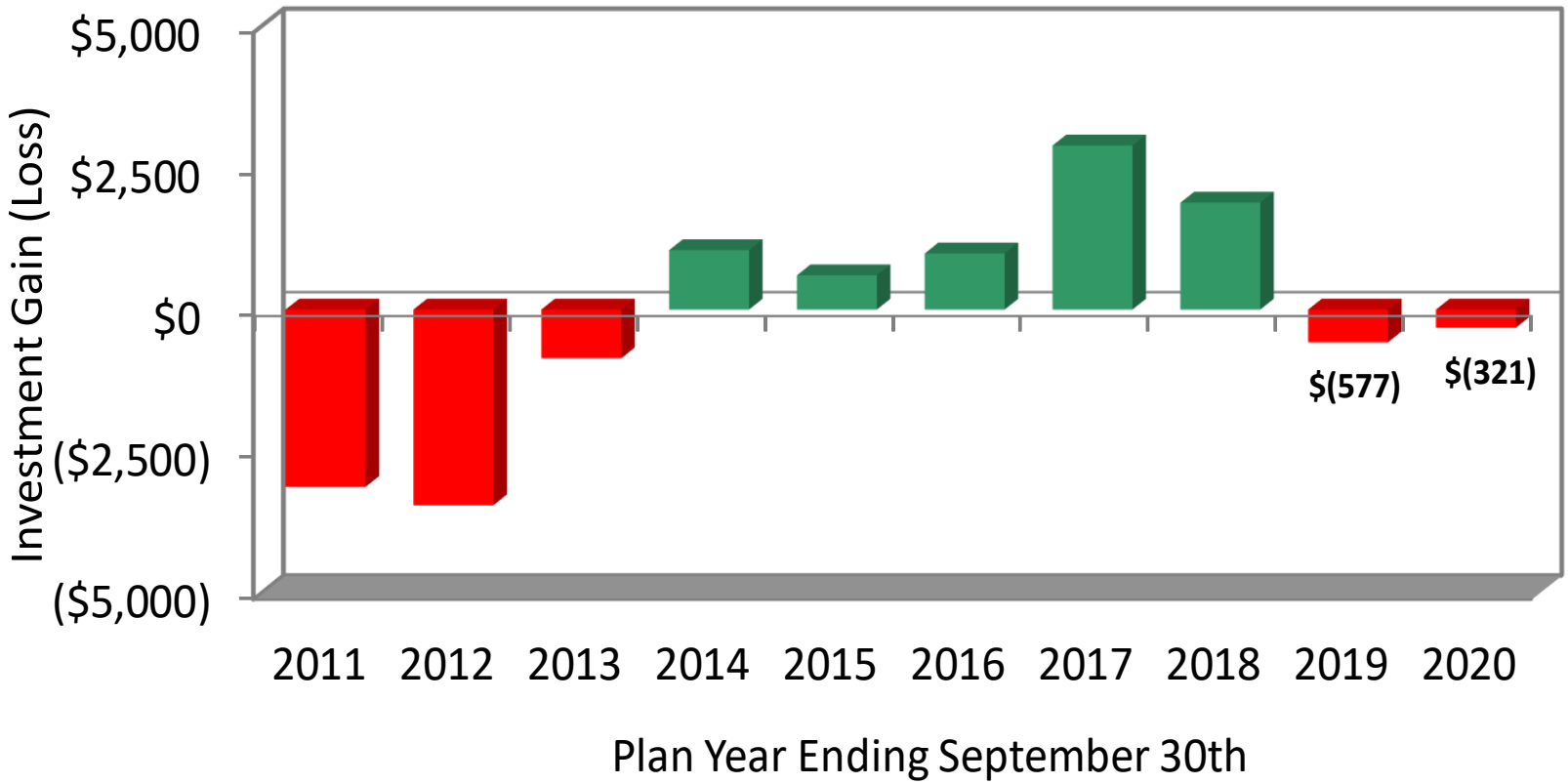


Actuarial & Market Net Rates of Return



Rates of return shown above are for Non-Hybrid assets.

Investment Gain/(Loss) ($ in Millions)



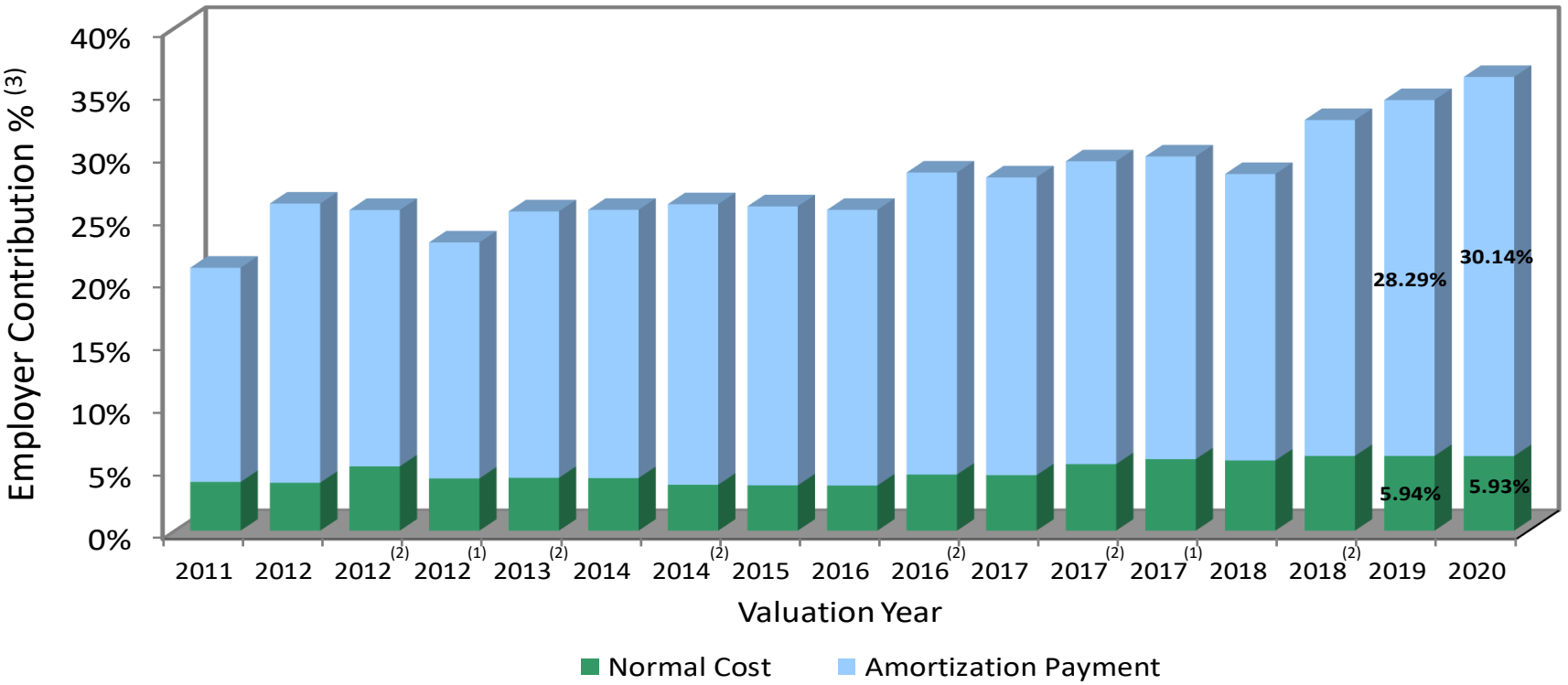
Demographic Gain/(Loss) ($ in Millions)

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

Plan Year Ending 9/30	2016	2017	2018	2019	2020
Rehires	$ 6.2	$ 9.1	$ 7.2	$ 9.6	$ (1.8)
Retiree Deaths	(82.2)	(86.7)	(80.9)	20.8	109.1
Investments	989.2	2,894.3	1,884.7	(577.3)	(321.4)
Pay Increases	290.6	386.0	241.6	(477.7)	72.3
Withdrawal	(55.4)	(64.6)	(73.0)	(55.8)	(26.1)
Retirements	14.8	25.4	24.8	27.6	18.6
University Refund*	(2.5)	0.0	0.0	0.0	0.0
Other	(52.4)	(86.7)	(141.4)	(48.6)	82.4
Total	**1,108.3**	**3,076.8**	**1,863.0**	**(1,101.3)**	**(66.9)**

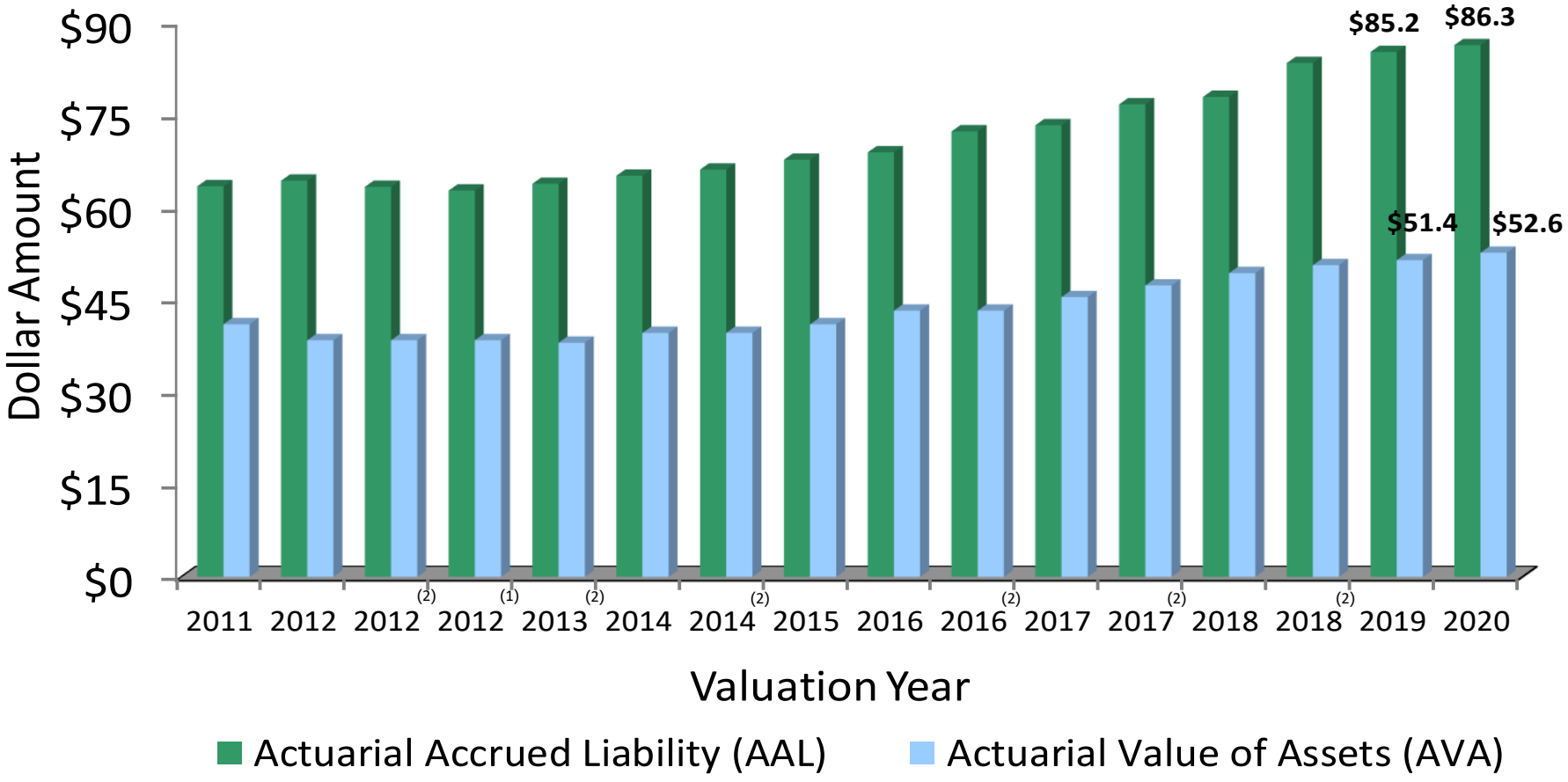
* Refund of University employer contributions.

Historical Employer Contribution %'s Valuation as of September 30



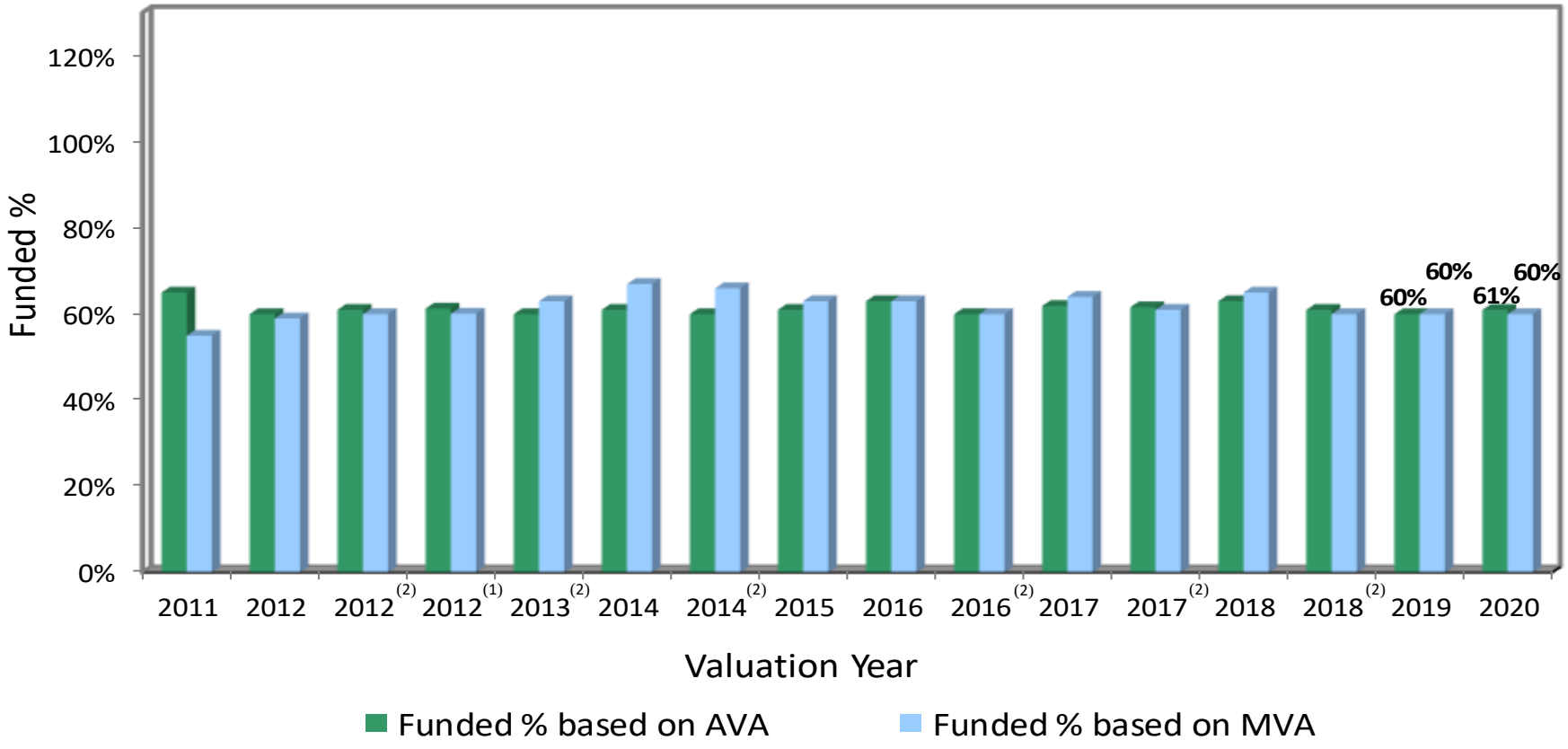
(1) Revised benefit provisions.
(2) Reflects actuarial assumptions and/or methods changes (not including changes in amortization payroll growth).
(3) Starting with the 2012 employer calculated contribution, the normal cost is expressed as a percentage of defined benefit participating active member payroll, 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).

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



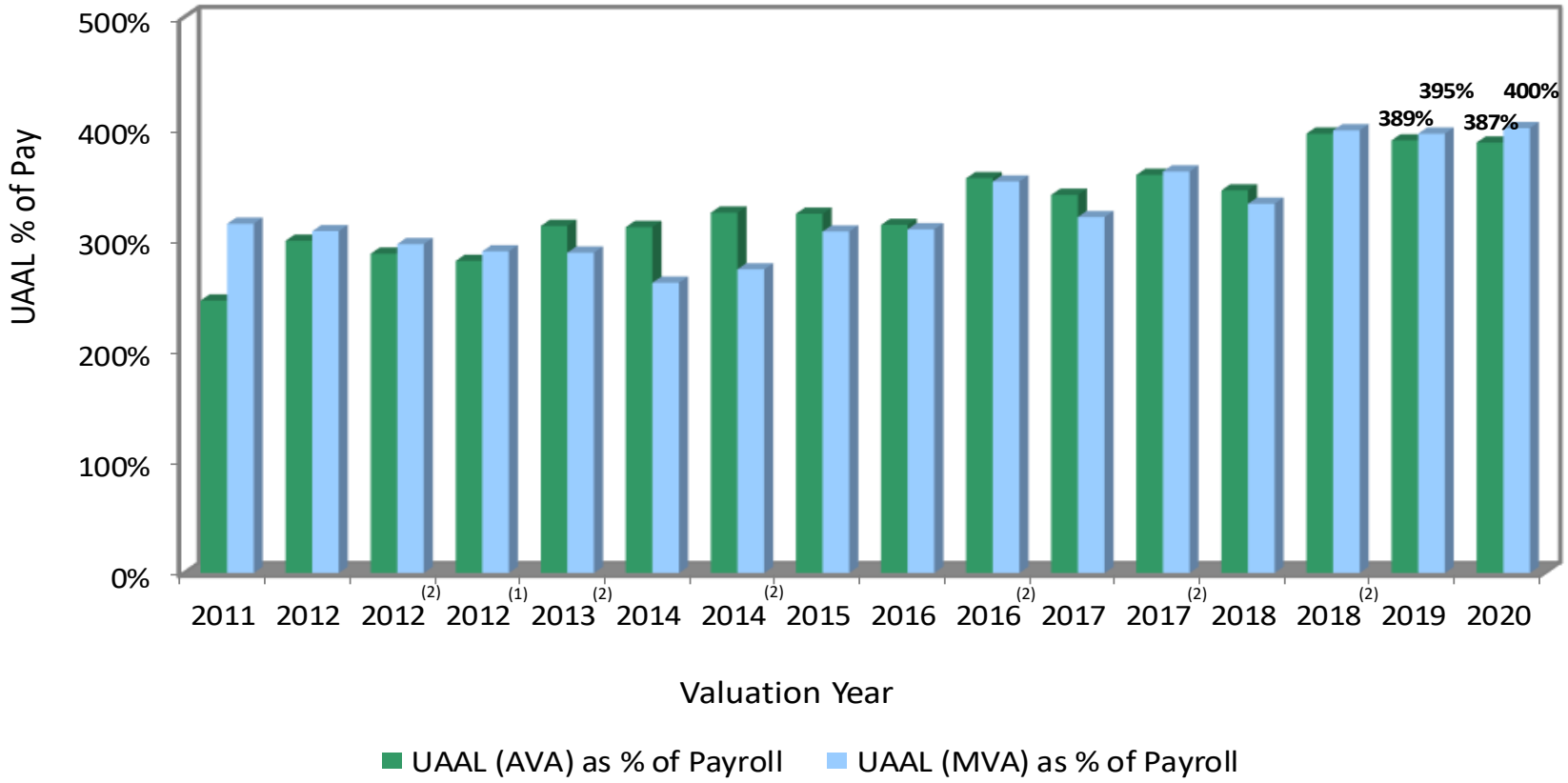
(1) Revised benefit provisions.
(2) Reflects actuarial assumptions and/or methods changes.

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 a 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).

Risk Metrics

- The determination of the actuarial accrued liability and the total computed employer contribution requires the use of assumptions regarding future economic and demographic experience
- Risk measures are intended to aid in the understanding of the effects of future experience differing from the assumptions
- Risk measures may also help with illustrating the potential volatility in the actuarial accrued liability and the total computed employer contribution

Risk Metrics

1. Funded Ratio (Funding Value of Assets basis)
   - This is the most widely known measure of a plan's financial strength. The trend in the funded ratio and the actual funded ratio are both important metrics. A trend approaching 100% is desirable.
2. Funded Ratio (Market Value of Assets basis)
   - This is similar to the above metric, except that the asset value is the market value.
3. Unfunded Actuarial Accrued Liability (UAAL) Amortization Period
   - Periods above about 17 to 23 years generally indicate that the UAAL payment is less than the interest on the UAAL. This situation is referred to as "negative amortization." Negative amortization is increasingly viewed as undesirable.
4. Total UAAL / Total Payroll
   - The ratio of UAAL to payroll gives an indication of the plan sponsor's ability to pay off the UAAL. A declining ratio is desirable. A ratio above approximately 3.0 to 4.0 may indicate difficulty in discharging the unfunded liability in some circumstances.

Risk Metrics

5. Total Funding Value of Assets / Total Payroll
   - The ratio of assets to payroll gives an indication of both maturity and volatility. Many systems have ratios between 5.0 and 7.0. Social Security Replacement Plans may fall above that range. A high ratio can indicate volatility of contribution rates.
6. Total Actuarial Accrued Liability (AAL) / Total Payroll
   - This is similar to the above metric. It illustrates the expected ratio of assets to payroll when the plan is fully funded.
7. Standard Deviation of Investment Return / Total Payroll
   - The portfolio standard deviation measures the volatility of investment returns. When divided by payroll, it gives the effect of a one standard deviation asset gain or loss as a percent of payroll. This theoretically may happen once every 6 years.

Risk Metrics

Valuation Date September 30,	Funded Ratio Based on AVA	Funded Ratio Based on MVA	UAAL Amortization Period	Total UAAL / Total Payroll[3]	Total Funding Value of Assets / Total Payroll[3]	Total AAL / Total Payroll[3]	Standard Deviation of Investment Return / Total Payroll[3]
2012 [1,2]	61 %	60 %	24	2.8	4.4	7.3	n/a
2013 [1]	60	63	23	3.1	4.6	7.7	n/a
2014 [1]	60	66	22	3.2	4.9	8.1	n/a
2015	61	63	21	3.2	5.0	8.2	n/a
2016 [1]	60	60	20	3.5	5.3	8.8	n/a
2017 [1]	62	61	19	3.6	5.7	9.3	n/a
2018 [1]	61	60	18	3.9	6.1	10.0	80 %
2019	60	60	17	3.9	5.9	9.8	77
2020	61	60	16	3.9	6.0	9.9	78

[1] *After changes in actuarial assumptions.*
[2] *After changes in plan provisions.*
[3] *Payroll for UAAL purposes (Total MPSERS Payroll).*

Disclaimers

- This presentation is intended to be used in conjunction with the September 30, 2020 pension actuarial valuation report. 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.