



Michigan Department of Treasury Bureau of Investments

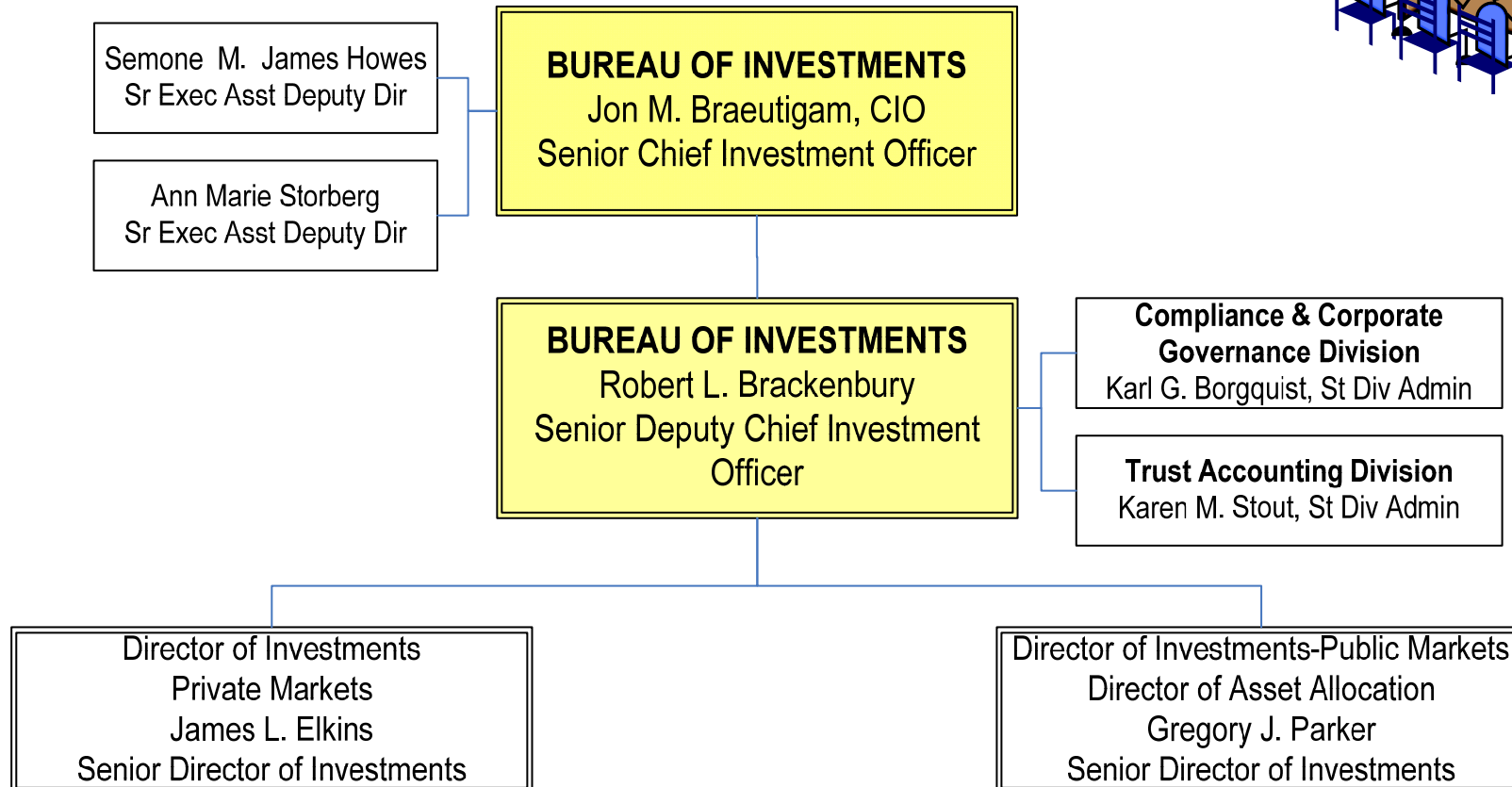
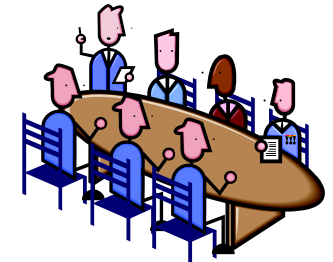


Jon M. Braeutigam
Chief Investment Officer
May 11, 2017



Bureau of Investments (BOI)

As of April 2017





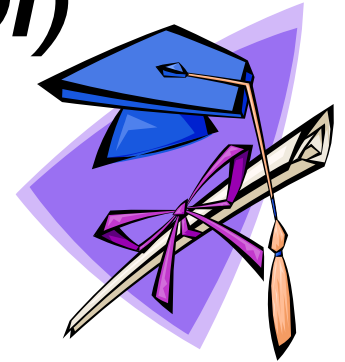
Executive Summary

- The market value of the MSPRS plan is up and the funding ratios are improving.
- Long-term results substantially beat peers.
- The market value of the MSPRS plan is different than the actuarial value. Actuarial value ‘smooths’ results over years, while the market value is the actual value of the fund as of a certain date.



Bureau of Investments (BOI)

As of February 2017



- 75 BOI Employees
- 47 Investment Professionals
- 33 Individuals with a Masters Degree or higher
- 15 C.F.A. Charter holders
- 13 Other professional designations
- Total of \$83.8 billion assets under management
- The large investment pool is an advantage for the MSPRS. Increase diversification while keeping costs low.



MSPRS Funded Ratio

\$1.3 Billion as of 3/31/17

Year	Market Value of Assets	Actuarial Value of Assets	Actuarial Accrued Liability	Funded Ratio Based on Actuarial Value
2015	\$1,233	\$1,197	\$1,851	64.7%
2014*	\$1,250	\$1,133	\$1,800	63.0%
2013	\$1,127	\$1,069	\$1,724	62.0%
2012	\$1,052	\$1,069	\$1,671	64.0%
2011	\$967	\$1,138	\$1,628	69.9%
2010	\$999	\$1,202	\$1,594	75.4%
2009	\$958	\$1,238	\$1,534	80.7%
1983	\$178	\$178	\$272	65.4%
<i>MSPRS Estimated Market Value Funded Ratio</i>				
3/31/2017	\$1,321	- - -	\$1,851	71.4%

(\$ in Millions)

Pension Fund Only

*Revised actuarial assumptions and/or methods.

Source: Pension Plans Component Unit Financial Reports and Actuarial Valuations, years ending in September



MSPRS

Contributions and Distributions

FY 2016

Contributions

Members	\$4.2
Employer	<u>115.7</u>

Total Contributions \$119.9

Pension Benefit Distributions 151.7

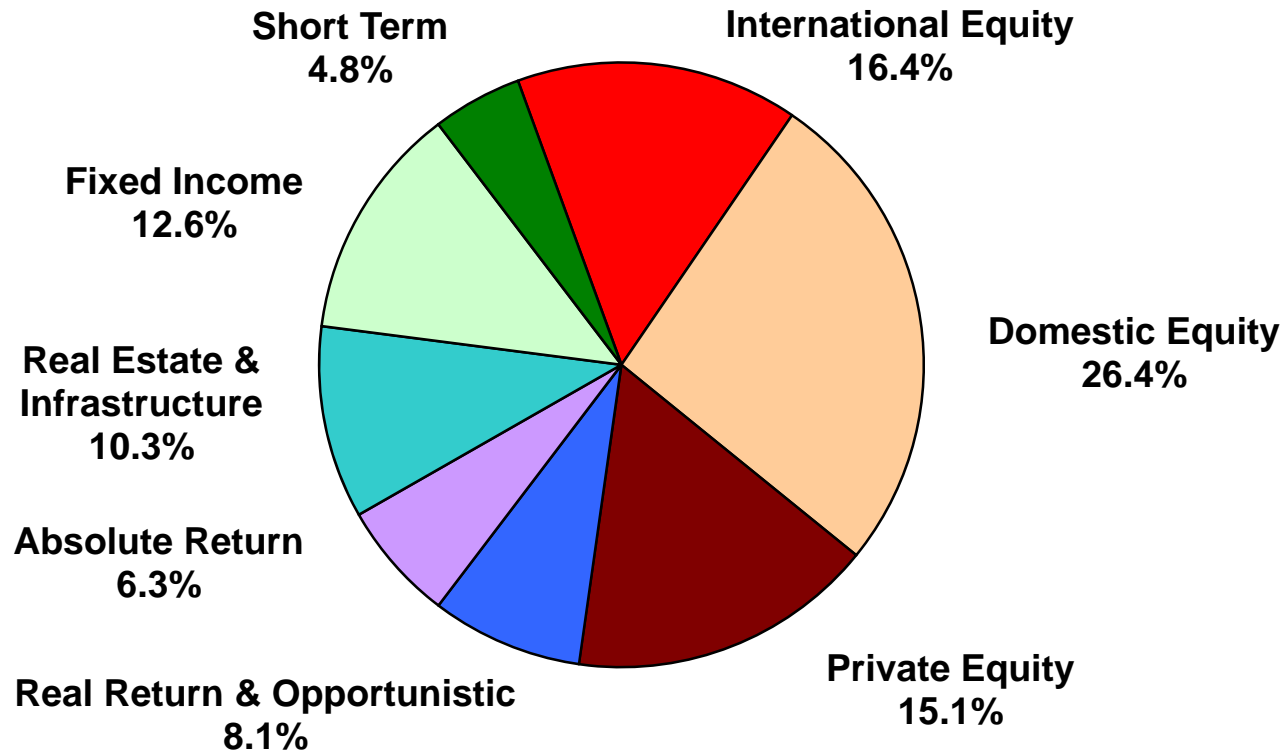
Net **(\$31.8)**

- Equal to (per quarter on average) (\$8.0)
- Or about 2.4% of total market value of fund



MSPRS Asset Allocation

As of March 31, 2017



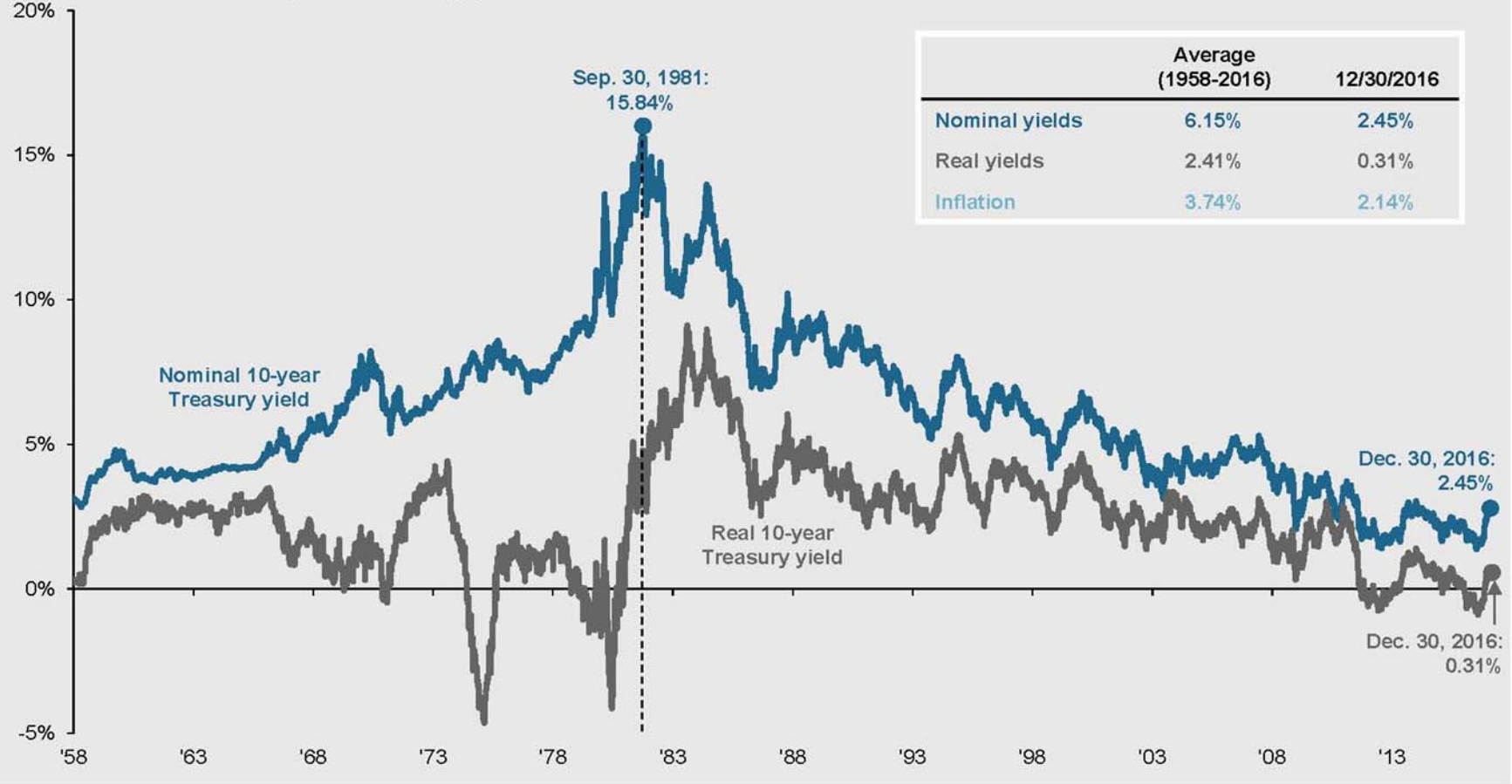
Diversification is essential to protect the funds. However, still reliant on equity markets.



Interest Rates and Inflation

Fixed income

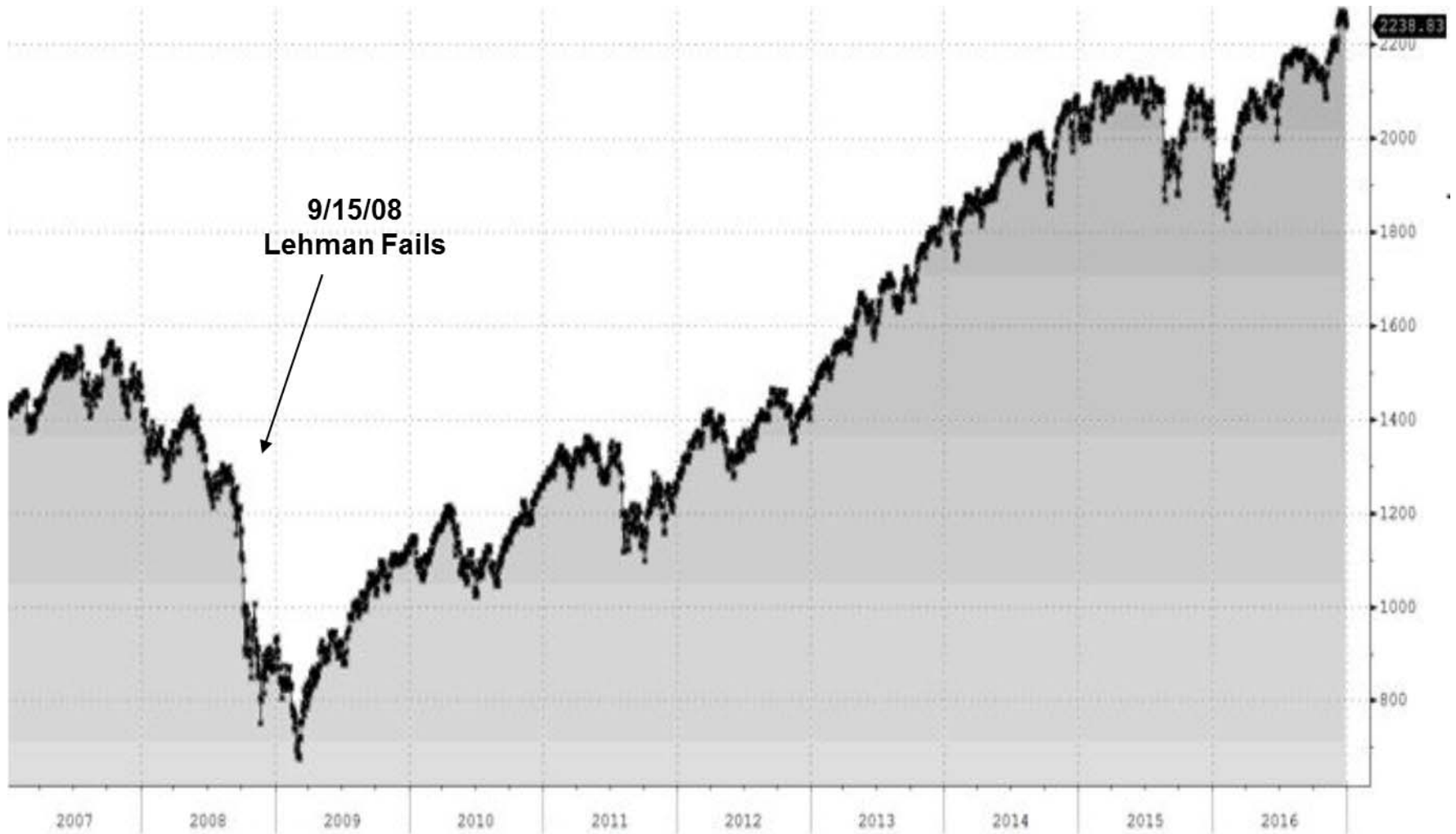
Nominal and real 10-year Treasury yields



Source: BLS, Federal Reserve, J.P. Morgan Asset Management.
 Real 10-year Treasury yields are calculated as the daily Treasury yield less year-over-year core CPI inflation for that month except for December 2016, where real yields are calculated by subtracting out November 2016 year-over-year core inflation.
 Guide to the Markets – U.S. Data are as of December 31, 2016.



S&P 500 – Last 10 Years





MSPRS FUND

Time-Weighted Rate of Return

Public Funds (DB) > \$10 Billion

As of December 31, 2016

Asset Class w/Benchmark	CY 2016									
	One Year*		Three Years*		Five Years*		Seven Years*		Ten Years*	
	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank
Total Plan	7.5%	75	7.1%	5	9.9%	20	9.4%	11	5.8%	17
Median	7.9%		5.3%		8.9%		8.4%		5.3%	

* Annualized Returns



U.S. Economy

- Forecasted for modest higher growth.
- Housing continues to do well, interest rates continue to be low.
- Auto sales are decent.
- Energy, less dependence on foreign sources.
- Consumer debt service is low.
- Labor market is still improving steadily.



Still Needed

- Need to address U.S., states, and municipalities long-term liabilities.
- World is uncertain (North Korea, Iran, Syria, etc.).
- Europe has low growth demographics.



Conclusion

- We have experienced a U.S. ‘Bull Market’ since 2009.
- The fund’s returns have substantially beaten peers.
- Going forward, with the U.S. 10-Year Treasury Bond at ~2.2%, achieving 8% is challenging for a diversified portfolio.
- The U.S. economy is doing decent. Most economists predict moderate economic growth in 2017.



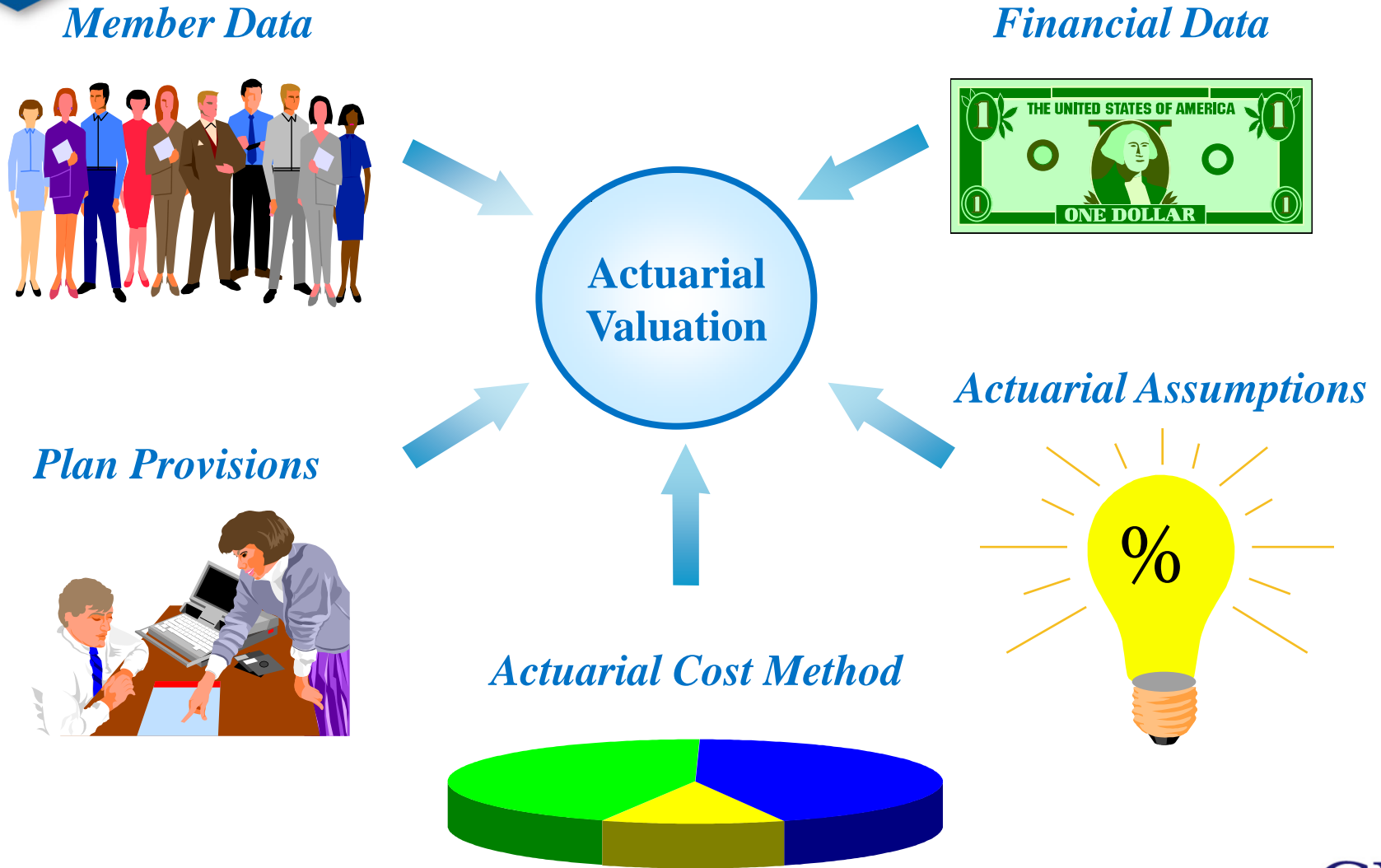
Michigan State Police Retirement System

Pension Actuarial Valuation Results
as of September 30, 2016



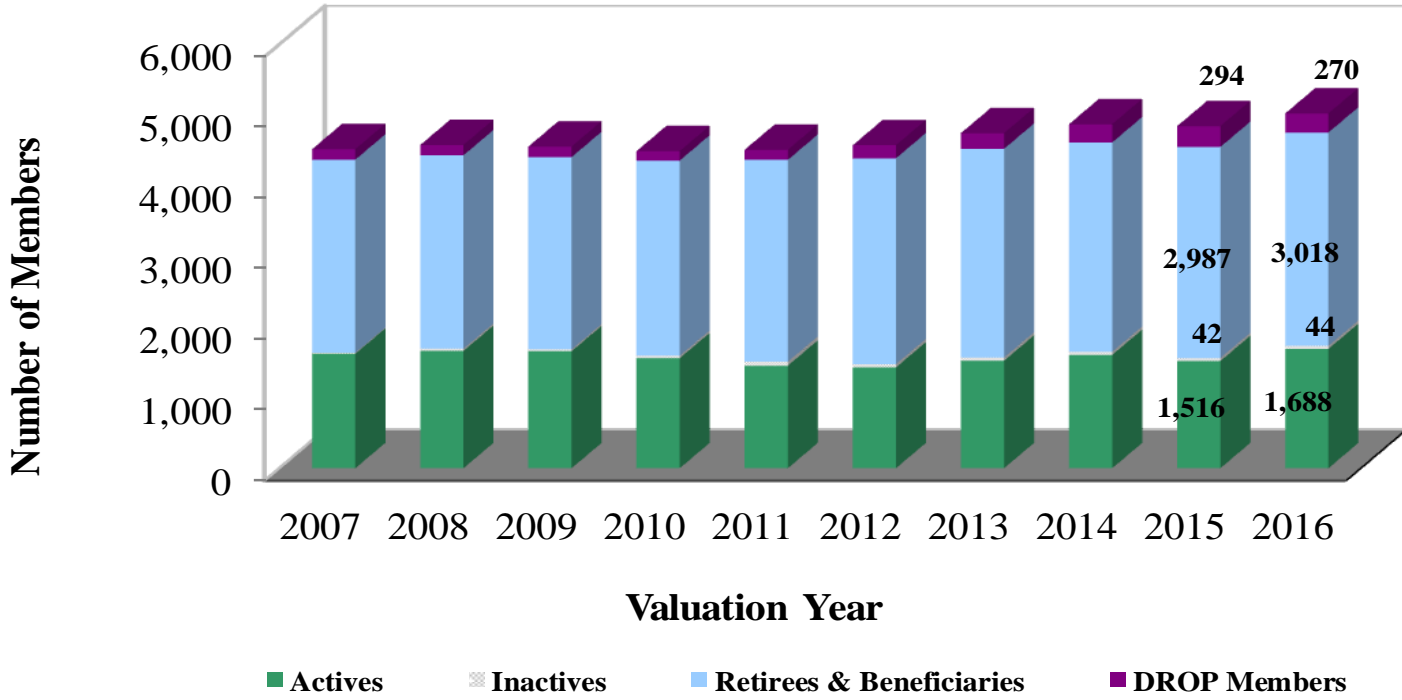
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Actuarial Valuation Process



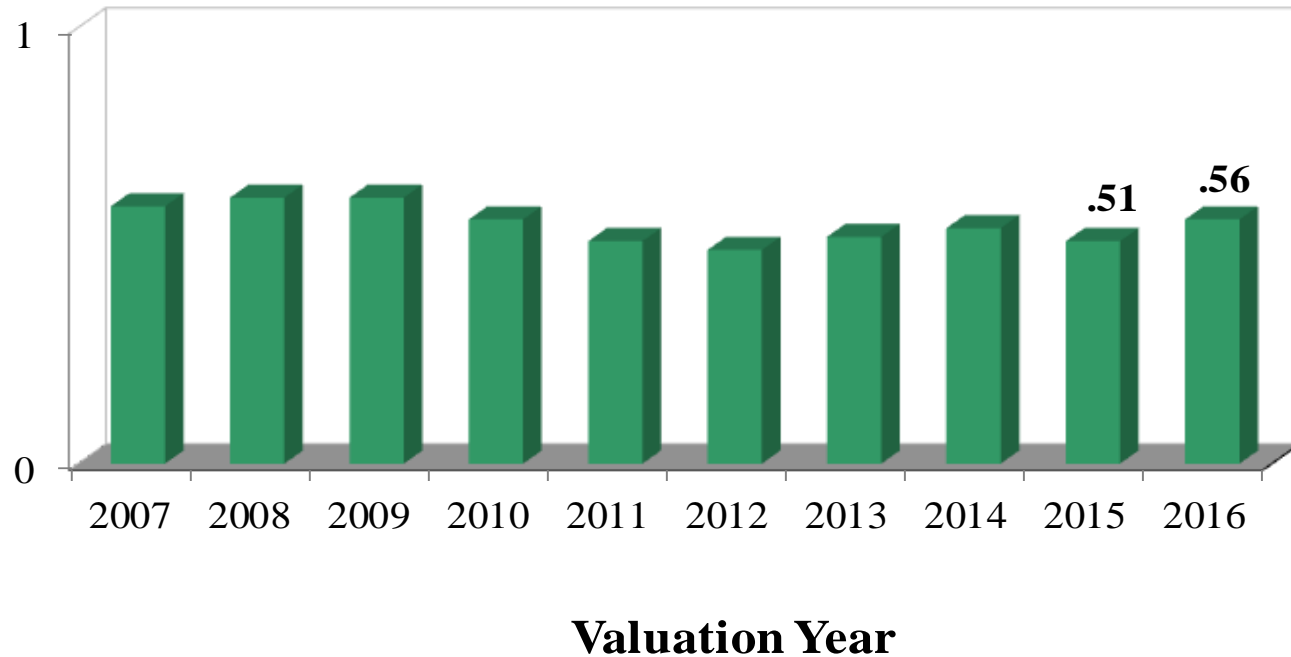


Membership Data



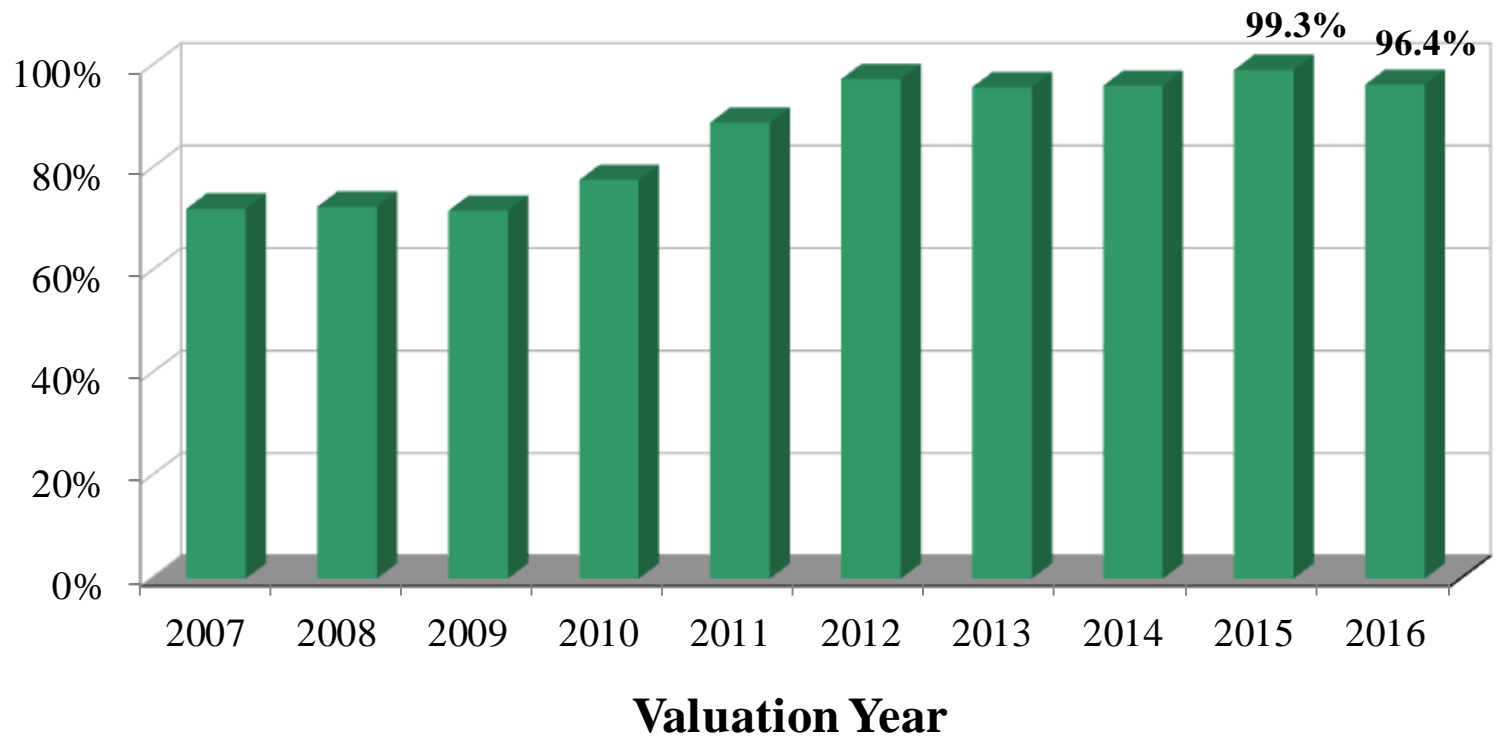


Ratio of Active Members to Pension Benefit Recipients



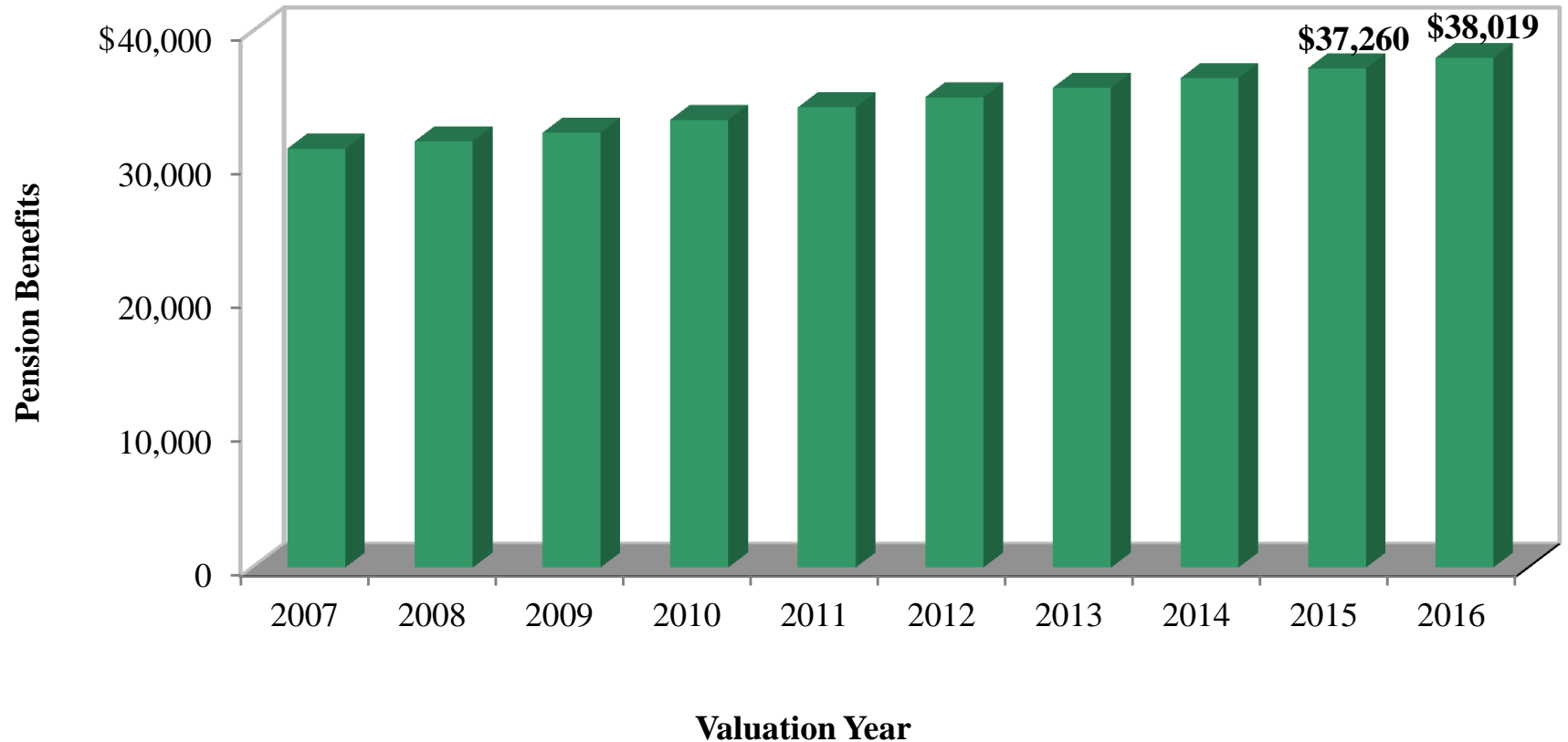


Pension Benefits Expressed as %'s of Active Member Pay



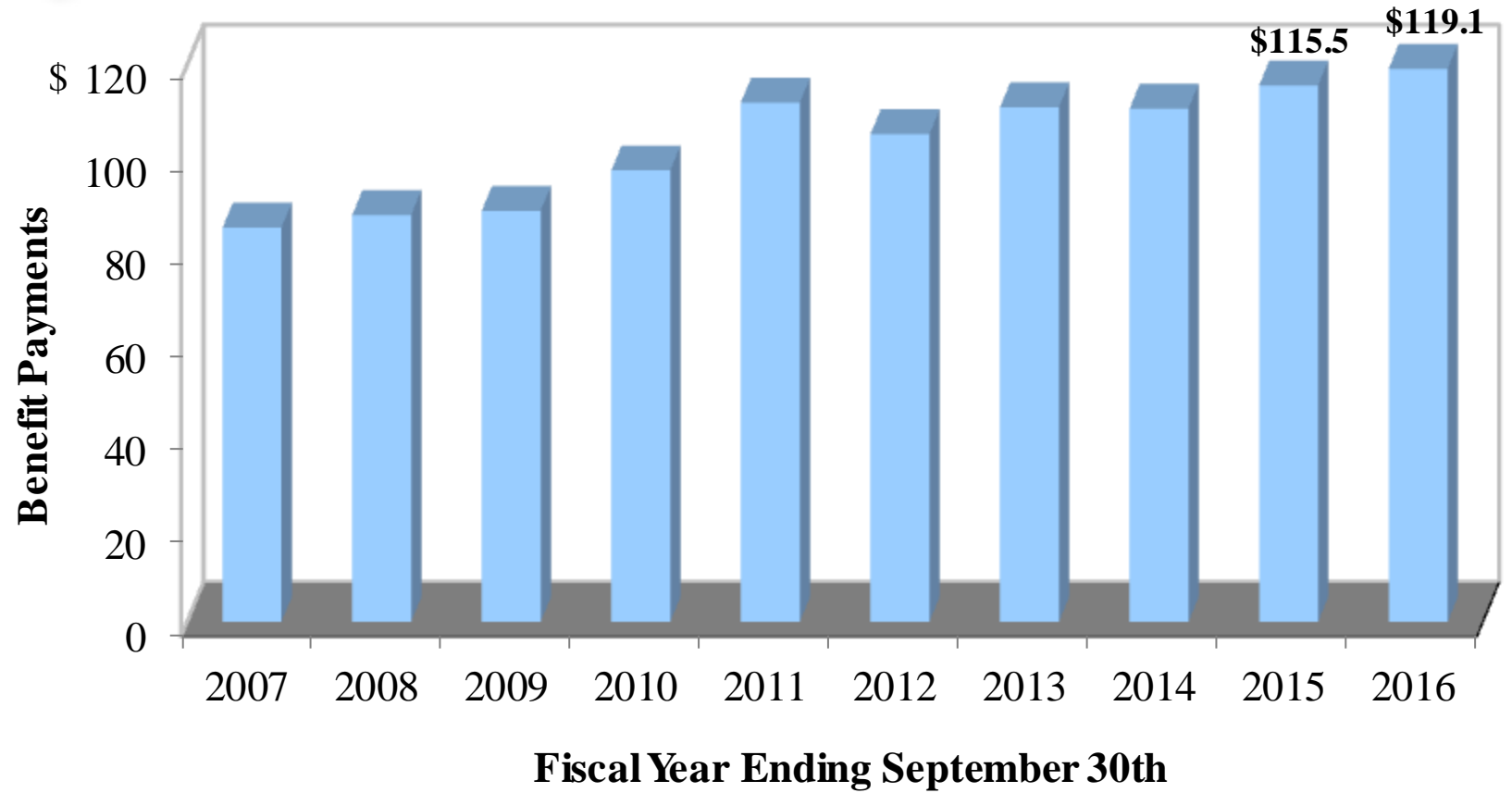


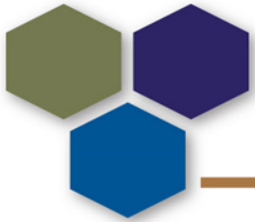
Average Annual Pensions as of September 30th of the Indicated Valuation Year





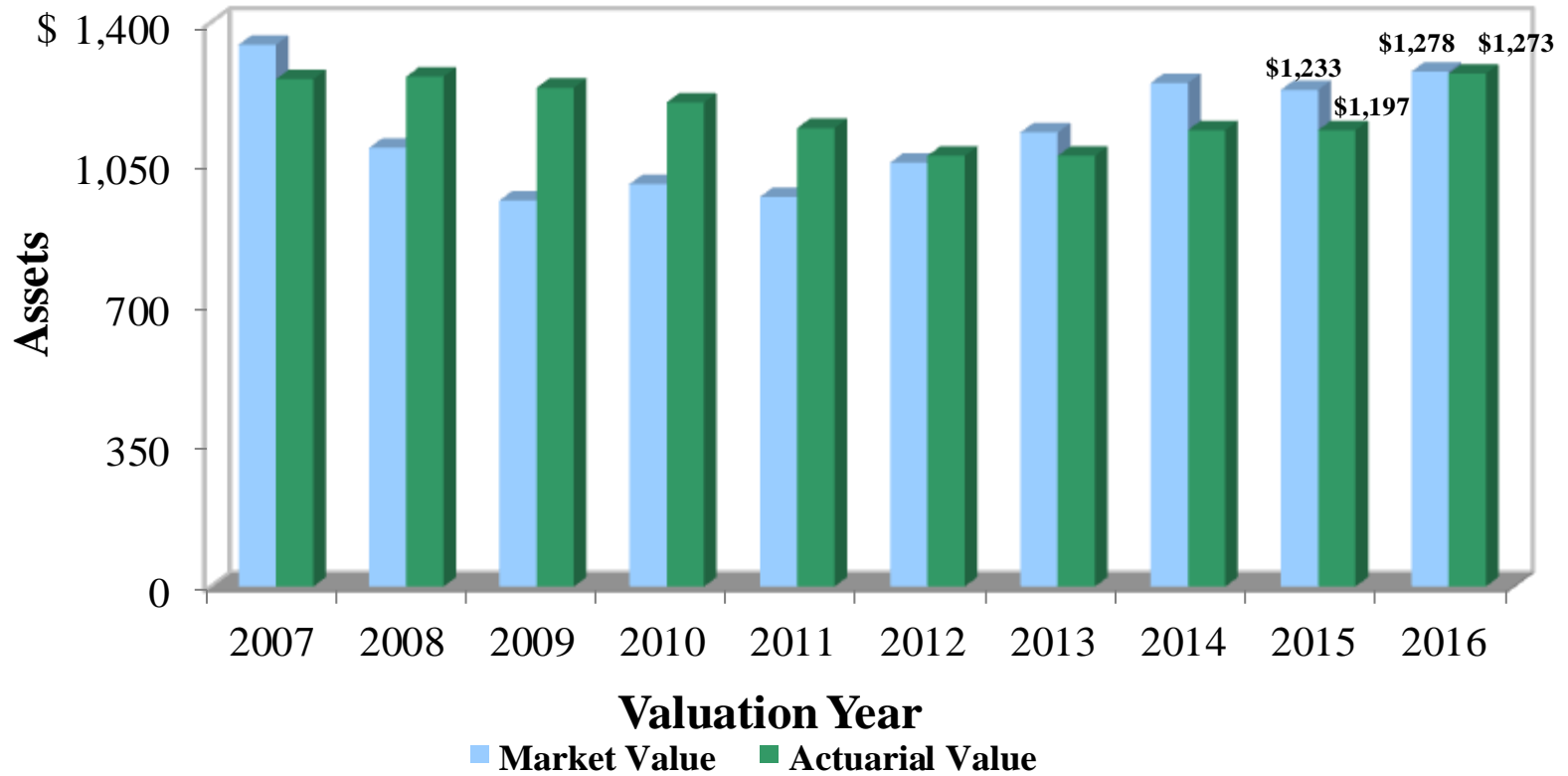
Actual Pension Benefit Payments by Fiscal Year (Amounts in Millions)



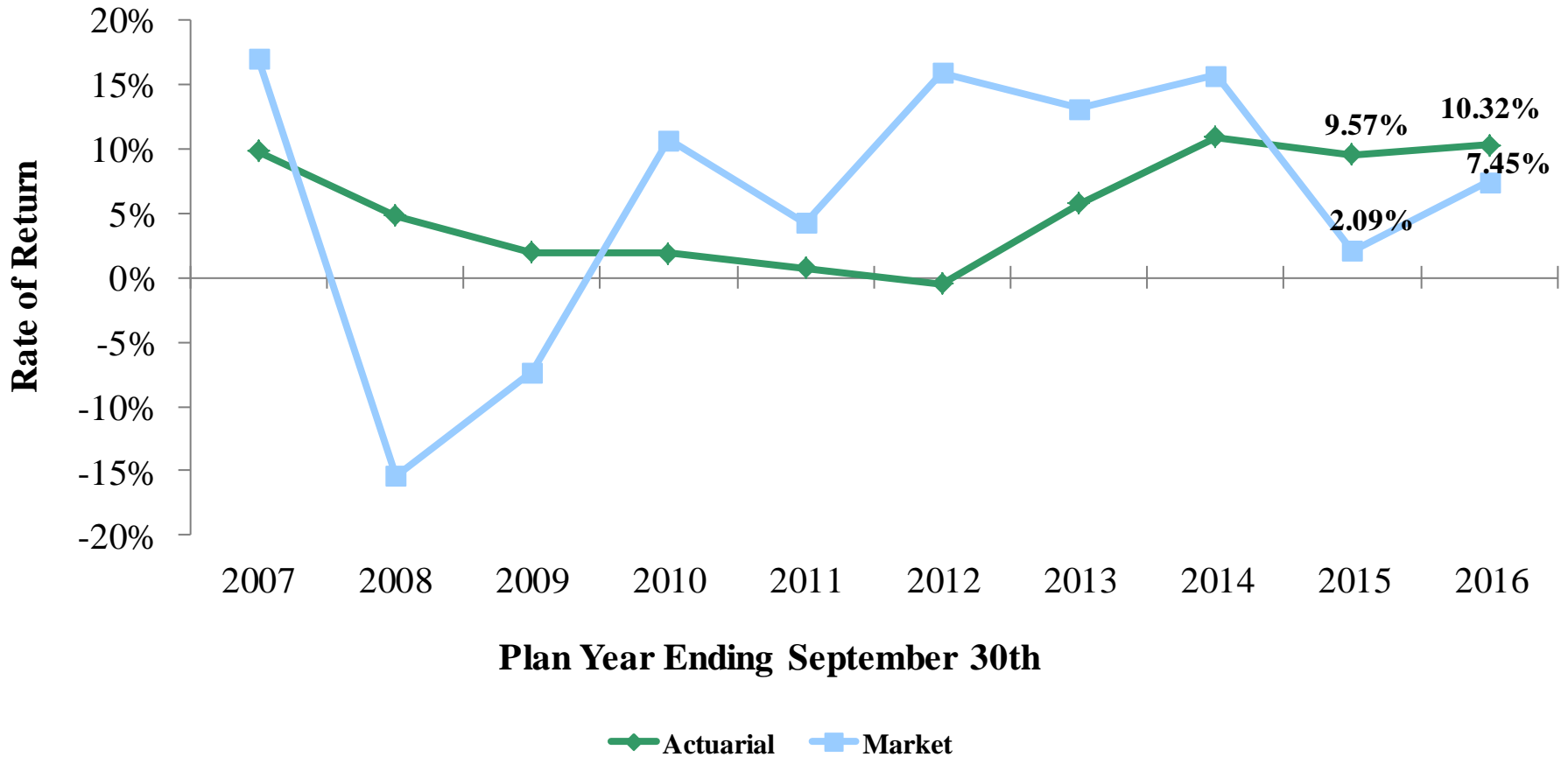


Pension Assets

(Amounts in Millions)



Actuarial & Market Net Rates of Return[#]

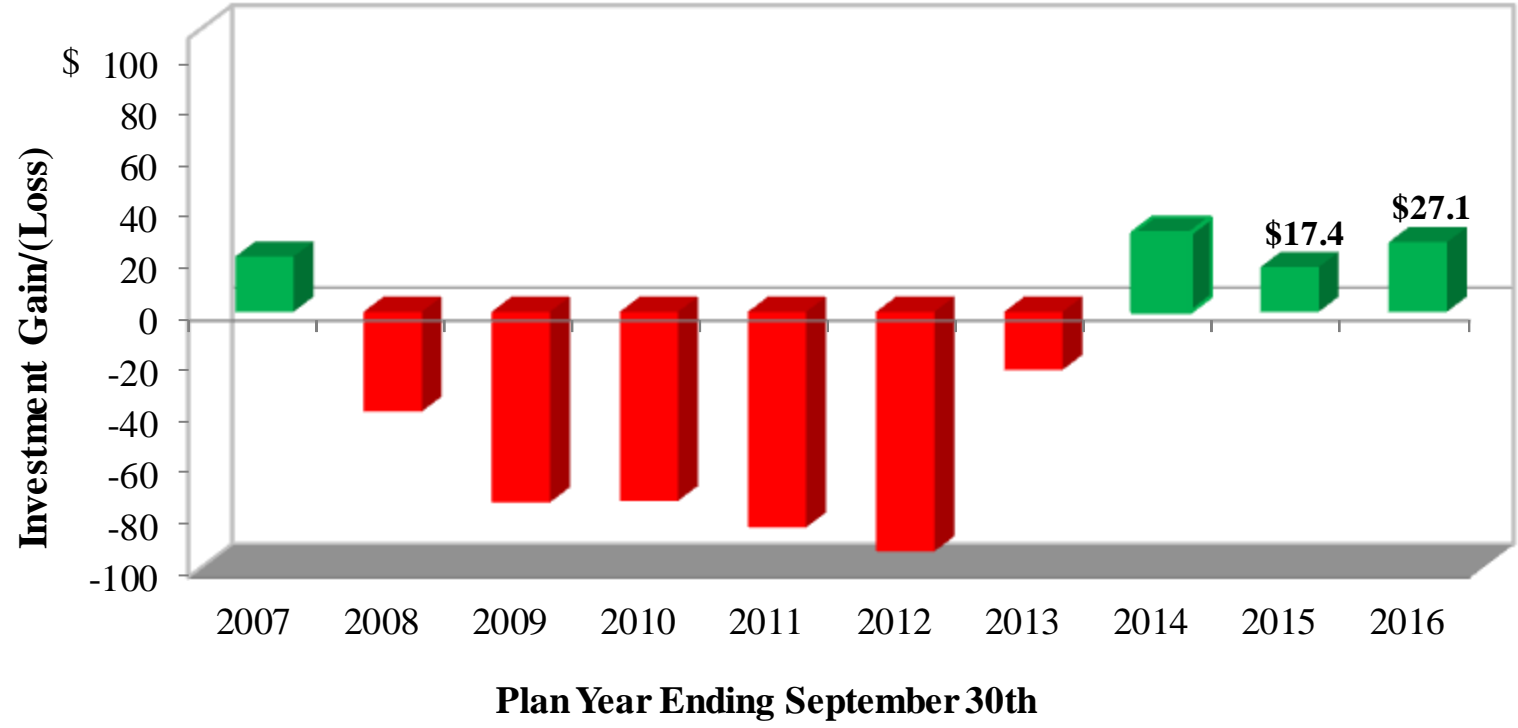


[#] Rates of return on Non-Hybrid actuarial assets.



Investment Gain/(Loss)

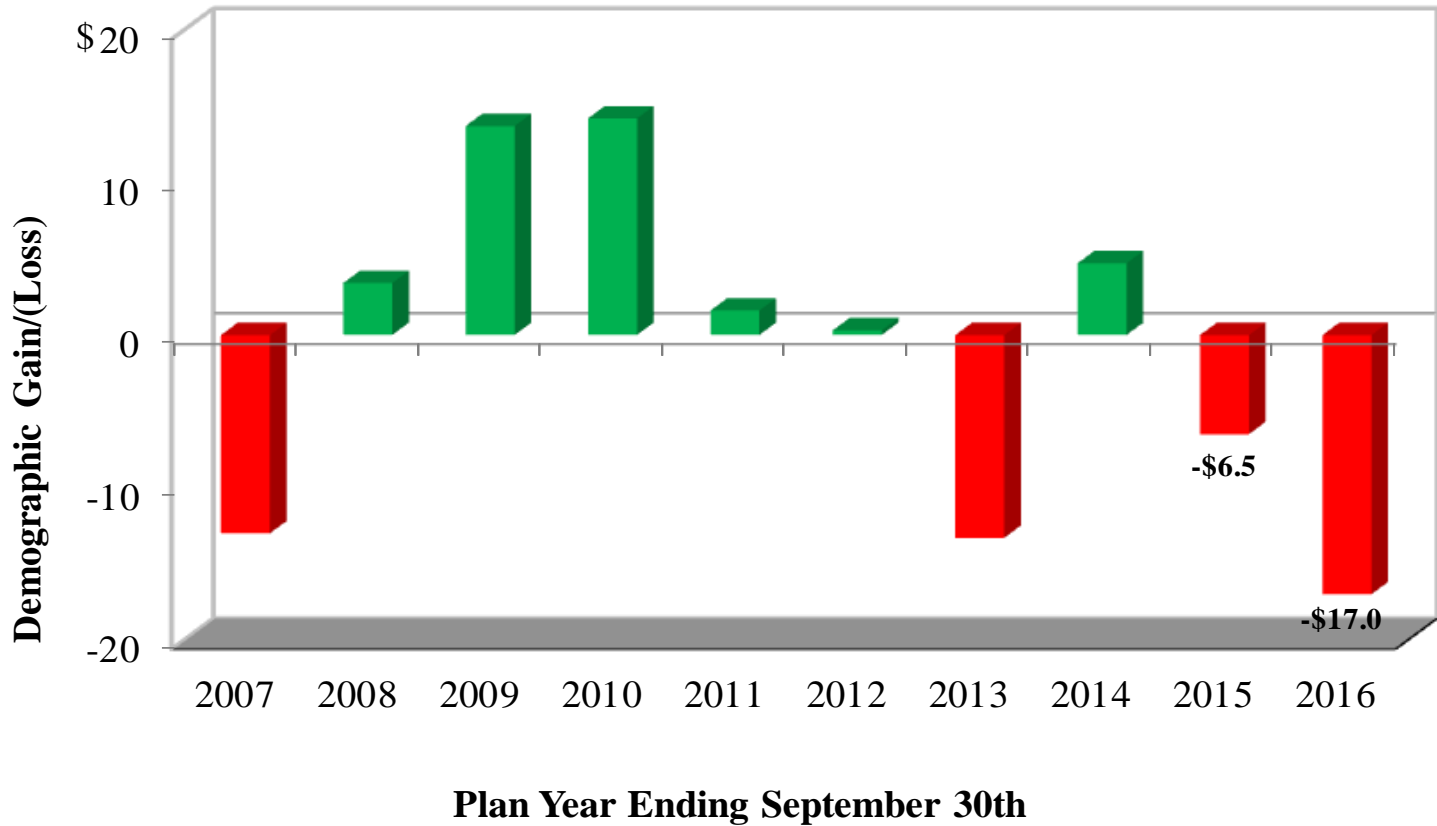
(Amounts in Millions)





Demographic Gain/(Loss)

(Amounts in Millions)





Gain/(Loss) by Type of Activity

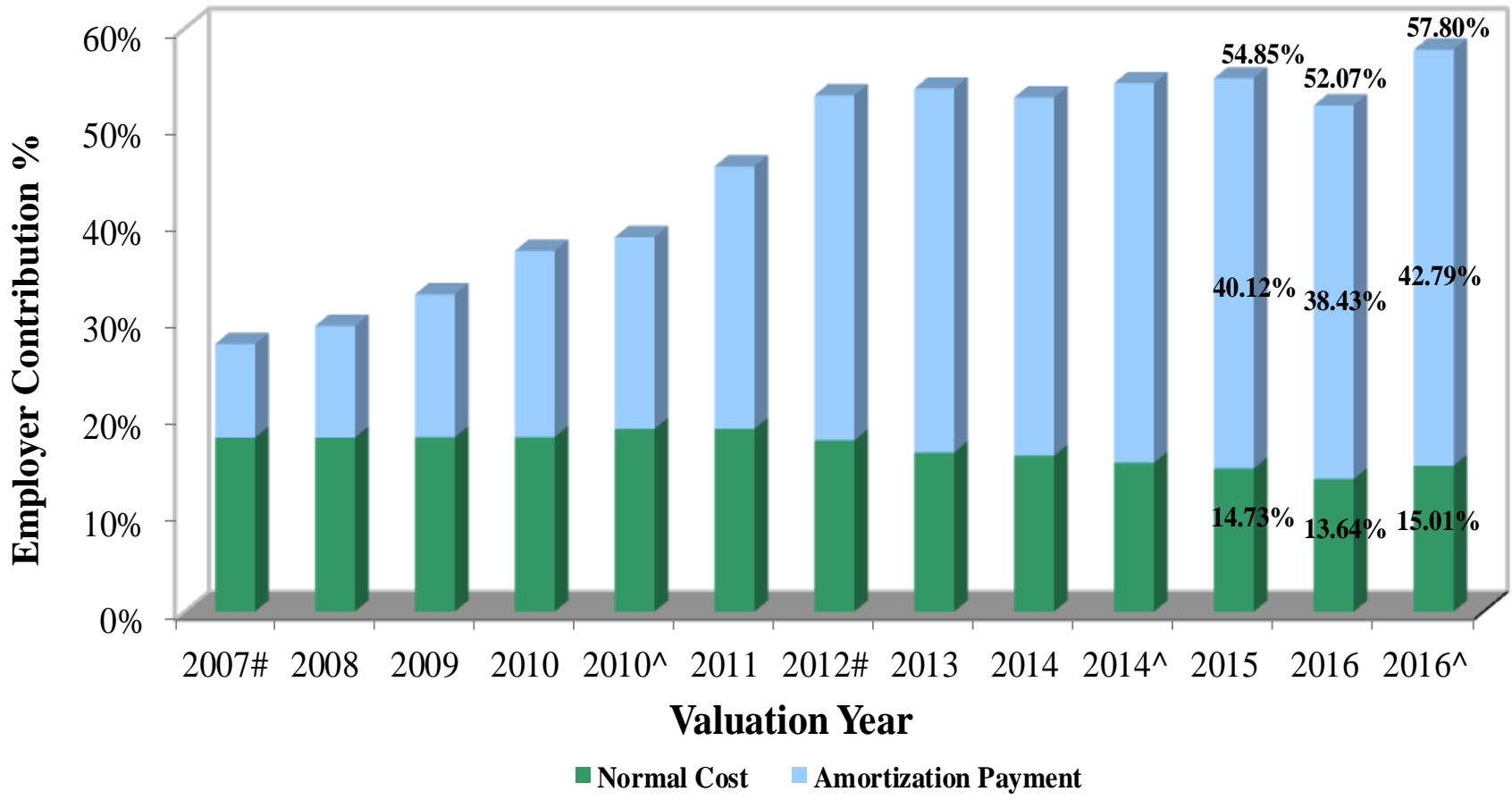
(Amounts in Millions)

Plan Year						
Ending 9/30	2016	2015	2014	2013	2012	2011
New Entrants *	0.00	0.00	0.00	0.00	(0.73)	(0.89)
Retiree Deaths	(2.84)	(0.71)	(2.78)	(6.34)	(5.57)	(5.38)
Investments	27.08	17.43	30.70	(22.72)	(93.39)	(84.04)
Pay Increases	1.14	5.40	8.93	(1.34)	11.94	11.74
Withdrawal	(1.48)	(0.54)	0.42	0.36	(0.02)	0.37
Retirements	1.12	(3.03)	(0.75)	(1.80)	(2.40)	(2.64)
Other	(14.98)	(7.62)	(1.11)	(4.20)	(2.93)	(1.58)
Total	10.04	10.93	35.41	(36.04)	(93.10)	(82.42)

* *New entrants with past service (rehires).*



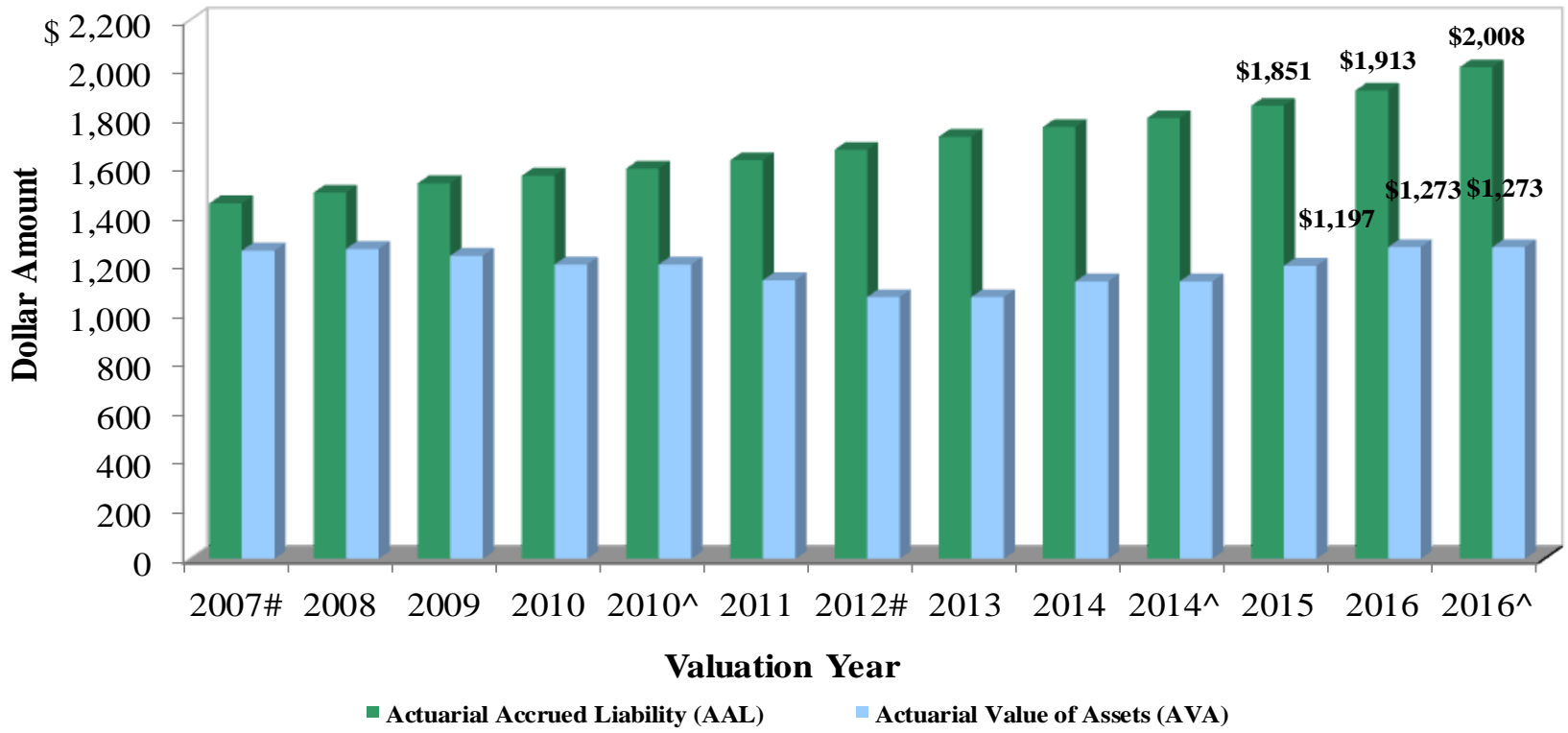
Historical Employer Contribution %'s Valuation as of September 30



Revised benefit provisions.
^ Revised actuarial assumptions.



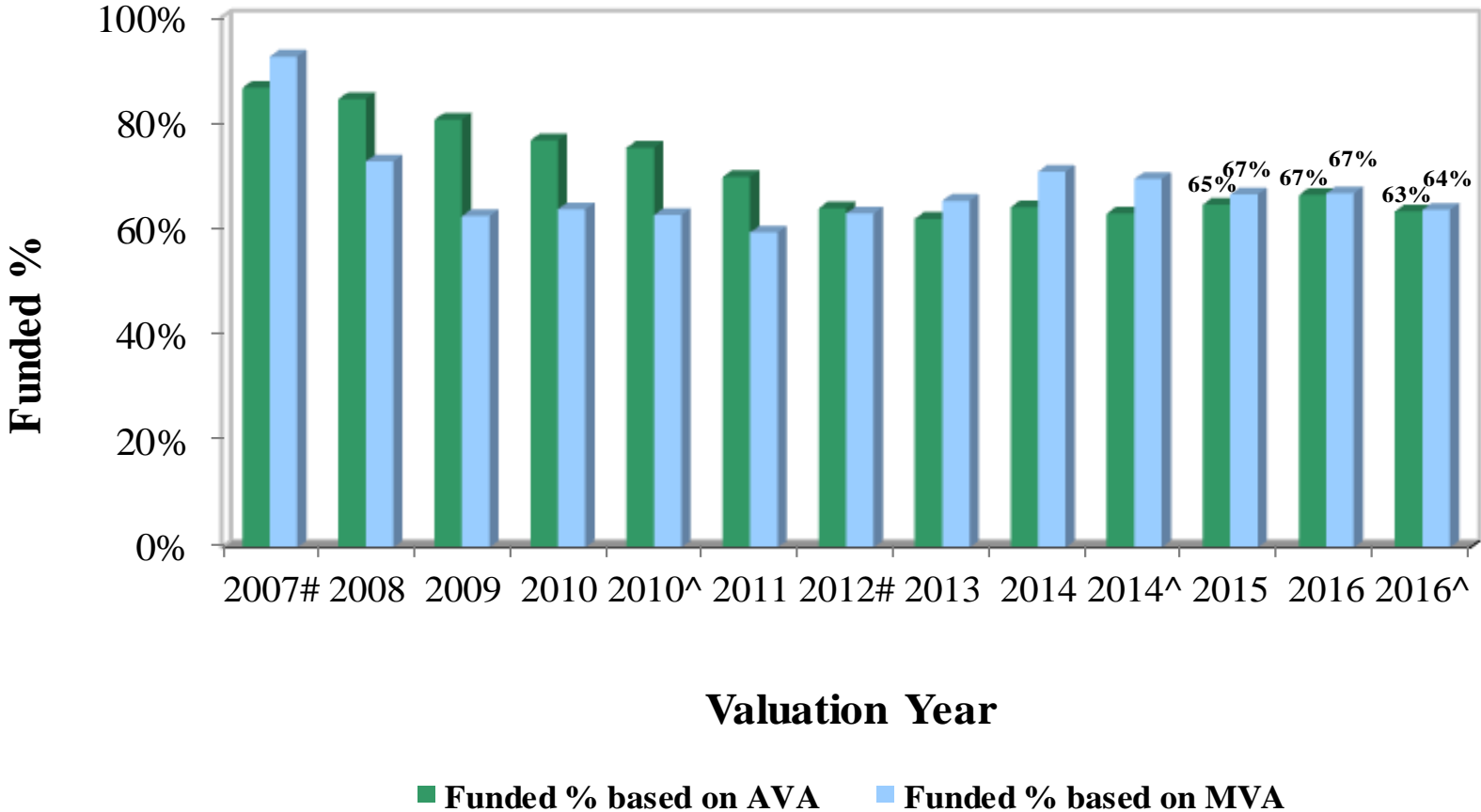
Actuarial Accrued Liability Compared to Actuarial Value of Assets (in millions)



Revised benefit provisions.
^ Revised actuarial assumptions.



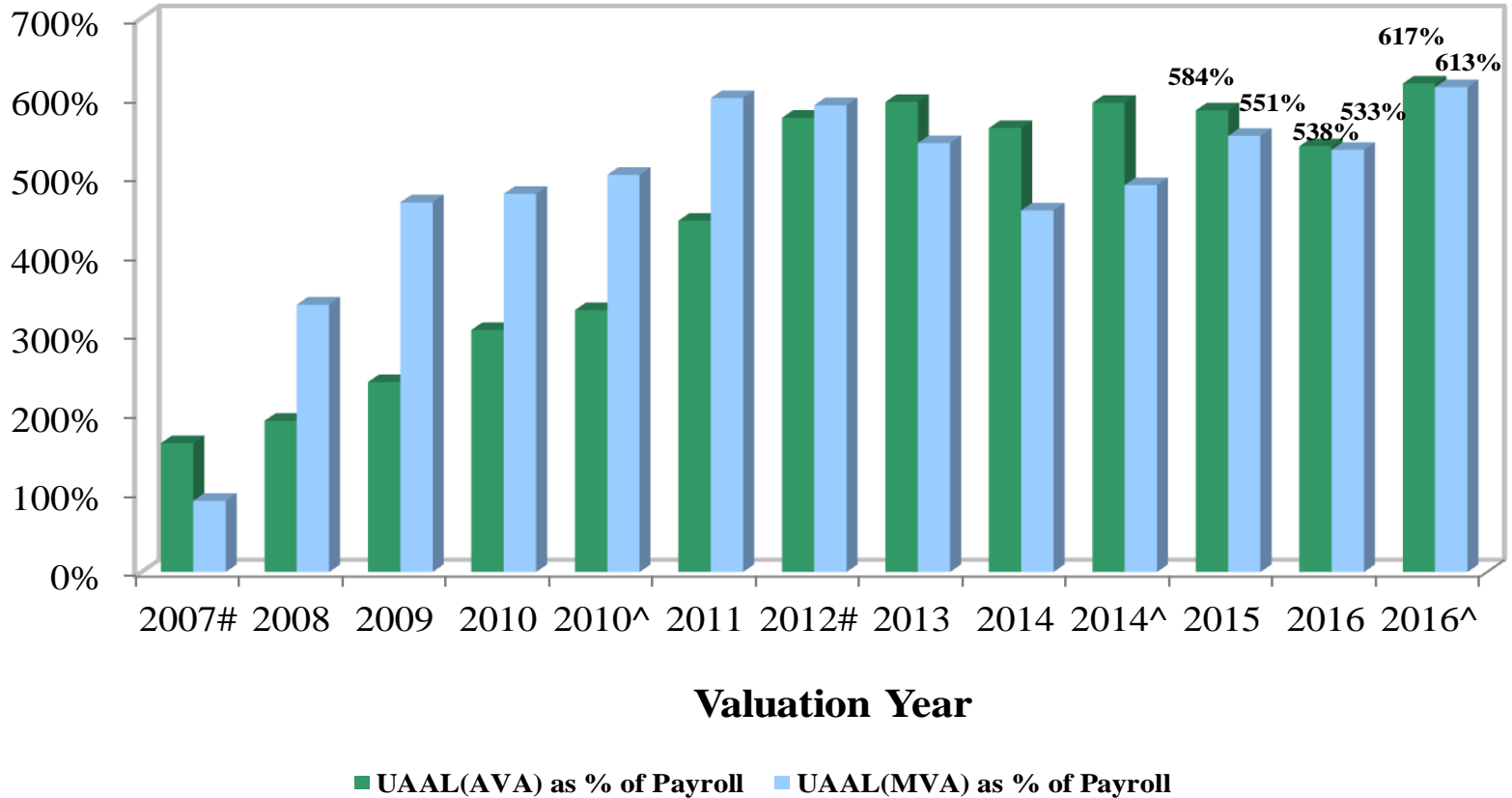
Retirement System Funded % Based on Actuarial Value and Market Value of Assets



Revised benefit provisions.
^ Revised actuarial assumptions.



Unfunded Actuarial Accrued Liability as a Percentage of Payroll



Revised benefit provisions.

^ Revised actuarial assumptions.



Comment on the Investment Markets and Other Issues

- ◆ Investment markets have been very volatile
- ◆ Valuation is based on a 5-year smoothed value of assets
 - ▶ Reduces the volatility of the valuation results
- ◆ 9/30/16 smoothed value of assets was lower than market value
 - ▶ Provides some margin for possible adverse investment experience over the next few years
- ◆ Optional Forms of Payment
 - ▶ Needed mostly for Hybrid Plan members
 - ▶ May wish to review factors after completion of the next experience study



Disclaimers

- ◆ This presentation is intended to be used in conjunction with the September 30, 2016 pension annual actuarial valuation report issued on April 24, 2017. This presentation should not be relied on 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 opinion contained herein.



Michigan State Police

Retiree Health Actuarial Valuation Results as of September 30, 2016



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Retiree Health Benefits

The Funding Issue

- ◆ Unlike pensions, health benefits have not been pre-funded for a long period of time
 - ▶ Most public plan sponsors nationwide have not pre-funded health benefits either
 - ▶ Currently, very little investment income is available to help pay the benefits
- ◆ Costs rise as more members retire, and health inflation outpaces general inflation
- ◆ Pre-funding contributions have been calculated since 1999 – but pre-funding started only recently



Governmental Accounting Standards Board

- ◆ Beginning with the 2007 CAFR, GASB Statements No. 43 and No. 45 specify how retiree health benefit liabilities and expenses are reported in financial statements
 - ▶ Required employer contribution referred to as the Annual Required Contribution (ARC)
 - ▶ Since SPRS is now being pre-funded, for accounting purposes, liability and expense results can be based upon the investment return assumption (e.g., 7.50% as of September 30, 2016)
- ◆ GASB Statement No. 74 will be effective for the plan year ending September 30, 2017
 - ▶ Expectation is that accounting results will continue to be based upon the investment return assumption (e.g., 7.50% as of September 30, 2016)
 - ▶ A separate report will be issued beginning with the September 30, 2017 annual valuation for accounting purposes



Retiree Health Valuation Results

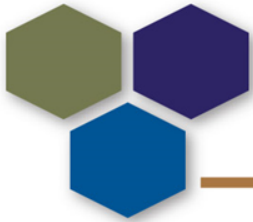
Full Actuarial Funding

- ◆ FY 2016 Expenditures for Retiree Health Care Benefits:
 - ▶ \$34.1 million

- ◆ FY 2016 Contributions for Retiree Health Care Benefits:
 - ▶ \$47.3 million – Employer Contributions (includes other governmental contributions)

 - ▶ \$1.2 Million – Member Contributions

Amounts reported above are from the 2016 SPRS Comprehensive Annual Financial Report.



Required Employer Contributions FY 2019

- ◆ Required employer contribution for FYE September 30, 2019:

	<u>FY 2019</u>
Employer Normal Cost	\$ 9.4 million
Amortization of UAAL ¹	<u>50.4 million</u>
Required Employer Contribution	59.8 million

¹Unfunded Actuarial Accrued Liabilities (UAAL) were amortized over 18 years from October 1, 2018.

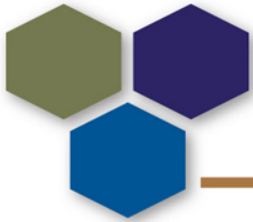
- ◆ Once fully funded, the annual employer contribution requirement decreases to the normal cost



Circumstances that Would Increase Projected Costs

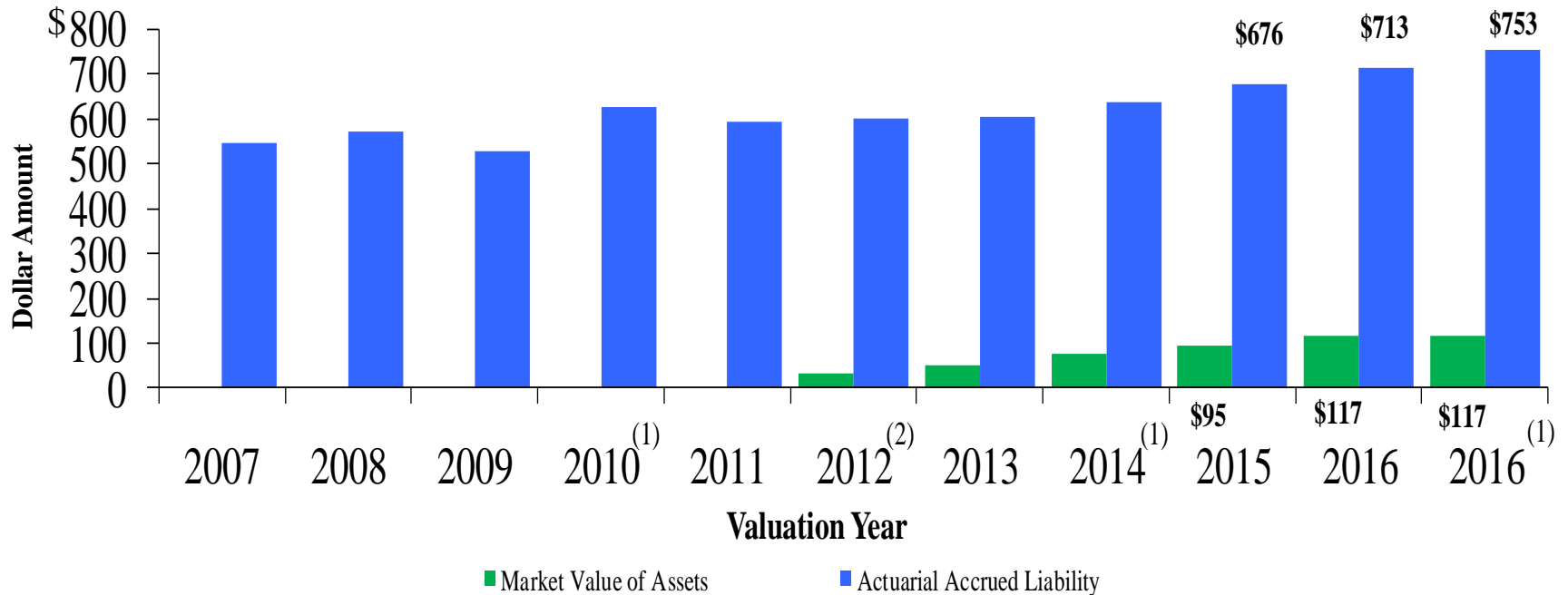
- ◆ Medicare funding reductions or cost shifting
- ◆ Unexpected new benefit recipients (from health benefit cutbacks of other employers)
- ◆ Medical inflation worse than assumed; the actual future contributions will depend on future per capita health cost increases (health inflation) *
- ◆ Lower than expected investment returns; bigger impact as plan assets grow
- ◆ This is not a complete list

* *Per capita costs are projected to increase 9.0% the first year, graded down to 3.5% in the tenth and later years*



Health Assets & Accrued Liabilities

Full Actuarial Funding (Amounts in Millions)

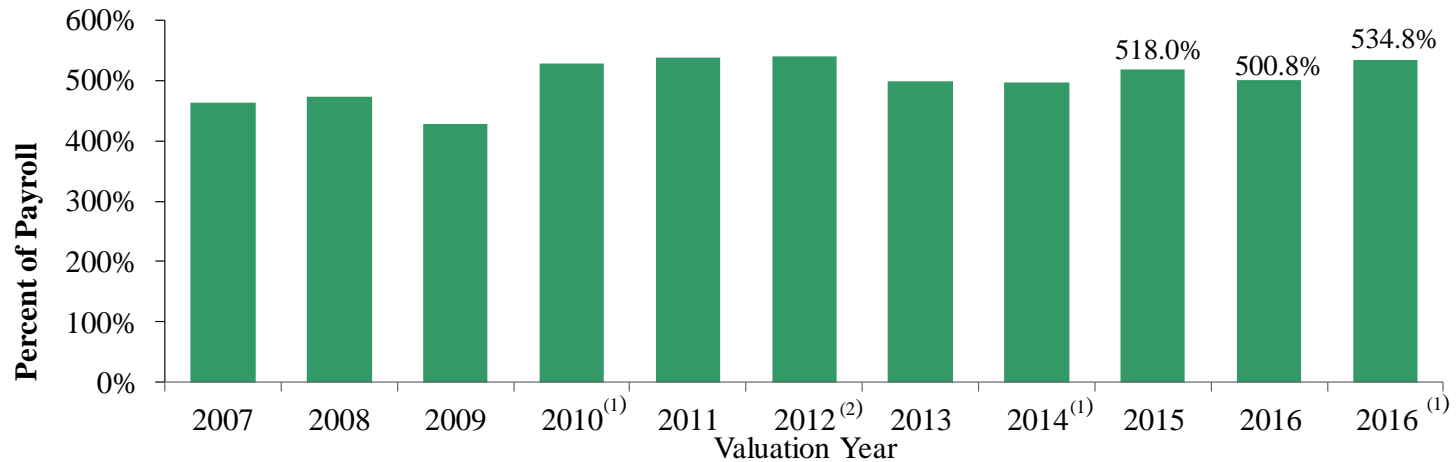


(1) Reflects assumption changes

(2) Revised benefit provisions



Unfunded Accrued Liabilities as %'s of Payroll – Full Actuarial Funding

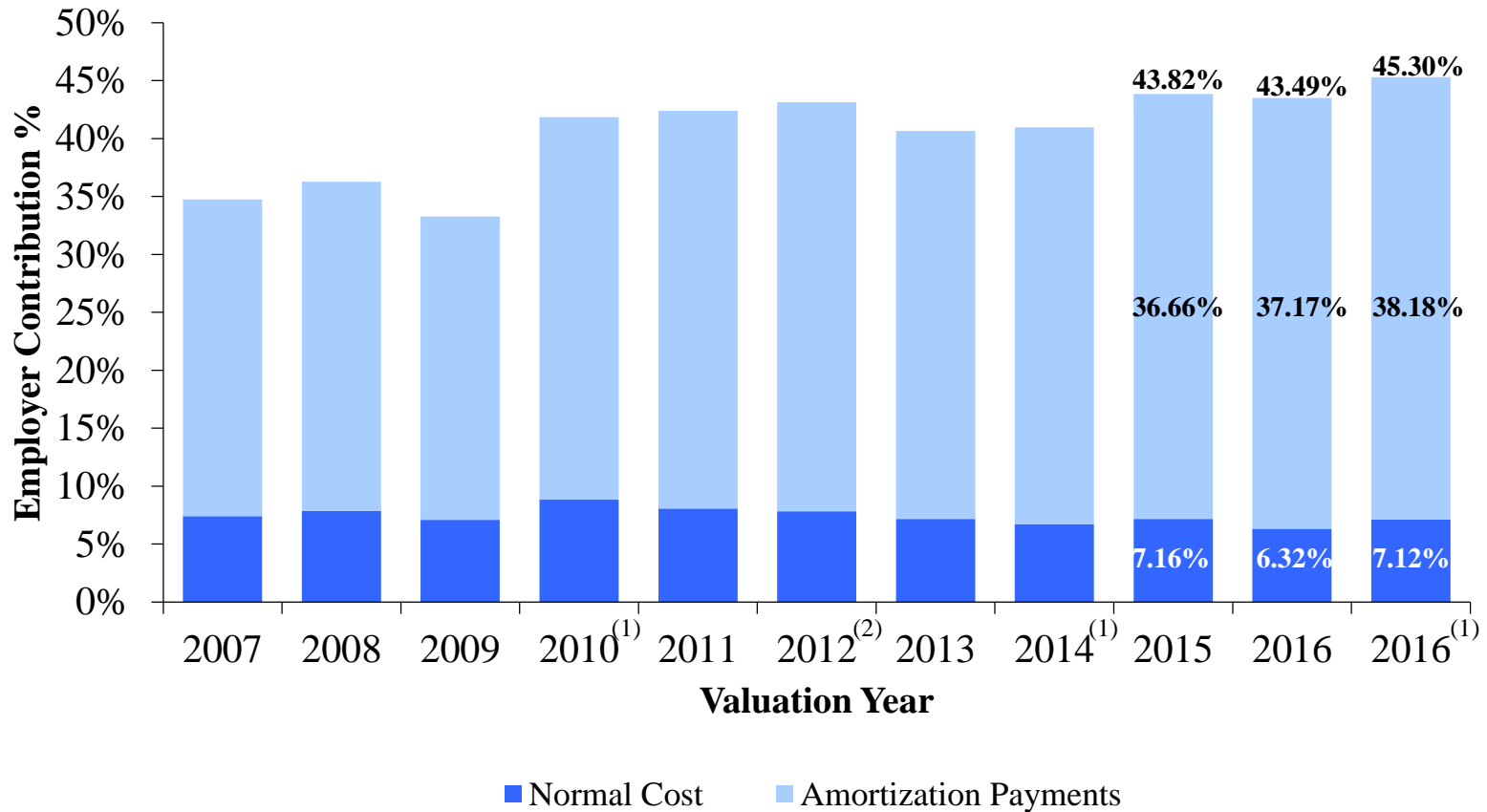


(1) Reflects assumption changes

(2) Revised benefit provisions



Required Employer Contributions as Percents of Payroll (Full Actuarial Funding)

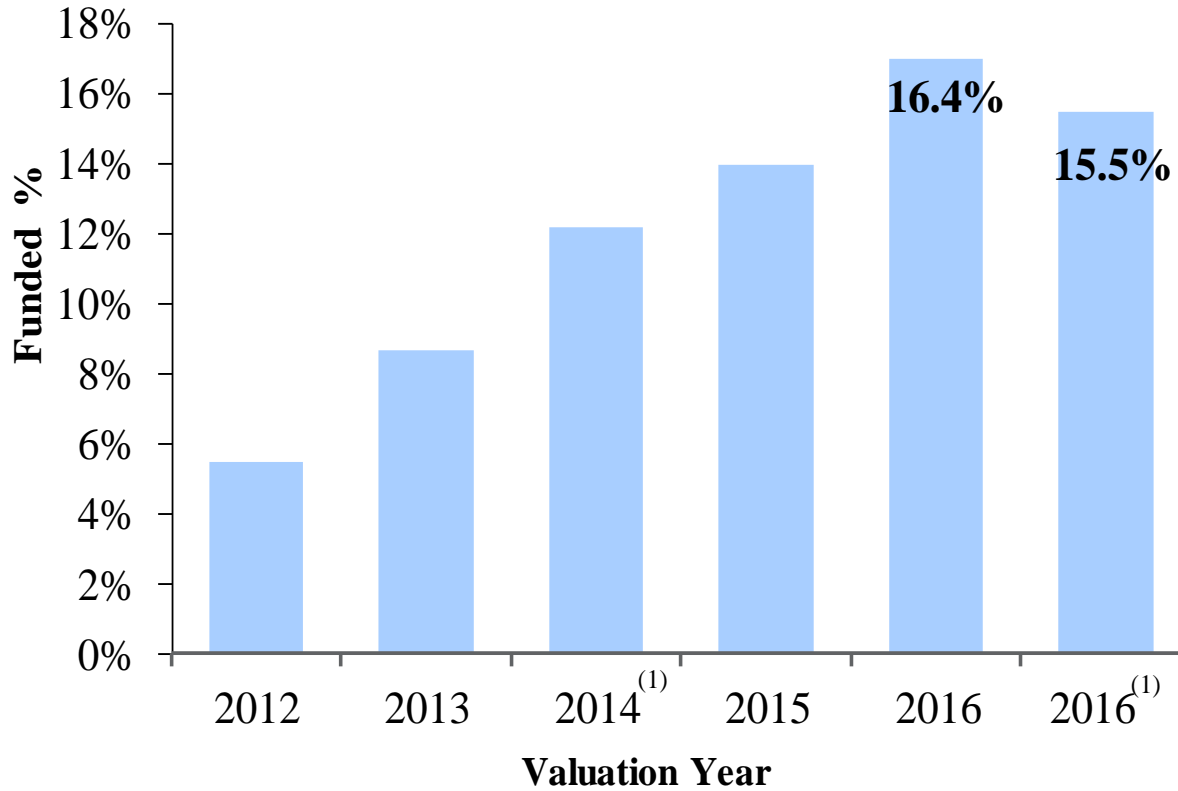


(1) Reflects assumption changes

(2) Revised benefit provisions



Funded Percent



(1) Reflects assumption changes



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