RVKuhns & ASSOCIATES, INC.

State of Michigan Retirement Systems

Michigan Public School Employees' Retirement System

Asset/Liability Study

June 2011

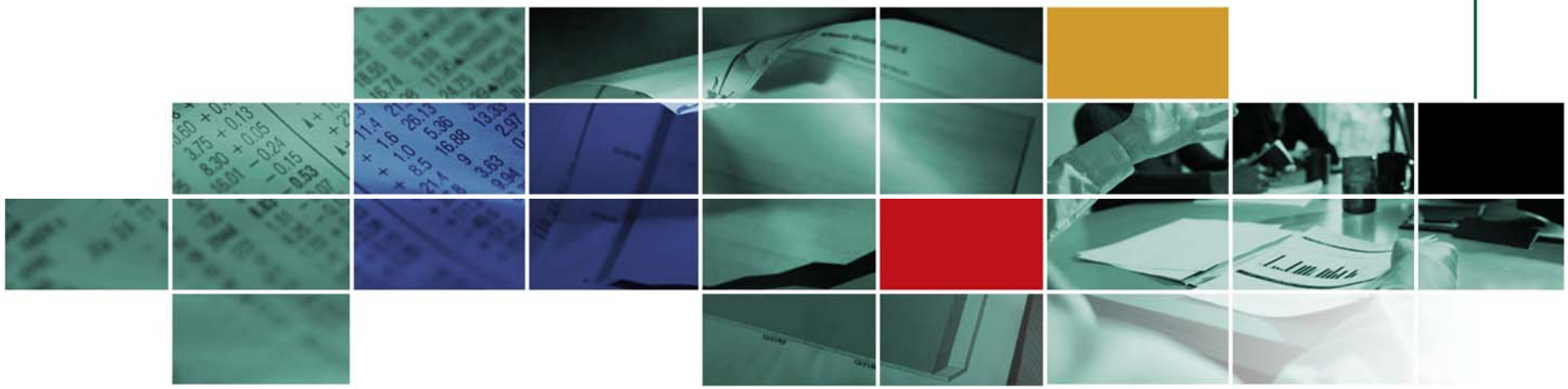


Table of Contents

ACKNOWLEDGEMENTS ..... PAGE 2

INTRODUCTION ..... PAGE 3

CURRENT STATUS ..... PAGE 7

DETERMINISTIC ANALYSIS ..... PAGE 8

DETERMINISTIC SCENARIO ANALYSIS ..... PAGE 20

STOCHASTIC ANALYSIS ..... PAGE 24

APPENDIX 1: SENSITIVITY ANALYSIS: VOLATILITY ..... PAGE 43

APPENDIX 2: SENSITIVITY ANALYSIS: CORRELATIONS ..... PAGE 57

APPENDIX 3: ASSUMPTIONS AND METHODS ..... PAGE 71

Acknowledgements

PREPARED BY:

JAMES VOYTKO, SENIOR CONSULTANT, R.V. KUHNS & ASSOCIATES, INC.

BECKY GRATSINGER, SENIOR CONSULTANT, R.V. KUHNS & ASSOCIATES, INC.

ASHLEE MOEHRING, CONSULTANT, R.V. KUHNS & ASSOCIATES, INC.

NICK WOODWARD, ASSOCIATE CONSULTANT, R.V. KUHNS & ASSOCIATES, INC.

RYAN SULLIVAN, INVESTMENT ASSOCIATE, R.V. KUHNS & ASSOCIATES, INC.

MATTHIAS BAUER, INVESTMENT ASSOCIATE, R.V. KUHNS & ASSOCIATES, INC.

WITH THE COOPERATION OF:

DAVID DOUGHERTY, LLC. (CONSULTING ACTUARY)

GABRIEL ROEDER SMITH & COMPANY (PLAN ACTUARIES)

Introduction

R.V. Kuhns & Associates, Inc. has prepared this report for the Michigan Public School Employees' Retirement System (MPSERS) to:

- Present projected valuation results with respect to the funded status of the Plan.
- Present projected benefit payments of the Plan.
- Investigate asset mixes to determine those which best serve to protect and increase funding levels, while providing adequate liquidity for benefit payments.

The valuation projections are shown using both a deterministic and stochastic process.

The deterministic process provides an open group analysis of projected valuation results based on a fixed set of future assumptions (see summary in the Assumptions and Methods section of this report).

The stochastic process provides an open group analysis of projected valuation results under many capital market environments based on expected asset returns and inflation, and their expected volatility. Using a Monte Carlo simulation technique, both assets and liabilities are assumed to vary stochastically, linked together by changes in inflation. Expected values, variances of the returns and inflation, and correlations are used to generate 2000 trials to produce a distribution of potential outcomes. A stochastic analysis can answer questions about the best/worst case outcomes along with the probability of such outcomes.

Introduction (continued)

What is an Asset/Liability Study?

- Investment programs do not exist in a vacuum. They seek to satisfy one or more investment objectives.
- The purpose of an Asset/Liability Study is to examine how well alternative investment strategies (i.e., differing asset allocations) address the objectives served by the Plan – the Plan "liabilities."
- In doing so, it creates an important "guidepost" for the actual asset allocation for the Plan; the asset allocation chosen by the Plan's fiduciaries will likely reflect the nature of the liabilities but also numerous other factors including risk preferences, liquidity, implementation constraints, etc.
- For the MPSERS Asset/Liability Study, we assume the objectives are:

    1. Fund all participants' benefits over time.
    2. Assure sufficient liquidity to pay benefits at all times.
    3. Foster a stable contribution stream consistent with objectives 1 and 2.
    4. Achieve adequate returns without accepting unnecessary or imprudent levels of risk.

An Asset/Liability Study is NOT . . .

- An actuarial study of the MPSERS liabilities—that is the purview of the Plan's actuary.
- A prescription for Plan benefits—that is the purview of the legislature.
- An assessment of the affordability of contribution levels—that is the purview of the elected officials and their constituents.
- The sole determinant of the final asset allocation adopted for the Plan—there are a number of factors, including insights from an Asset/Liability Study, which will bear on the optimal asset allocation.

Introduction (continued)

Asset/Liability Study in Practice . . .

- Begin with a forecast of the financial liabilities (i.e., benefit obligations).
- Include a baseline estimation of the financial contributions to the Plan over time.
- Compare alternative investment strategies (i.e., total fund asset allocations to the Plan's financial needs).
- Draw conclusions regarding how well various investment strategies satisfy the Plan's financial needs.

This Asset/Liability Study . . .

- Uses data from the proposed September 30, 2010 MPSERS Actuarial Valuation to project pension liabilities.
- Uses the Actuarial Cost Method and other assumptions described in the September 30, 2010 Actuarial Valuation.*
- Compares these specific investment strategies—(A) MPSERS Current Allocation, (B) MPSERS Target Allocation, (C) a conservative illustrative portfolio (Conservative Portfolio), (D) diversified lower risk (Potential Portfolio 1), and (E) diversified higher risk (Portfolio 10),—expressed as total fund asset allocations to the projection of Plan liabilities.
- Note: Does not assume any actuarial adjustments that may take place in future years.

*Certain techniques were employed in the stochastic forecasts to approximate the special amortization of the unfunded retirement incentive liability and entry age normal cost computations. No adjustment was made to the unfunded actuarial liability to reflect the present value of future reconciliation payments in both deterministic and stochastic forecasts. Therefore, reconciliation payments are implicitly included in projected employer contribution calculations.

Introduction (continued)

Summary of Plan Changes

Retirement Eligibility

Basic Members:	55 years of age with 30 years or more of service or 60 years of age with 10 years of service
MIP Members:	Any age with 30 years of service or 60 years of age with 5 years of service
PPP Members:	60 years of age with 10 years of service

Early Retirement Eligibility

Basic/MIP Members:	55 years of age with at least 15 years but less than 30 years of service
PPP Members:	None

Final Average Compensation

Basic Members:	Average of highest 5 consecutive years
MIP Members:	Average of highest 3 consecutive years
PPP Members:	Average of highest 5 consecutive years

2010 Normal Cost (as a % of Payroll)

Basic/MIP Members:	9.32%
PPP Members:	7.36%
Weighted Average:	9.22%

COLAs

Basic/MIP Members:	3% or supplemental payments
PPP Members:	None

Member Contributions

Basic Members:	None
MIP Members:	
hired prior to 1/1/1990:	3.9% of pay
hired 1/1/90 - 7/1/2008:	3.0% of first $5,000 of pay, plus 3.6% of next $10,000 of pay, plus 4.3% of pay in excess of $15,000
hired after 7/1/2008:	3.0% of first $5,000 of pay, plus 3.6% of next $10,000 of pay, plus 6.4% of pay in excess of $15,000
PPP Members:	3.0% of first $5,000 of pay, plus 3.6% of next $10,000 of pay, plus 6.4% of pay in excess of $15,000

Investment Return Assumption

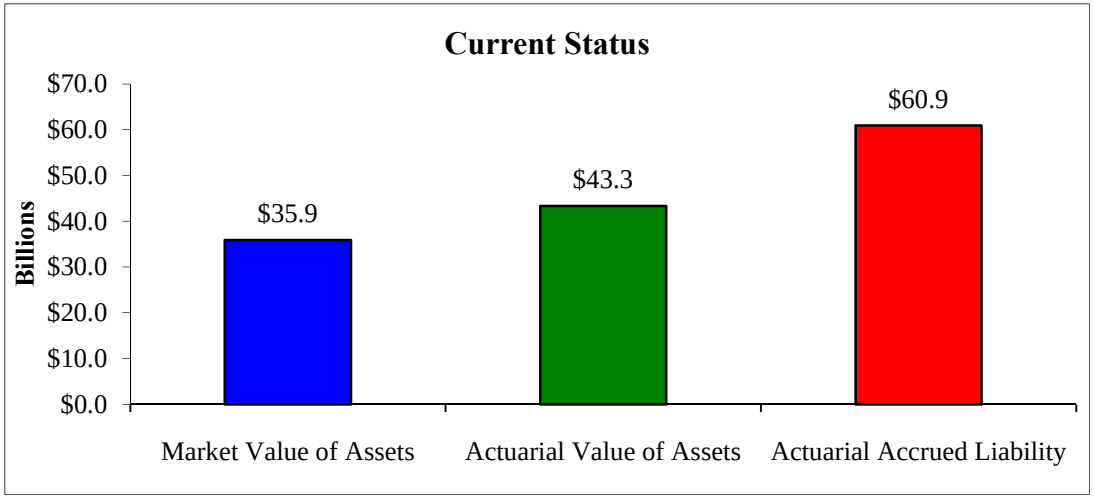
Basic/MIP Members:	8.00%
PPP Members:	7.00%

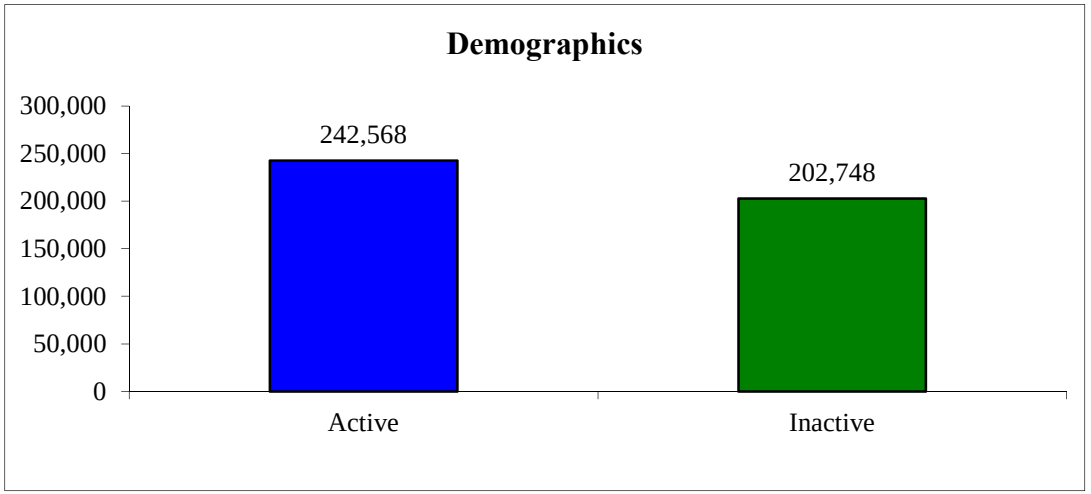
Employees hired prior to July 1, 2010 are part of the Basic/Member Investment Plan (MIP). Employees hired on or after July 1, 2010 are enrolled in the Pension Plus Plan (PPP).

Current Status

A summary of the Plan follows:

Valuation Date	September 30, 2010
Market Value of Assets (MVA)*	$35.9 billion
Actuarial Value of Assets (AVA)	$43.3 billion
Actuarial Accrued Liability (AAL)	$60.9 billion
Actuarial Funded Ratio (AVA/AAL)	71%
Market Value Funded Ratio (MVA/AAL)	59%
Active Participants	242,568
Inactive Participants	202,748





*The market value of assets (MVA) as of March 31, 2011 was $40.2 billion.

Deterministic Analysis

This section provides an analysis of the Plan's assets, liabilities, funded status, and benefit payments based on a fixed set of future assumptions. Each analysis that follows in this deterministic section rests on the critical assumptions below and must be read and interpreted with them in mind—particularly assumptions #3, #4 and #5.

The deterministic assumptions are as follows:

1. Current Plan provisions (see summary of Benefit Provisions in the Assumptions and Methods section of this report).

2. The actuarial data used by Gabriel Roeder Smith & Company (see summary in the Assumptions and Methods section of this report).

3. Actuarially assumed rate of return on Plan assets for all projection years: 8.00% for employees hired prior to 7/1/2010 and 7.00% for employees hired 7/1/2010 or later.

4. Employer contribution rates equal the amount necessary to fund the actuarially computed normal cost plus an amortization payment towards the unfunded actuarial liability each year with a 30 year amortization schedule that began in 2006. The unfunded actuarial liability associated with the recent retirement incentive program is amortized separately over 5 years beginning in 2012.

5. Assumes current employee contribution rates, as a weighted average percentage of salary.

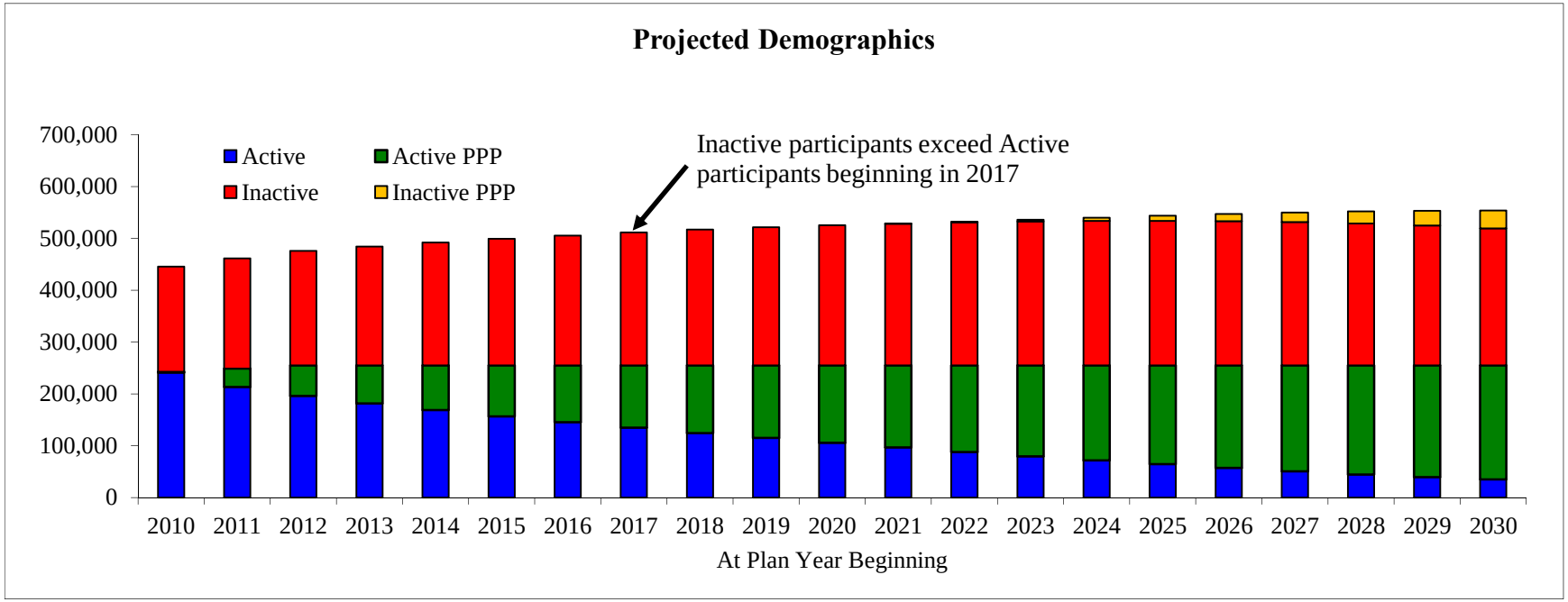
6. Open group analysis: New active participants entering the Plan are assumed to have similar characteristics to recently hired participants.

7. Assumes an increase in the active population of 2.5% for two years, thereafter maintaining a level active population of 254,848 employees.

Deterministic Analysis (continued)

Demographics

Following are the projected number of active and inactive participants at the beginning of each Plan year from 2010 through 2030 (2010 is actual). These projections are based on an open group analysis. Using the actuary's assumptions for death, termination, retirement, and disability, current participants are assumed to leave the Plan in the future. The open group analysis replaces these participants with new ones having similar characteristics as to recently hired participants. The number of inactive participants increases by almost 50% during the 20-year projection period shown. The number of inactive participants is projected to exceed the number of active participants starting in 2017 and continue to exceed active participants for the remainder of the study.

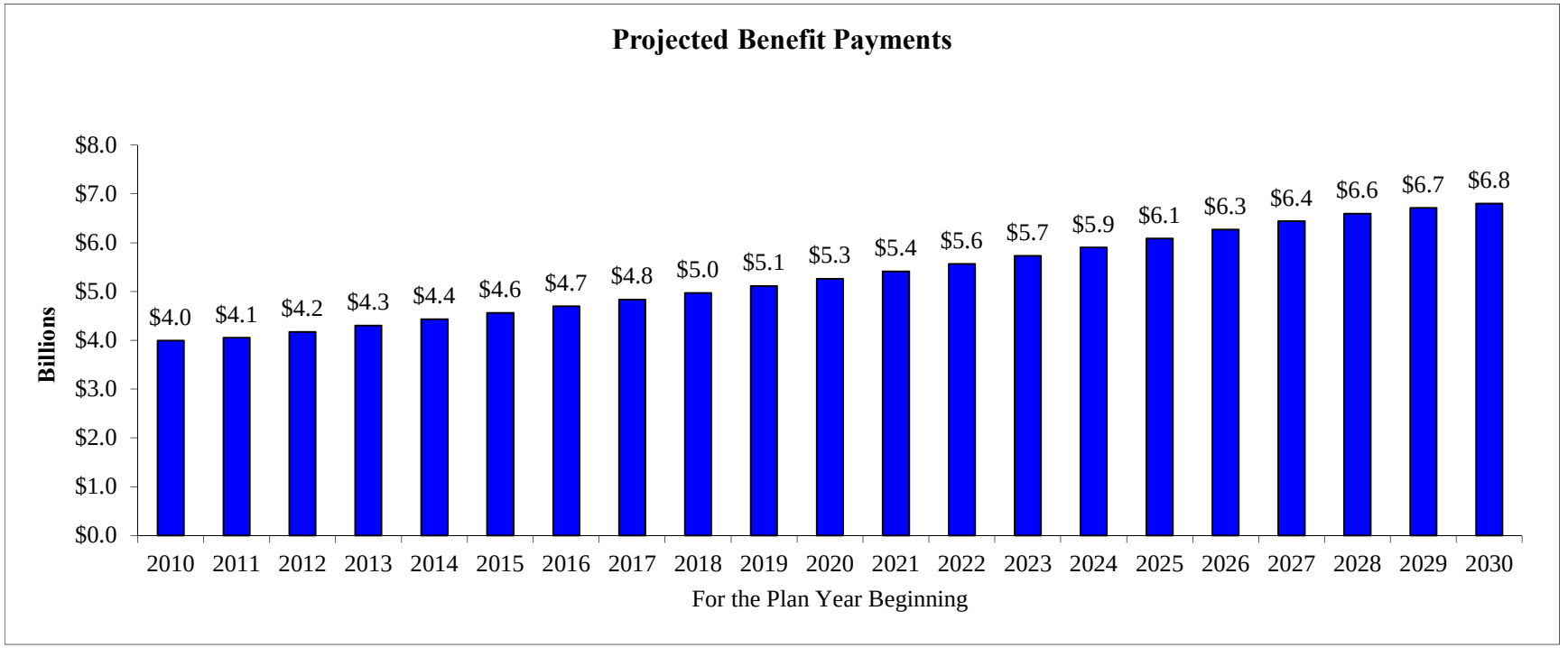


Total Population	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Annual Percent Change	N/A	3.6%	3.2%	1.7%	1.6%	1.5%	1.3%	1.2%	1.0%	0.9%	0.7%	0.6%	0.7%	0.8%	0.7%	0.7%	0.7%	0.5%	0.3%	0.3%	0.1%

Deterministic Analysis (continued)

Benefit Payments

The Plan's projected benefit payments are shown in the chart below. The projected benefit payments are expected to increase by more than 70% over the next 20 years. As a percentage of the market value of Plan assets, benefit payments are expected to gradually decline through the end of the projection period (see next page).

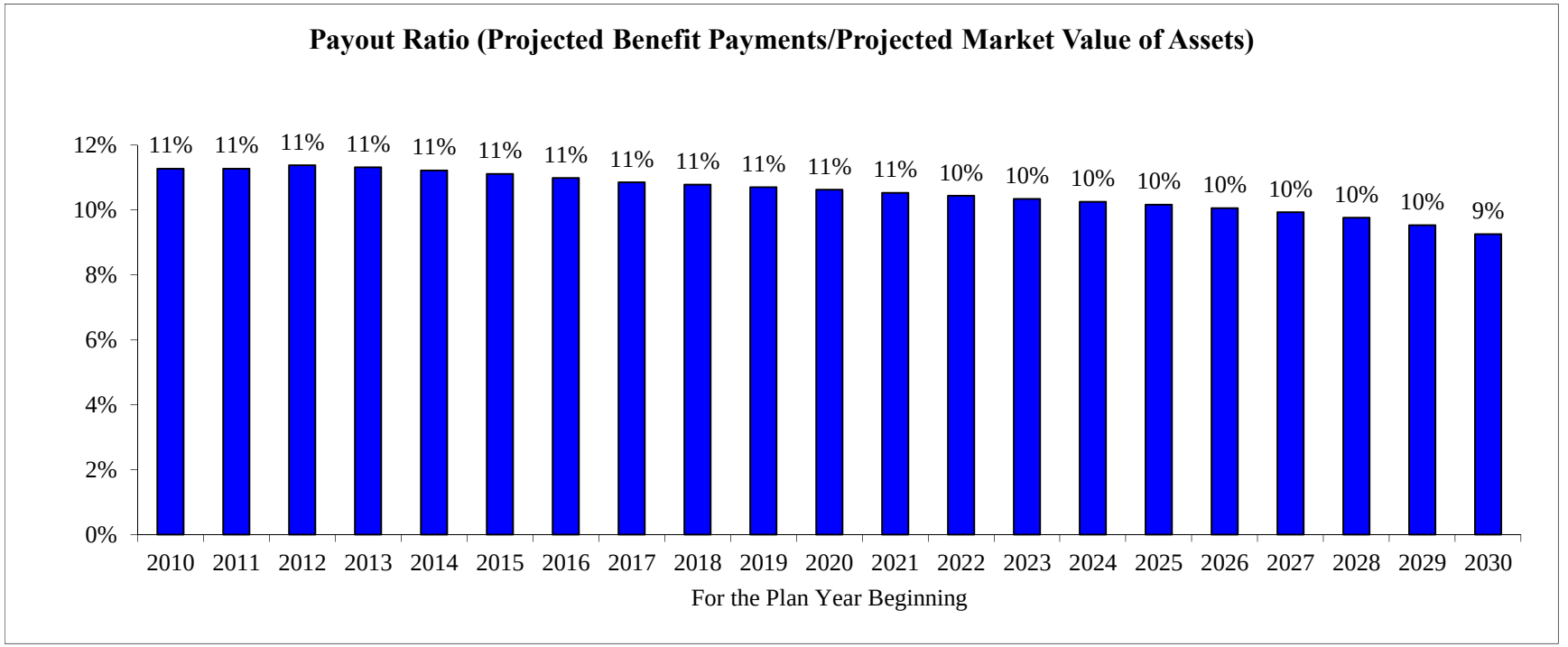


	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Annual Percent Change	N/A	1.4%	3.0%	3.0%	3.0%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	3.0%	3.0%	3.1%	3.0%	2.7%	2.4%	1.8%	1.4%

Deterministic Analysis (continued)

Payout Ratio (benefit payments/market value of assets)

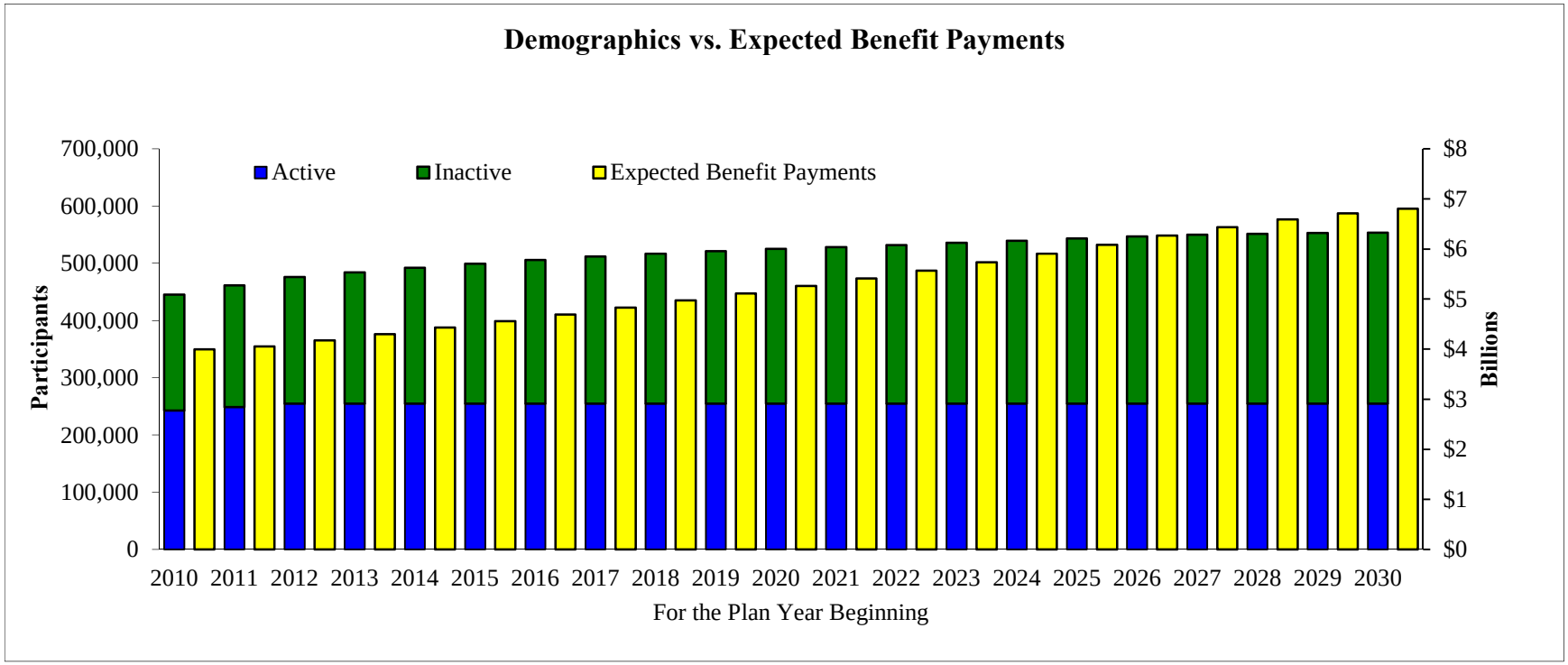
The Plan's projected payout ratios are shown in the chart below. The payout ratios are expected to gradually decline through the end of the projection period. The results assume the current contribution policy remains unchanged and that the Plan's assets return precisely the actuarially assumed rate each year without exception for all projection years.



Deterministic Analysis (continued)

Demographics and Benefit Payments

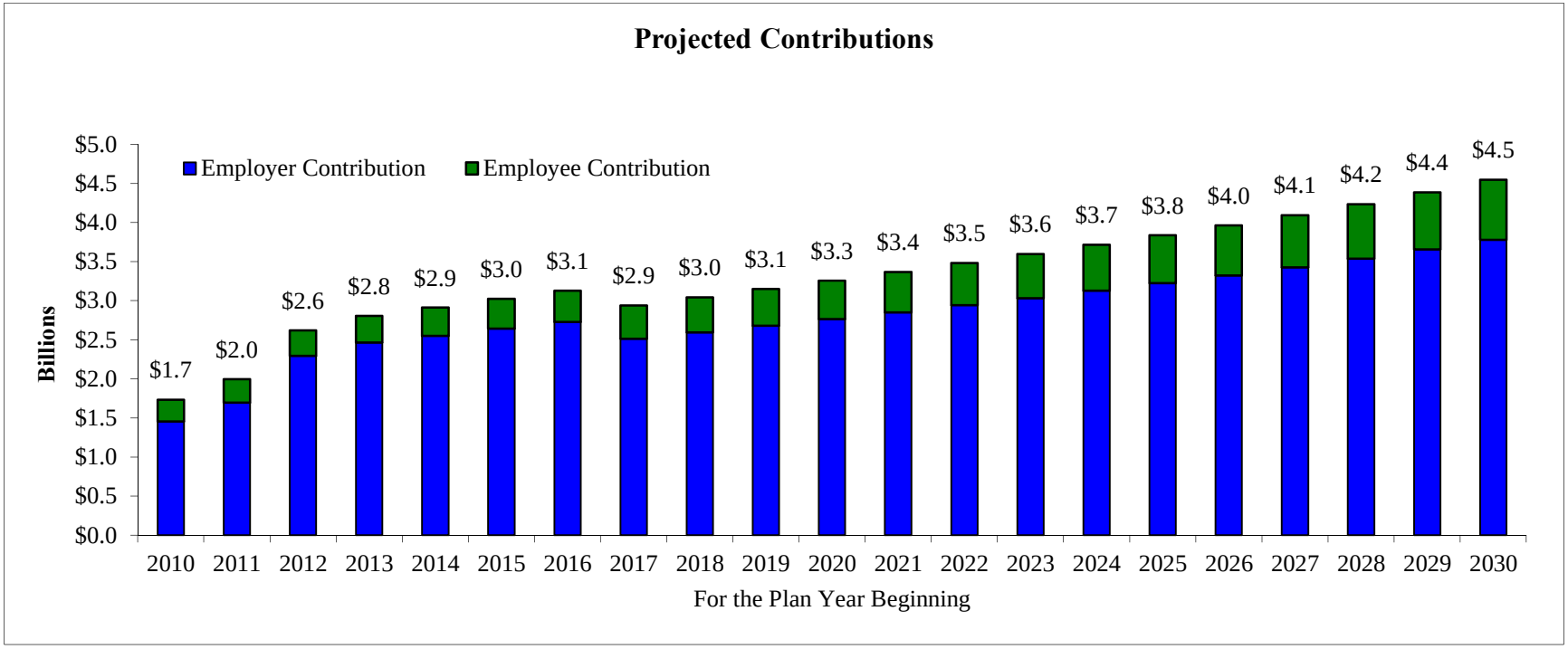
The chart below highlights the demographic and benefit payment projections shown on the prior pages, illustrating the comparison between the projected number of active and inactive participants and the projected benefit payments through the Plan year beginning 2030.



Deterministic Analysis (continued)

Contributions

The Plan's projected contributions, expressed as total dollar contributions, are shown in the chart below. Contributions to fund early retirements are scheduled to take place between Plan years 2012 and 2016. This creates a temporary increase in total contributions for these years. The results assume the current contribution policy remains unchanged and that the Plan's assets return precisely the actuarially assumed rate each year without exception for all projection years.

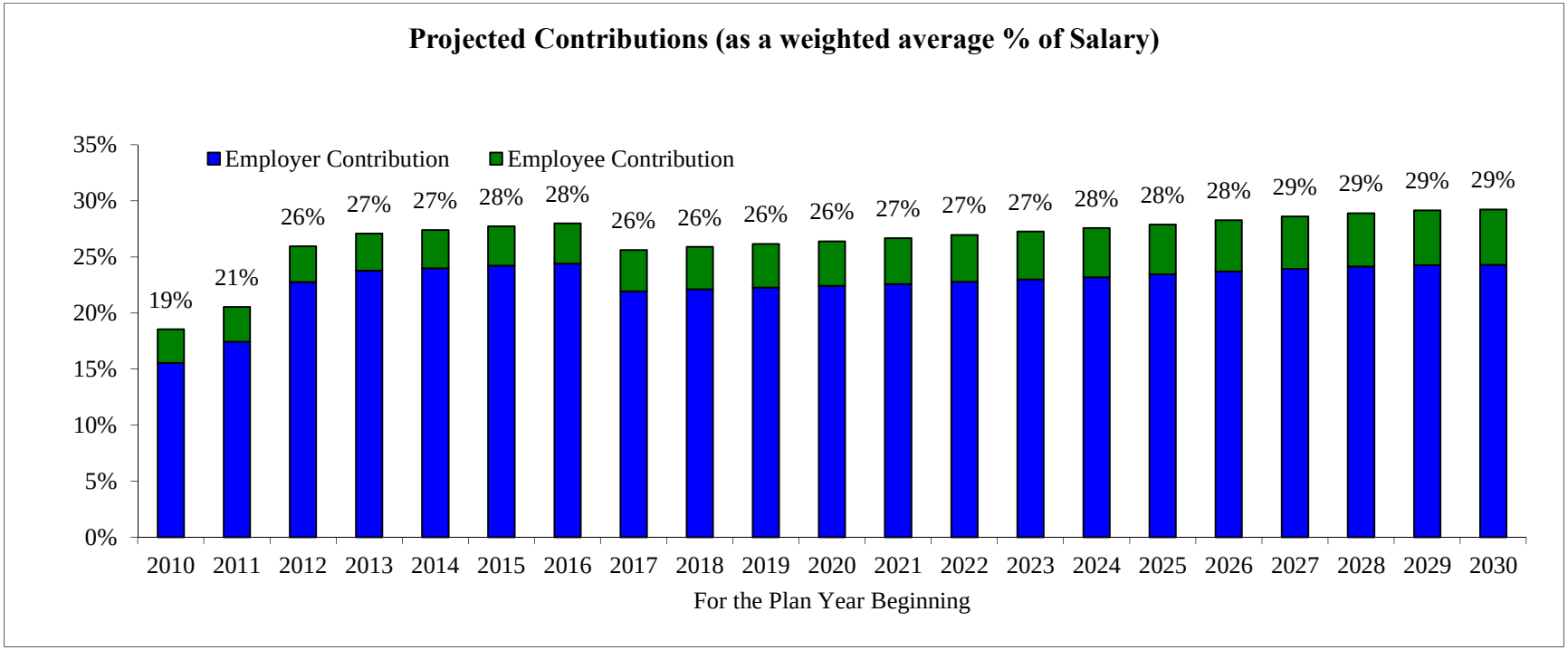


	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Annual Percent Change	N/A	15.0%	31.3%	7.1%	3.8%	3.8%	3.5%	-6.1%	3.6%	3.5%	3.5%	3.4%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.4%	3.6%	3.7%

Deterministic Analysis (continued)

Contributions

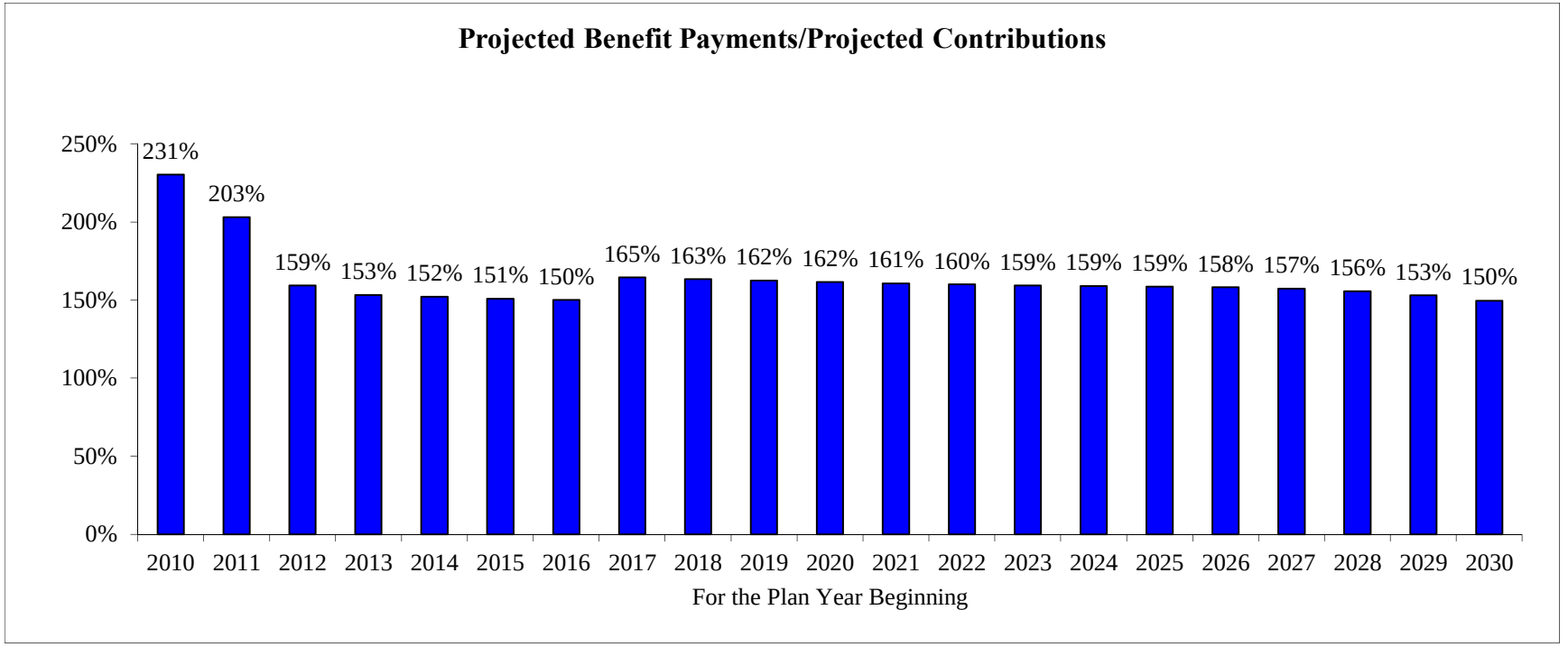
The Plan's projected contributions, expressed as a weighted average percentage of salary, are shown in the chart below. Contributions to fund early retirements are scheduled to take place between Plan years 2012 and 2016. This creates a temporary increase in total contributions for these years. The results assume the current contribution policy remains unchanged and that the Plan's assets return precisely the actuarially assumed rate each year without exception for all projection years.



Deterministic Analysis (continued)

Benefit Payments/Contributions

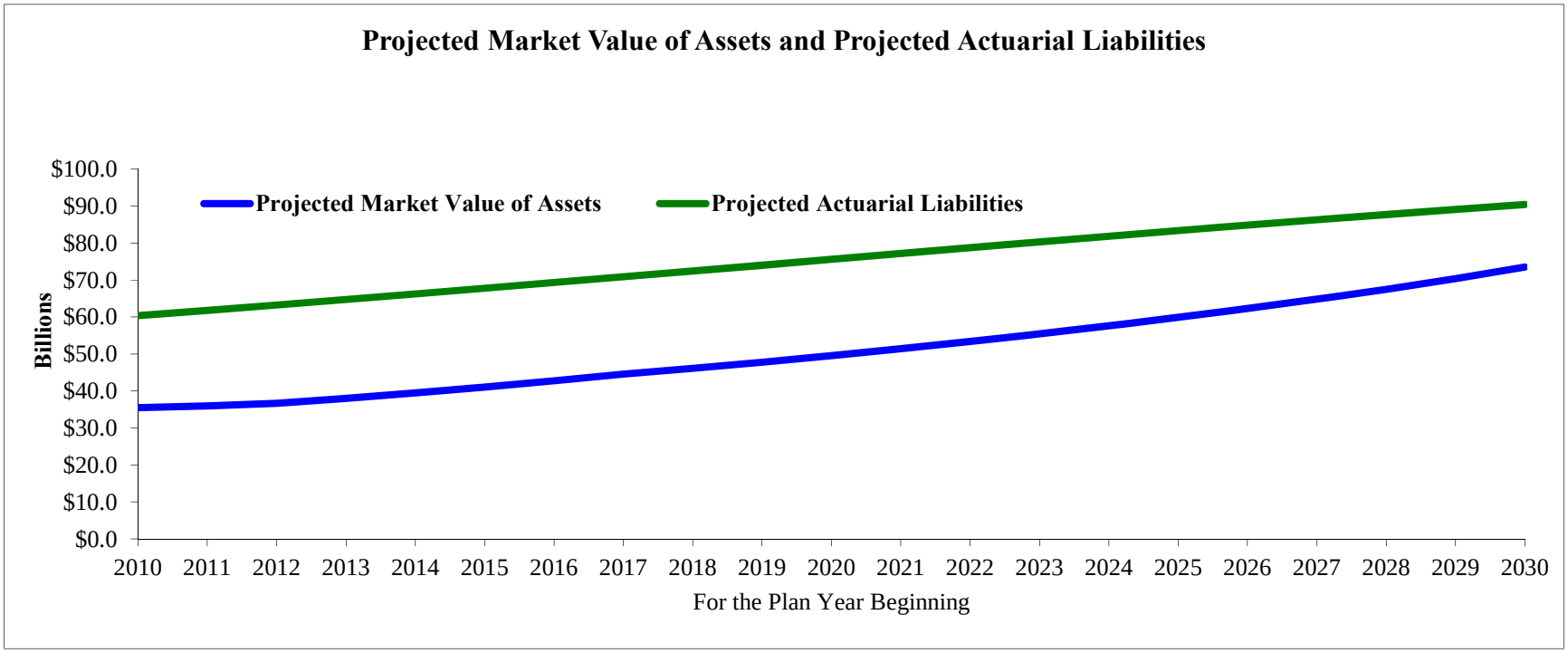
The Plan's projected benefit payments divided by projected contributions are shown in the chart below. Contributions to fund early retirements are scheduled to take place between Plan years 2012 and 2016. This creates a temporary increase in total contributions for these years. The results assume the current contribution policy remains unchanged and that the Plan's assets return precisely the actuarially assumed rate each year without exception for all projection years.



Deterministic Analysis (continued)

Actuarial Accrued Liabilities and Market Value of Assets

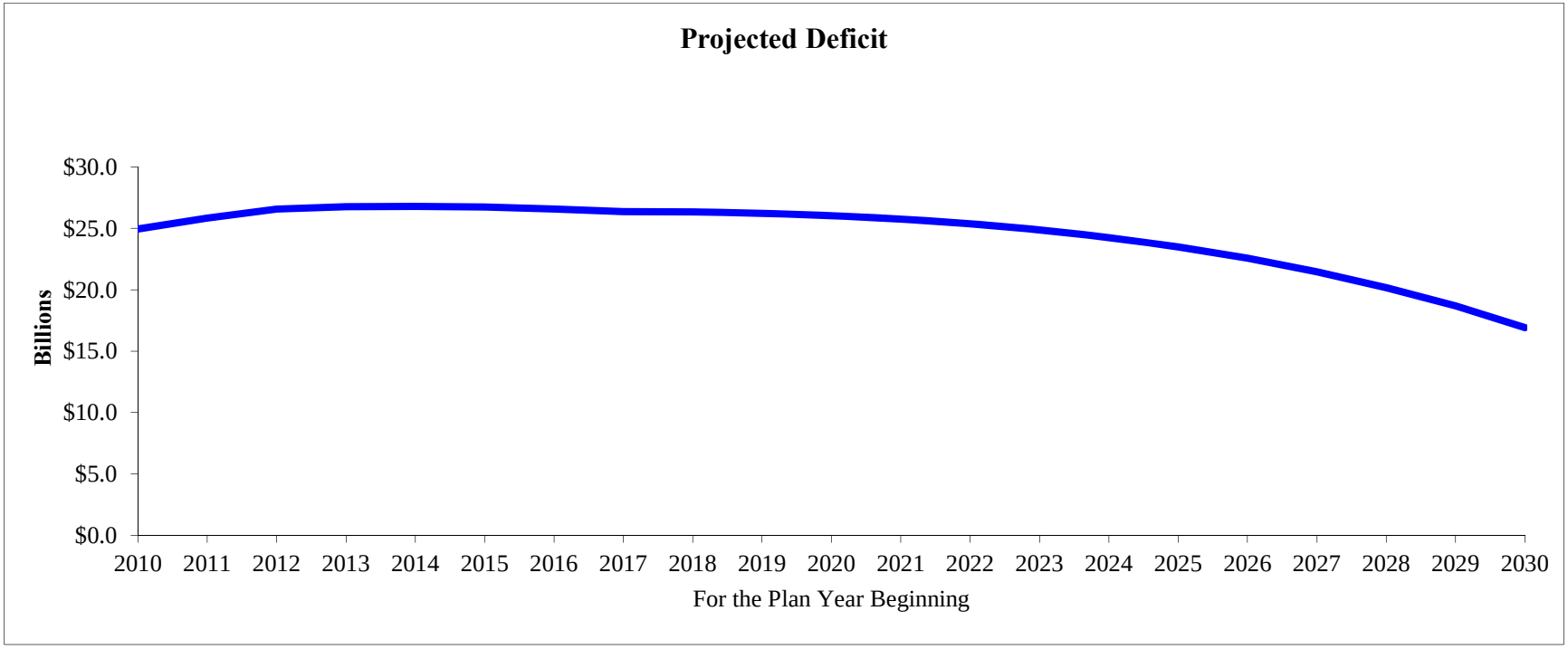
The Plan's projected actuarial accrued liabilities and market value of assets are shown in the chart below. The results assume the current contribution policy remains unchanged and that the Plan's assets return precisely the actuarially assumed rate each year without exception for all projection years. The relative disparity between the market value of assets and Plan liabilities is expected to fall by almost 33% through the end of the projection period. The actuarial funded ratio (based on actuarial value of assets) is expected to fall from about 71% currently to about 60% in five years before beginning to climb to approximately 81% at the end of the projection period. This is shown more clearly on the following pages.



Deterministic Analysis (continued)

Deficit (market value of assets – actuarial accrued liabilities)

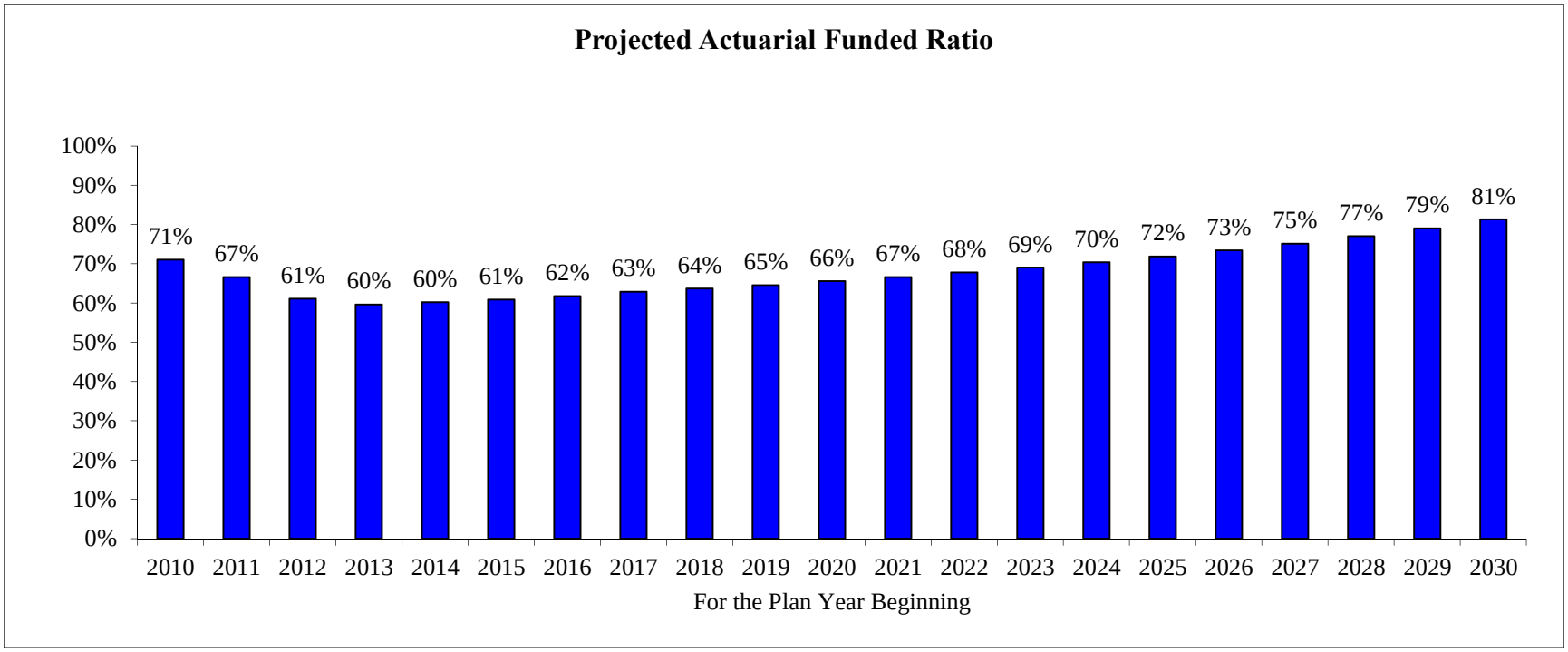
The Plan's projected deficit of assets is shown in the chart below. The results assume the current contribution policy remains unchanged and that the Plan's assets return precisely the actuarially assumed rate each year without exception for all projection years. The disparity between the market value of assets and Plan liabilities is expected to fall through the end of the projection period by almost 33%.



Deterministic Analysis (continued)

Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability)

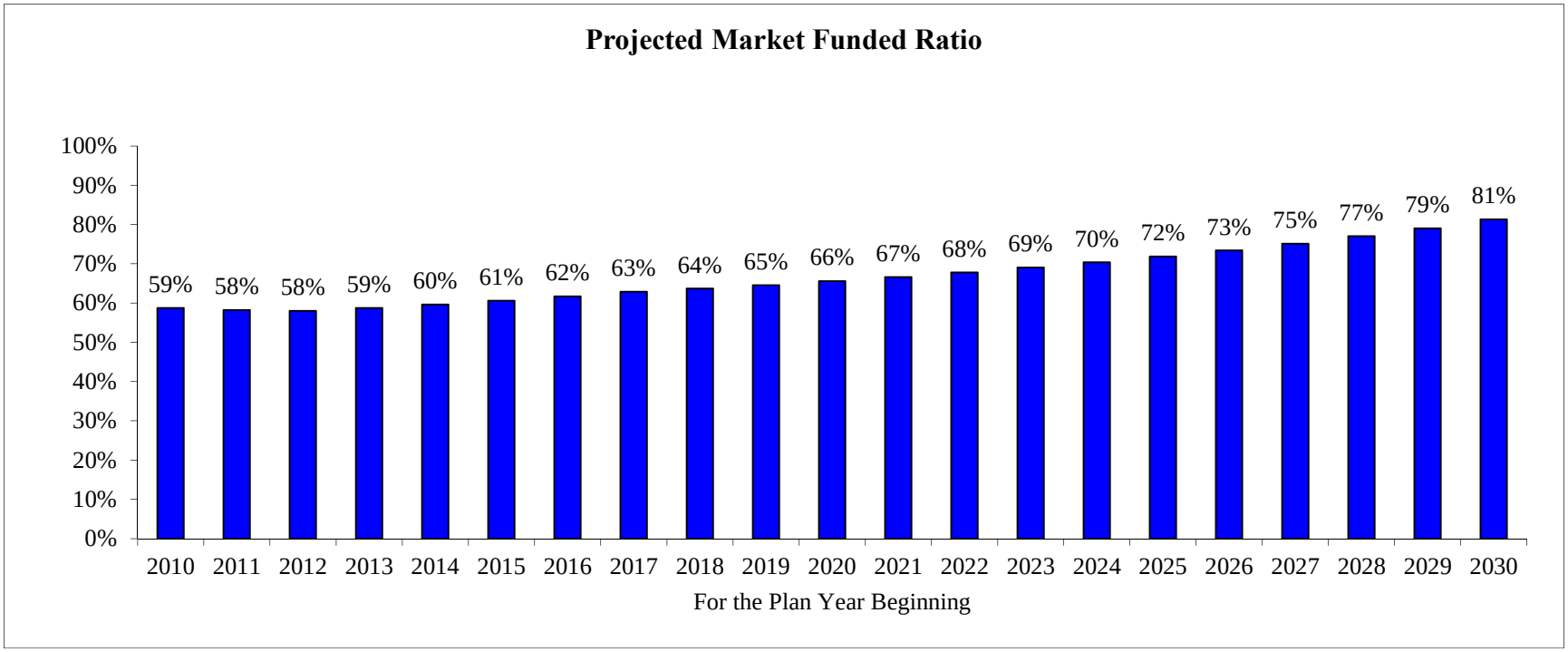
The Plan's projected actuarial funded ratio is shown in the chart below. The Plan is expected to end the projection period at approximately 81% funded. The results assume the current contribution policy remains unchanged and that the Plan's assets return precisely the actuarially assumed rate each year without exception for all projection years.



Deterministic Analysis (continued)

Market Funded Ratio (market value of assets/actuarial accrued liability)

The Plan's projected market funded ratio is shown in the chart below. The Plan is expected to end the projection period at approximately 81% funded. The results assume the current contribution policy remains unchanged and that the Plan's assets return precisely the actuarially assumed rate each year without exception for all projection years.

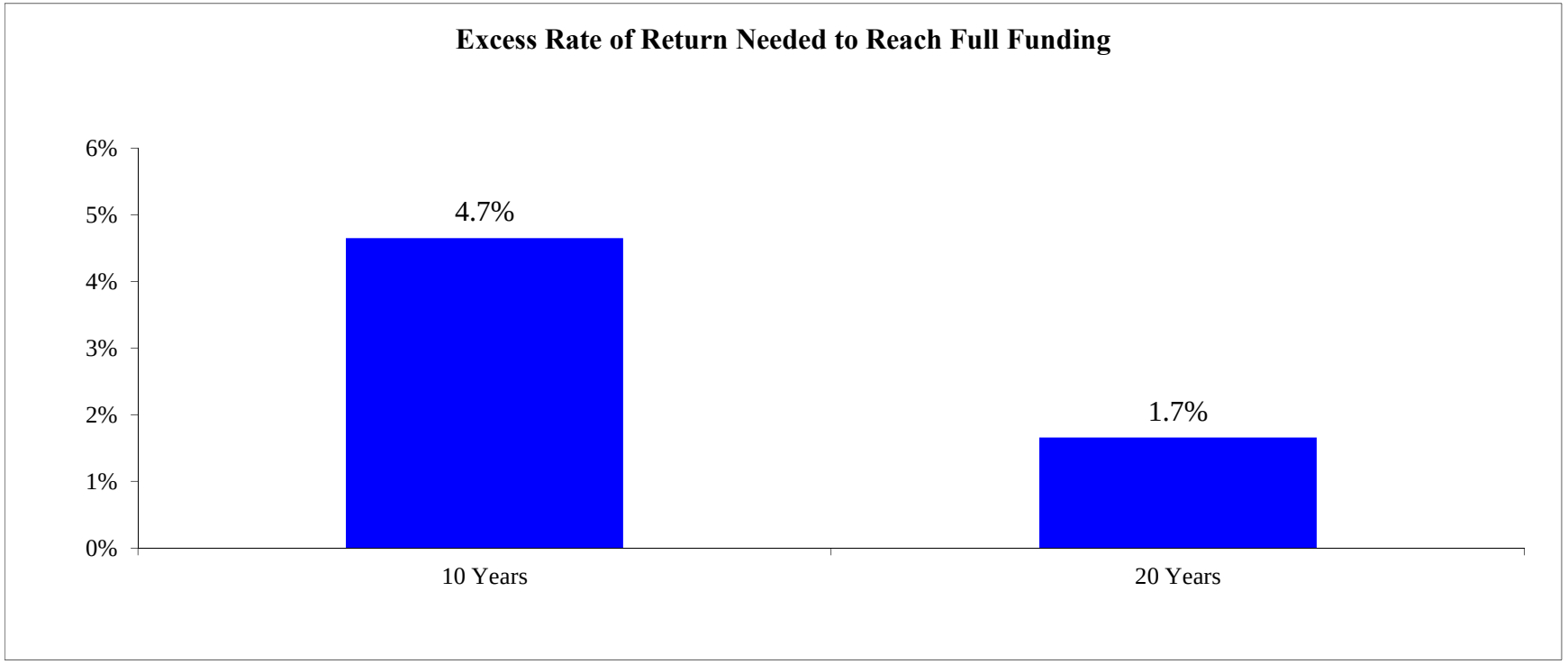


Deterministic Scenario Analysis

Full Funding Implied Excess Returns

The figure below shows the excess return over the actuarial assumed rate of return needed to bring the Plan to 100% funded in 10 and 20 years respectively. Achieving these respective levels of excess return consistently over the stated time period and without variation is highly improbable. The results assume all other actuarial assumptions are precisely met over the time periods shown.

Actuarially assumed rate of return for employees hired prior to 7/1/2010 – **8.00%**
Actuarially assumed rate of return for employees hired on or after 7/1/2010 – **7.00%**



Deterministic Scenario Analysis (continued)

Sensitivity Analysis – Decreased Return

Under the deterministic analysis presented in the preceding pages, the Plan is projected to have a funded ratio of 81% in 20 years. The table below summarizes the projected funded ratio and other key statistics in 2030 assuming the Plan experiences an annualized investment return of 50 basis points lower than the actuarially assumed rate of return. The values assume all other actuarial assumptions are exactly met. The original values are also presented in the table for comparison.

	Value in 2030			
	Actuarially Assumed Rate of Return	Reduced Return (50 bps)	Impact of Reduced Return Assumption	
Projected Payout Ratio	9.3%	9.8%	0.6%	▲
Projected Employer Contributions (billions)	$3.8	$4.4	$0.6	▲
Projected Contributions (Weighted Average % of Salary)	29.2%	33.5%	4.3%	▲
Projected Benefit Payments/Projected Total Contributions	150%	131%	-19%	▼
Projected Actuarial Accrued Liabilities (billions)	$90.4	$90.4	$0.0	▬
Projected Market Value of Assets (billions)	$73.5	$69.3	($4.2)	▼
Projected Deficit (billions)	$16.9	$21.1	$4.2	▲
Projected Market Funded Ratio	81%	77%	-4%	▼
	20 Year Cumulative Total			
Projected Cumulative Employer Contributions (billions)	$59.3	$63.7	$4.4	▲

Deterministic Scenario Analysis (continued)

Sensitivity Analysis – Increased Contributions

Under the deterministic analysis presented in the preceding pages, the Plan is projected to have a funded ratio of 81% in 20 years. The table below summarizes the projected funded ratio and other key statistics in 2030 assuming the Plan experiences employer contribution rates that are $300 million higher than the calculated ARC each year. To provide context, the ARC (actuarially required contribution) under the increased return scenario for 2012, 2015, and 2020, to which this hypothetical $300 million would be added to create this scenario, are $2.6 billion, $2.9 billion, and $3.0 billion respectively. The values assume all other actuarial assumptions are exactly met. The original values are also presented in the table for comparison.

	Value in 2030			
	Legislated Contributions	Increased Contributions	Impact of Increased Contributions	
Projected Payout Ratio	9.3%	8.7%	-0.5%	▼
Projected Employer Contributions (billions)	$3.8	$3.3	($0.5)	▼
Projected Contributions (Weighted Average % of Salary)	29.2%	25.8%	-3.4%	▼
Projected Benefit Payments/Projected Total Contributions	150%	169%	20%	▲
Projected Actuarial Accrued Liabilities (billions)	$90.4	$90.4	$0.0	▬
Projected Market Value of Assets (billions)	$73.5	$77.9	$4.4	▲
Projected Deficit (billions)	$16.9	$12.6	($4.3)	▼
Projected Market Funded Ratio	81%	86%	5%	▲
	20 Year Cumulative Total			
Projected Cumulative Employer Contributions (billions)	$59.3	$58.9	($0.4)	▼

Deterministic Scenario Analysis (continued)

Sensitivity Analysis – Increased Contributions

Under the deterministic analysis presented in the preceding pages, the Plan is projected to have a funded ratio of 81% in 20 years. The table below summarizes the projected funded ratio and other key statistics in 2030 assuming the Plan experiences employer contribution rates that are $400 million higher than the calculated ARC each year. To provide context, the ARC (actuarially required contribution) under the increased return scenario for 2012, 2015, and 2020, to which this hypothetical $400 million would be added to create this scenario, are $2.6 billion, $2.9 billion, and $2.9 billion respectively. The values assume all other actuarial assumptions are exactly met. The original values are also presented in the table for comparison.

	Value in 2030			
	Legislated Contributions	Increased Contributions	Impact of Increased Contributions	
Projected Payout Ratio	9.3%	8.6%	-0.7%	▼
Projected Employer Contributions (billions)	$3.8	$3.1	($0.7)	▼
Projected Contributions (Weighted Average % of Salary)	29.2%	24.7%	-4.5%	▼
Projected Benefit Payments/Projected Total Contributions	150%	177%	27%	▲
Projected Actuarial Accrued Liabilities (billions)	$90.4	$90.4	$0.0	▬
Projected Market Value of Assets (billions)	$73.5	$79.3	$5.8	▲
Projected Deficit (billions)	$16.9	$11.1	($5.8)	▼
Projected Market Funded Ratio	81%	88%	6%	▲
	20 Year Cumulative Total			
Projected Cumulative Employer Contributions (billions)	$59.3	$58.7	($0.5)	▼

Stochastic Analysis

This section analyzes Plan assets and liabilities under many capital market environments based on expected asset returns and inflation, and their expected volatility. Using a Monte Carlo simulation technique, both assets and liabilities are assumed to vary stochastically, linked together by changes in inflation.

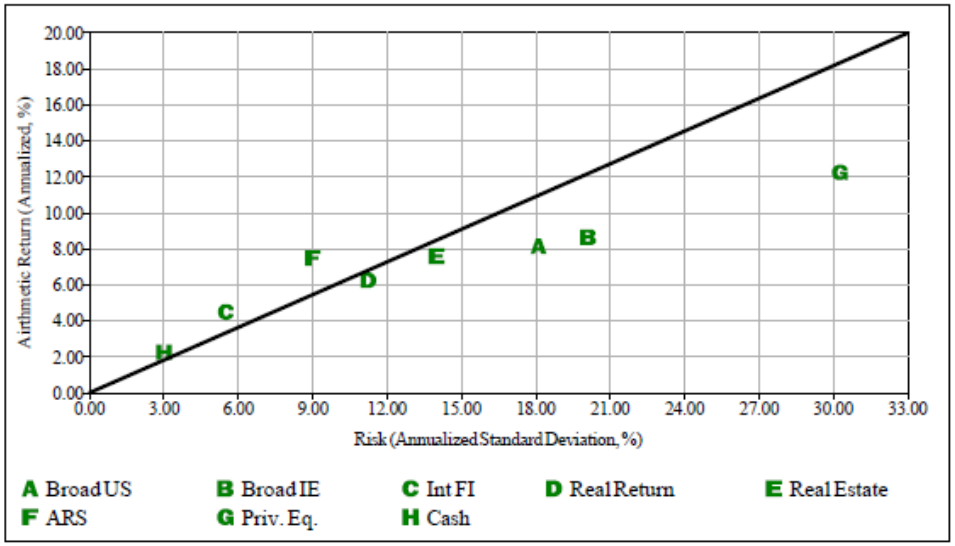
Using the expected values and variances of the returns and inflation, along with their correlations, 2000 trials are generated to produce a distribution of results. A stochastic analysis can answer questions about the best/worst case outcomes along with the probability of such outcomes. This is contrasted with the deterministic analysis that provides an expected value if all assumptions are exactly met.

Stochastic Analysis (continued)

Long-Term Return and Risk Assumptions

In order to perform a stochastic analysis and create asset allocation alternatives, it is necessary to estimate, for each asset class, its probable return and risk. The expected returns are our best estimates of the average annual percentage increases in values of each asset class over a prospective long period of time, and assumed to be normally distributed. The risk of an asset class is measured by its standard deviation, or volatility. If asset returns are normally distributed, two-thirds (67%) of all returns are expected to lie within one standard deviation on either side of the mean. For example, we expect Broad US Equity to return, annually on average, 8.15% with a standard deviation of 18.10%, meaning that two-thirds of the time we expect its return to lie between –9.95% (= 8.15 – 18.10) and 26.25% (= 8.15 + 18.10). Moreover, we expect 95% of all return outcomes to lie within two standard deviations of the mean return, implying only a one-in-twenty chance that the return on Broad US Equity will either fall below -28.05% or rise above 44.35%. The risk and return assumptions used in this study are outlined in the charts below:

Asset Class	Arithmetic Return Assumption	Standard Deviation Assumption
Broad US Equity	8.15	18.10
Broad International Equity	8.65	20.10
Int. Duration Fixed Income	4.50	5.50
Real Return	6.25	11.25
Real Estate	7.60	14.00
Absolute Return	7.50	9.00
Private Equity	12.25	30.25
Cash Equivalents	2.25	3.00



Stochastic Analysis (continued)

Correlation Between Asset Classes

Creating a diversified portfolio of asset classes enables the investor to achieve a high rate of return while minimizing volatility of the portfolio. As defined on the previous page, volatility is "risk" or standard deviation. By minimizing the volatility of a portfolio, we produce asset returns that vary less from year to year. Diversification exists because the returns of different asset classes do not always move in the same direction, at the same time, or with the same magnitude. Correlation values are between 1.00 and –1.00. If returns of two asset classes rise or fall at the same time and in the same magnitude, they have a correlation value of 1.00. Conversely, two asset classes that simultaneously move in opposite directions, and in the same magnitude, have a correlation value of –1.00. A correlation of zero indicates no relationship between returns. The assumed correlations are largely based on historical index data, with some qualitative analysis applied. For instance, where appropriate, we have weighted current history more heavily. The correlation matrix used in this study is shown below:

	Broad US Equity	Broad International Equity	Int. Duration Fixed Income	Real Return	Real Estate	Absolute Return	Private Equity	Cash Equivalents
Broad US Equity	1.00	0.84	0.21	0.63	0.32	0.50	0.71	0.03
Broad International Equity	0.84	1.00	0.02	0.75	0.36	0.70	0.71	-0.11
Int. Duration Fixed Income	0.21	0.02	1.00	0.25	-0.03	0.14	-0.25	0.25
Real Return	0.63	0.75	0.25	1.00	0.43	0.62	0.48	-0.08
Real Estate	0.32	0.36	-0.03	0.43	1.00	0.39	0.46	0.13
Absolute Return	0.50	0.70	0.14	0.62	0.39	1.00	0.53	0.19
Private Equity	0.71	0.71	-0.25	0.48	0.46	0.53	1.00	-0.02
Cash Equivalents	0.03	-0.11	0.25	-0.08	0.13	0.19	-0.02	1.00

The fact that the correlations shown in the table are nearly all positive does not imply that these asset classes do not diversify one another. Their correlations are significantly less than 1.00, meaning we expect a measurable number of instances when the underperformance of one or more of the asset classes will be offset by the outperformance of others. This point is demonstrated on the following pages, which illustrate that diversification into less correlated asset classes can decrease the expected overall volatility of a portfolio.

Stochastic Analysis (continued)

Efficient Portfolios

Each frontier portfolio (optimal allocation) is created using target rates of return both above and below the projected rate of return for the current allocation. This range illustrates the trade-off between return and risk; additional return can only be achieved by undertaking additional risk. The table below shows the possible optimal allocations given the selected asset classes and their constraints listed under "Min" and "Max." The table shows the Current Allocation (as of 3/31/2011) and Target Allocation of MPSERS, and also highlights a potential target (Potential Portfolio 1) and efficient portfolio #10 for further consideration throughout this study. An illustrative portfolio (Conservative Portfolio) is also shown for demonstrative purposes throughout this study.

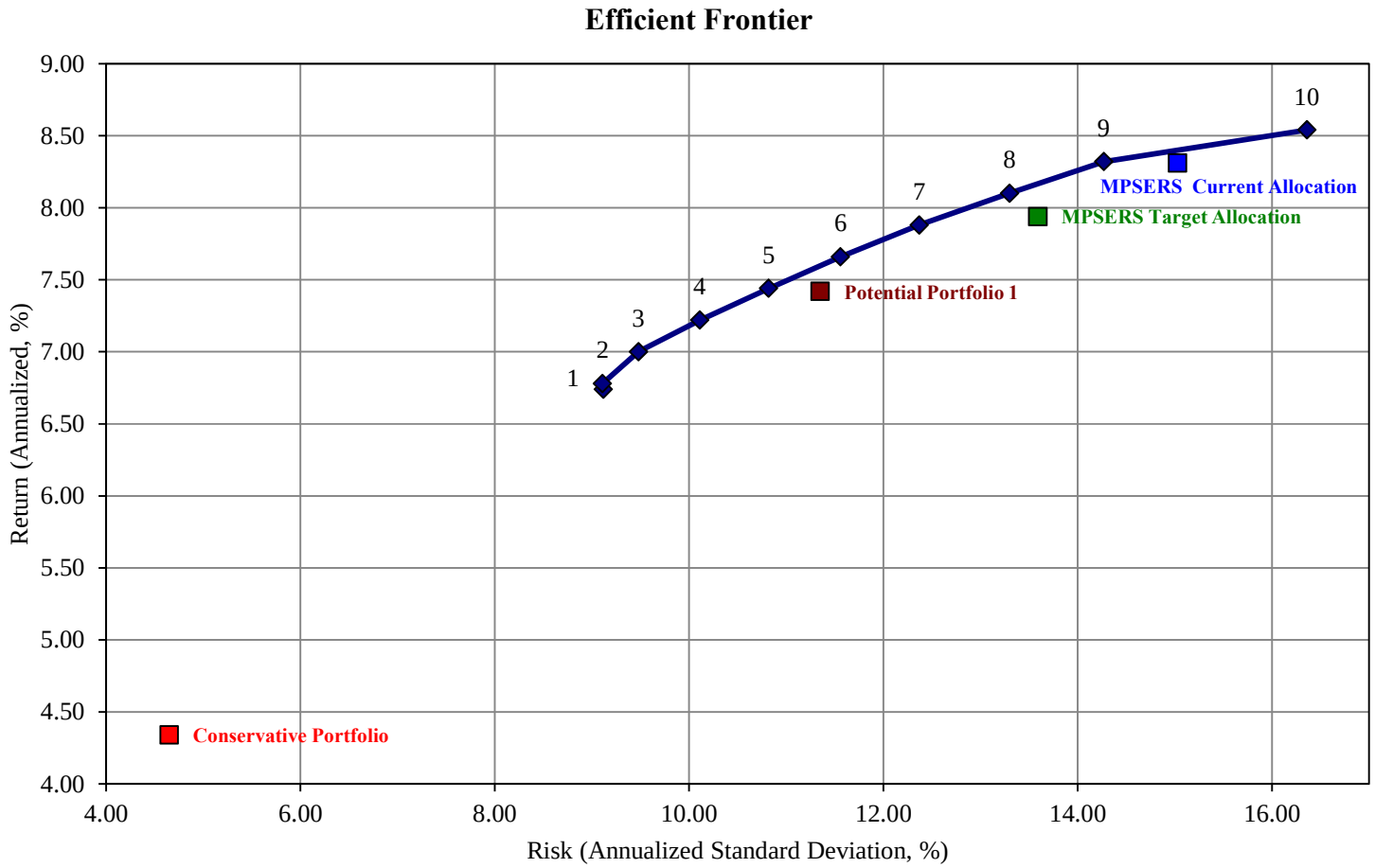
	Min	Max	1	2	3	4	5	6	7	8	9	10	MPSERS Current Allocation	MPSERS Target Allocation	Conservative Portfolio	Potential Portfolio 1
Broad US Equity	20	70	20	20	20	20	20	20	20	20	22	40	35	33	0	24
Broad International Equity	10	20	10	10	10	10	10	10	11	17	20	20	14	16	0	16
Int. Duration Fixed Income	10	50	41	45	38	34	31	28	25	19	13	10	15	16	75	25
Real Return	0	10	0	0	0	0	0	0	0	0	2	0	2	4	10	4
Real Estate	8	12	8	8	10	12	12	12	12	12	12	8	9	9	0	9
Absolute Return	0	10	6	5	10	10	10	10	10	10	10	0	3	6	0	10
Private Equity	10	20	10	10	10	12	15	18	20	20	20	20	21	14	0	10
Cash Equivalents	2	5	5	2	2	2	2	2	2	2	2	2	2	2	15	2
Total			100	100	100	100	100	100	100	100	100	100	100	100	100	100
Capital Appreciation			40	40	40	42	45	48	51	57	62	80	70	63	0	50
Capital Preservation			46	47	40	36	33	30	27	21	15	12	17	18	90	27
Alpha			6	5	10	10	10	10	10	10	10	0	3	6	0	10
Inflation			8	8	10	12	12	12	12	12	14	8	11	13	10	13
Expected Return			**6.74**	**6.78**	**7.00**	**7.22**	**7.44**	**7.66**	**7.88**	**8.10**	**8.32**	**8.54**	8.31	7.94	4.34	7.42
Risk (Standard Deviation)			**9.12**	**9.11**	**9.48**	**10.11**	**10.82**	**11.56**	**12.37**	**13.30**	**14.27**	**16.36**	15.03	13.59	4.65	11.35
Return (Compound)			6.35	6.39	6.58	6.75	6.90	7.04	7.18	7.29	7.39	7.33	7.28	7.09	4.24	6.83
Return/Risk Ratio			0.74	0.74	0.74	0.71	0.69	0.66	0.64	0.61	0.58	0.52	0.55	0.58	0.93	0.65
RVK Expected Eq Beta (LC US Eq = 1)			0.47	0.47	0.49	0.51	0.55	0.58	0.61	0.65	0.70	0.84	0.77	0.70	0.09	0.58
RVK Liquidity Metric (T-Bills = 100)			72	72	68	65	63	61	59	59	59	69	65	68	83	68

Portfolio Restrictions: Domestic Equity cannot exceed 70% of the Total Portfolio. International Equity cannot exceed 20% of the Total Portfolio. Absolute Return and Real Return combined cannot exceed 20% of the Total Portfolio. Private Equity cannot exceed 30% of the Total Portfolio.

Stochastic Analysis (continued)

Efficient Frontier

The risk of each alternative allocation is plotted against the horizontal axis, while the return is measured on the vertical axis. The line connecting the points represents all the optimal portfolios subject to the given constraints and is known as the "efficient frontier." The upward slope of the efficient frontier indicates the direct relationship between return and risk.



Stochastic Analysis (continued)

Asset Mixes

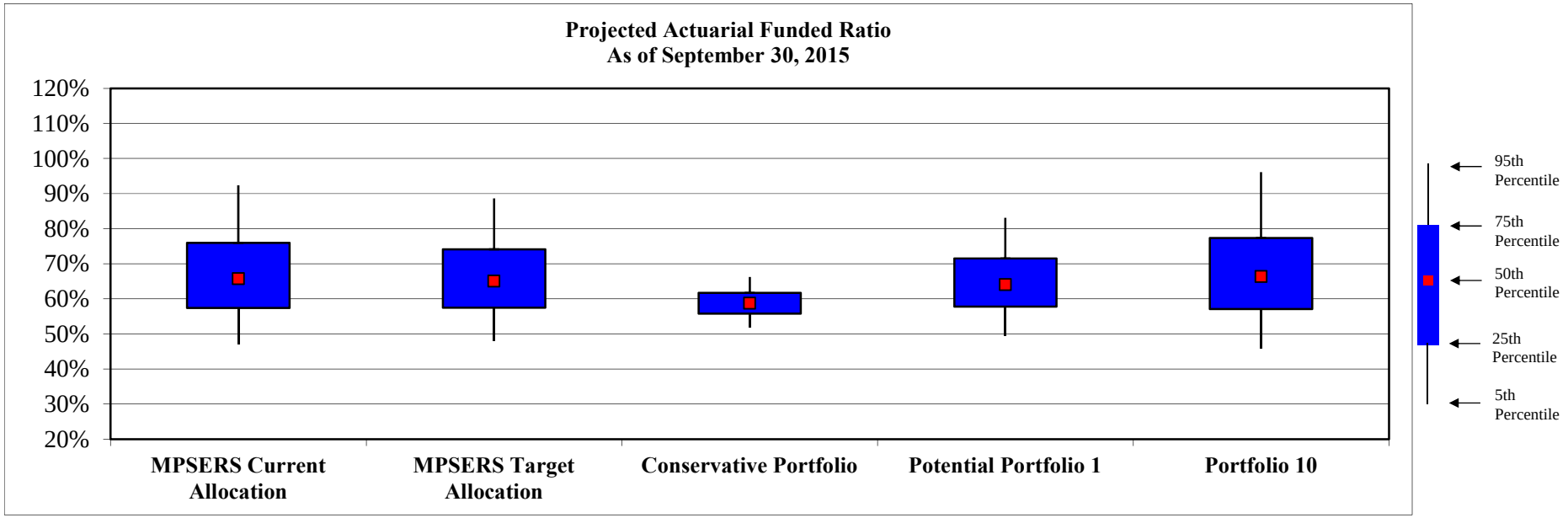
Outlined below are the Current Allocation and Target Allocation (as of 3/31/2011) and three other mixes to be examined in this stochastic analysis. The expected return and expected risk, as measured by standard deviation, for each is also shown.

Asset Class	MPSERS Current Allocation	MPSERS Target Allocation	Conservative Portfolio	Potential Portfolio 1	Portfolio 10
Broad US Equity	35%	33%	0%	24%	40%
Broad International Equity	14%	16%	0%	16%	20%
Int. Duration Fixed Income	15%	16%	75%	25%	10%
Real Return	2%	4%	10%	4%	0%
Real Estate	9%	9%	0%	9%	8%
Absolute Return	3%	6%	0%	10%	0%
Private Equity	21%	14%	0%	10%	20%
Cash Equivalents	2%	2%	15%	2%	2%
Expected Return	**8.31%**	**7.94%**	**4.34%**	**7.42%**	**8.54%**
Expected Risk	**15.03%**	**13.59%**	**4.65%**	**11.35%**	**16.36%**

Stochastic Analysis (continued)

Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); **5 Years**

The graph below shows the distribution of possible actuarial funded ratios five years from now, assuming the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.



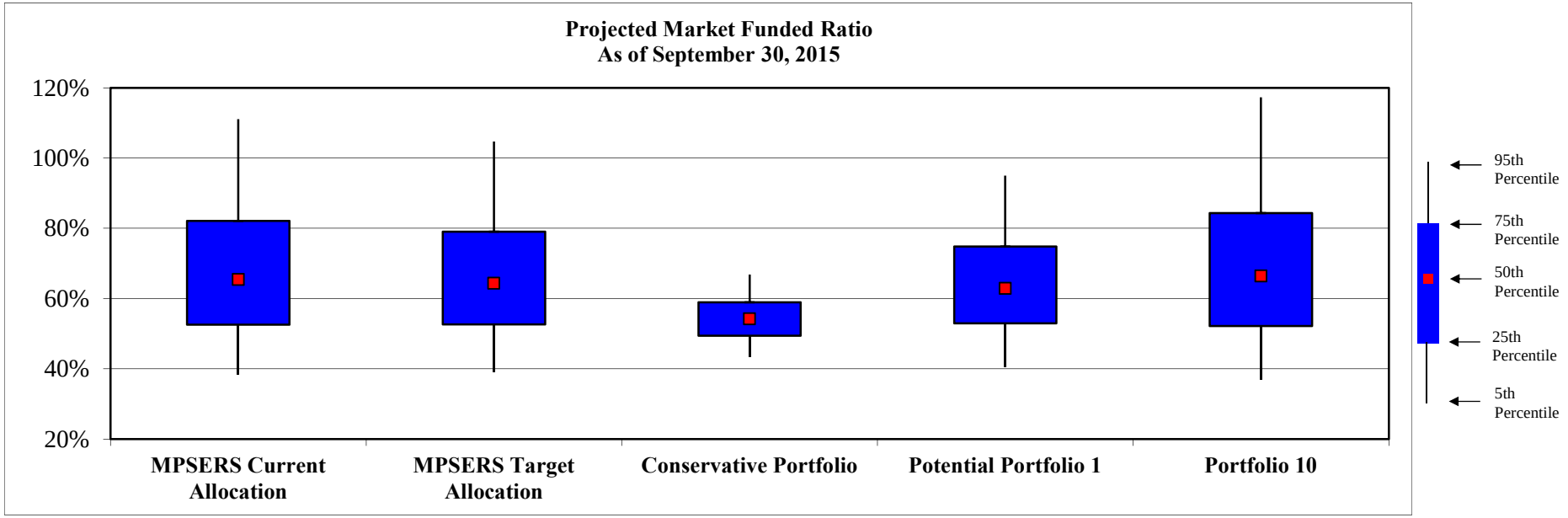
	MPSERS Current Allocation		MPSERS Target Allocation		Conservative Portfolio		Potential Portfolio 1		Portfolio 10	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	($34.7)	47.0%	($34.1)	47.9%	($31.4)	51.8%	($33.0)	49.6%	($35.4)	46.0%
25th Percentile	($28.2)	57.4%	($28.1)	57.5%	($29.1)	55.8%	($27.9)	57.8%	($28.2)	57.1%
50th Percentile	($22.7)	65.7%	($23.1)	65.0%	($27.4)	58.7%	($23.7)	64.1%	($22.3)	66.3%
75th Percentile	($16.1)	76.0%	($17.3)	74.1%	($25.5)	61.7%	($19.1)	71.5%	($15.1)	77.3%
95th Percentile	($5.0)	92.4%	($7.7)	88.6%	($22.7)	66.2%	($11.4)	83.1%	($2.6)	96.1%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected. For further example, the 25th percentile indicates that 25% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 75% of the time a higher ratio is expected.

Stochastic Analysis (continued)

Projected Market Funded Ratio (market value of assets/actuarial accrued liability); **5 Years**

The graph below shows the distribution of possible market funded ratios five years from now, assuming the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.



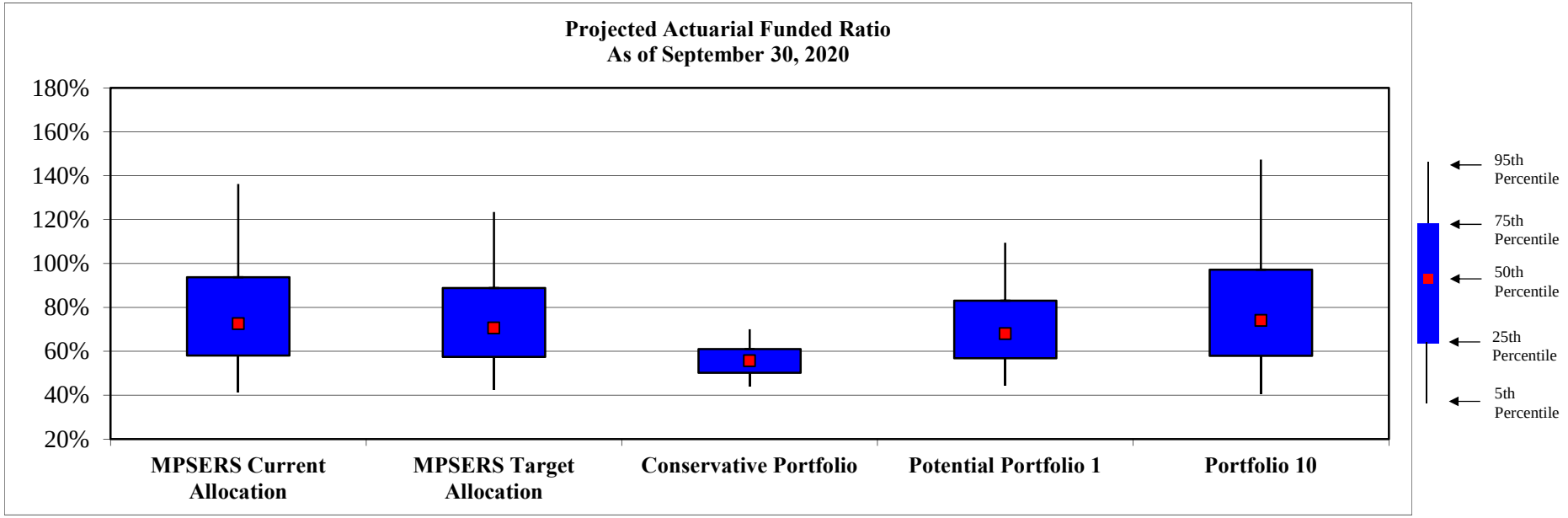
	MPSERS Current Allocation		MPSERS Target Allocation		Conservative Portfolio		Potential Portfolio 1		Portfolio 10	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	($40.5)	38.2%	($39.8)	39.0%	($36.5)	43.3%	($38.5)	40.6%	($41.2)	37.0%
25th Percentile	($31.2)	52.5%	($31.0)	52.7%	($33.1)	49.4%	($30.9)	52.9%	($31.2)	52.2%
50th Percentile	($22.6)	65.4%	($23.6)	64.4%	($30.3)	54.2%	($24.6)	62.9%	($22.2)	66.4%
75th Percentile	($11.8)	82.1%	($14.1)	79.0%	($27.5)	58.9%	($16.9)	74.8%	($10.4)	84.3%
95th Percentile	$7.5	111.1%	$3.3	104.7%	($22.6)	66.9%	($3.5)	94.9%	$11.5	117.3%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected. For further example, the 25th percentile indicates that 25% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 75% of the time a higher ratio is expected.

Stochastic Analysis (continued)

Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); **10 Years**

The graph below shows the distribution of possible actuarial funded ratios ten years from now, assuming the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.



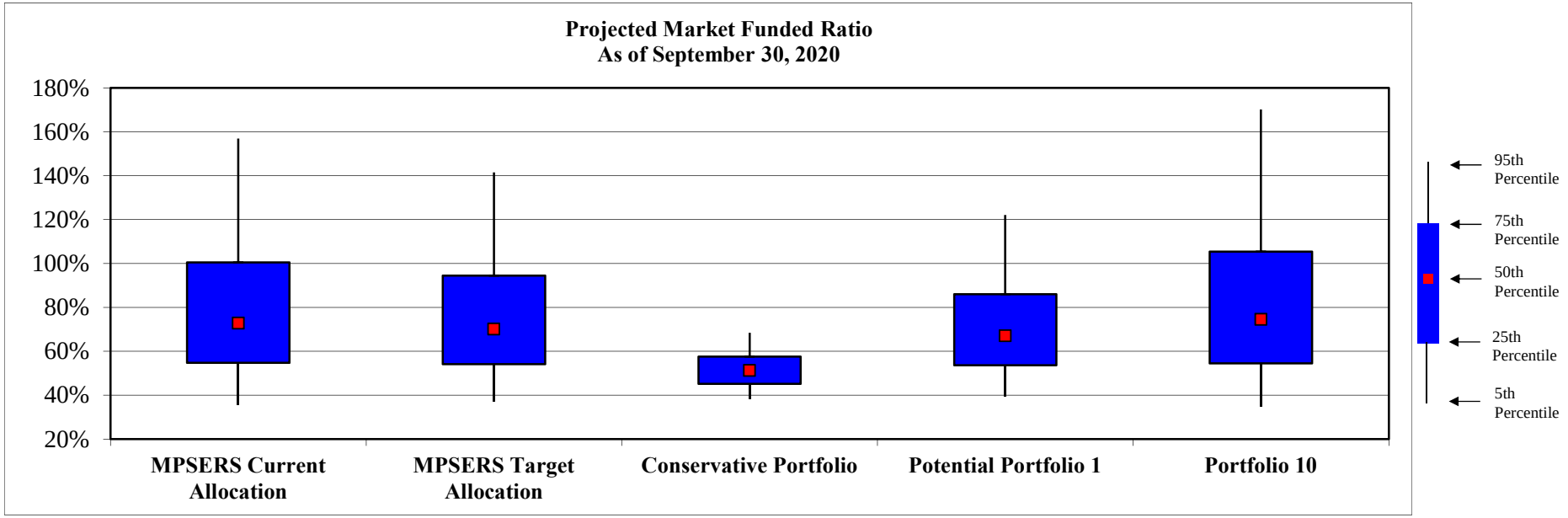
	MPSERS Current Allocation		MPSERS Target Allocation		Conservative Portfolio		Potential Portfolio 1		Portfolio 10	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	($42.2)	41.5%	($41.4)	42.5%	($40.0)	43.8%	($40.3)	44.3%	($43.1)	40.4%
25th Percentile	($30.8)	58.0%	($31.1)	57.4%	($36.3)	50.2%	($31.3)	56.8%	($31.0)	57.9%
50th Percentile	($20.1)	72.6%	($21.8)	70.6%	($33.2)	55.6%	($23.9)	68.0%	($19.2)	74.0%
75th Percentile	($4.8)	93.7%	($8.4)	88.8%	($29.7)	61.0%	($13.1)	83.1%	($2.3)	97.1%
95th Percentile	$28.7	136.1%	$19.0	123.4%	($23.5)	70.1%	$7.3	109.4%	$37.2	147.3%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected. For further example, the 25th percentile indicates that 25% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 75% of the time a higher ratio is expected.

Stochastic Analysis (continued)

Projected Market Funded Ratio (market value of assets/actuarial accrued liability); **10 Years**

The graph below shows the distribution of possible market funded ratios ten years from now, assuming the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.



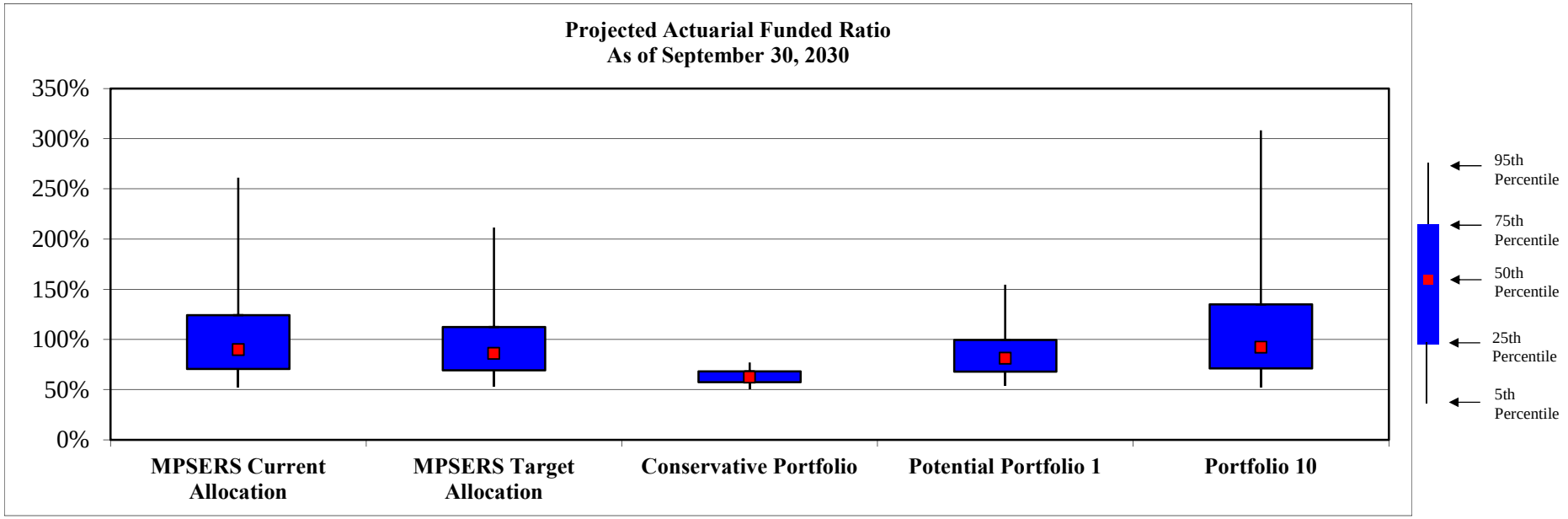
	MPSERS Current Allocation		MPSERS Target Allocation		Conservative Portfolio		Potential Portfolio 1		Portfolio 10	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	($46.1)	35.6%	($45.6)	36.9%	($43.7)	38.2%	($44.2)	39.2%	($46.9)	34.5%
25th Percentile	($33.6)	54.6%	($33.8)	54.0%	($39.6)	45.1%	($33.8)	53.6%	($33.7)	54.4%
50th Percentile	($19.8)	72.8%	($22.1)	70.0%	($36.3)	51.2%	($24.3)	67.0%	($18.6)	74.5%
75th Percentile	$0.3	100.4%	($4.2)	94.5%	($32.4)	57.6%	($10.5)	86.0%	$4.0	105.4%
95th Percentile	$44.7	156.9%	$32.3	141.4%	($25.4)	68.4%	$17.3	122.1%	$54.9	170.1%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected. For further example, the 25th percentile indicates that 25% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 75% of the time a higher ratio is expected.

Stochastic Analysis (continued)

Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); **20 Years**

The graph below shows the distribution of possible actuarial funded ratios twenty years from now, assuming the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.



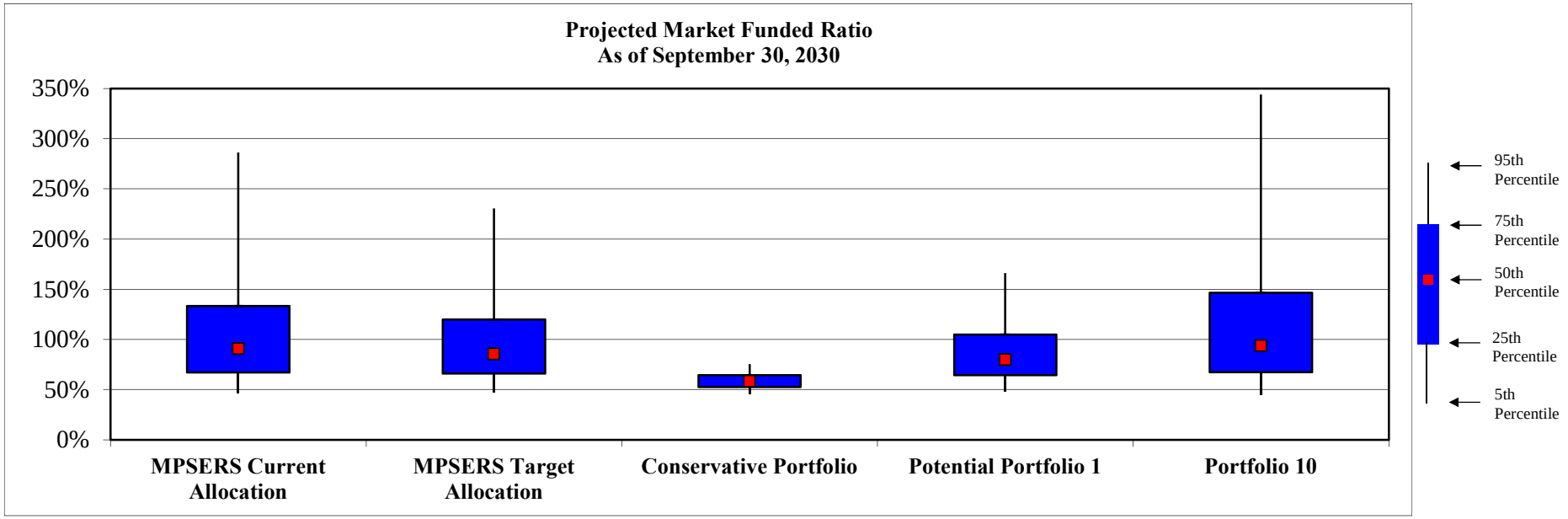
	MPSERS Current Allocation		MPSERS Target Allocation		Conservative Portfolio		Potential Portfolio 1		Portfolio 10	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	($39.7)	52.5%	($39.5)	52.7%	($41.2)	50.3%	($38.4)	53.8%	($40.7)	52.0%
25th Percentile	($25.6)	70.5%	($26.5)	69.1%	($36.9)	57.3%	($27.7)	67.8%	($25.1)	71.2%
50th Percentile	($9.5)	89.7%	($12.8)	85.9%	($33.6)	62.3%	($17.0)	81.1%	($7.0)	92.0%
75th Percentile	$22.7	124.3%	$11.1	112.3%	($29.8)	68.2%	($0.4)	99.6%	$31.8	134.9%
95th Percentile	$152.7	261.0%	$109.4	211.3%	($23.0)	76.9%	$57.0	154.5%	$203.0	308.3%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected. For further example, the 25th percentile indicates that 25% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 75% of the time a higher ratio is expected.

Stochastic Analysis (continued)

Projected Market Funded Ratio (market value of assets/actuarial accrued liability); **20 Years**

The graph below shows the distribution of possible market funded ratios twenty years from now, assuming the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.



	MPSERS Current Allocation		MPSERS Target Allocation		Conservative Portfolio		Potential Portfolio 1		Portfolio 10	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	($45.8)	46.2%	($45.1)	46.8%	($45.9)	45.2%	($43.3)	48.3%	($47.1)	45.1%
25th Percentile	($28.3)	67.0%	($29.7)	66.0%	($41.0)	52.6%	($30.8)	64.3%	($27.9)	67.4%
50th Percentile	($8.1)	90.7%	($12.8)	85.5%	($37.3)	58.3%	($17.8)	79.8%	($5.5)	93.9%
75th Percentile	$31.5	133.3%	$18.6	119.8%	($33.1)	64.4%	$4.5	104.8%	$43.0	146.4%
95th Percentile	$182.1	286.3%	$126.2	230.4%	($24.9)	75.4%	$64.4	166.1%	$231.7	344.0%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected. For further example, the 25th percentile indicates that 25% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 75% of the time a higher ratio is expected.

Stochastic Analysis (continued)

Projected Market Funded Ratio and Drawdown (market value of assets/actuarial accrued liability); **20 Years**

The table below shows the probability (at the conclusion of the forecast period) that the Plan will be fully funded (market value of assets meets or exceed liabilities) and the probability the Plan's asset will be less than 60% of liabilities for each of the five different asset mixes highlighted on the prior pages. The table also illustrates the maximum 1 year investment loss each portfolio is expected to experience. The results below assume the current contribution policy remains unchanged for all projection years.

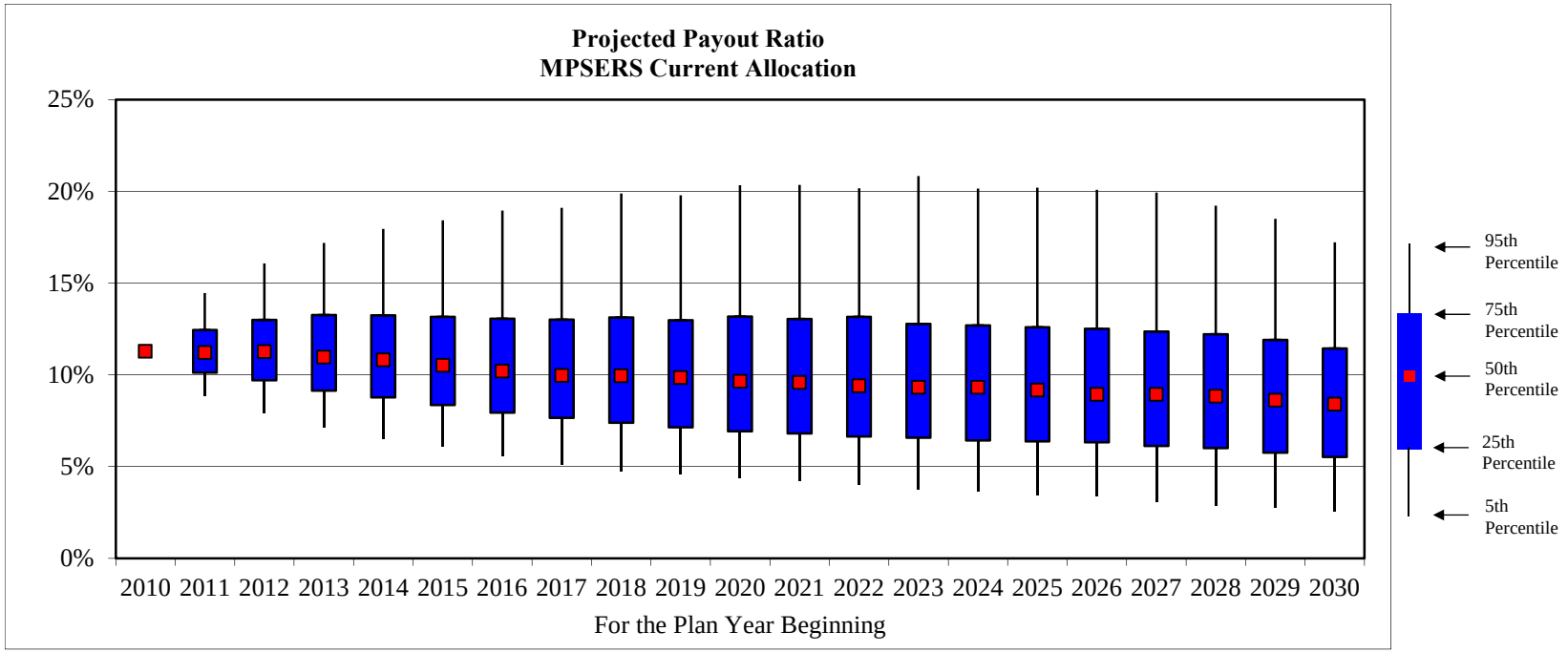
	Probability of Full Funding in 2030	Probability of less than 60% Funding in 2030	Maximum 1 Year Portfolio Investment Loss
MPSERS Current Allocation	43%	16%	-48%
MPSERS Target Allocation	38%	17%	-45%
Conservative Portfolio	0%	58%	-16%
Potential Portfolio 1	29%	18%	-39%
Portfolio 10	46%	17%	-51%

Stochastic Analysis (continued)

Projected Payout Ratio (expected benefit payments/market value of assets); **MPSERS Current Allocation**

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the MPSERS Current Allocation (highlighted on the prior pages). The results below assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 8.4% and 11.3%. The worst-case scenario could reach 21% or higher.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Median	11.3%	11.2%	11.3%	10.9%	10.8%	10.5%	10.2%	10.0%	9.9%	9.8%	9.6%	9.6%	9.4%	9.3%	9.3%	9.2%	8.9%	8.9%	8.8%	8.6%	8.4%

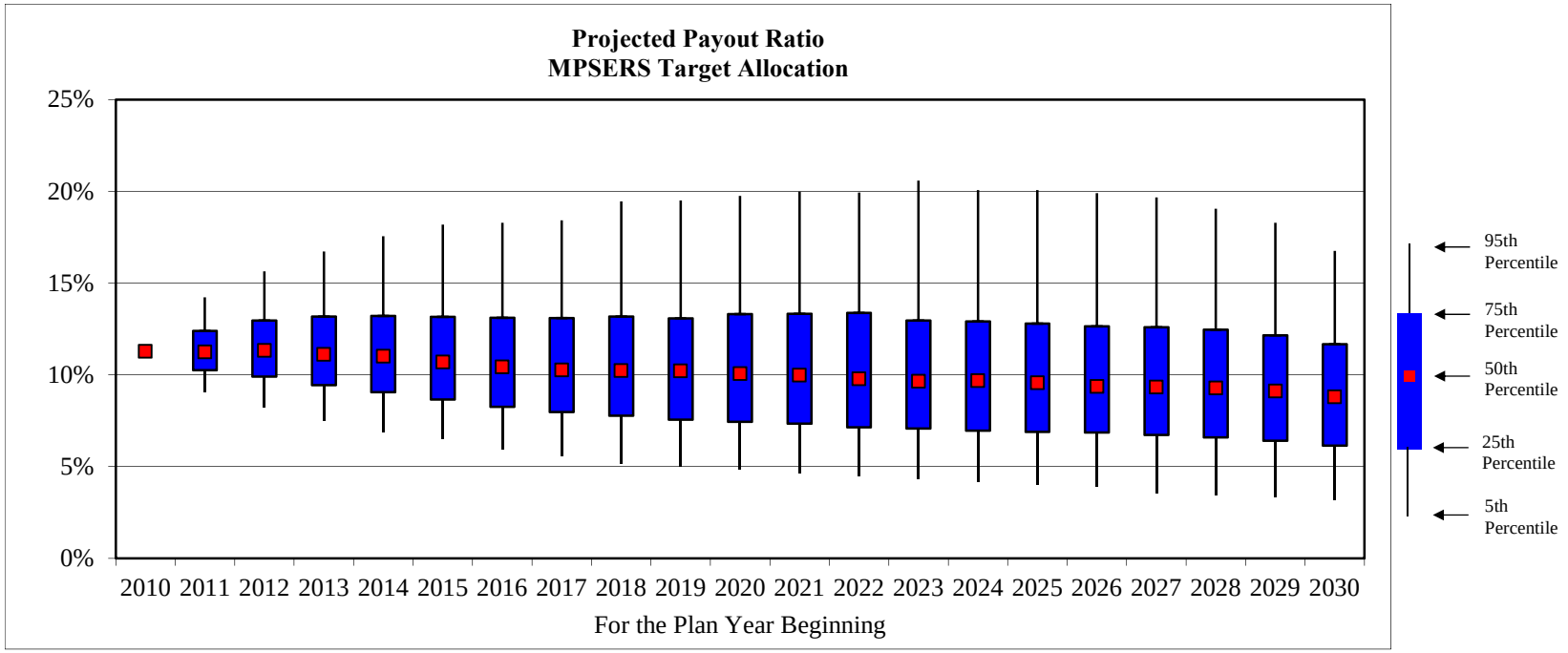
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile (median) indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

Stochastic Analysis (continued)

Projected Payout Ratio (expected benefit payments/market value of assets); **MPSERS Target Allocation**

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the MPSERS Target Allocation (highlighted on the prior pages). The results below assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 8.8% and 11.3%. The worst-case scenario could reach 21% or higher.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Median	11.3%	11.2%	11.3%	11.1%	11.0%	10.7%	10.4%	10.3%	10.2%	10.2%	10.1%	10.0%	9.8%	9.6%	9.7%	9.6%	9.4%	9.3%	9.3%	9.1%	8.8%

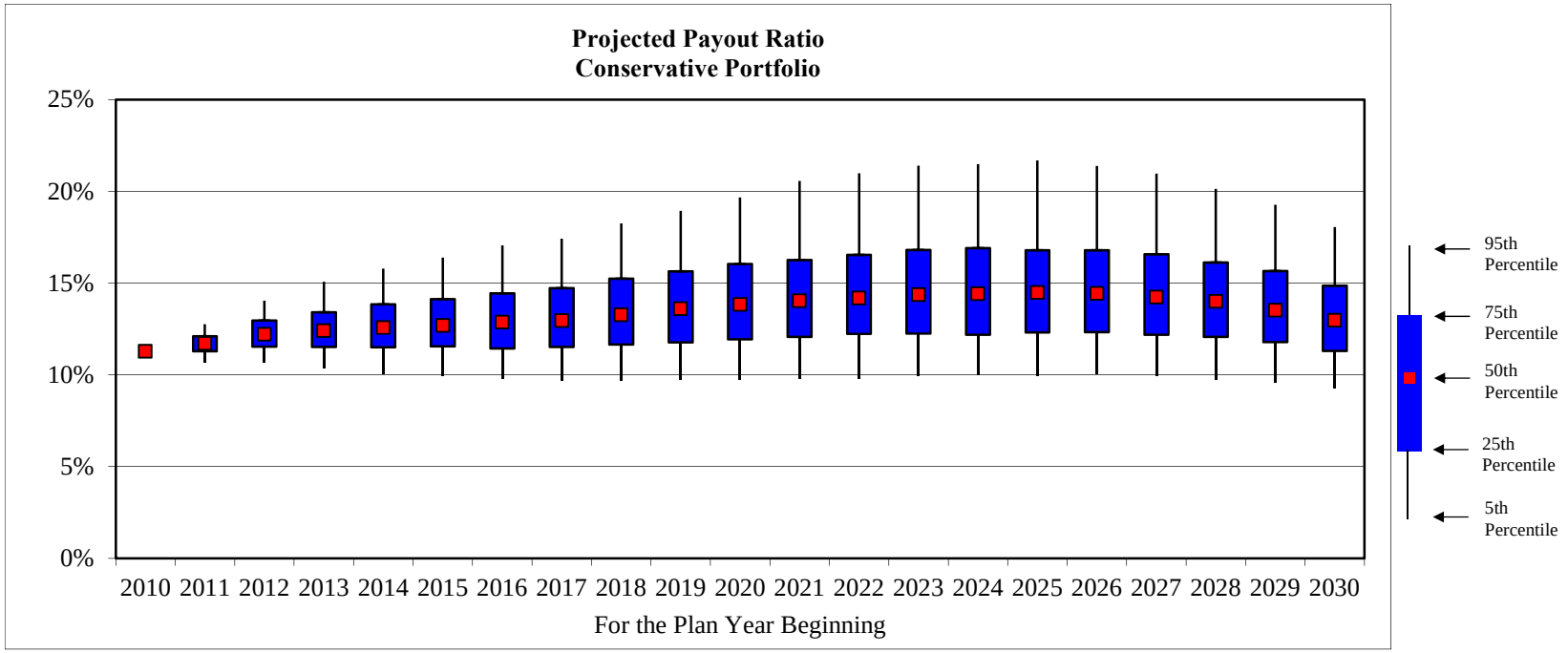
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile (median) indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

Stochastic Analysis (continued)

Projected Payout Ratio (expected benefit payments/market value of assets); **Conservative Portfolio**

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the Conservative Portfolio (highlighted on the prior pages). The results below assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 11.3% and 14.5%. The worst-case scenario could reach 22% or higher.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Median	11.3%	11.7%	12.2%	12.4%	12.6%	12.7%	12.9%	13.0%	13.3%	13.6%	13.8%	14.0%	14.2%	14.4%	14.4%	14.5%	14.4%	14.2%	14.0%	13.5%	13.0%

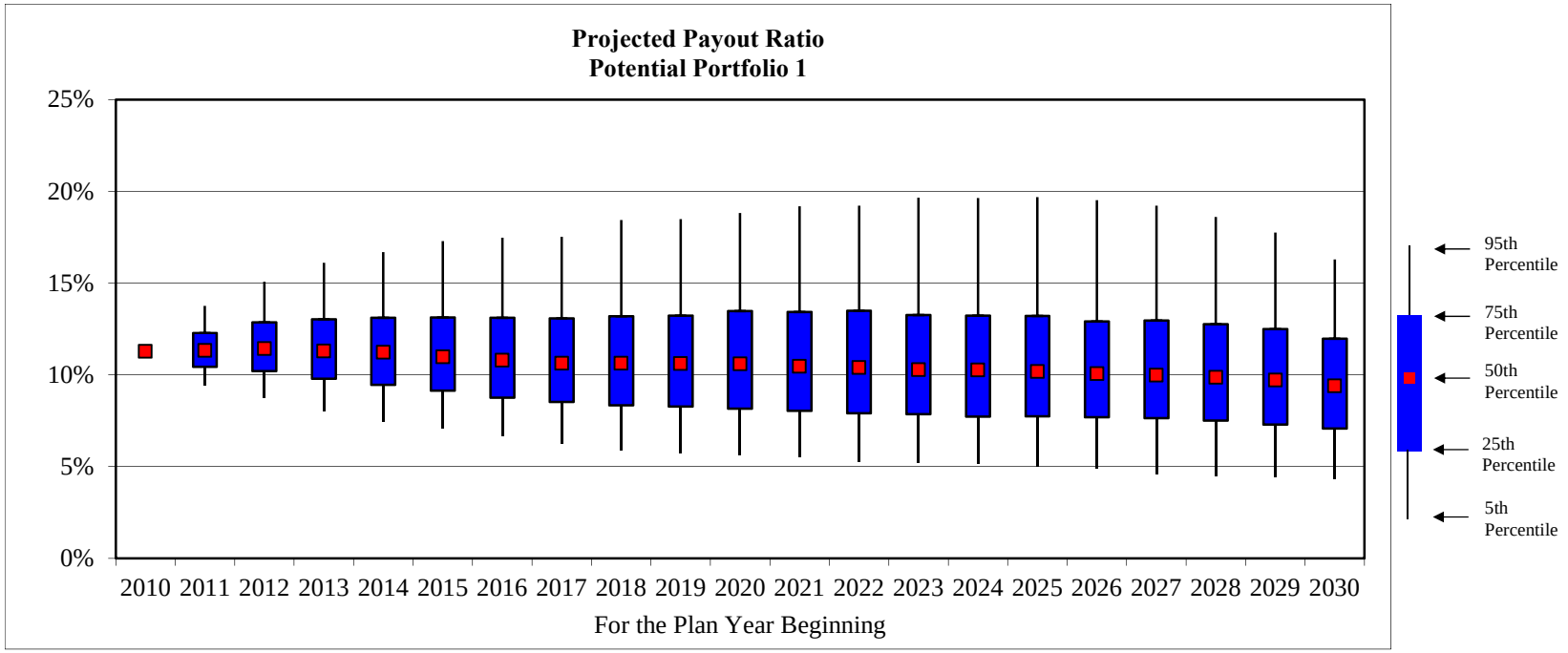
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile (median) indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

Stochastic Analysis (continued)

Projected Payout Ratio (expected benefit payments/market value of assets); **Potential Portfolio 1**

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to Potential Portfolio 1 (highlighted on the prior pages). The results below assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 9.4% and 11.4%. The worst-case scenario could reach 20% or higher.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Median	11.3%	11.3%	11.4%	11.3%	11.2%	11.0%	10.8%	10.6%	10.6%	10.6%	10.6%	10.5%	10.4%	10.3%	10.3%	10.2%	10.1%	10.0%	9.9%	9.7%	9.4%

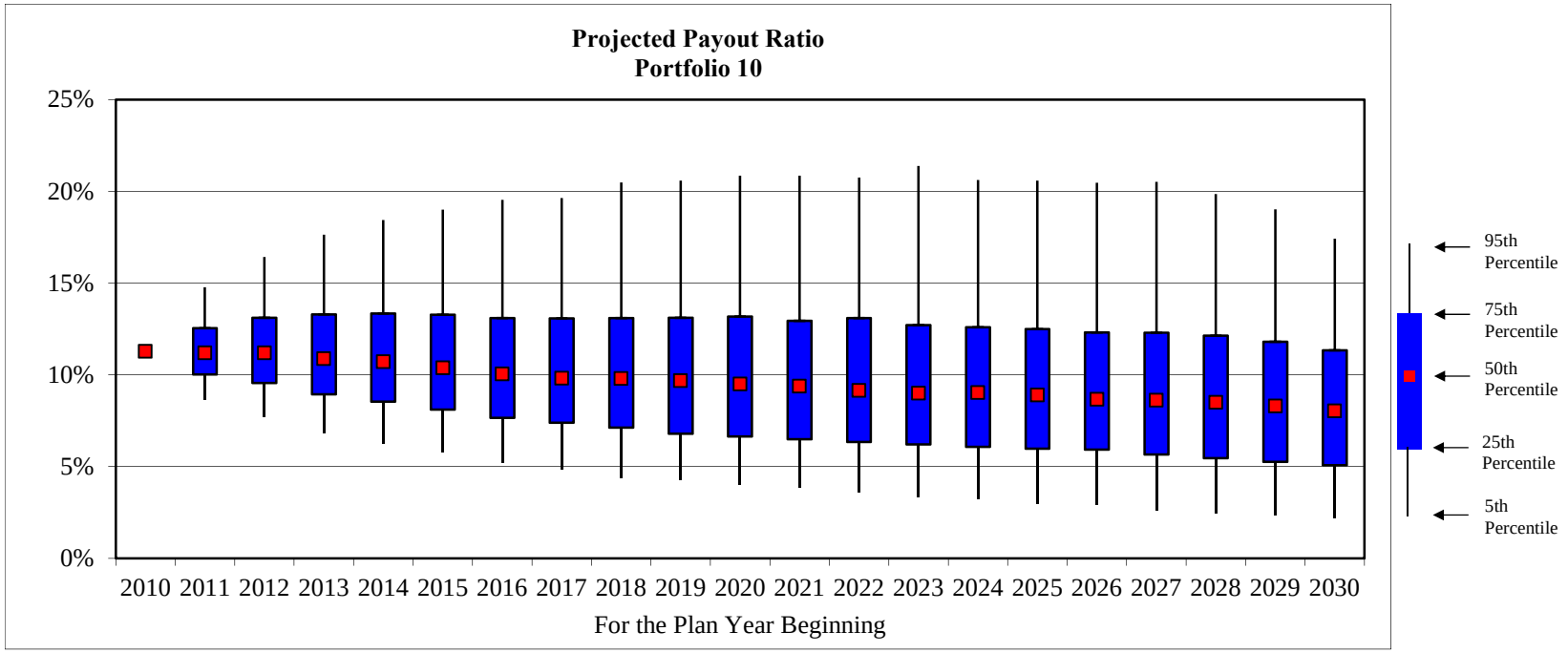
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile (median) indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

Stochastic Analysis (continued)

Projected Payout Ratio (expected benefit payments/market value of assets); **Portfolio 10**

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to Portfolio 10 (highlighted on the prior pages). The results below assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 8.0% and 11.3%. The worst-case scenario could reach 21% or higher.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Median	11.3%	11.2%	11.2%	10.9%	10.7%	10.4%	10.0%	9.8%	9.8%	9.7%	9.5%	9.4%	9.1%	9.0%	9.0%	8.9%	8.7%	8.6%	8.5%	8.3%	8.0%

Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile (median) indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

Drawing Inferences

The table below compares the projected actuarial and market funded ratios 20 years from now, under the median (50th percentile), worst-case (5th percentile), and best-case (95th percentile) scenarios, assuming the five different asset mixes highlighted on the prior pages. The table also displays for comparative purposes the median, peak, and trough projected payout ratios over the 20 year period, assuming the same five asset mixes being examined.

	Actuarial Funded Ratio in Year 20			Market Funded Ratio in Year 20			Payout Ratios		
	50th	5th	95th	50th	5th	95th	Year 20 Median	2010-2030 Peak	2010-2030 Trough
MPSERS Current Allocation	89.7%	52.5%	261.0%	90.7%	46.2%	286.3%	8.4%	2.5%	20.8%
MPSERS Target Allocation	85.9%	52.7%	211.3%	85.5%	46.8%	230.4%	8.8%	3.2%	20.6%
Conservative Portfolio	62.3%	50.3%	76.9%	58.3%	45.2%	75.4%	13.0%	9.2%	21.7%
Potential Portfolio 1	81.1%	53.8%	154.5%	79.8%	48.3%	166.1%	9.4%	4.3%	19.7%
Portfolio 10	92.0%	52.0%	308.3%	93.9%	45.1%	344.0%	8.0%	2.2%	21.4%

Appendix 1: Sensitivity Analysis: "Effect of Higher Volatility"

This section provides a sensitivity analysis of the original stochastic projections by assuming the risk (as measured by standard deviation) of each asset class is doubled. These modified assumptions are outlined in the table below, compared to the original values:

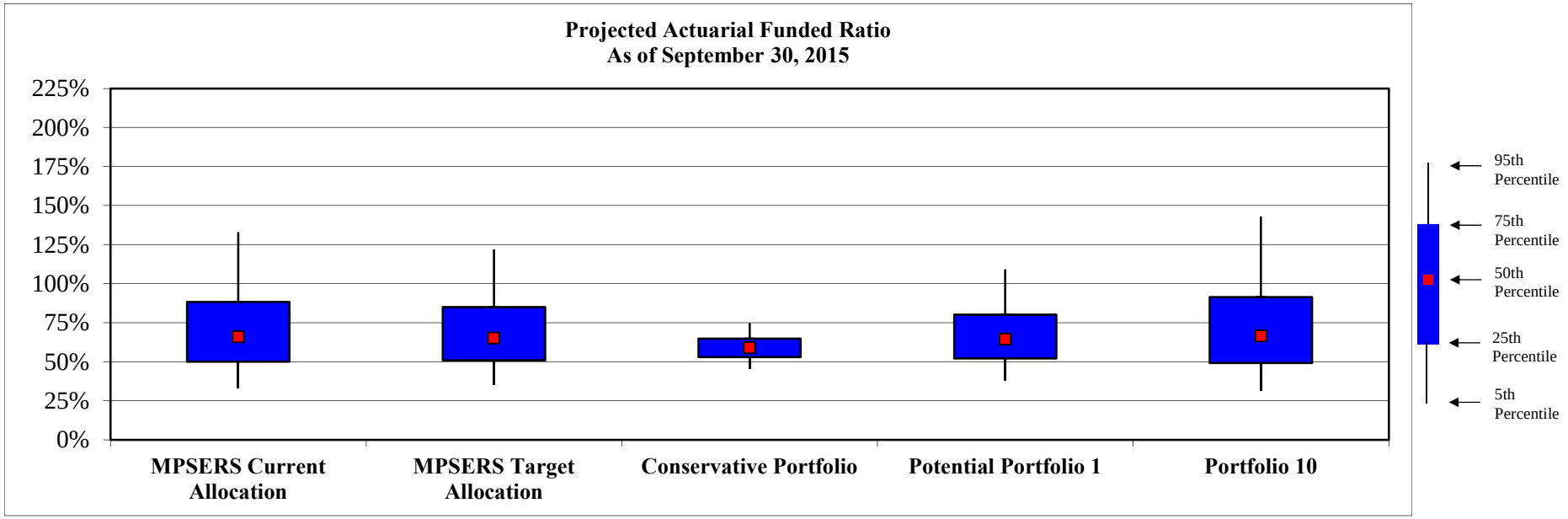
Asset Class	Arithmetic Return Assumption	Standard Deviation Assumption	Standard Deviation Assumption Doubled
Broad US Equity	8.15	18.10	36.20
Broad International Equity	8.65	20.10	40.20
Int. Duration Fixed Income	4.50	5.50	11.00
Real Return	6.25	11.25	22.50
Real Estate	7.60	14.00	28.00
Absolute Return	7.50	9.00	18.00
Private Equity	12.25	30.25	60.50
Cash Equivalents	2.25	3.00	6.00

RVK supports the recommendations based on the original assumptions shown in the Stochastic Analysis section of this report. However, this stress-testing illustrates that potential increased capital market volatility does not change the asset allocation recommendations, based on the current status of the Plan. Instead it simply widens the range of potential results, exacerbating the potential best and worst-case scenarios.

Appendix 1: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); **5 Years**

The graph below shows the distribution of possible actuarial funded ratios five years from now, assuming the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.



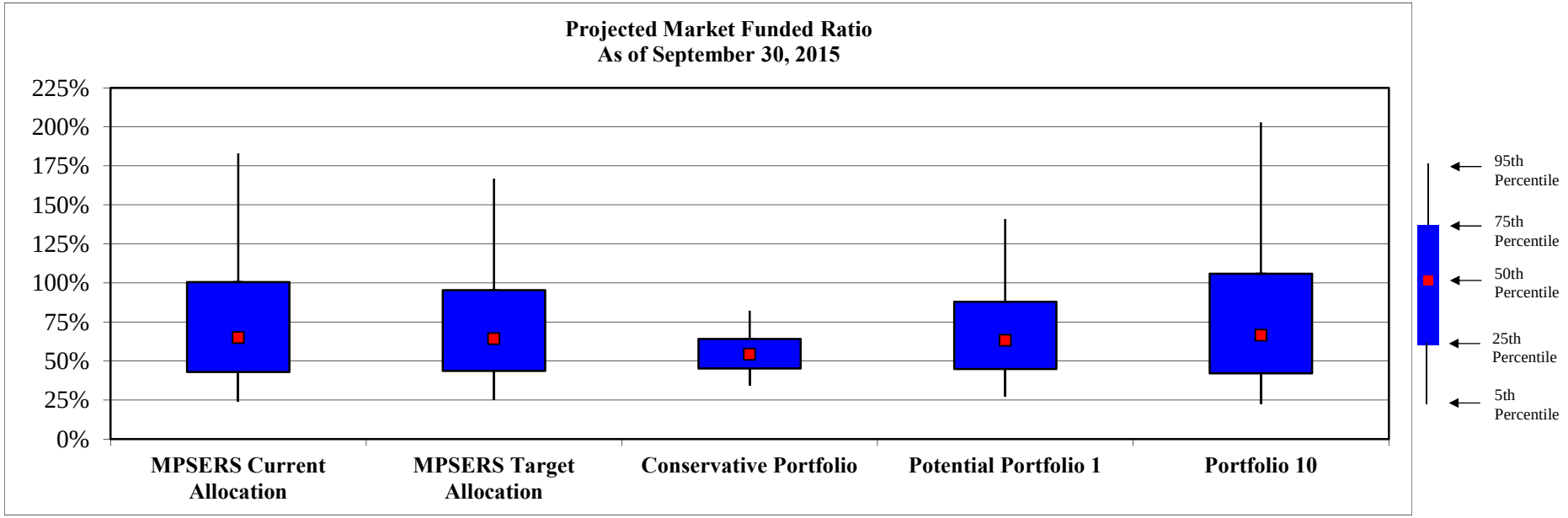
	MPSERS Current Allocation		MPSERS Target Allocation		Conservative Portfolio		Potential Portfolio 1		Portfolio 10	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	($43.9)	33.0%	($42.6)	34.9%	($35.2)	45.4%	($40.6)	37.8%	($44.8)	31.3%
25th Percentile	($32.8)	50.0%	($32.2)	50.9%	($30.8)	52.9%	($31.5)	52.1%	($33.4)	49.1%
50th Percentile	($22.7)	65.9%	($23.0)	65.1%	($27.5)	58.8%	($23.7)	64.4%	($22.3)	66.5%
75th Percentile	($8.1)	88.2%	($10.0)	85.0%	($23.6)	64.9%	($13.6)	80.2%	($6.0)	91.4%
95th Percentile	$22.9	132.9%	$15.0	121.9%	($17.3)	74.8%	$6.3	109.1%	$29.7	143.0%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected. For further example, the 25th percentile indicates that 25% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 75% of the time a higher ratio is expected.

Appendix 1: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

Projected Market Funded Ratio (market value of assets/actuarial accrued liability); **5 Years**

The graph below shows the distribution of possible market funded ratios five years from now, assuming the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.



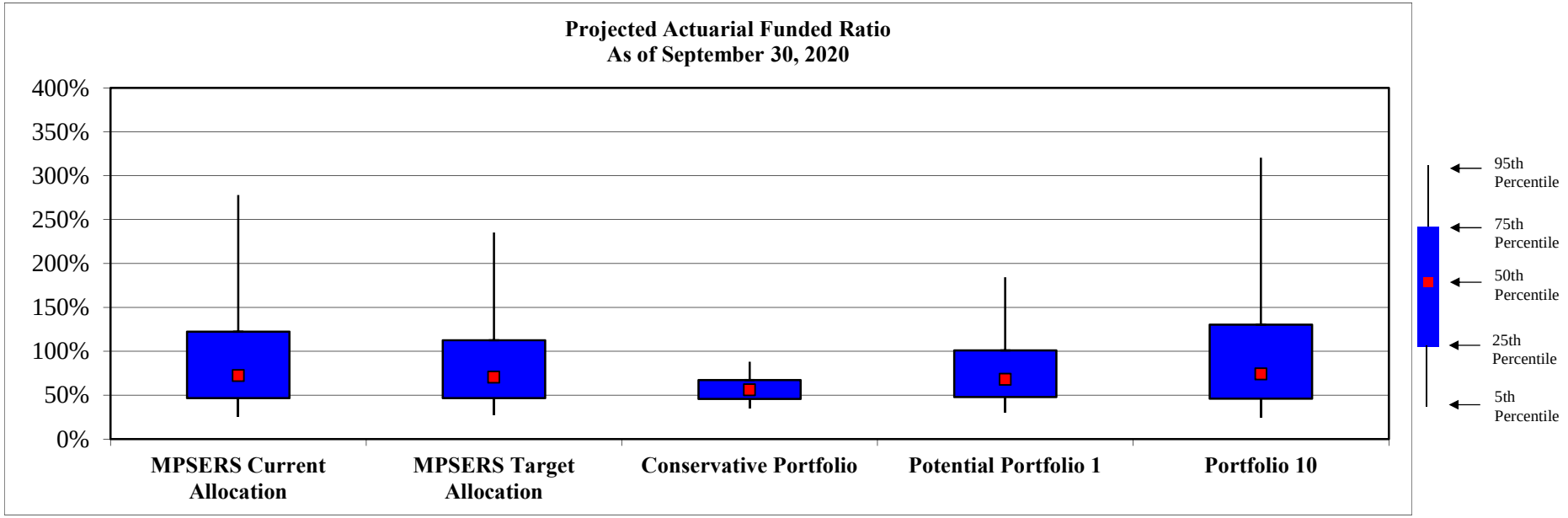
	MPSERS Current Allocation		MPSERS Target Allocation		Conservative Portfolio		Potential Portfolio 1		Portfolio 10	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	($49.3)	23.8%	($48.2)	24.8%	($41.1)	34.4%	($46.5)	27.2%	($50.1)	22.5%
25th Percentile	($37.1)	42.9%	($36.8)	43.7%	($35.6)	45.1%	($36.1)	44.9%	($37.6)	42.0%
50th Percentile	($22.7)	65.0%	($23.6)	64.2%	($30.4)	54.3%	($24.5)	63.1%	($22.0)	66.4%
75th Percentile	$0.4	100.6%	($3.0)	95.4%	($24.4)	64.1%	($8.0)	87.9%	$3.8	105.8%
95th Percentile	$57.5	183.1%	$45.6	166.8%	($12.6)	82.3%	$29.3	140.9%	$69.1	202.9%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected. For further example, the 25th percentile indicates that 25% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 75% of the time a higher ratio is expected.

Appendix 1: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); **10 Years**

The graph below shows the distribution of possible actuarial funded ratios ten years from now, assuming the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.



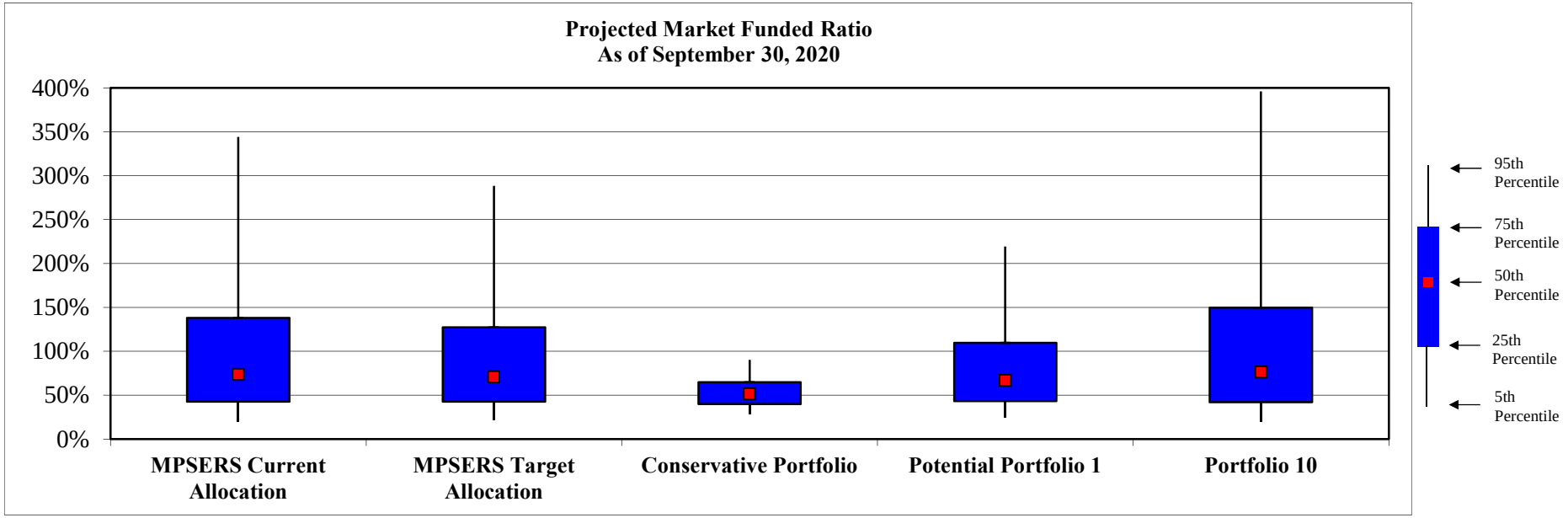
	MPSERS Current Allocation		MPSERS Target Allocation		Conservative Portfolio		Potential Portfolio 1		Portfolio 10	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	($52.7)	25.8%	($51.7)	27.3%	($45.4)	34.4%	($49.2)	29.7%	($54.1)	24.7%
25th Percentile	($38.5)	46.5%	($38.4)	46.6%	($39.2)	45.5%	($37.6)	47.8%	($39.5)	46.0%
50th Percentile	($20.3)	72.3%	($22.4)	70.4%	($33.3)	56.0%	($24.1)	67.8%	($19.6)	73.8%
75th Percentile	$16.7	122.3%	$9.8	112.4%	($25.8)	67.2%	$0.6	100.8%	$24.4	130.2%
95th Percentile	$149.8	277.8%	$114.0	235.3%	($9.7)	88.1%	$69.6	184.3%	$179.7	320.3%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected. For further example, the 25th percentile indicates that 25% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 75% of the time a higher ratio is expected.

Appendix 1: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

Projected Market Funded Ratio (market value of assets/actuarial accrued liability); **10 Years**

The graph below shows the distribution of possible market funded ratios ten years from now, assuming the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.



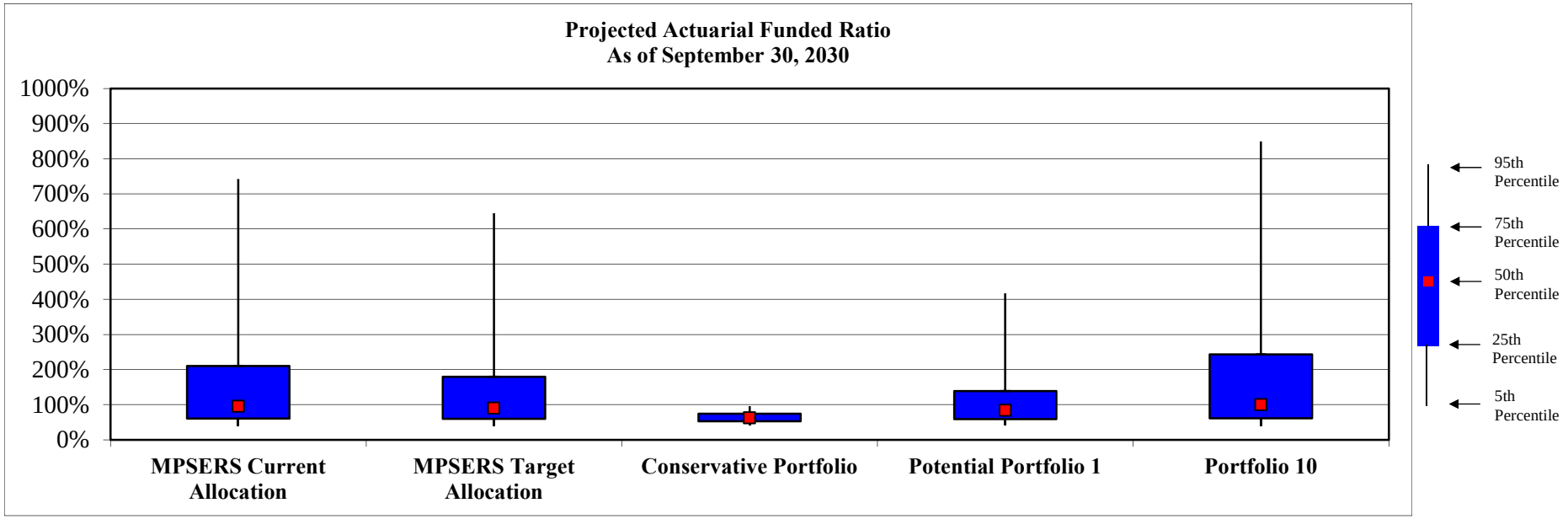
	MPSERS Current Allocation		MPSERS Target Allocation		Conservative Portfolio		Potential Portfolio 1		Portfolio 10	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	($56.9)	20.2%	($55.7)	21.8%	($49.1)	28.2%	($53.8)	24.2%	($58.1)	19.1%
25th Percentile	($41.9)	42.6%	($42.0)	42.5%	($42.5)	39.7%	($40.8)	43.3%	($42.7)	41.9%
50th Percentile	($20.0)	73.5%	($22.0)	70.5%	($36.5)	51.2%	($24.6)	66.6%	($18.3)	76.1%
75th Percentile	$28.8	138.1%	$20.6	127.1%	($28.1)	64.7%	$6.8	109.3%	$38.5	149.7%
95th Percentile	$197.7	344.2%	$153.8	288.2%	($8.3)	90.2%	$103.7	219.4%	$245.5	396.0%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected. For further example, the 25th percentile indicates that 25% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 75% of the time a higher ratio is expected.

Appendix 1: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); **20 Years**

The graph below shows the distribution of possible actuarial funded ratios twenty years from now, assuming the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.



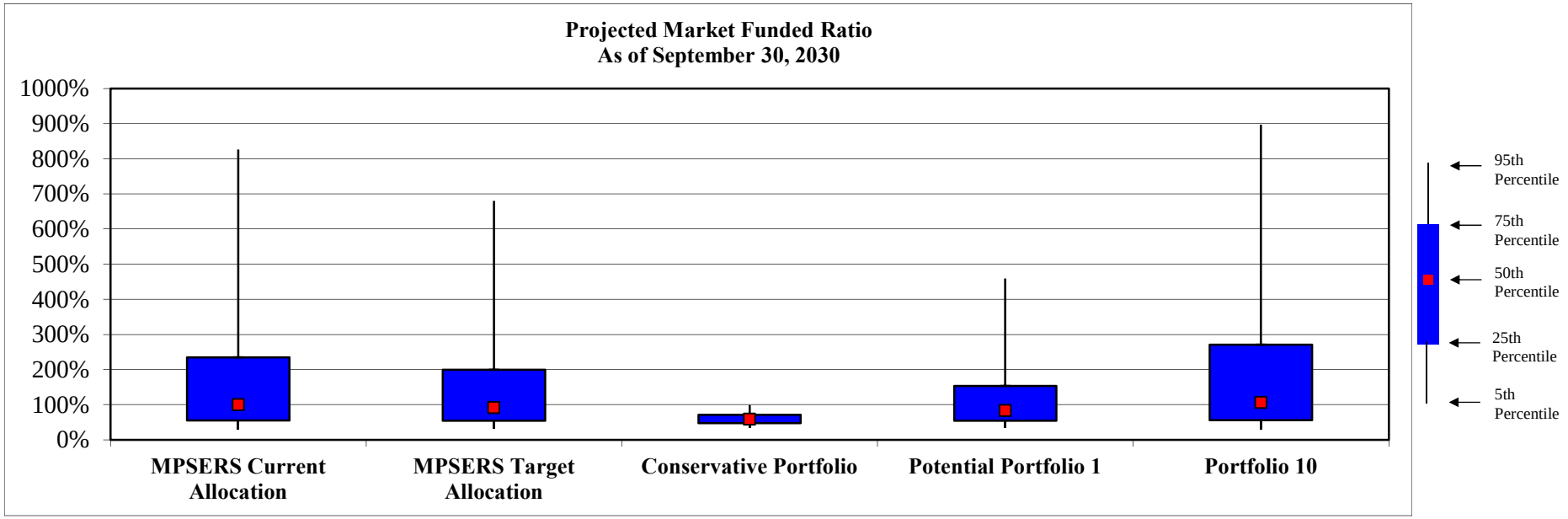
	MPSERS Current Allocation		MPSERS Target Allocation		Conservative Portfolio		Potential Portfolio 1		Portfolio 10	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	($51.1)	38.7%	($49.9)	39.5%	($48.9)	41.0%	($47.9)	40.9%	($52.8)	37.7%
25th Percentile	($32.8)	60.6%	($33.2)	59.2%	($39.2)	52.9%	($33.6)	59.0%	($32.4)	61.0%
50th Percentile	($3.8)	95.6%	($9.5)	89.8%	($33.3)	62.4%	($15.7)	83.4%	($0.1)	99.9%
75th Percentile	$108.6	210.2%	$76.6	178.9%	($25.4)	74.2%	$38.2	138.9%	$141.1	242.6%
95th Percentile	$815.9	741.9%	$600.8	644.4%	($5.1)	95.3%	$350.0	417.0%	$864.4	849.5%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected. For further example, the 25th percentile indicates that 25% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 75% of the time a higher ratio is expected.

Appendix 1: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

Projected Market Funded Ratio (market value of assets/actuarial accrued liability); **20 Years**

The graph below shows the distribution of possible market funded ratios twenty years from now, assuming the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.



	MPSERS Current Allocation		MPSERS Target Allocation		Conservative Portfolio		Potential Portfolio 1		Portfolio 10	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	($60.8)	30.4%	($59.0)	31.5%	($54.1)	35.2%	($56.3)	33.2%	($62.1)	29.6%
25th Percentile	($36.5)	55.3%	($37.6)	54.6%	($43.5)	47.5%	($37.9)	54.1%	($36.5)	55.5%
50th Percentile	($0.2)	99.8%	($7.4)	91.7%	($36.8)	58.5%	($15.4)	82.7%	$5.5	106.1%
75th Percentile	$132.6	234.2%	$95.4	198.8%	($28.0)	71.3%	$53.3	153.0%	$165.2	270.7%
95th Percentile	$855.4	826.5%	$698.6	679.8%	($1.3)	98.7%	$387.8	459.0%	$879.2	896.7%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected. For further example, the 25th percentile indicates that 25% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 75% of the time a higher ratio is expected.

Appendix 1: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

Projected Market Funded Ratio and Drawdown (market value of assets/actuarial accrued liability); **20 Years**

The table below shows the probability (at the conclusion of the forecast period) that the Plan will be fully funded (market value of assets meets or exceed liabilities) and the probability the Plan's asset will be less than 60% of liabilities for each of the five different asset mixes highlighted on the prior pages. The table also illustrates the maximum 1 year investment loss each portfolio is expected to experience. The results below assume the current contribution policy remains unchanged for all projection years.

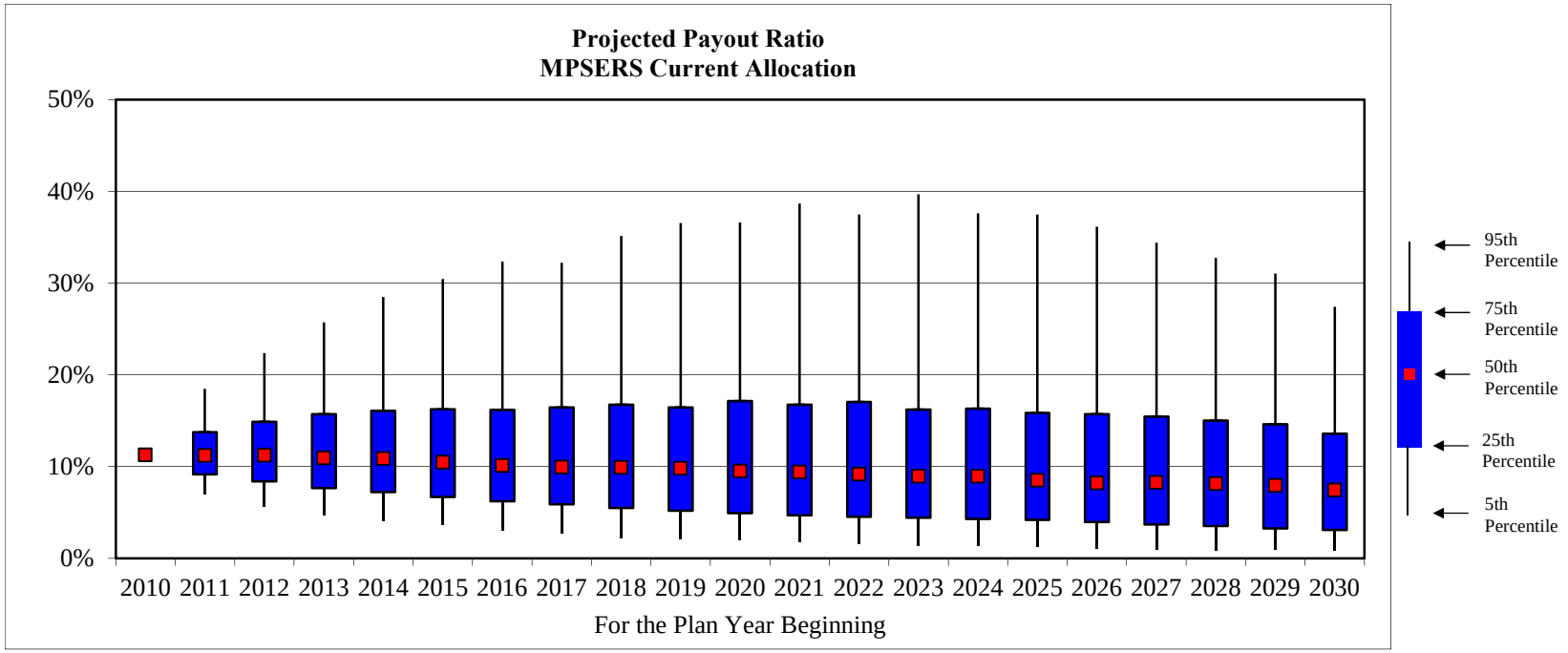
	Probability of Full Funding in 2030	Δ from Base Analysis	Probability of less than 60% Funding in 2030	Δ from Base Analysis	Maximum 1 Year Portfolio Investment Loss
MPSERS Current Allocation	50%	+7%	28%	+12%	-74%
MPSERS Target Allocation	46%	+9%	30%	+13%	-71%
Conservative Portfolio	5%	+4%	54%	-4%	-32%
Potential Portfolio 1	42%	+13%	31%	+13%	-65%
Portfolio 10	52%	+6%	28%	+11%	-77%

Appendix 1: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

Projected Payout Ratio (expected benefit payments/market value of assets); **MPSERS Current Allocation**

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the MPSERS Current Allocation (highlighted on the prior pages). The results below assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 7.4% and 11.3%. The worst-case scenario could reach 40% or higher.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Median	11.3%	11.2%	11.2%	10.9%	10.9%	10.5%	10.1%	9.9%	9.9%	9.8%	9.5%	9.4%	9.2%	8.9%	8.9%	8.5%	8.2%	8.2%	8.1%	7.9%	7.4%

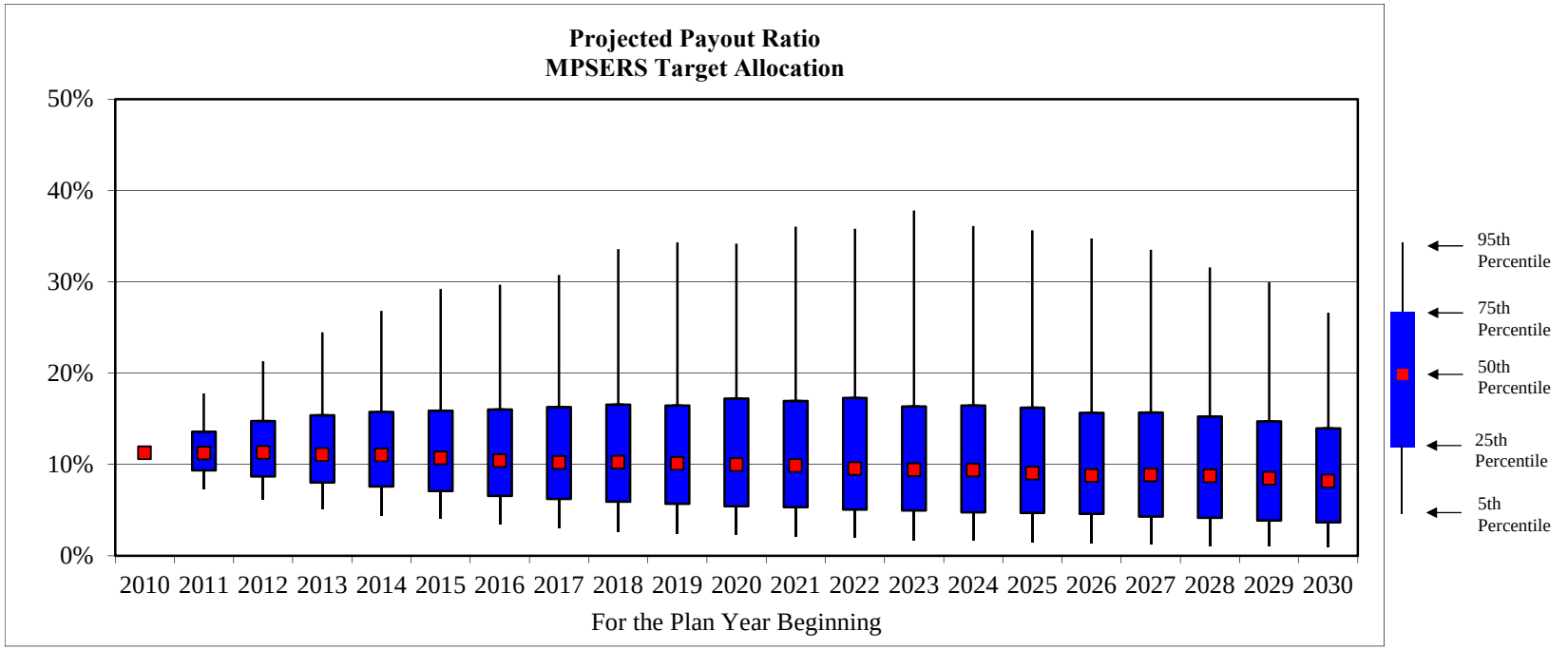
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile (median) indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

Appendix 1: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

Projected Payout Ratio (expected benefit payments/market value of assets); **MPSERS Target Allocation**

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the MPSERS Target Allocation (highlighted on the prior pages). The results below assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 8.1% and 11.3%. The worst-case scenario could reach 38% or higher.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Median	11.3%	11.2%	11.3%	11.1%	11.0%	10.7%	10.4%	10.2%	10.2%	10.1%	10.0%	9.9%	9.5%	9.4%	9.3%	9.0%	8.8%	8.8%	8.7%	8.5%	8.1%

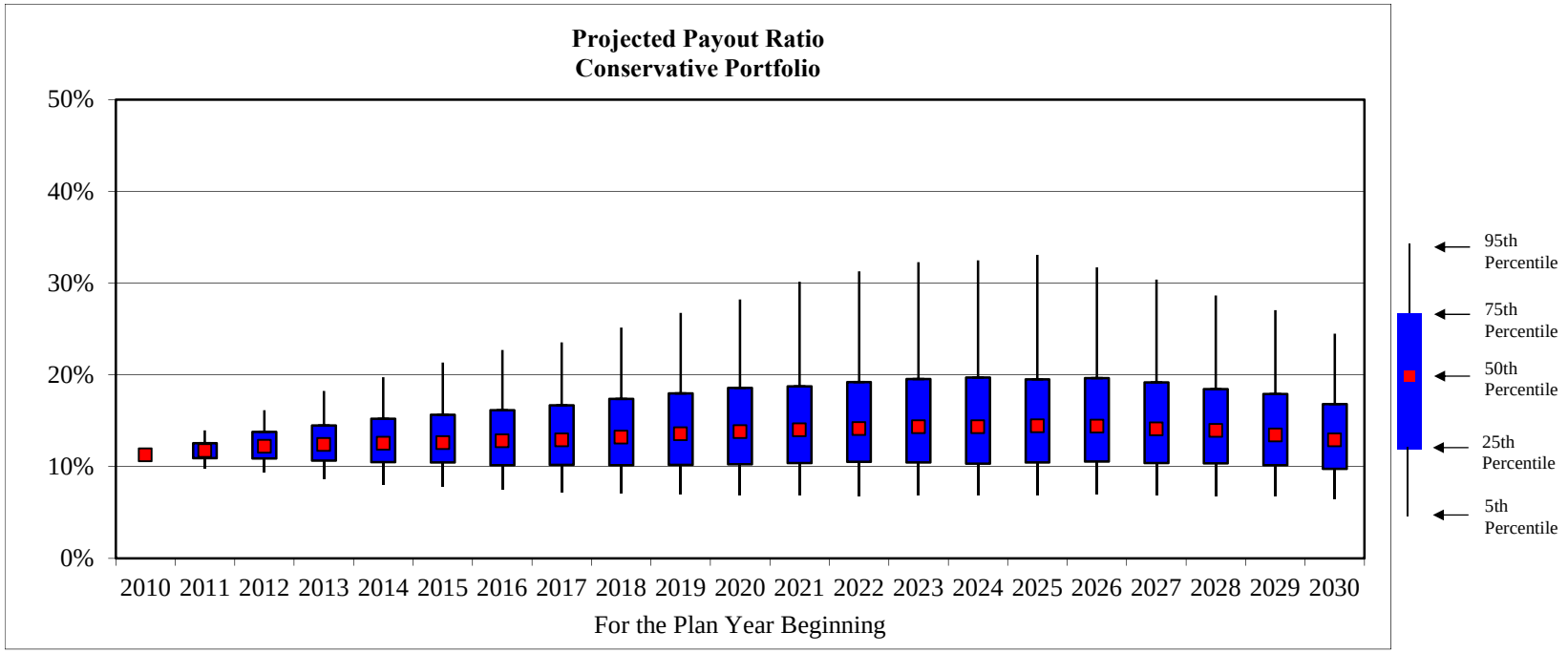
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile (median) indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

Appendix 1: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

Projected Payout Ratio (expected benefit payments/market value of assets); **Conservative Portfolio**

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the Conservative Portfolio (highlighted on the prior pages). The results below assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 11.3% and 14.4%. The worst-case scenario could reach 33% or higher.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Median	11.3%	11.7%	12.2%	12.4%	12.5%	12.6%	12.8%	12.9%	13.2%	13.6%	13.8%	14.0%	14.1%	14.3%	14.3%	14.4%	14.4%	14.1%	13.9%	13.4%	12.9%

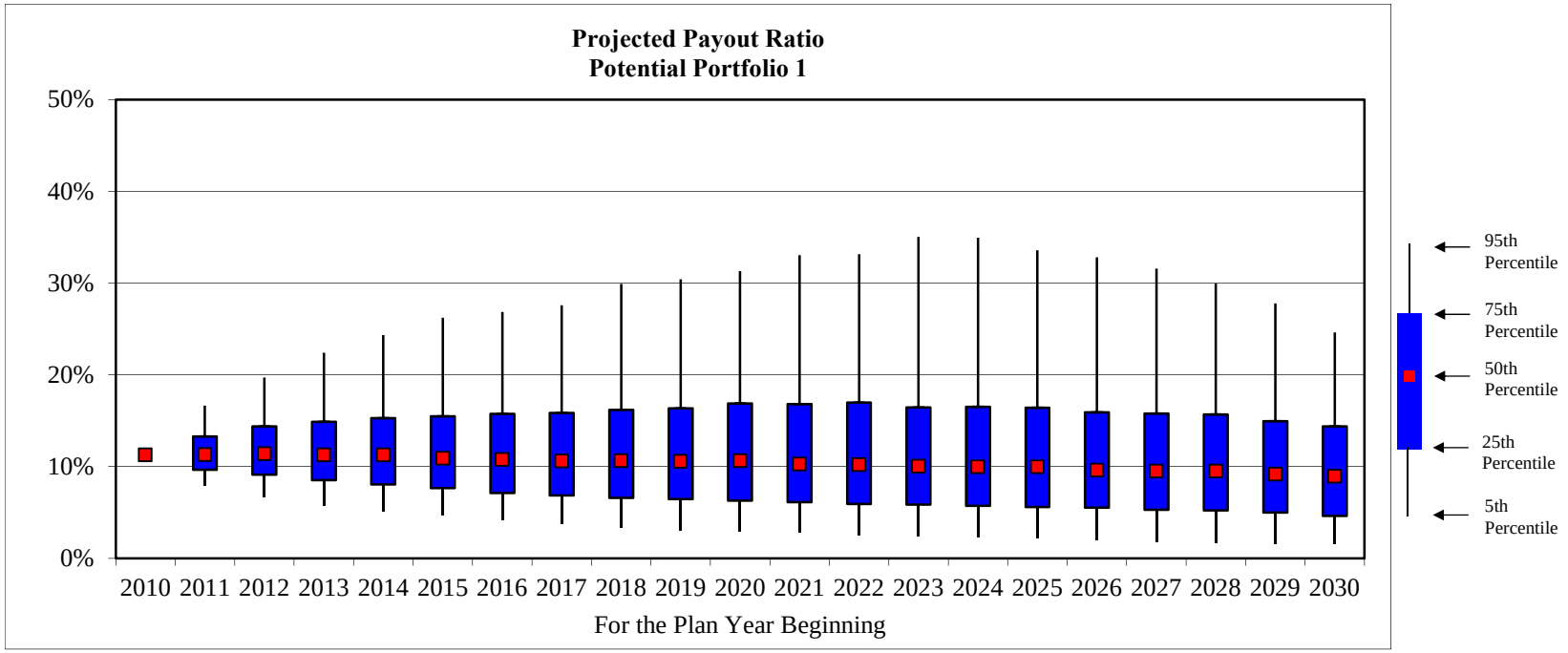
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile (median) indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

Appendix 1: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

Projected Payout Ratio (expected benefit payments/market value of assets); **Potential Portfolio 1**

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to Potential Portfolio 1 (highlighted on the prior pages). The results below assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 8.9% and 11.4%. The worst-case scenario could reach 35% or higher.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Median	11.3%	11.3%	11.4%	11.3%	11.3%	10.9%	10.8%	10.6%	10.6%	10.6%	10.6%	10.3%	10.2%	10.0%	10.0%	10.0%	9.6%	9.5%	9.5%	9.2%	8.9%

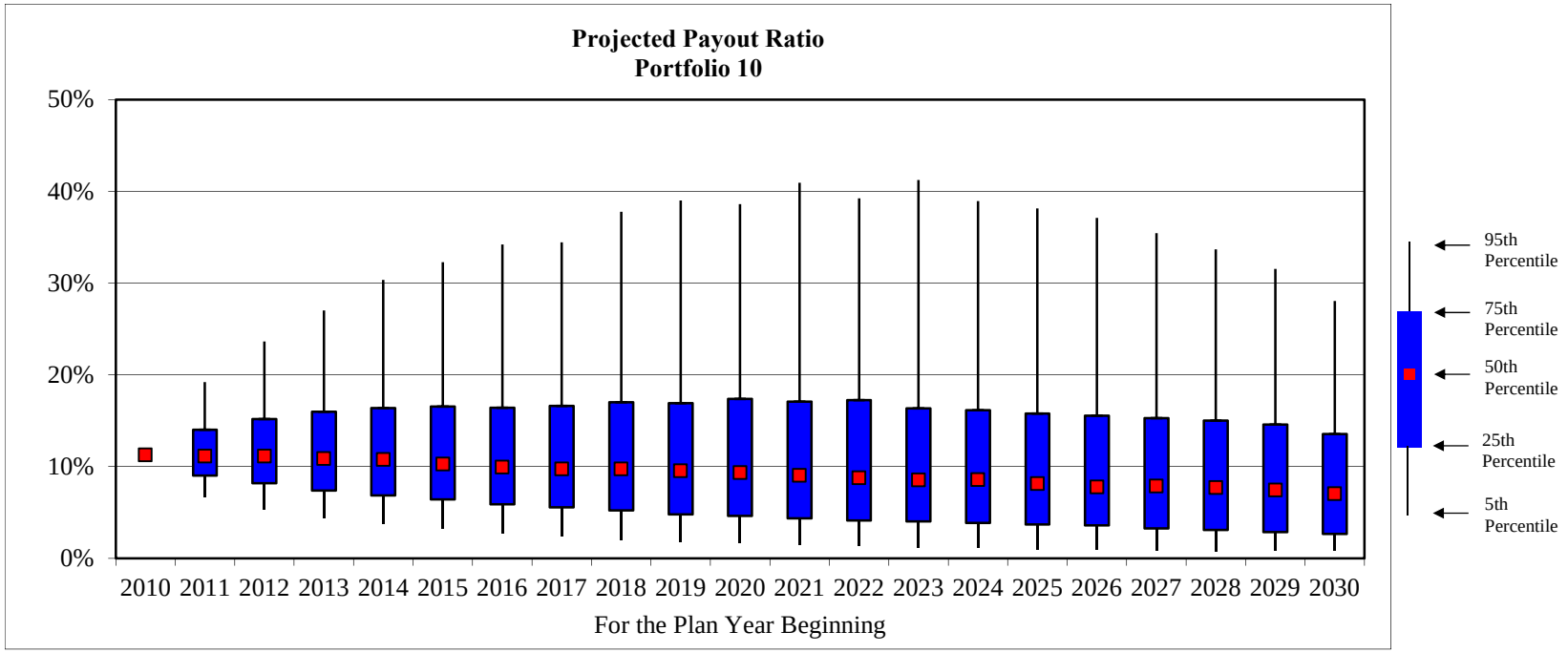
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile (median) indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

Appendix 1: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

Projected Payout Ratio (expected benefit payments/market value of assets); **Portfolio 10**

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to Portfolio 10 (highlighted on the prior pages). The results below assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 7.0% and 11.3%. The worst-case scenario could reach 41% or higher.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Median	11.3%	11.1%	11.1%	10.9%	10.8%	10.3%	9.9%	9.7%	9.7%	9.5%	9.3%	9.0%	8.8%	8.5%	8.6%	8.1%	7.8%	7.9%	7.7%	7.4%	7.0%

Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile (median) indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

Appendix 1: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

Drawing Inferences

The table below compares the projected actuarial and market funded ratios 20 years from now, under the median (50th percentile), worst-case (5th percentile), and best-case (95th percentile) scenarios, assuming the five different asset mixes highlighted on the prior pages. The table also displays for comparative purposes the median, peak, and trough projected payout ratios over the 20 year period, assuming the same five asset mixes being examined.

	Actuarial Funded Ratio in Year 20			Market Funded Ratio in Year 20			Payout Ratios		
	50th	5th	95th	50th	5th	95th	Year 20 Median	2010-2030 Peak	2010-2030 Trough
MPSERS Current Allocation	95.6%	38.7%	741.9%	99.8%	30.4%	826.5%	7.4%	0.8%	39.7%
MPSERS Target Allocation	89.8%	39.5%	644.4%	91.7%	31.5%	679.8%	8.1%	1.0%	37.8%
Conservative Portfolio	62.4%	41.0%	95.3%	58.5%	35.2%	98.7%	12.9%	6.5%	33.1%
Potential Portfolio 1	83.4%	40.9%	417.0%	82.7%	33.2%	459.0%	8.9%	1.6%	35.0%
Portfolio 10	99.9%	37.7%	849.5%	106.1%	29.6%	896.7%	7.0%	0.8%	41.2%

Appendix 2: Sensitivity Analysis: "Effect of Higher Correlations"

This section provides a sensitivity analysis of the original stochastic projections by assuming that all asset classes are perfectly positively correlated (i.e. correlation = 1.00). A correlation matrix reflecting these modified assumptions is provided below:

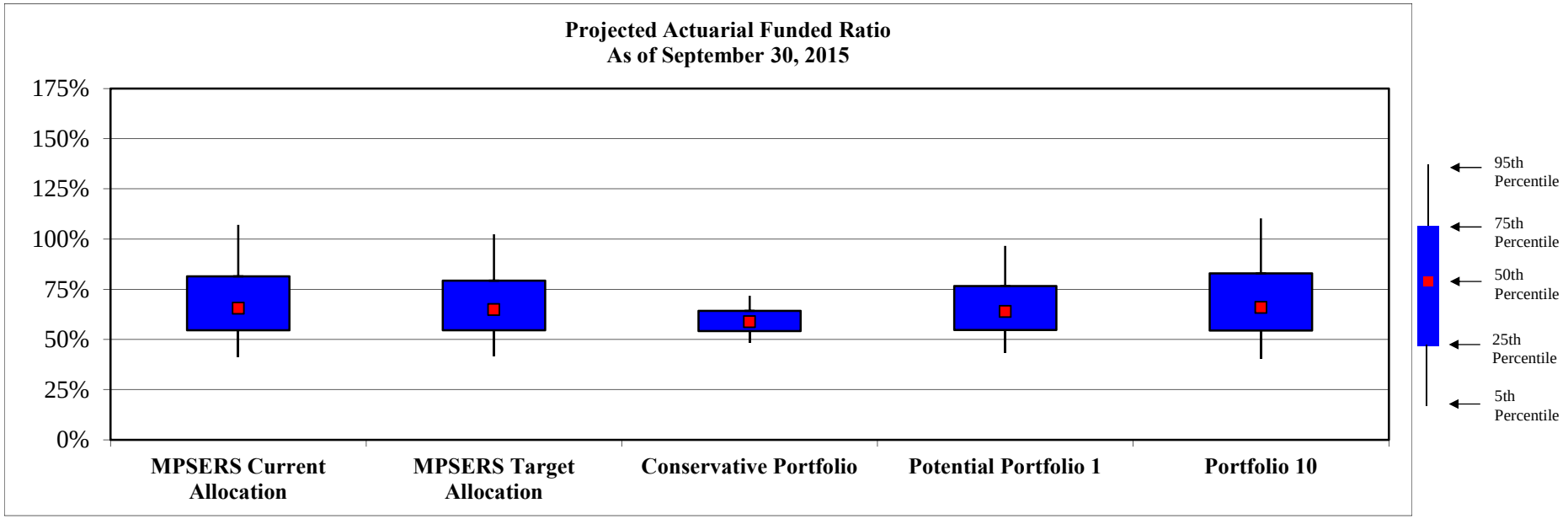
	Broad US Equity	Broad International Equity	Int. Duration Fixed Income	Real Return	Real Estate	Absolute Return	Private Equity	Cash Equivalents
Broad US Equity	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Broad International Equity	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Int. Duration Fixed Income	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Real Return	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Real Estate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Absolute Return	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Private Equity	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cash Equivalents	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

RVK supports the recommendations based on the original assumptions shown in the Stochastic Analysis section of this report. However, this stress-testing illustrates that converging correlations across capital markets does not change the asset allocation recommendations, based on the current status of the Plan. Instead it simply widens the range of potential results, indicating higher risk for all asset mixes given the dampened effects of total fund diversification.

Appendix 2: Sensitivity Analysis: "Effect of Higher Correlations" (continued)

Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); **5 Years**

The graph below shows the distribution of possible actuarial funded ratios five years from now, assuming the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.



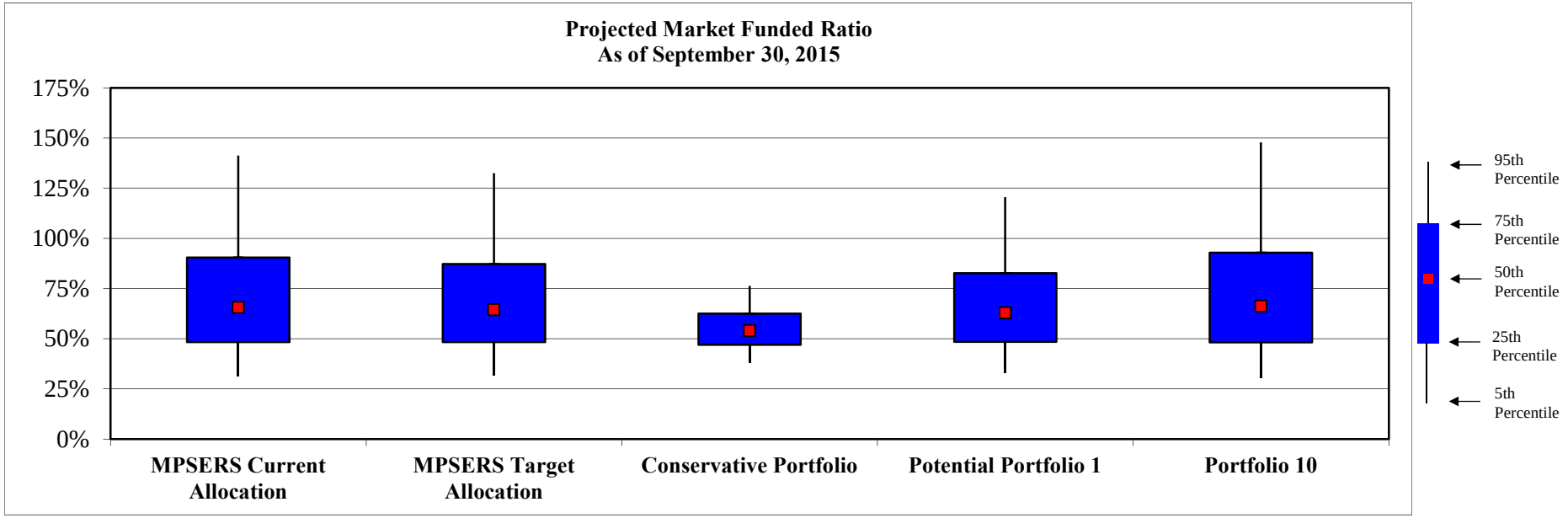
	MPSERS Current Allocation		MPSERS Target Allocation		Conservative Portfolio		Potential Portfolio 1		Portfolio 10	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	($36.9)	41.1%	($36.5)	41.8%	($32.5)	48.3%	($35.6)	43.1%	($37.4)	40.5%
25th Percentile	($29.5)	54.5%	($29.4)	54.6%	($29.7)	54.2%	($29.3)	54.7%	($29.5)	54.4%
50th Percentile	($22.7)	65.5%	($23.1)	64.8%	($27.2)	58.8%	($23.8)	63.9%	($22.5)	66.0%
75th Percentile	($12.7)	81.4%	($14.0)	79.3%	($24.3)	64.2%	($16.0)	76.6%	($11.7)	82.8%
95th Percentile	$4.8	107.0%	$1.7	102.4%	($19.9)	71.7%	($2.4)	96.5%	$7.0	110.3%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected. For further example, the 25th percentile indicates that 25% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 75% of the time a higher ratio is expected.

Appendix 2: Sensitivity Analysis: "Effect of Higher Correlations" (continued)

Projected Market Funded Ratio (market value of assets/actuarial accrued liability); **5 Years**

The graph below shows the distribution of possible market funded ratios five years from now, assuming the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.



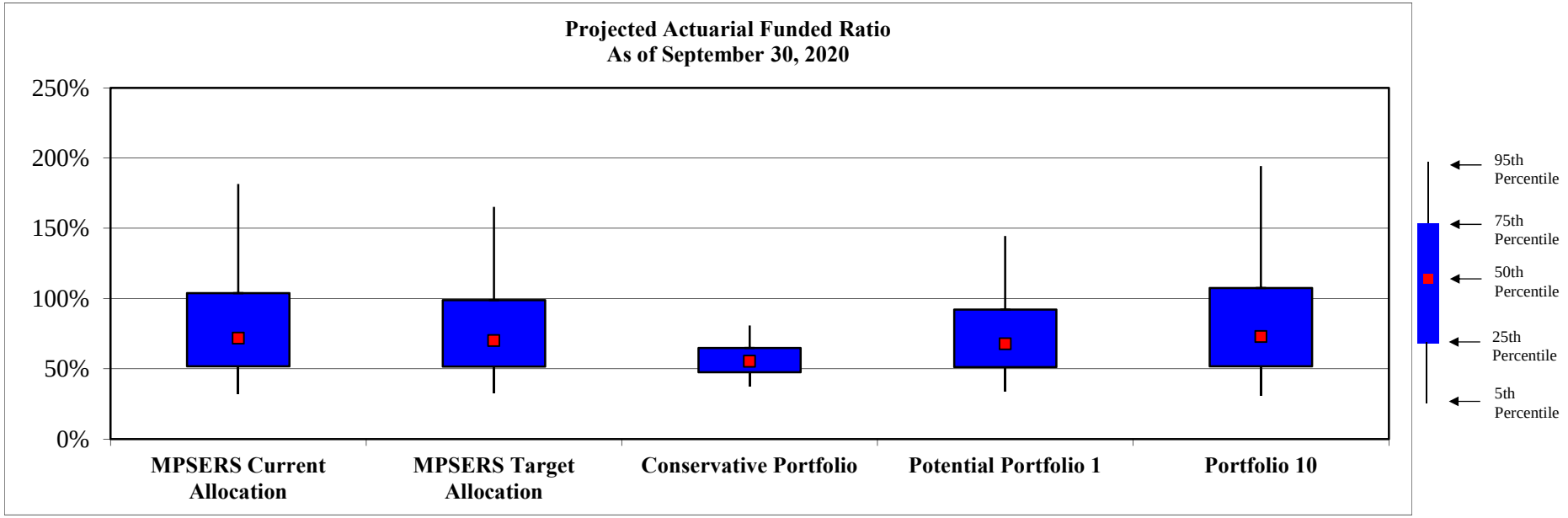
	MPSERS Current Allocation		MPSERS Target Allocation		Conservative Portfolio		Potential Portfolio 1		Portfolio 10	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	($43.1)	31.1%	($42.6)	31.7%	($38.8)	37.8%	($41.8)	32.8%	($43.4)	30.4%
25th Percentile	($33.3)	48.2%	($33.3)	48.3%	($34.3)	46.9%	($33.4)	48.4%	($33.3)	48.2%
50th Percentile	($22.9)	65.5%	($23.6)	64.4%	($30.4)	54.0%	($24.6)	62.8%	($22.4)	66.2%
75th Percentile	($6.5)	90.4%	($8.7)	87.2%	($25.4)	62.5%	($11.7)	82.7%	($4.9)	92.8%
95th Percentile	$29.1	141.2%	$22.7	132.4%	($16.7)	76.3%	$14.4	120.5%	$33.9	147.9%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected. For further example, the 25th percentile indicates that 25% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 75% of the time a higher ratio is expected.

Appendix 2: Sensitivity Analysis: "Effect of Higher Correlations" (continued)

Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); **10 Years**

The graph below shows the distribution of possible actuarial funded ratios ten years from now, assuming the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.



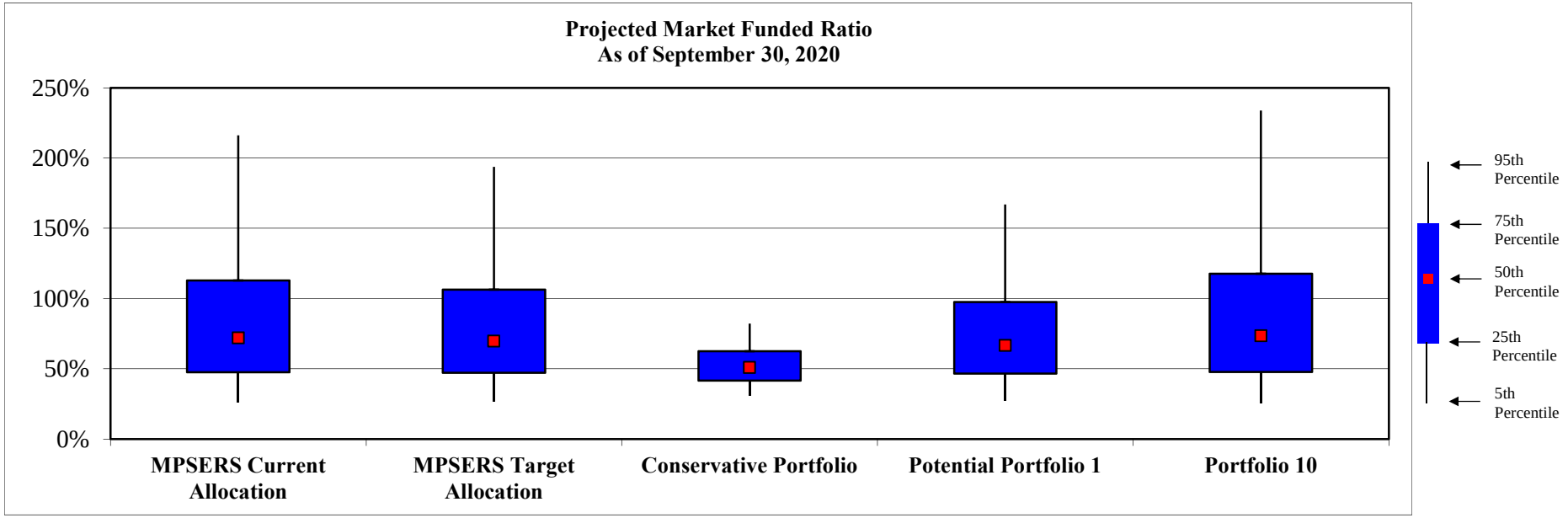
	MPSERS Current Allocation		MPSERS Target Allocation		Conservative Portfolio		Potential Portfolio 1		Portfolio 10	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	($45.3)	32.0%	($44.8)	32.6%	($41.8)	37.7%	($44.1)	33.9%	($45.7)	31.3%
25th Percentile	($34.1)	51.7%	($34.3)	51.5%	($37.4)	47.6%	($34.5)	51.1%	($34.2)	51.7%
50th Percentile	($21.0)	71.7%	($22.2)	70.0%	($33.2)	55.2%	($24.0)	67.7%	($20.1)	72.8%
75th Percentile	$3.0	103.9%	($0.8)	98.9%	($27.4)	64.8%	($6.1)	92.2%	$5.8	107.5%
95th Percentile	$68.0	181.5%	$54.4	165.2%	($16.0)	80.9%	$37.1	144.4%	$79.0	194.3%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected. For further example, the 25th percentile indicates that 25% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 75% of the time a higher ratio is expected.

Appendix 2: Sensitivity Analysis: "Effect of Higher Correlations" (continued)

Projected Market Funded Ratio (market value of assets/actuarial accrued liability); **10 Years**

The graph below shows the distribution of possible market funded ratios ten years from now, assuming the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.



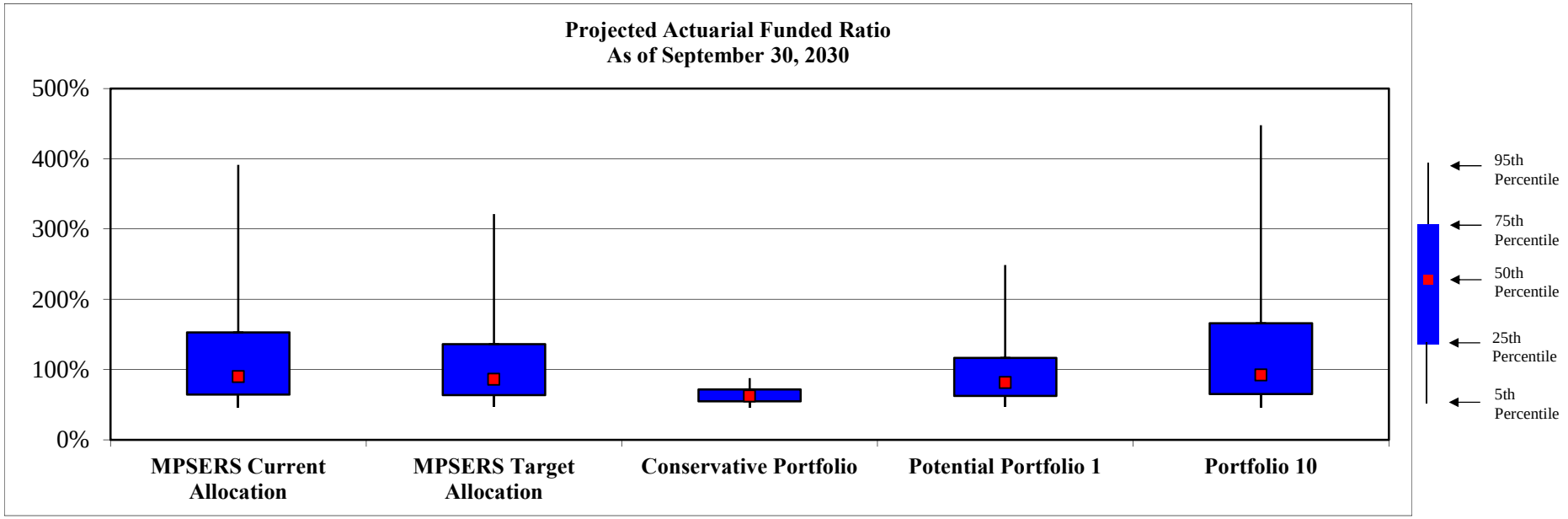
	MPSERS Current Allocation		MPSERS Target Allocation		Conservative Portfolio		Potential Portfolio 1		Portfolio 10	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	($49.2)	26.0%	($48.8)	26.6%	($46.1)	30.7%	($48.2)	27.4%	($49.5)	25.5%
25th Percentile	($37.0)	47.5%	($37.4)	47.1%	($41.3)	41.6%	($37.8)	46.6%	($37.0)	47.7%
50th Percentile	($20.8)	72.0%	($22.6)	69.7%	($36.4)	50.9%	($24.8)	66.6%	($19.7)	73.5%
75th Percentile	$10.1	112.9%	$5.0	106.4%	($29.3)	62.5%	($1.9)	97.5%	$13.9	117.7%
95th Percentile	$97.3	216.2%	$79.3	193.8%	($15.0)	82.2%	$56.2	166.8%	$112.8	233.8%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected. For further example, the 25th percentile indicates that 25% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 75% of the time a higher ratio is expected.

Appendix 2: Sensitivity Analysis: "Effect of Higher Correlations" (continued)

Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); **20 Years**

The graph below shows the distribution of possible actuarial funded ratios twenty years from now, assuming the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.



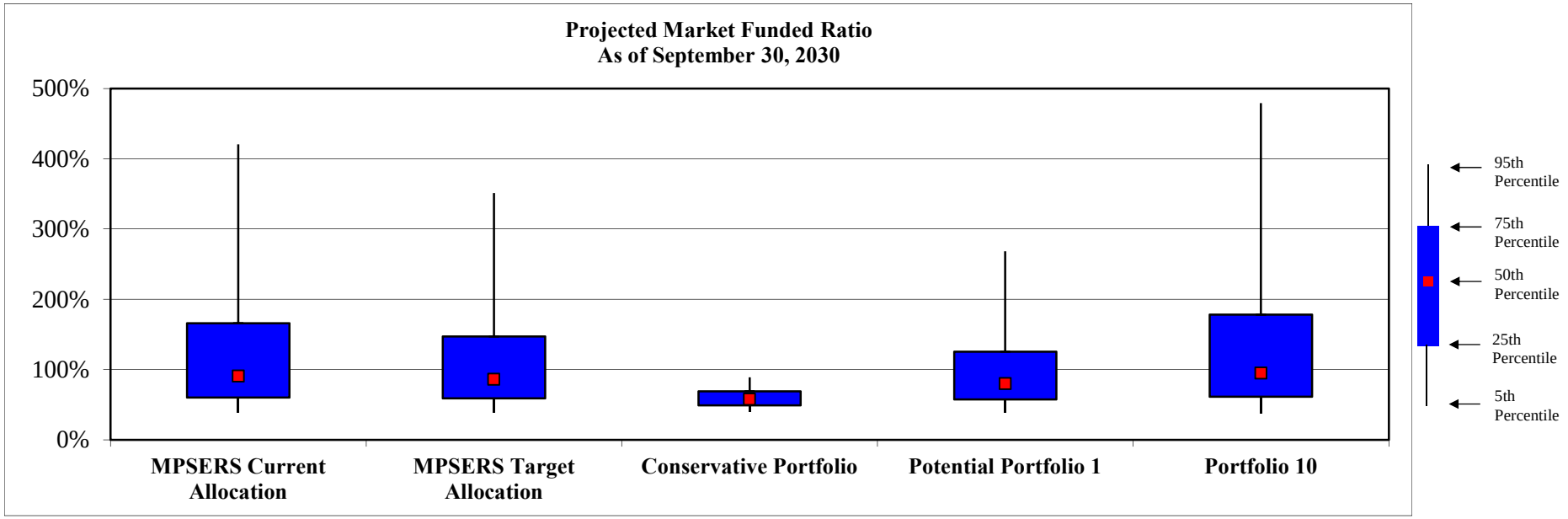
	MPSERS Current Allocation		MPSERS Target Allocation		Conservative Portfolio		Potential Portfolio 1		Portfolio 10	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	($39.9)	46.4%	($39.8)	46.6%	($39.9)	46.2%	($39.5)	46.9%	($40.0)	46.1%
25th Percentile	($29.0)	64.4%	($29.9)	63.4%	($37.3)	54.6%	($31.0)	62.2%	($28.6)	65.1%
50th Percentile	($9.3)	89.7%	($12.6)	85.9%	($33.7)	62.3%	($16.8)	81.2%	($6.9)	92.2%
75th Percentile	$52.1	152.9%	$35.4	136.2%	($28.0)	71.7%	$16.3	116.3%	$64.8	165.9%
95th Percentile	$331.1	391.3%	$254.6	321.2%	($13.8)	87.7%	$169.3	248.6%	$389.3	447.8%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected. For further example, the 25th percentile indicates that 25% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 75% of the time a higher ratio is expected.

Appendix 2: Sensitivity Analysis: "Effect of Higher Correlations" (continued)

Projected Market Funded Ratio (market value of assets/actuarial accrued liability); **20 Years**

The graph below shows the distribution of possible market funded ratios twenty years from now, assuming the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.



	MPSERS Current Allocation		MPSERS Target Allocation		Conservative Portfolio		Potential Portfolio 1		Portfolio 10	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	($46.2)	38.2%	($46.0)	38.4%	($45.5)	39.7%	($45.7)	39.0%	($46.4)	37.9%
25th Percentile	($32.3)	60.2%	($33.3)	58.9%	($41.9)	49.1%	($34.7)	57.4%	($31.7)	61.1%
50th Percentile	($8.1)	90.8%	($12.4)	85.8%	($37.5)	57.5%	($17.9)	79.7%	($4.7)	94.7%
75th Percentile	$64.1	165.9%	$46.7	147.1%	($30.6)	69.1%	$24.6	125.1%	$76.6	178.2%
95th Percentile	$366.4	420.4%	$287.5	350.9%	($12.6)	88.8%	$189.6	268.1%	$429.7	479.1%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected. For further example, the 25th percentile indicates that 25% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 75% of the time a higher ratio is expected.

Appendix 2: Sensitivity Analysis: "Effect of Higher Correlations" (continued)

Projected Market Funded Ratio (market value of assets/actuarial accrued liability); **20 Years**

The table below shows the probability (at the conclusion of the forecast period) that the Plan will be fully funded (market value of assets meets or exceed liabilities) and the probability the Plan's asset will be less than 60% of liabilities for each of the five different asset mixes highlighted on the prior pages. The results below assume the current contribution policy remains unchanged for all projection years.

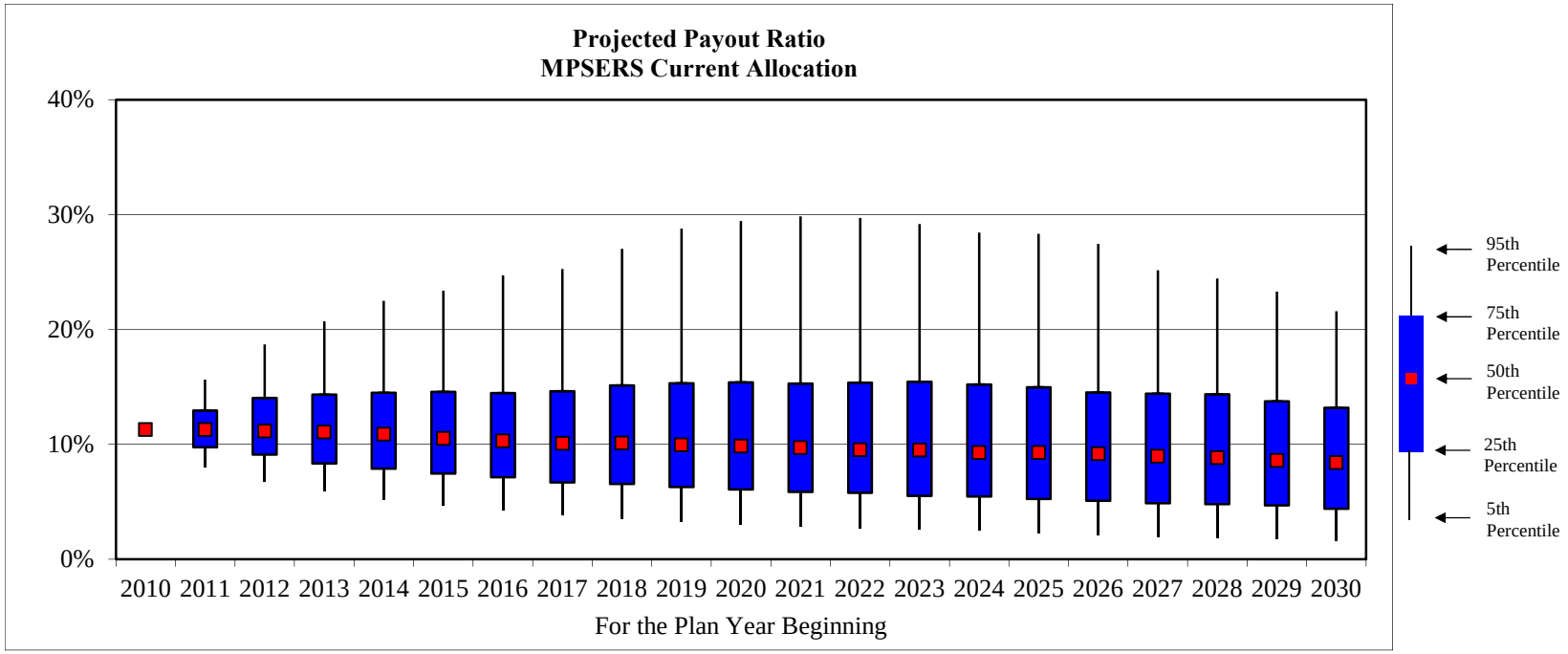
	Probability of Full Funding in 2030	Δ from Base Analysis	Probability of less than 60% Funding in 2030	Δ from Base Analysis	Maximum 1 Year Portfolio Investment Loss
MPSERS Current Allocation	45%	+2%	25%	+8%	-54%
MPSERS Target Allocation	41%	+4%	26%	+9%	-52%
Conservative Portfolio	2%	+1%	57%	-1%	-28%
Potential Portfolio 1	35%	+6%	28%	+10%	-48%
Portfolio 10	47%	+1%	24%	+7%	-56%

Appendix 2: Sensitivity Analysis: "Effect of Higher Correlations" (continued)

Projected Payout Ratio (expected benefit payments/market value of assets); **MPSERS Current Allocation**

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the MPSERS Current Allocation (highlighted on the prior pages). The results below assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 8.4% and 11.3%. The worst-case scenario could reach 30% or higher.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Median	11.3%	11.3%	11.1%	11.1%	10.9%	10.5%	10.3%	10.1%	10.1%	9.9%	9.8%	9.7%	9.5%	9.5%	9.3%	9.3%	9.2%	8.9%	8.8%	8.6%	8.4%

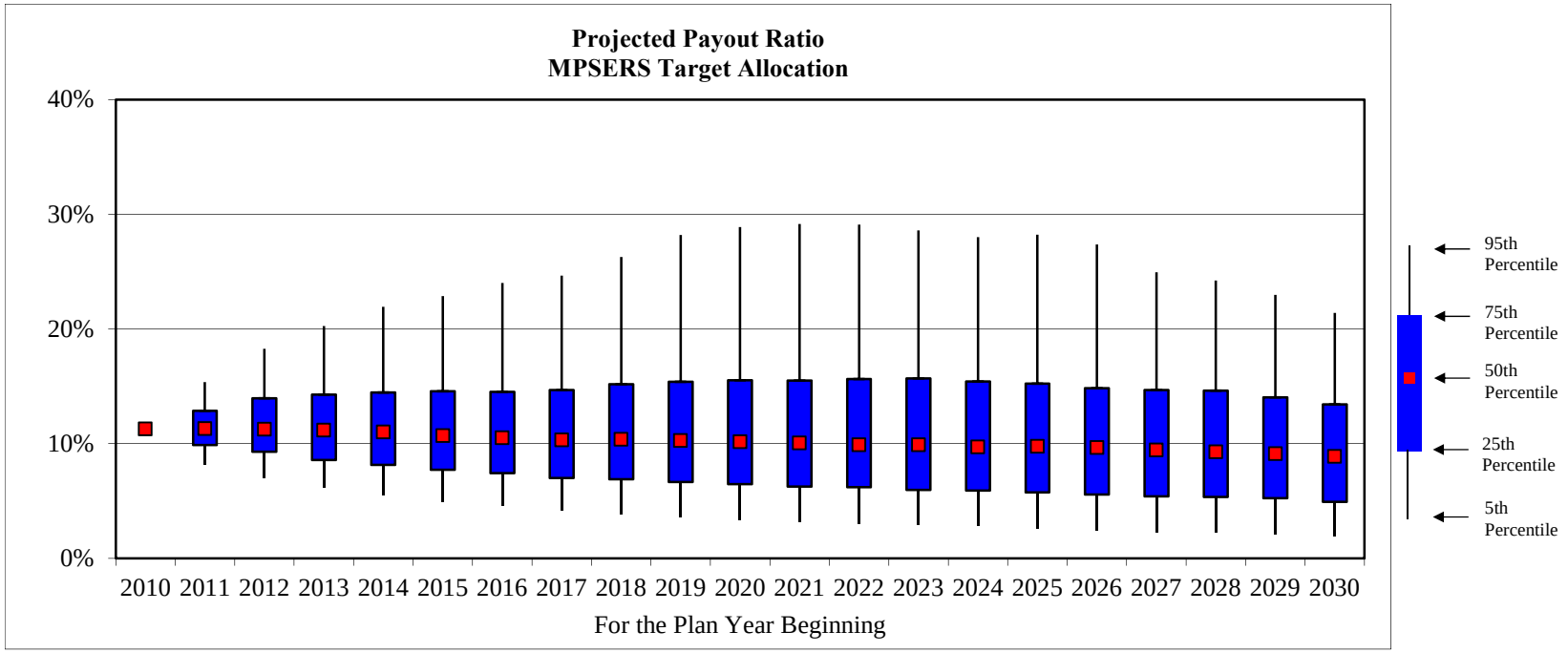
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile (median) indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

Appendix 2: Sensitivity Analysis: "Effect of Higher Correlations" (continued)

Projected Payout Ratio (expected benefit payments/market value of assets); **MPSERS Target Allocation**

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the MPSERS Target Allocation (highlighted on the prior pages). The results below assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 8.9% and 11.3%. The worst-case scenario could reach 29% or higher.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Median	11.3%	11.3%	11.2%	11.2%	11.0%	10.7%	10.5%	10.3%	10.4%	10.3%	10.2%	10.0%	9.9%	9.9%	9.7%	9.7%	9.6%	9.4%	9.3%	9.1%	8.9%

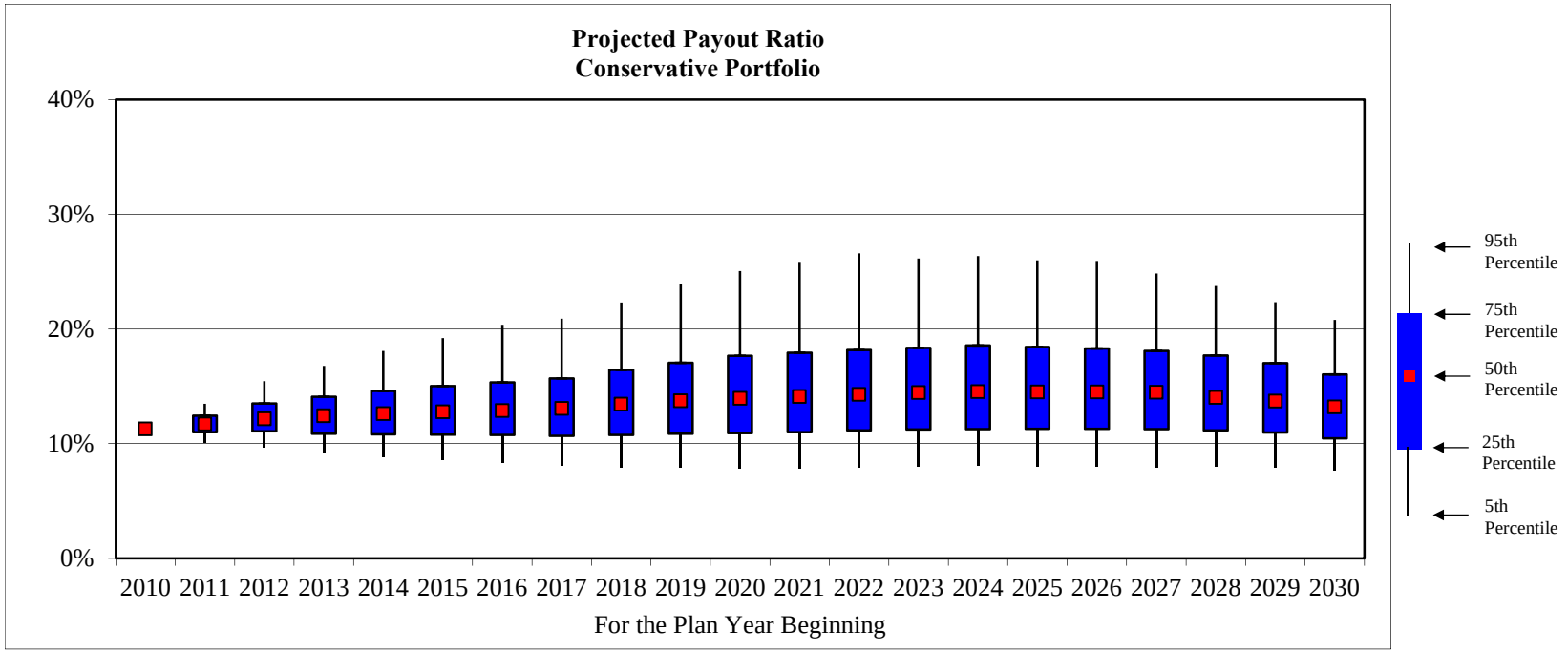
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile (median) indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

Appendix 2: Sensitivity Analysis: "Effect of Higher Correlations" (continued)

Projected Payout Ratio (expected benefit payments/market value of assets); **Conservative Portfolio**

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the Conservative Portfolio (highlighted on the prior pages). The results below assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 11.3% and 14.5%. The worst-case scenario could reach 27% or higher.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Median	11.3%	11.7%	12.2%	12.4%	12.6%	12.8%	12.9%	13.0%	13.4%	13.7%	13.9%	14.1%	14.3%	14.4%	14.5%	14.5%	14.5%	14.5%	14.0%	13.7%	13.2%

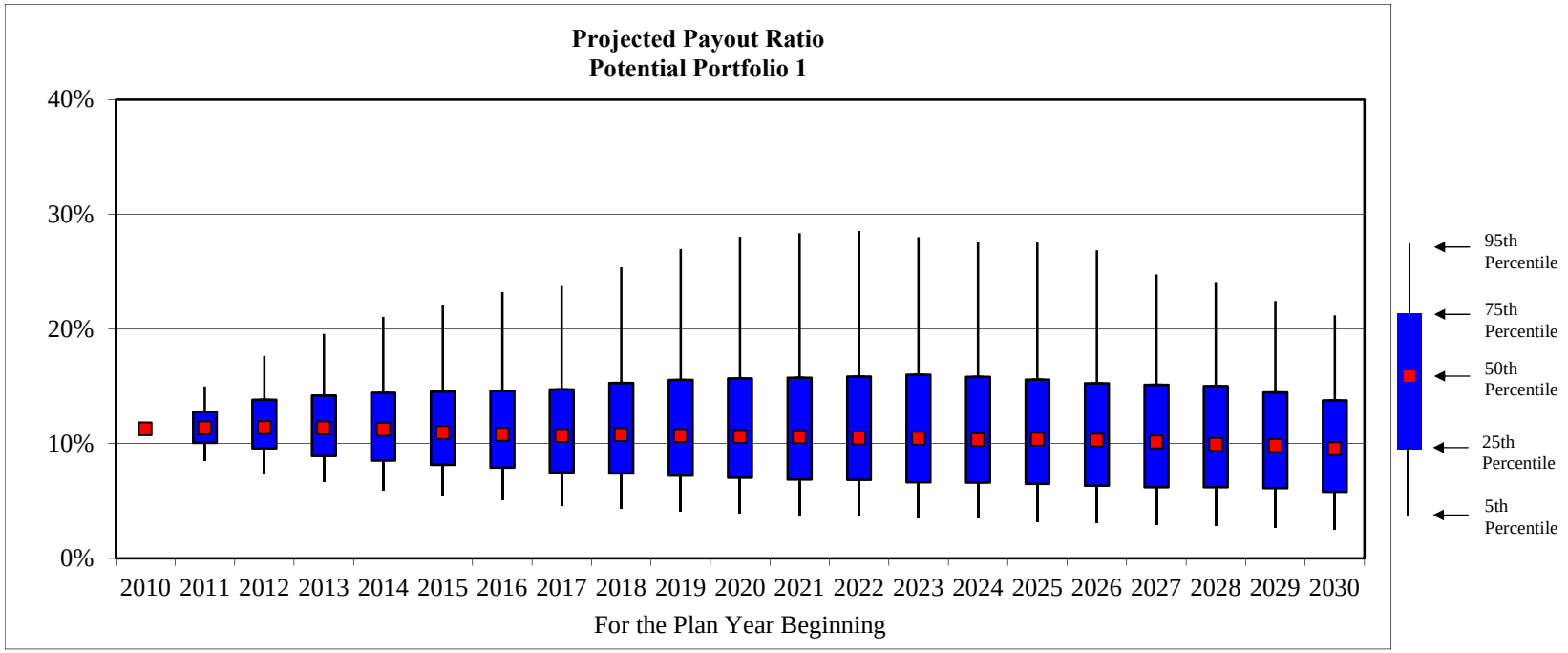
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile (median) indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

Appendix 2: Sensitivity Analysis: "Effect of Higher Correlations" (continued)

Projected Payout Ratio (expected benefit payments/market value of assets); **Potential Portfolio 1**

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to Potential Portfolio 1 (highlighted on the prior pages). The results below assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 9.5% and 11.4%. The worst-case scenario could reach 29% or higher.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Median	11.3%	11.4%	11.4%	11.3%	11.2%	11.0%	10.8%	10.7%	10.8%	10.7%	10.6%	10.6%	10.5%	10.4%	10.3%	10.4%	10.3%	10.1%	9.9%	9.8%	9.5%

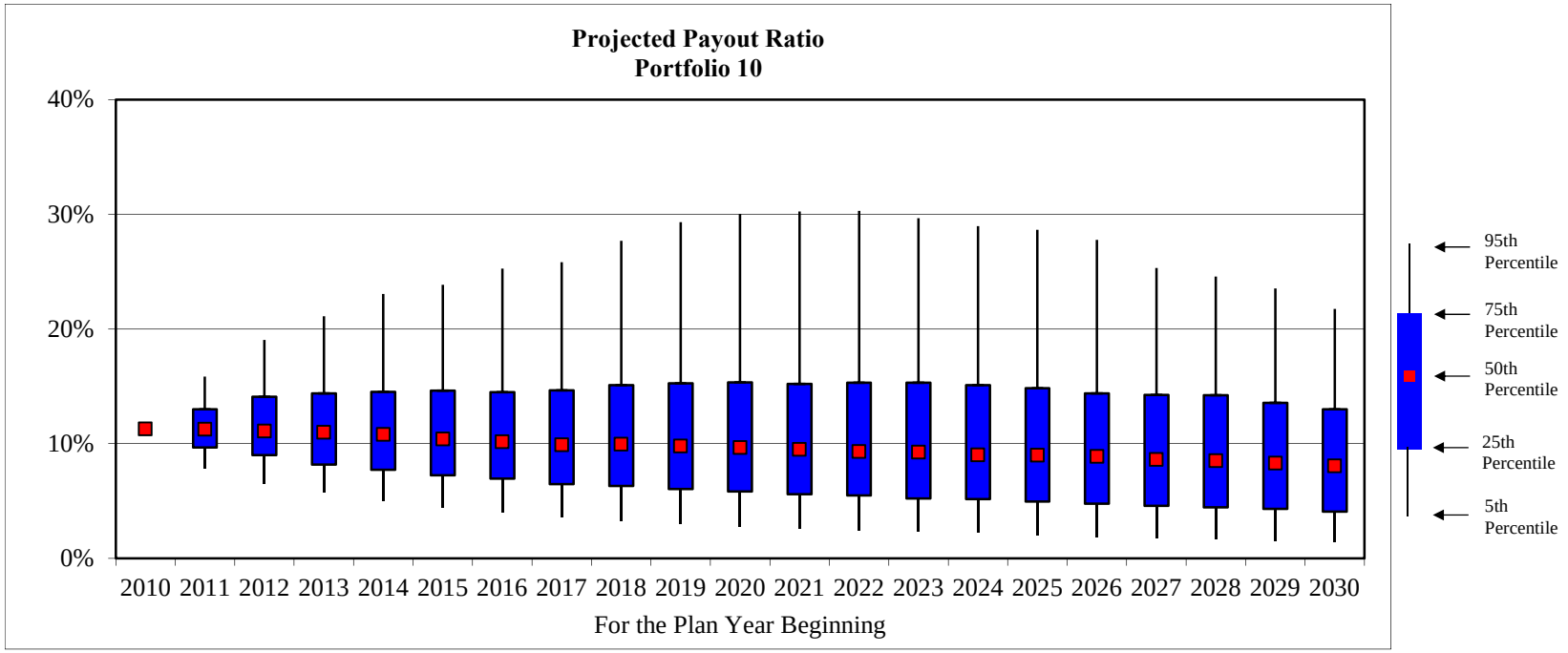
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile (median) indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

Appendix 2: Sensitivity Analysis: "Effect of Higher Correlations" (continued)

Projected Payout Ratio (expected benefit payments/market value of assets); **Portfolio 10**

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to Portfolio 10 (highlighted on the prior pages). The results below assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 8.0% and 11.3%. The worst-case scenario could reach 30% or higher.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Median	11.3%	11.2%	11.1%	11.0%	10.8%	10.4%	10.1%	9.9%	9.9%	9.8%	9.6%	9.5%	9.3%	9.2%	9.0%	9.0%	8.9%	8.6%	8.5%	8.3%	8.0%

Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50th percentile (median) indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

Appendix 2: Sensitivity Analysis: "Effect of Higher Correlations" (continued)

Drawing Inferences

The table below compares the projected actuarial and market funded ratios 20 years from now, under the median (50th percentile), worst-case (5th percentile), and best-case (95th percentile) scenarios, assuming the five different asset mixes highlighted on the prior pages. The table also displays for comparative purposes the median, peak, and trough projected payout ratios over the 20 year period, assuming the same five asset mixes being examined.

	Actuarial Funded Ratio in Year 20			Market Funded Ratio in Year 20			Payout Ratios		
	50th	5th	95th	50th	5th	95th	Year 20 Median	2010-2030 Peak	2010-2030 Trough
MPSERS Current Allocation	89.7%	46.4%	391.3%	90.8%	38.2%	420.4%	8.4%	1.6%	29.8%
MPSERS Target Allocation	85.9%	46.6%	321.2%	85.8%	38.4%	350.9%	8.9%	1.9%	29.1%
Conservative Portfolio	62.3%	46.2%	87.7%	57.5%	39.7%	88.8%	13.2%	7.7%	26.6%
Potential Portfolio 1	81.2%	46.9%	248.6%	79.7%	39.0%	268.1%	9.5%	2.5%	28.5%
Portfolio 10	92.2%	46.1%	447.8%	94.7%	37.9%	479.1%	8.0%	1.4%	30.3%

Appendix 3: Assumptions and Methods

Actuarial Valuation Assumptions and Methods: At the beginning of each projection year, an actuarial valuation is performed to determine employer contributions. The methods and assumptions used in each projected actuarial valuation are the same used in the valuation as of September 30, 2010, prepared by Gabriel Roeder Smith & Company. Base salary inflation is tied to changes in inflation under the stochastic projections. These methods and assumptions are described below:

Actuarial Cost Method	Individual Entry-Age. Certain techniques were employed in the stochastic forecasts to approximate the special amortization of the unfunded retirement incentive liability and entry age normal cost computations. No adjustment was made to the unfunded actuarial liability to reflect the present value of future reconciliation payments in both deterministic and stochastic forecasts. Therefore, reconciliation payments are implicitly included in projected employer contribution calculations.
Liability Discount Rate	8.00% compounded annually for employees hired before 7/1/2010 and 7.00% for employees hired on and after 7/1/2010.
Expenses	No explicit expense assumption, assumed to be funded by returns in excess of the actuarially assumed rate of return.
Future Salary Increases	Future salary increases are outlined in the table on page E3 of the September 30, 2010 Actuarial Valuation and vary by participant age. These rates include a 3.5% base salary inflation rate.
Retirement	Retirement assumptions are outlined on pages E6 and E7 of the September 30, 2010 Actuarial Valuation.
Mortality	Mortality assumptions are outlined on pages E4 and E5 of the September 30, 2010 Actuarial Valuation.
Disability	Rates of disability as outlined on page E9 of the September 30, 2010 Actuarial Valuation.
Withdrawal	Rates of withdrawal as outlined on page E8 of the September 30, 2010 Actuarial Valuation.
Asset Valuation Method	Five year smoothed market value.

Appendix 3: Assumptions and Methods (continued)

Amortization Method	Level percent of payroll, 26 years left on a 30 amortization schedule at the start of the study. The unfunded actuarial liability associated with the recent retirement incentive program is amortized separately over 5 years beginning in 2012.
Cost of Living Adjustments	Cost of Living Adjustments as outlined on page F3 of the September 30, 2010 Actuarial Valuation. No supplemental payments or 13th checks were assumed.

Appendix 3: Assumptions and Methods (continued)

Projection Assumptions (used in the deterministic and stochastic asset/liability projections): These projections begin with the Plan's participant population as of September 30, 2010, as provided by Gabriel Roeder Smith & Company. The Plan's population is projected forward and assumed to change as a result of employment separation, death, retirement, and new hires as predicted by the assumptions outlined in the September 30, 2010 Actuarial Valuation provided by Gabriel Roeder Smith & Company (and described on the prior page). Employee compensation is projected into the future in accordance with the assumptions described on the prior page. Investment returns are projected into the future in accordance with assumptions described below.

Total Contributions	Equal to the amount necessary to fund the actuarially computed normal cost plus an amortization payment towards the unfunded actuarial liability each year with a 30 year amortization schedule that began in 2006. The unfunded actuarial liability associated with the recent retirement incentive program is amortized separately over 5 years beginning in 2012. Current employee contribution rates.
New Entrants	Assumes an increase in the active population of 2.5% for two years, thereafter maintaining a level active population of 254,848 employees.
Rate of Return on Assets	Deterministic Analysis: 8.00% compounded annually for employees hired before 7/1/2010 and 7.00% for employees hired on or after 7/1/2010. Stochastic Analysis: Returns on the portfolio are based on the expected returns of each asset class and the correlations between each class which are detailed in the Stochastic Analysis section of this report.
Inflation	2.50% per year with a standard deviation of 3.00%.
Other	All other projection assumptions are the same as those chosen by the Plan's actuary, shown above. The participant data, Plan liabilities, and assets, as of September 30, 2010 were provided by Gabriel Roeder Smith & Company.