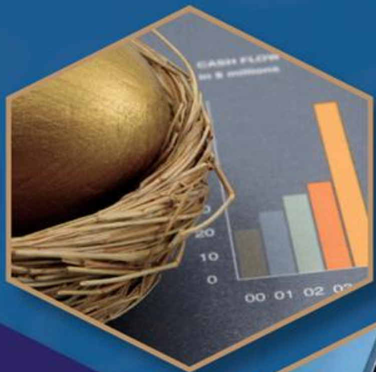

# Texas Municipal Retirement System Actuarial Valuation Report as of December 31, 2015

May 20, 2016

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Joseph Newton

GRS
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# Today's Agenda

- Summary of System-wide Results
- Asset Performance
- Funded Status
- Contribution Requirements
- Future Expectations
- Summary

# Summary of System-wide Results

| $ amounts in millions | Dec 31, 2014 Valuation | Dec 31, 2015 Valuation Old Assumptions | Dec 31, 2015 Valuation New Assumptions |
|---|---|---|---|
| Actuarial Accrued Liability (AAL) | $26,647 | $28,117 | $28,379 |
| Actuarial Value of Assets | $22,861 | $24,348 | $24,348 |
| Unfunded Actuarial Accrued Liability (UAAL) | $3,786 | $3,769 | $4,031 |
| Funded Ratio | 85.8% | 86.6% | 85.8% |
| **Full Contribution Rates:** | | | |
| Straight Average | 8.39% | 8.33% | 9.02% |
| Payroll Weighted Average | 12.63% | 12.54% | 13.24% |
| Normal Cost % | 7.86% | 7.88% | 8.41% |
| Prior Service % | 4.77% | 4.66% | 4.83% |



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# Aggregate BAF Valuation ($ in millions)

## Reconciliation of Unfunded Actuarial Accrued Liability ("UAAL")

| | Change in UAAL | Impact on Funded Ratio | Impact on Full Rate |
|---|---|---|---|
| UAAL @ BOY | $3,786 | 85.8% | 12.63% |
| Interest (7.00%) | 268 | | 0 |
| Amortization Payments* | (274) | 0.8% | (0.09%) |
| Asset Performance | 71 | -0.3% | 0.08% |
| Benefit Changes | 37 | -0.1% | 0.08% |
| Assumption/Method Changes | 262 | -0.8% | 0.70% |
| Contributions different than Actuarially Determined | (42) | 0.1% | (0.01%) |
| Liability (Gains)/Losses | (77) | 0.3% | (0.15%) |
| UAAL @ EOY | $4,031 | 85.8% | 13.24% |



*No longer have "negative" amortization as the funding period has reached approximately 21 years

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# Non-Investment Experience

- Actual CPI of 0.73% was less than the 3.00% assumption, so liability for repeating COLAs was less than expected
  - System-wide, created a Liability Gain of about $110 million
  - 2014 CPI of 0.76% resulted in a system-wide gain of about $100 million
  - 2013 CPI of 1.50% resulted in a system-wide gain of about $60 million
- Valuation uses 3-year smoothing on salaries
  - The 2014-2015 salary experience was close to expected, still some deferred gains from prior valuations are being reflected in this valuation
  - System-wide, created a Liability Gain of about $50 million
- For active employees:
  - Average age decreased by 0.1 from last year to 43.2 years
  - Average service is 10.6 years and decreased by 0.1 from last year



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# Summary of Benefit Changes

- Total Changes

  48 cities made changes that impacted the total retirement rate since the last valuation

  - Increases in Benefits 45
  - Decreases in Benefits 3

- Number of cities changing matching ratio, deposit rate, and eligibilities 28



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# Summary of Benefit Changes (cont)

- USC Changes
  - Ad Hoc USC 13
  - Rescind/Decrease Repeating USC 2
- COLA Changes
  - Ad Hoc COLA 11
  - New Repeating COLA 1
  - Rescind/Decrease Repeating COLA 2



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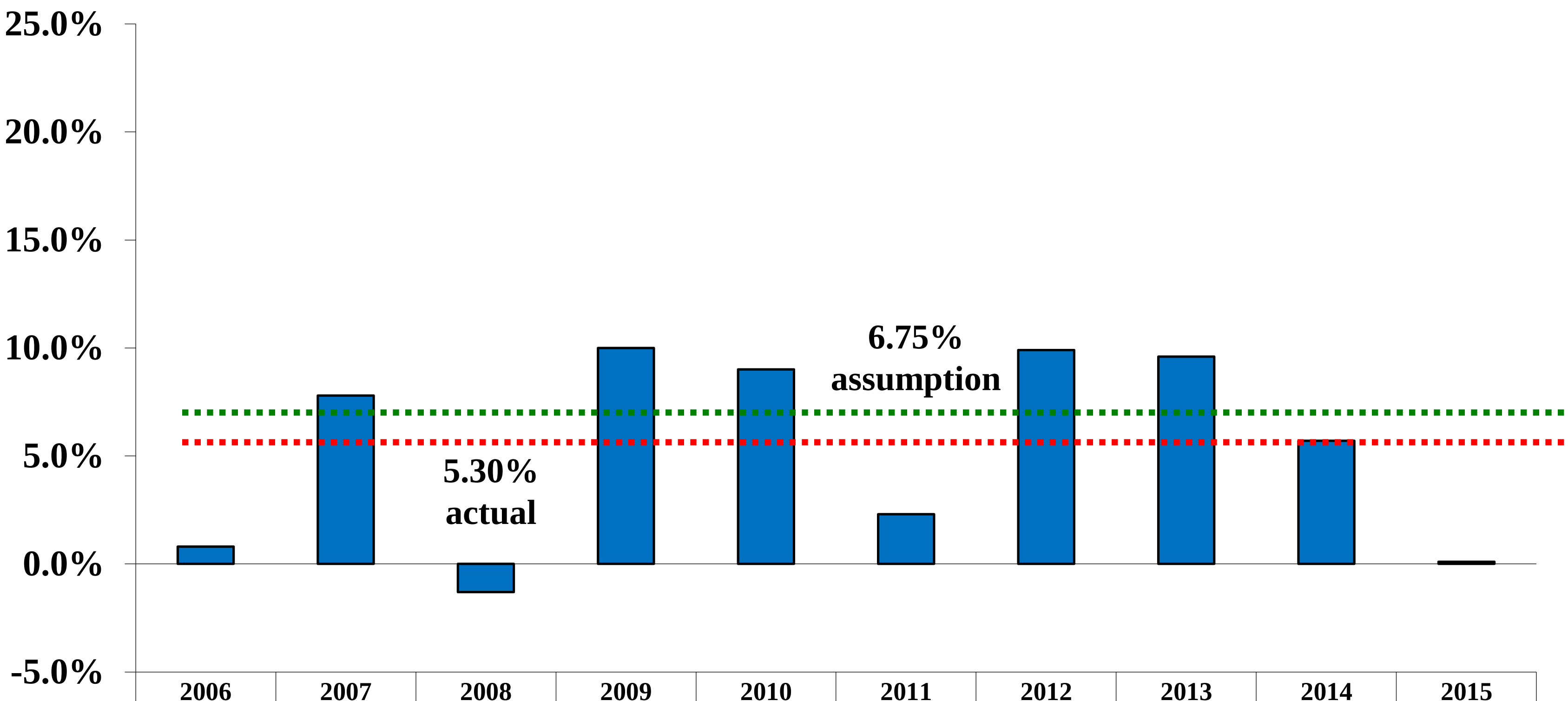
# Yields based on Market Value of Assets




| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|
| Market | 0.8% | 7.8% | -1.3% | 10.0% | 9.0% | 2.3% | 9.9% | 9.6% | 5.7% | 0.1% |

5.30% average compound return (on market value) over the last 10 years



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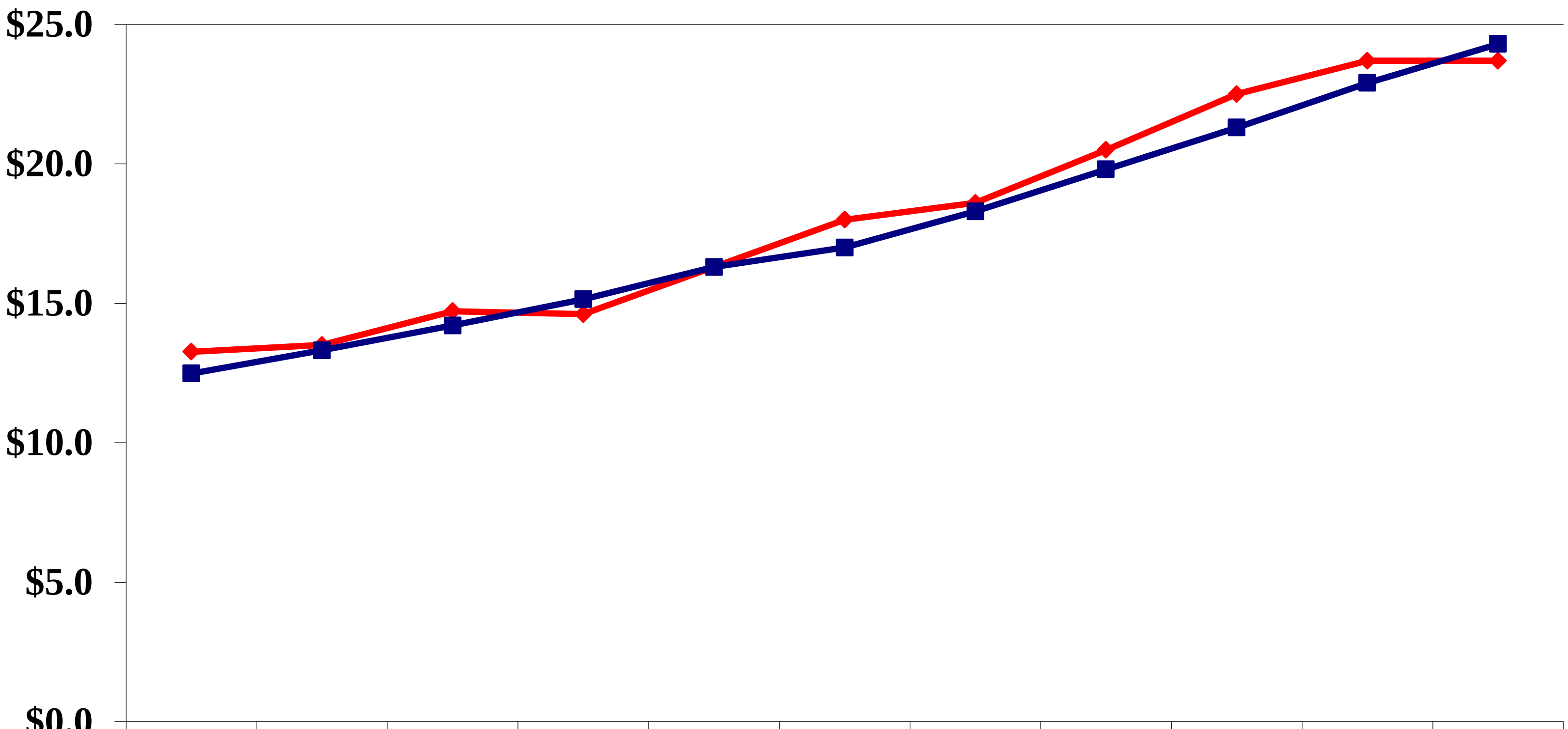
# Market and Actuarial Values of Assets

$ amounts are in Billions




| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Market | $13.3 | $13.5 | $14.7 | $14.6 | $16.3 | $18.0 | $18.6 | $20.5 | $22.5 | $23.7 | $23.7 |
| Actuarial | $12.5 | $13.3 | $14.2 | $15.1 | $16.3 | $17.0 | $18.3 | $19.8 | $21.3 | $22.9 | $24.3 |

- AVA is currently 102.5% of MVA, was 96.6% last year
  AVA was Book Value prior to 2009



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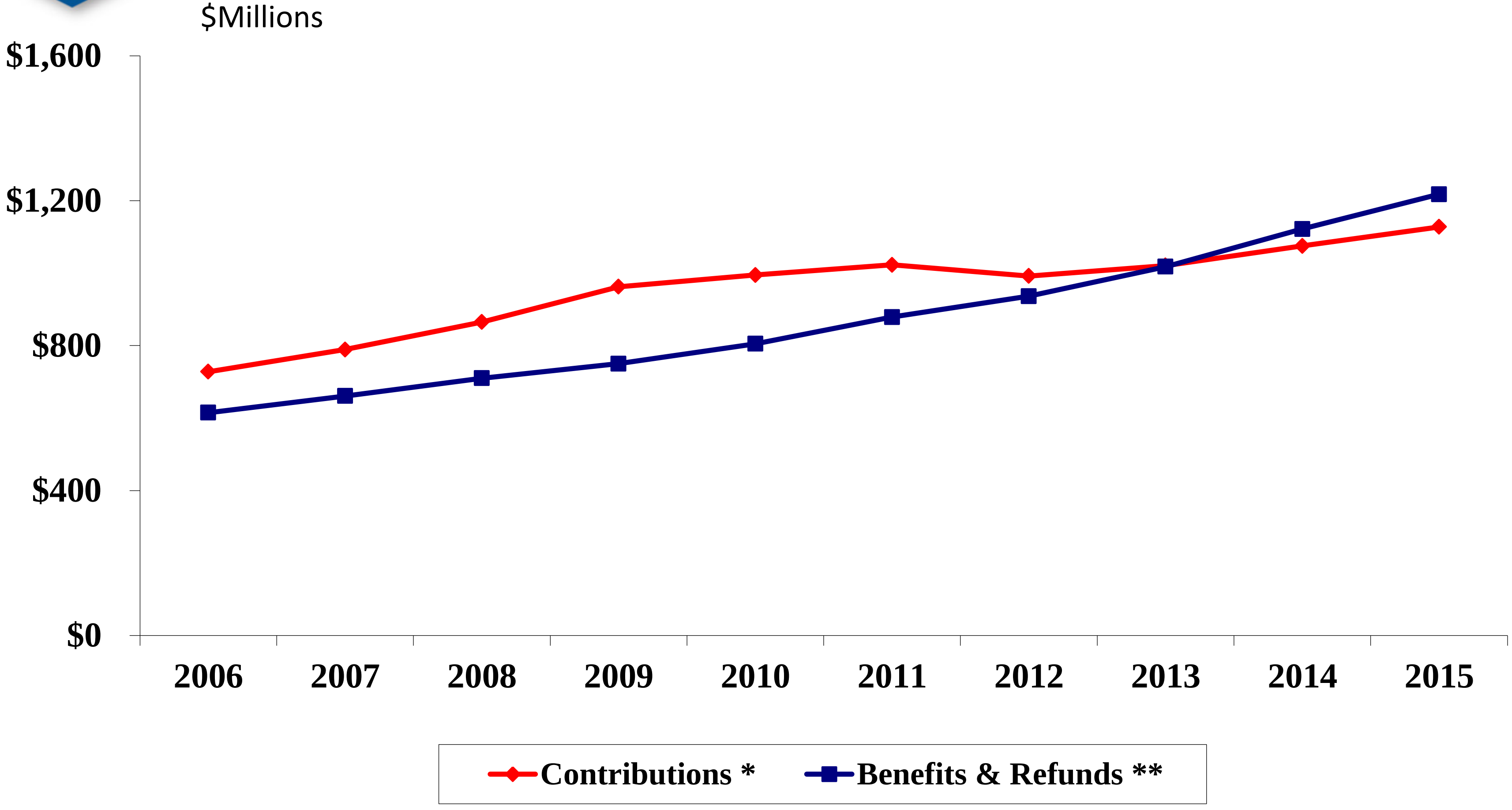
# Contributions vs. Benefits and Refunds




* Includes member and employer contributions

** Includes administrative and investment expenses



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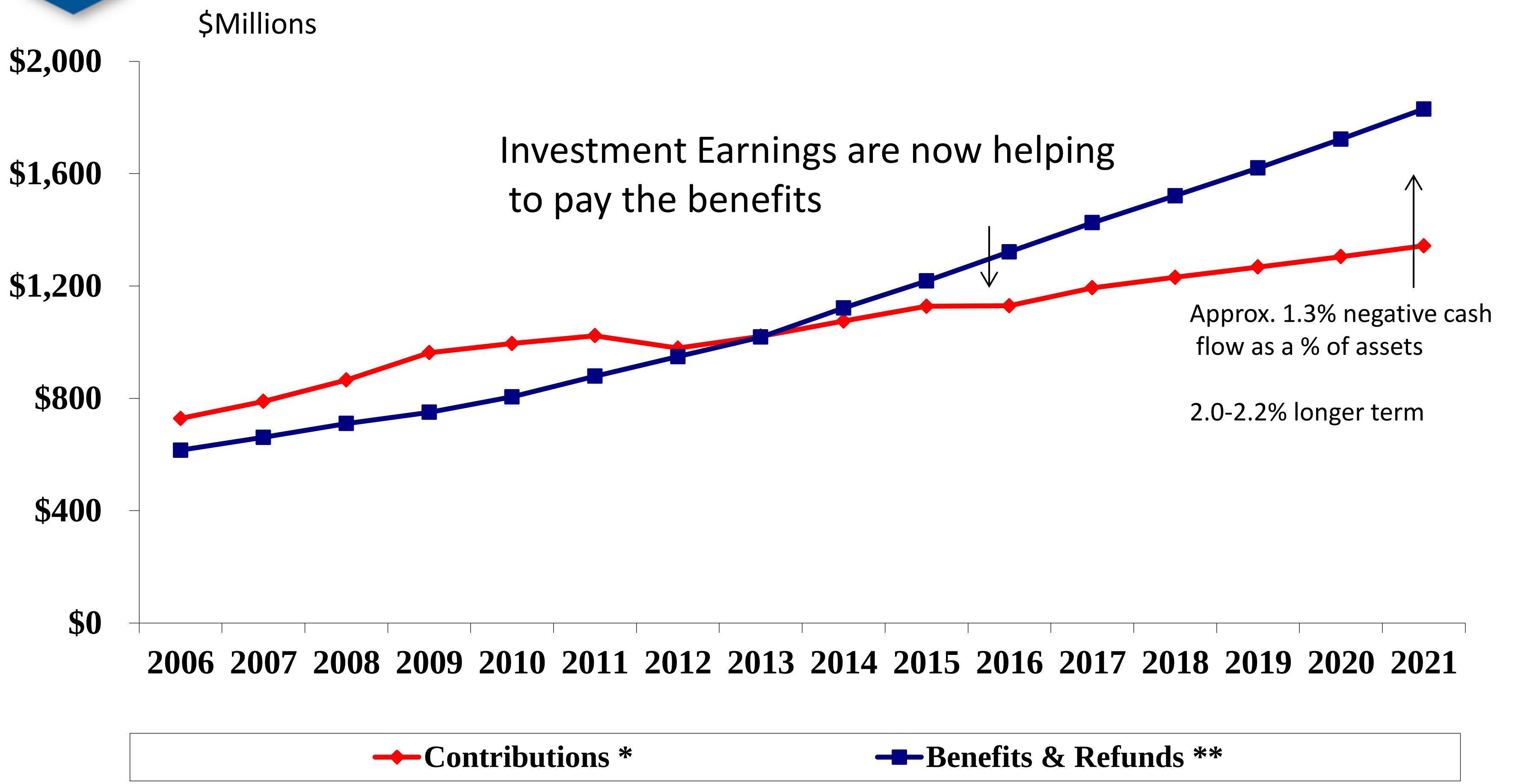
# Projected Contributions vs. Benefits and Refunds




* Includes member and employer contributions

** Includes administrative and investment expenses

Assumes no recognition of current deferred investment gains/losses



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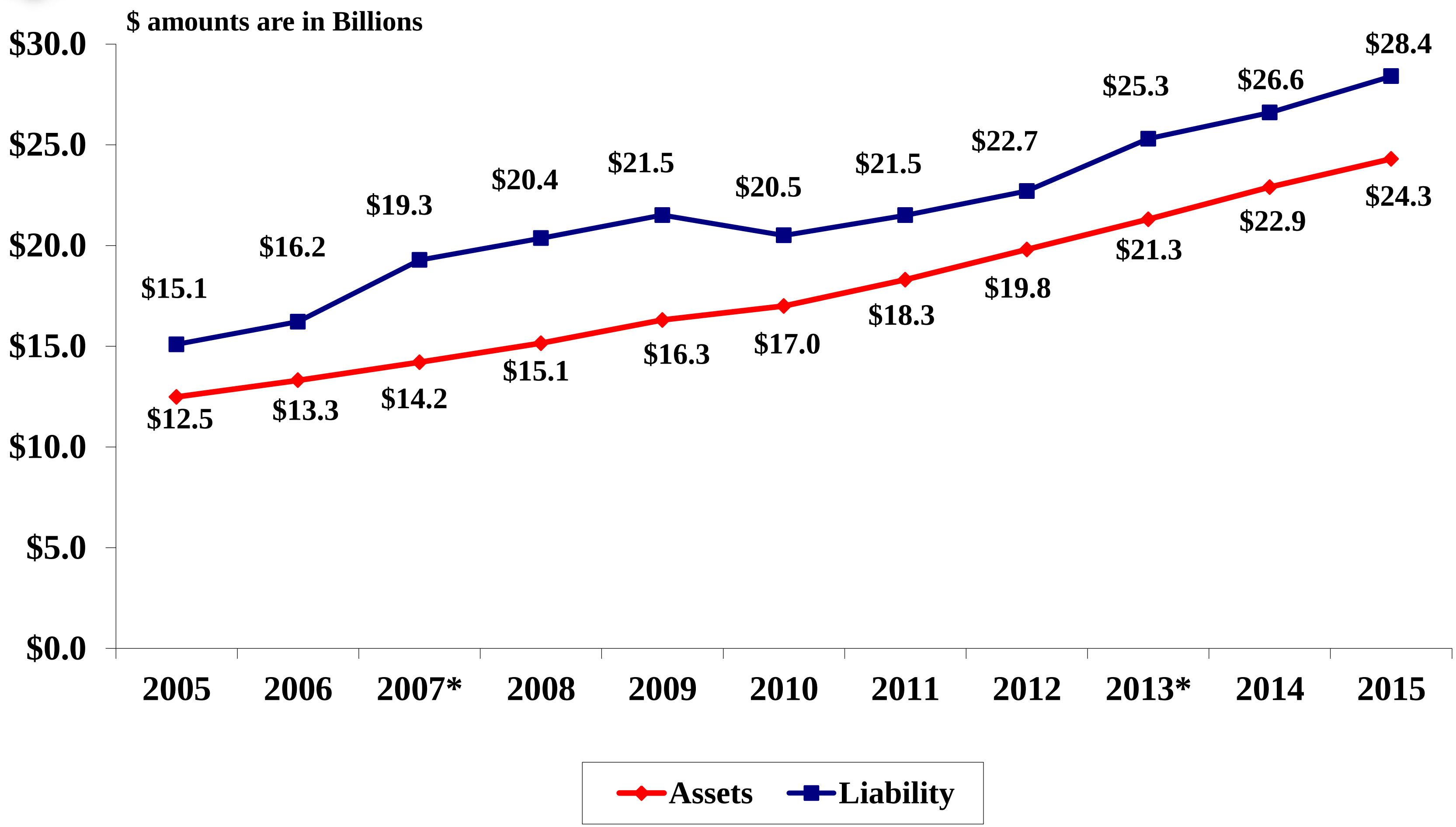
# Actuarial Value of Assets (Smoothed) vs. Actuarial Accrued Liability (AAL)




*Liabilities for years prior to 2013/2007 reflect PUC/UC method and prior assumptions



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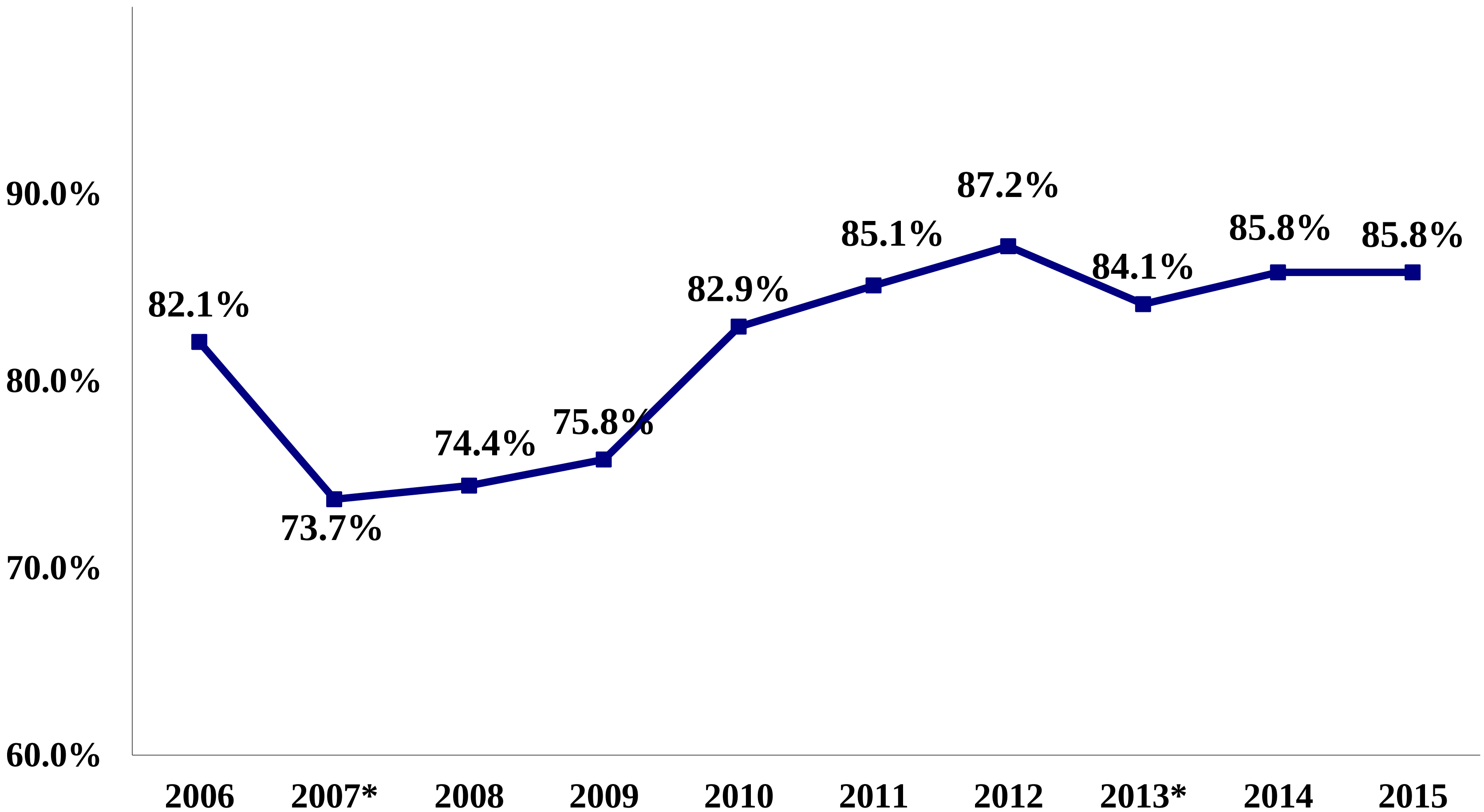
# Funded Ratio Percentages




*Years prior to 2013/2007 reflect PUC/UC method and prior assumptions



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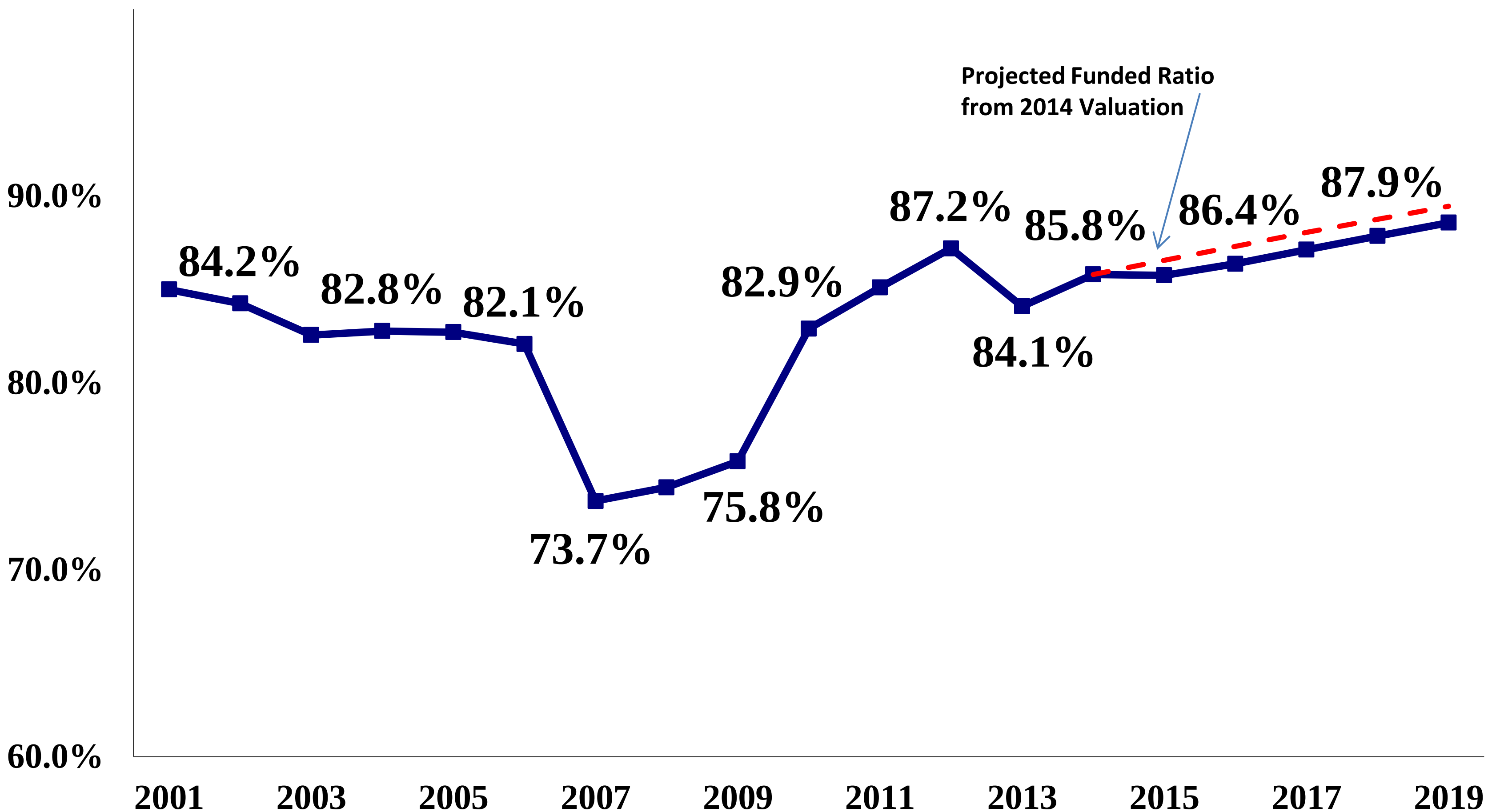
# Projected Funded Ratio




*Assumes all assumptions are met in future years*



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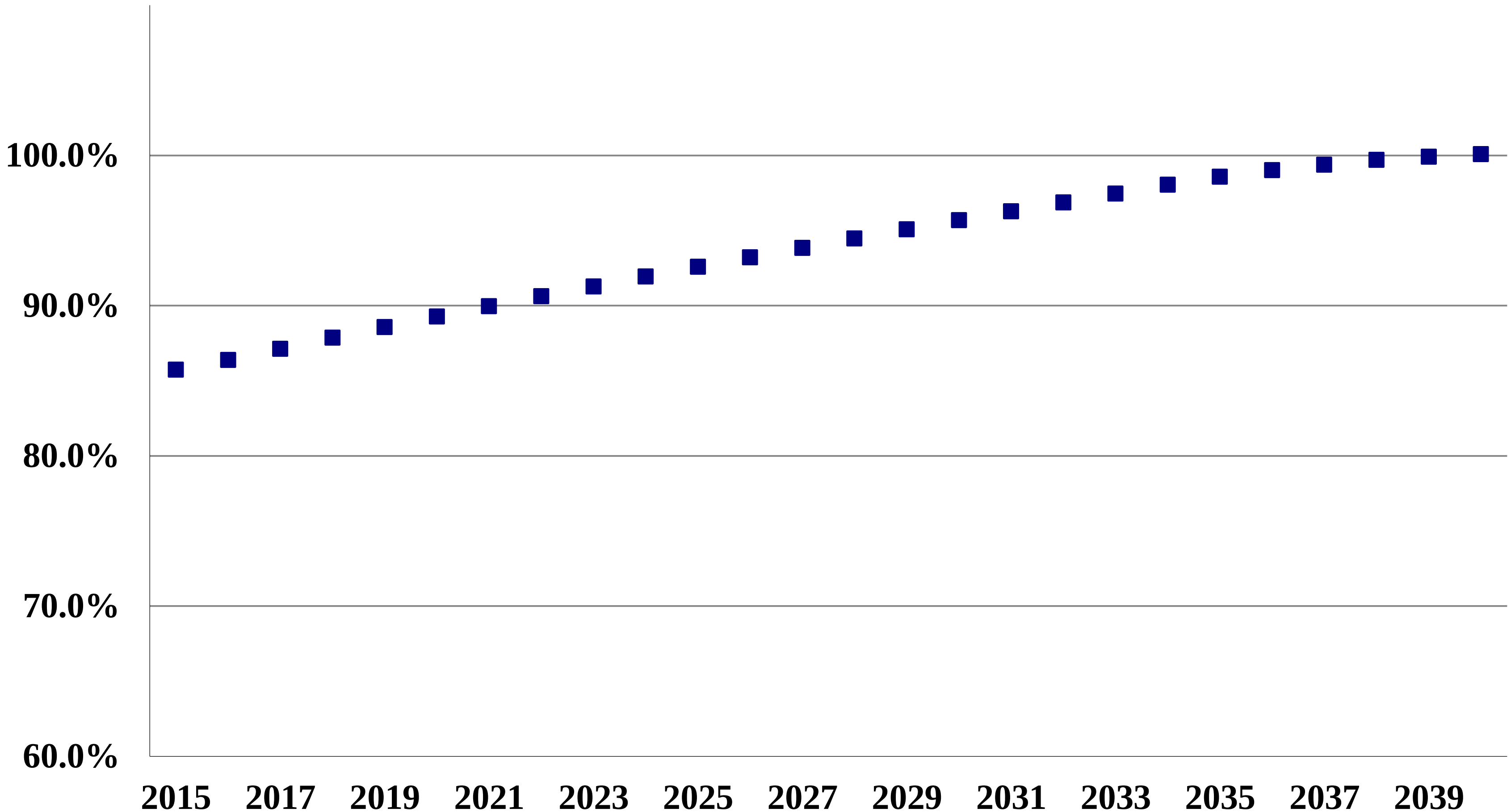
# Projected Funded Ratio
## (Longer Term)




*Assumes all assumptions are met in future years*



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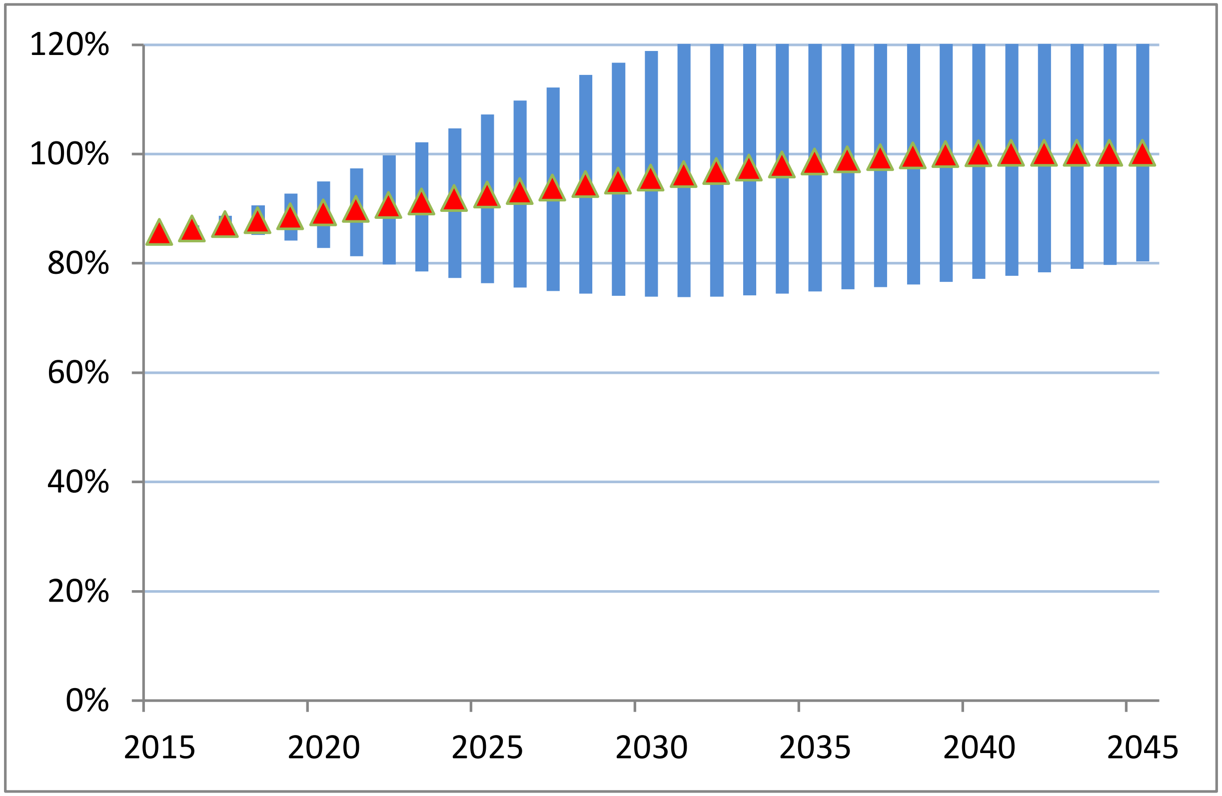
# Projected Funded Ratio: System-wide




Median Expectation    25th-75th percentile of expectation

- **Assumes ADEC met each year**
- **Assumes continuation of current amortization policy & payroll grows at 3.00% per year**
- **Investment returns are only variable in the stochastic process**



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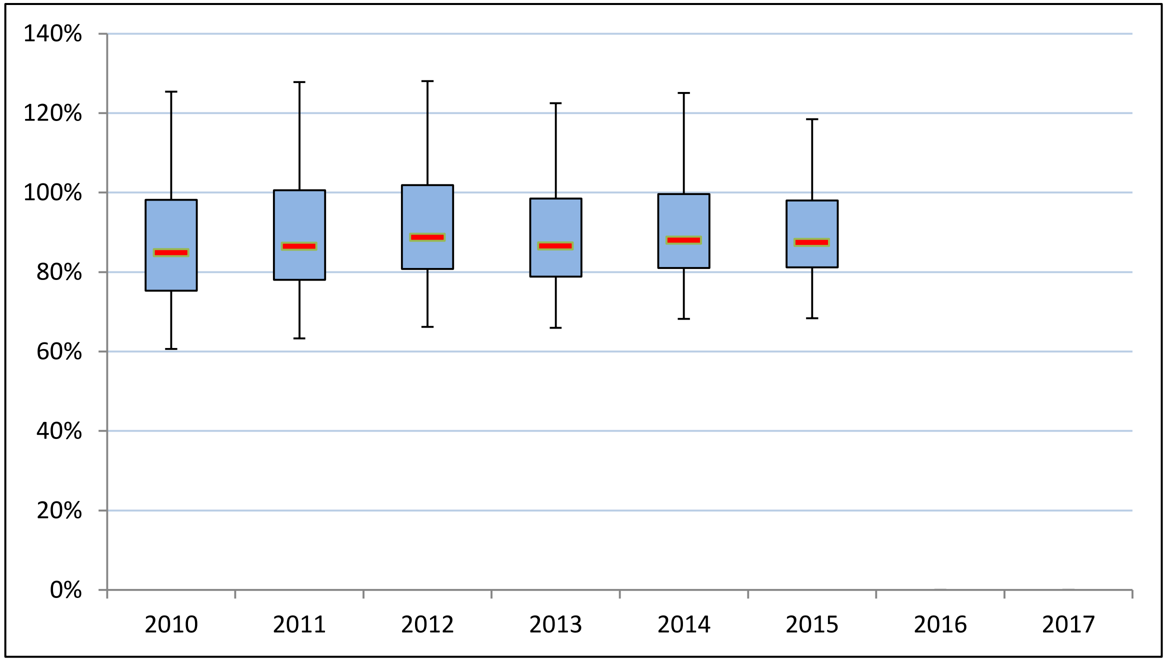
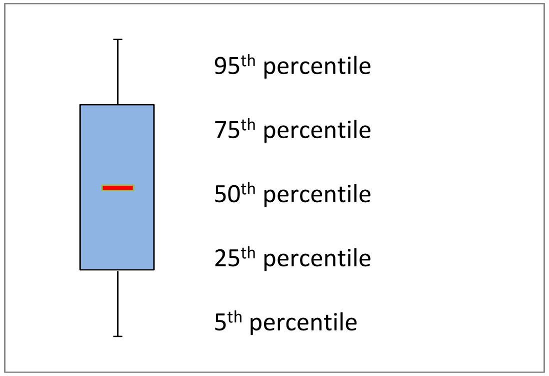
# Distribution of Funded Ratio Percentages




The percentile represents the proportion of employers below the point. For example, the 75th percentile is 98%, meaning that 75% of cities have a funded ratio less than 98%. Conversely, 25% of the cities have a funded ratio of 98% or greater.



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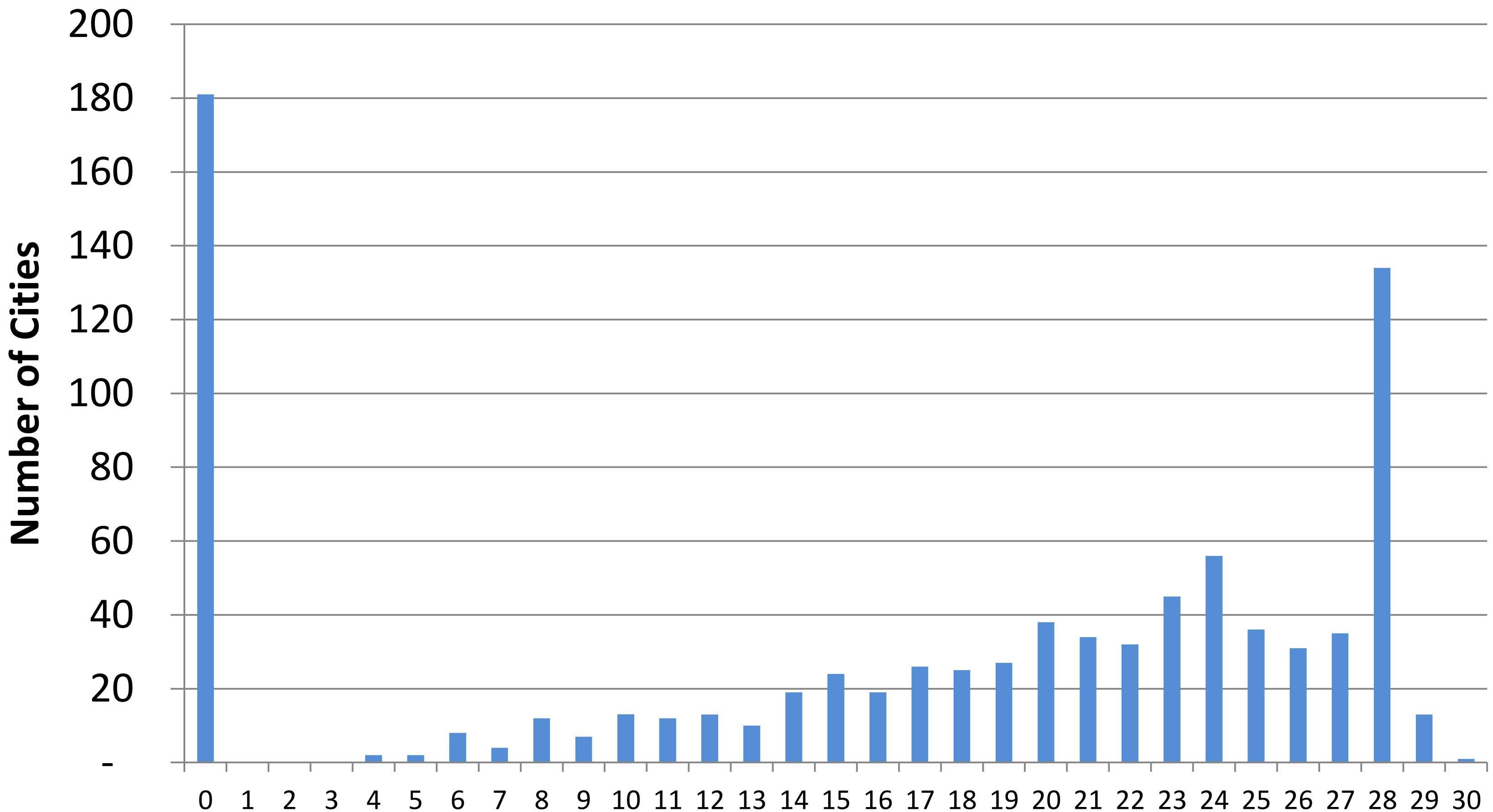
# Distribution of Single Equivalent Amortization Periods




Remaining average period in years

0 would be overfunded



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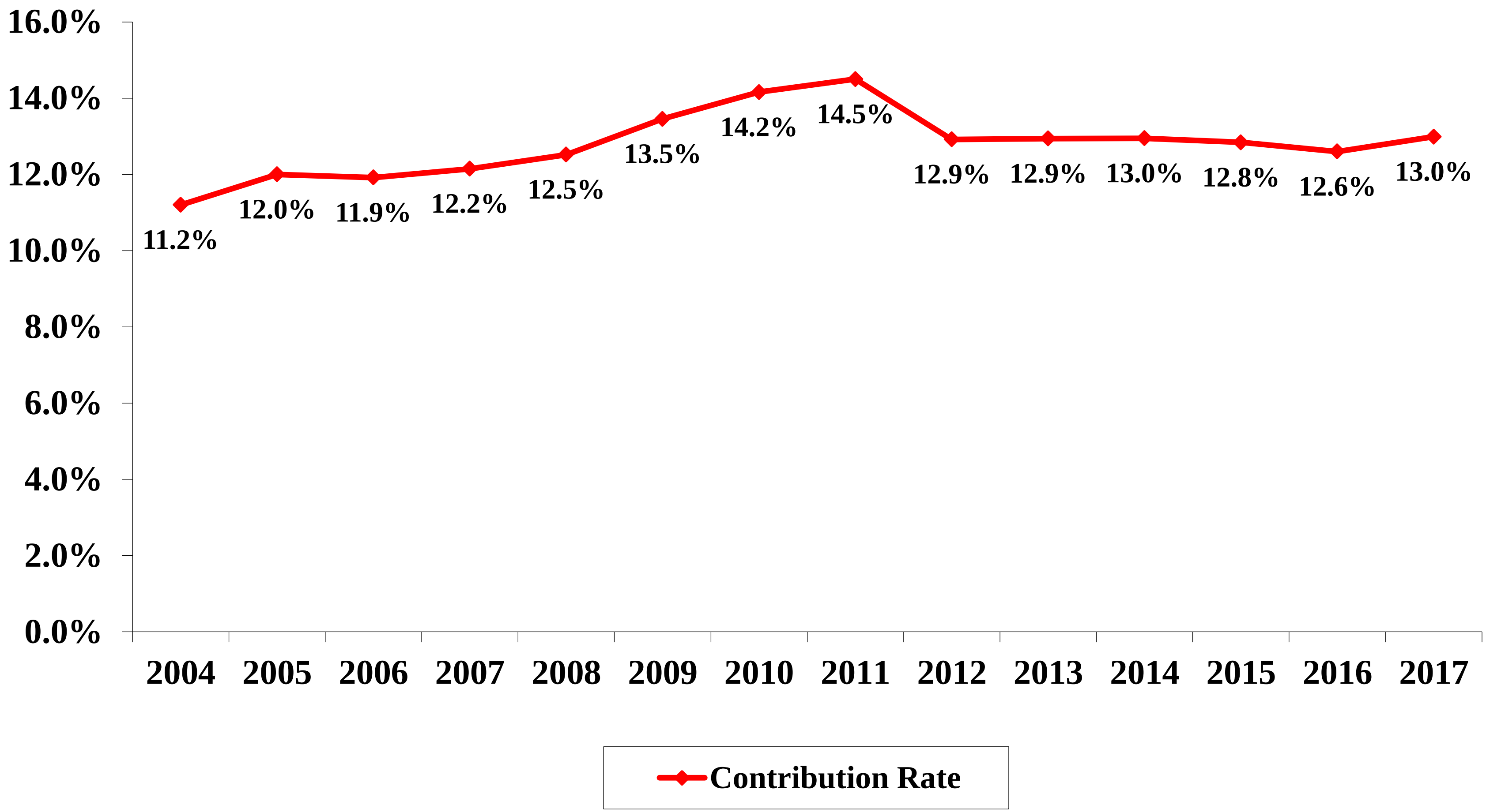
# Historical Dollar Weighted Contribution Rates for TMRS




2016 and 2017 are projected rates based upon phase-in minimum



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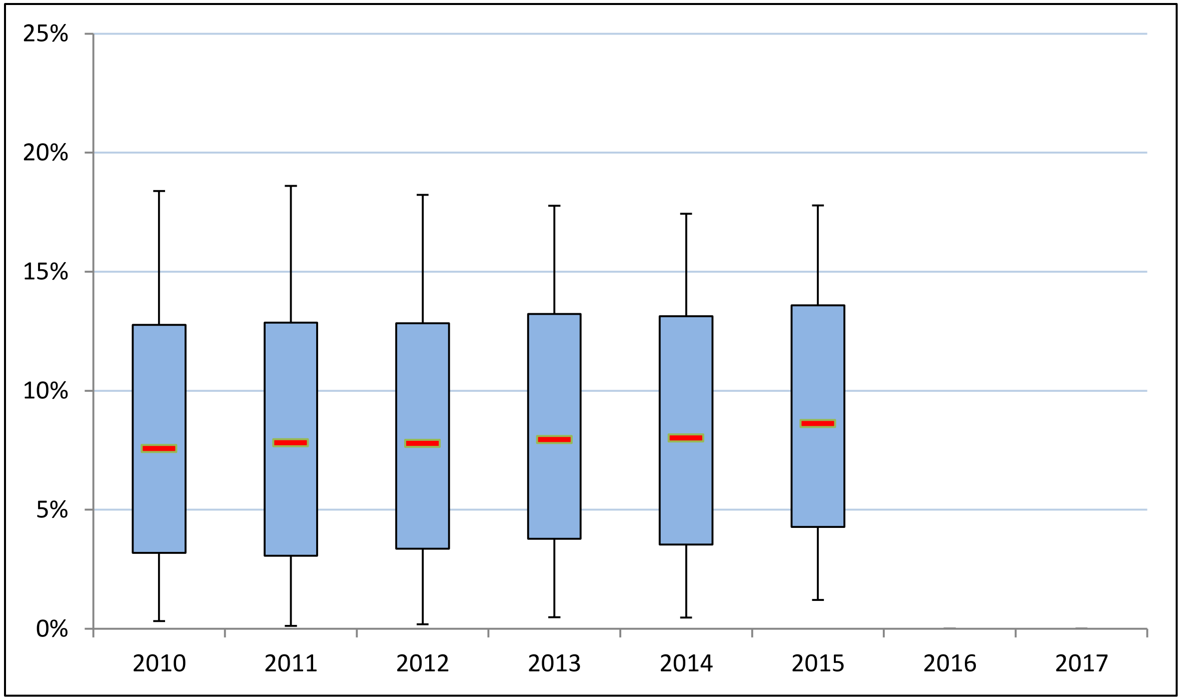
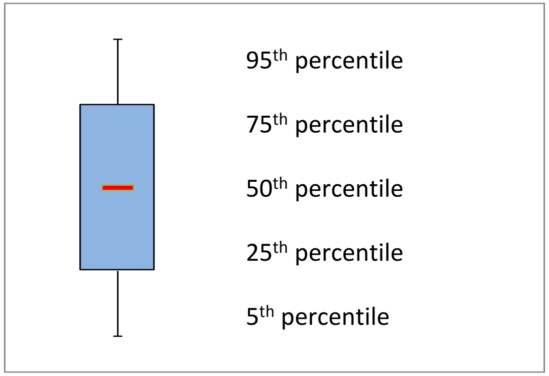
# Distribution of Full Retirement Rate




The percentile represents the proportion of employers below the point. For example, the 75th percentile is 13.53%, meaning that 75% of cities have a rate less than 13.53%.

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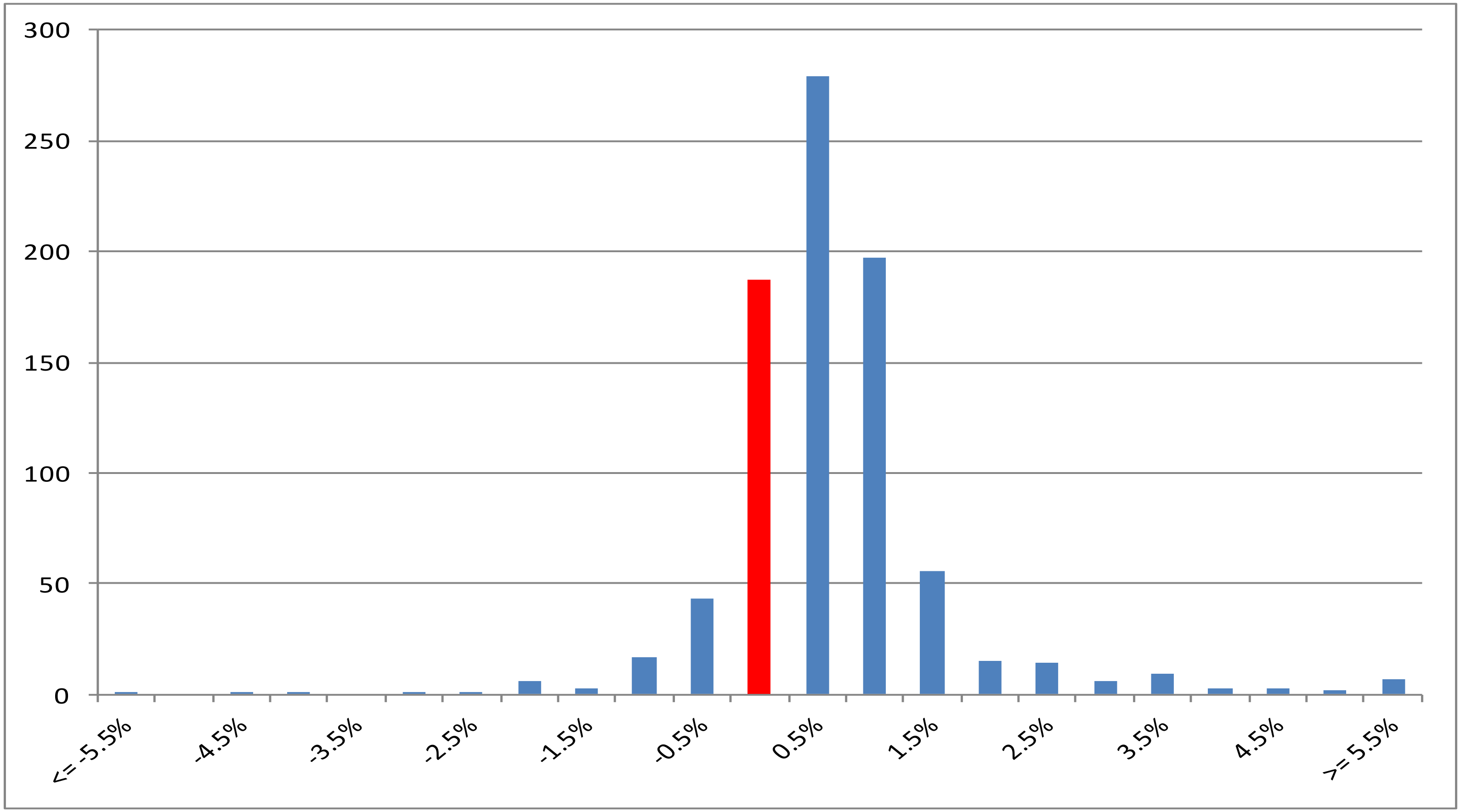
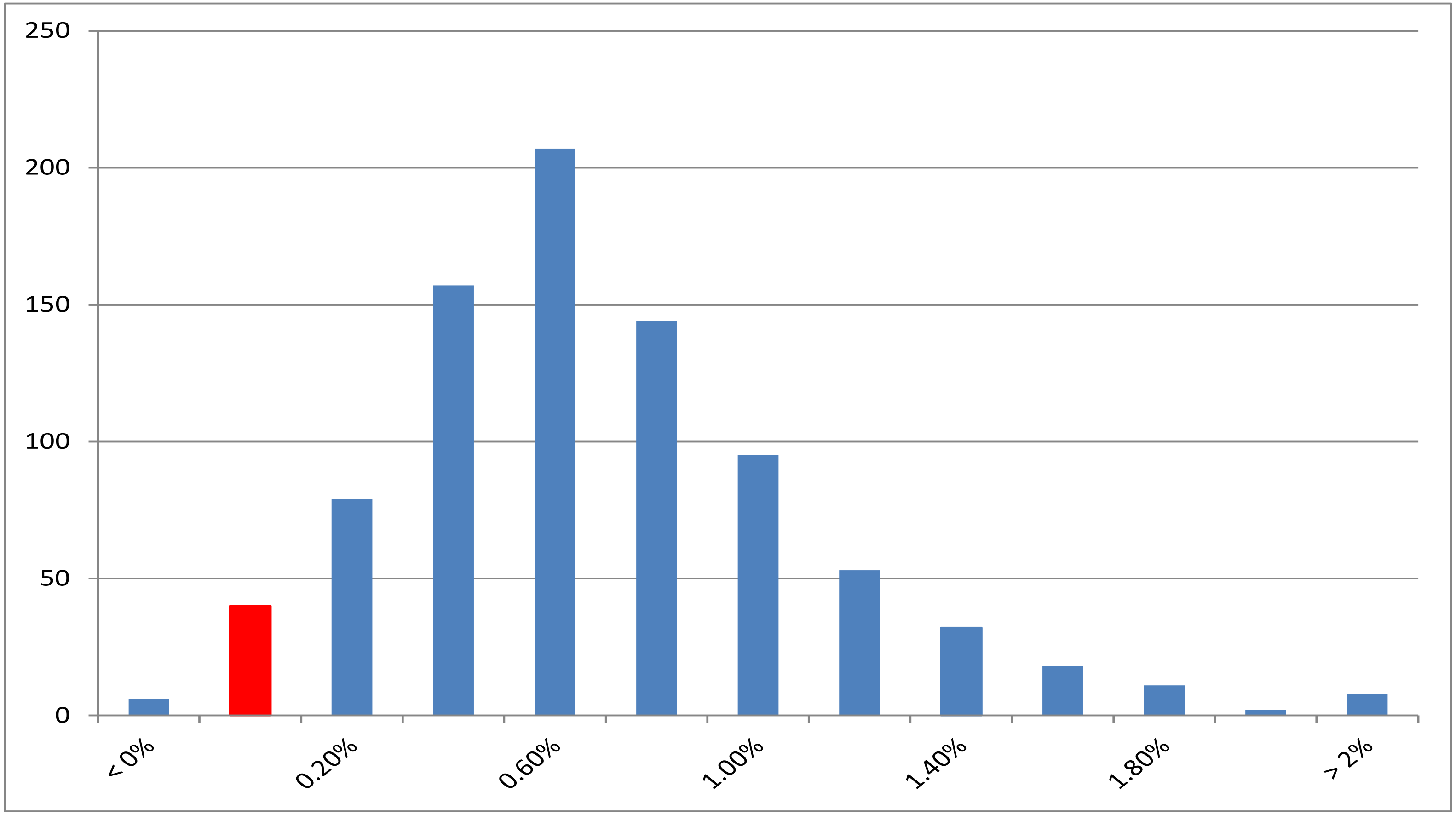
# Distribution of Changes: By City
# Total Changes in Full Retirement Rate




Rounded to nearest 0.5% change in rate

# Distribution of Changes: Impact on Full Rate Due to Change in Assumptions




Rounded to nearest 0.2% change in rate



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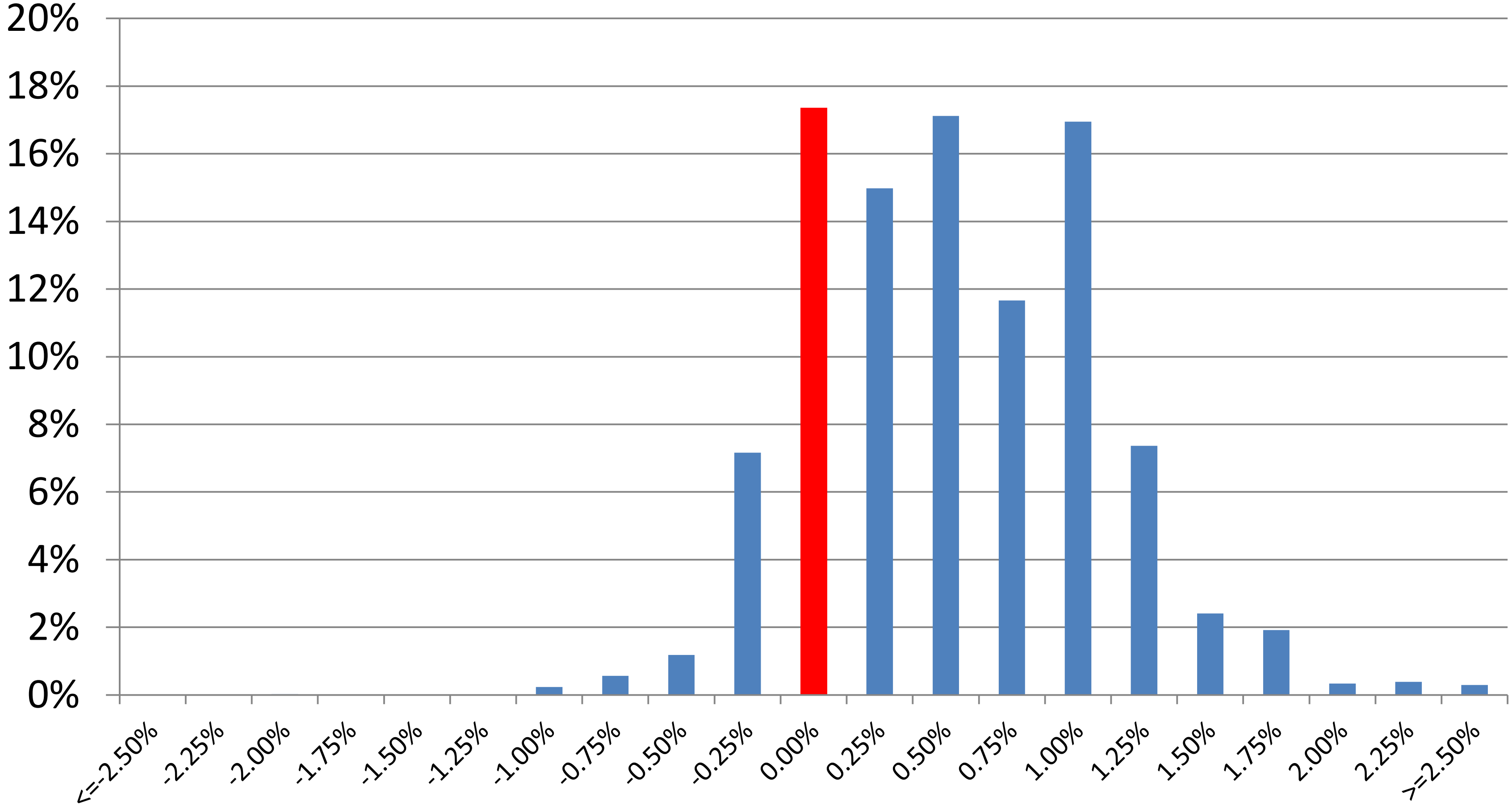
# Distribution of Changes: Payroll Weighted Total Changes in Full Retirement Rate




Rounded to nearest 0.25% change in rate

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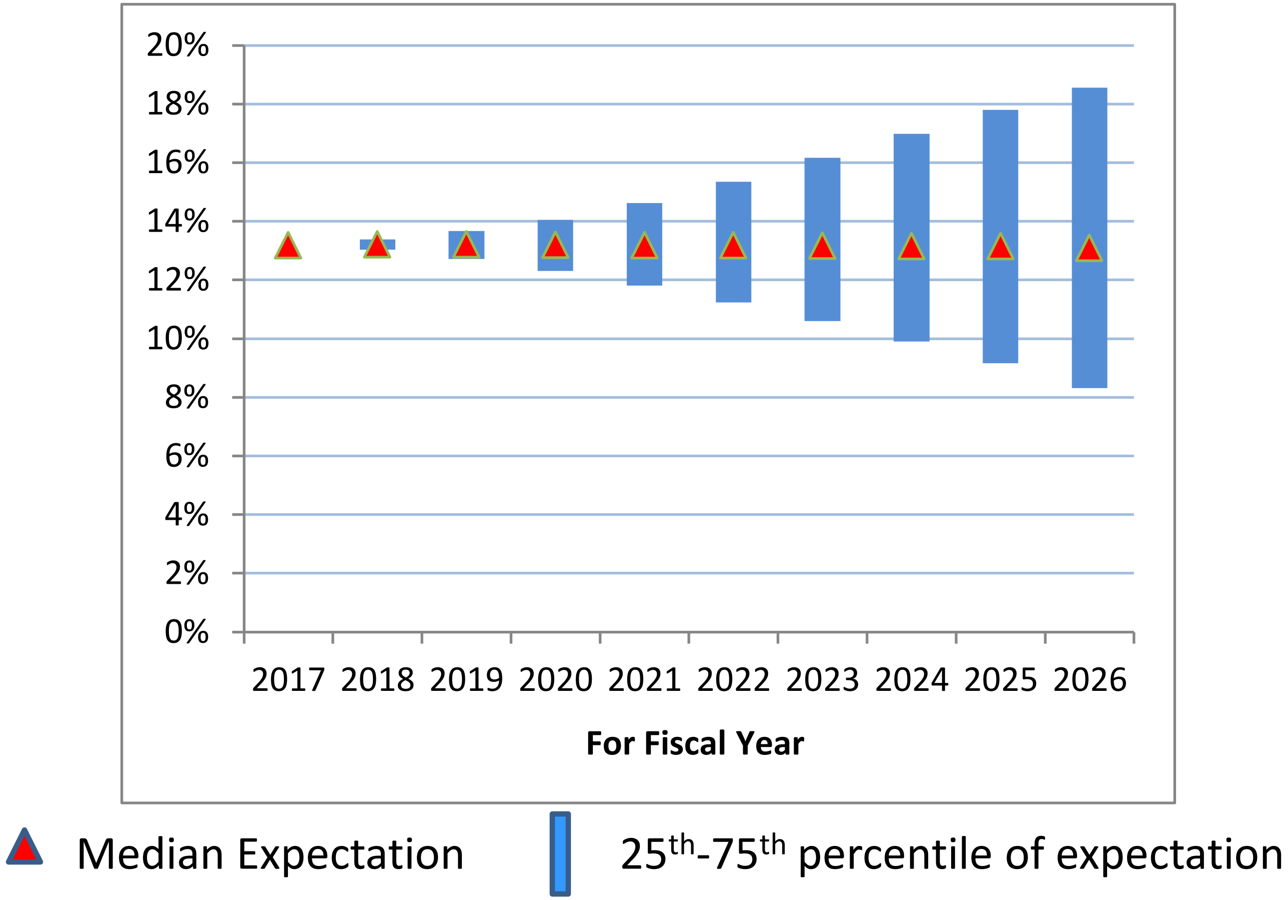
# Projected Aggregate Employer Contribution Rate




- Assumes ADEC met each year, projected from market value of assets as of December 31, 2015
- Assumes continuation of current amortization policy & payroll grows at 3.00% per year
- Investment returns are variable in the stochastic process



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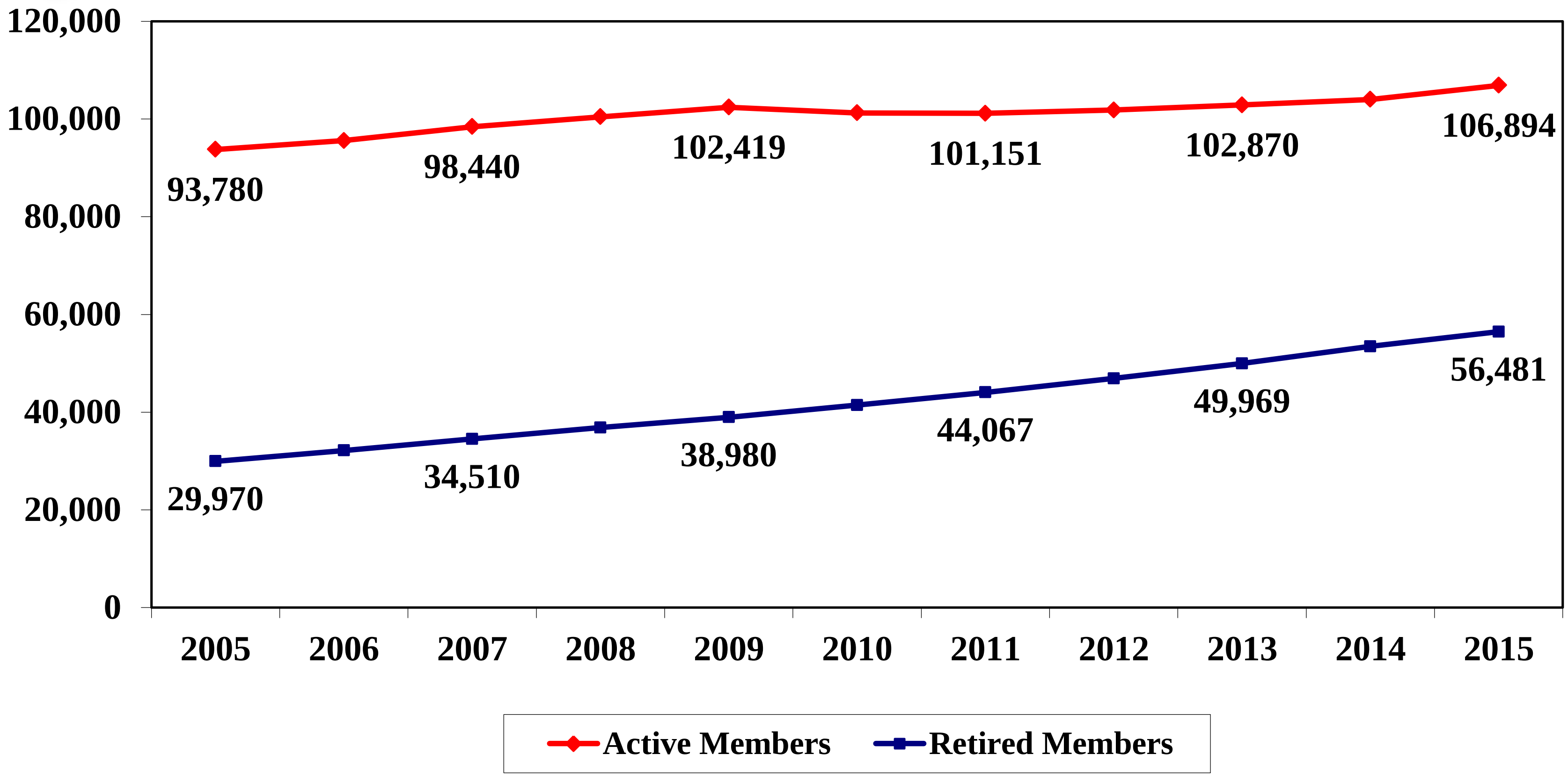
# Phase-In

- As of this valuation, 71 TMRS cities still had phase-in bases from the 2013 changes
- A new phase-in base was established in conjunction with the 2015 valuation if the change in actuarial assumptions & methods caused a City's rate to increase by more than 0.50% net of any experience gain. The City could phase-into that increase by 0.50% per year.
  - 400 cities fall into this category
  - Average new phase-in base for these cities is 0.40%
- The new base is combined with the remaining base from 2013 and will be phased in by 0.50% per year.
  - 431 cities have a phase-in rate this year
  - Expected Runoff:
    - 145 cities with a phase-in in 2016 valuation (15% of overall payroll)
    - 43 cities with a phase-in in 2017 valuation (3% of overall payroll)
    - 13 cities with a phase-in in 2018 valuation (0% of overall payroll)
    - 7 cities with a phase-in in 2019 valuation (0% of overall payroll)
    - 2 cities with a phase-in in 2020 valuation (0% of overall payroll)
- We continue to recommend cities contribute their full rate

# Active Members & Retired Members




1.32% average increase in active members since 2005; 2.8% increase in 2015

6.54% average increase in retired members since 2005; 5.7% increase in 2015

There are currently 1.9 actives for every retiree, down from 3.1 in 2005



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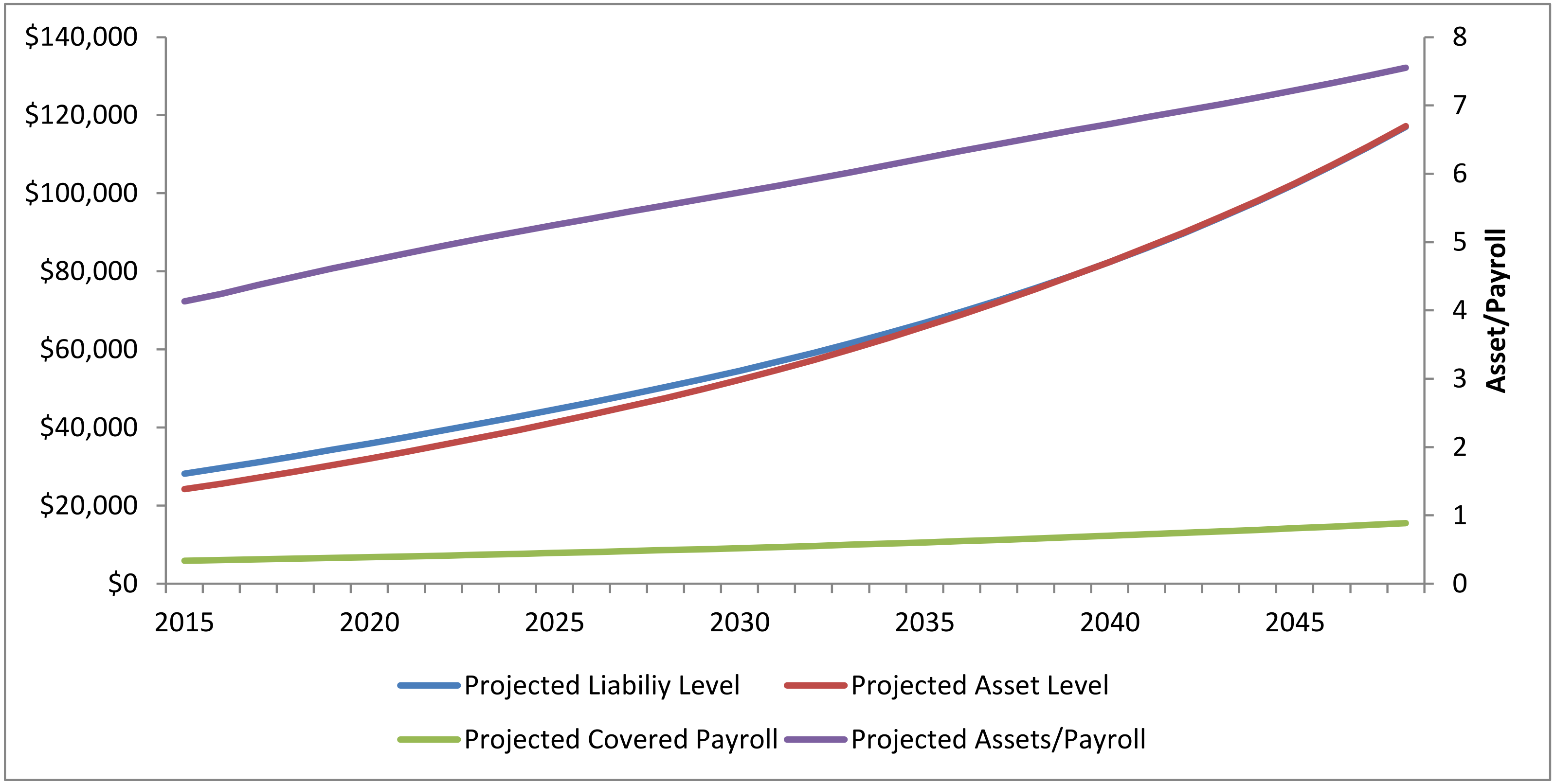
# Measures of Leverage

- As the plan matures, the ratio of assets to payroll will continue to climb, and could eventually double compared to today's ratio
- This ratio correlates with how large a potential loss could be in relation to the impact on the contribution rates
- Example: $1,000,000 asset; 10% loss yields:
  - $1,000,000 * .1 = $100,000 / amortization factor 16.29 = increase in annual contribution of $6,140
  - If payroll is $250,000 (4.0 ratio), this is 2.46% of payroll
  - If payroll is $150,000 (6.7 ratio), this is 4.09% of payroll

# Measures of Leverage



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# Sustainability

- **Sustainability is (per Google, Dictionary, etc)**
  - the capacity to endure
  - the endurance of systems and processes
  - pertaining to a system that maintains its own viability by using techniques that allow for continual reuse
  - able to be supported as with the basic necessities or sufficient funds
  - able to be used without being completely used up or destroyed
- **Per Wikipedia: *"Sustainability*** *can also be defined as a socio-ecological process characterized by the pursuit of a common ideal. An ideal is by definition unattainable in a given time/space but endlessly approachable, and this endless pursuit is what builds in sustainability in the process"*

# Sustainability Checklist

- The following is a list of metrics that can be used to assess the sustainability of a pension plan.
- This can be used to gain a larger picture of sources of risk on a pension plan
- Please note the aggregate results are much more meaningful than the impact of any one item.
- Also, it is unnecessary to achieve a 5 star result on each item to be considered sustainable.  In fact, that type of result may suggest too much conservatism.

# Sustainability Checklist

| | Answer | Stars |
|---|---|---|
| Do you have a legally required contribution amount based on accepted actuarial practices? | Yes | ***** |
| Does the contribution amount automatically adjust if certain minimums are not met? | Yes | ***** |
| Have you met the required contribution each year over the past 10 years? | Yes | ***** |
| What is the amortization period for the current UAAL based on the required contribution? | 21 Years | **** |
| What is the amortization period for new losses? | 25 Years | **** |
| What is the sum of your amortization period and asset smoothing period? | 35 Years | **** |
| What is your investment return assumption? | 6.75% | ***** |
| Does your current investment policy and target asset allocation support the current assumption? | Yes | **** |
| What is your payroll (revenue) growth assumption? | 3.00% | **** |
| Are there any benefits, that are likely to be paid, not reflected in the liabilities and contributions? | Yes^ | *** |
| Are any of the liabilities contingent on future experience? | No# | *** |
| What is your short – intermediate term negative cash flow as a % of assets? | 0-1% | ***** |
| What is your longer term negative cash flow as a % of assets? | 2-3% | ***** |
| What is your current active to retiree ratio? | 1.9 | **** |
| What is your longer term active to retiree ratio? | 1.0-1.3 | ** |
| What is your ratio of accrued liability to payroll? | 4.9 | **** |
| What is your longer term ratio of accrued liability to payroll? | 6.5-7.5 | ** |



^ It is possible to get interest credits to member accounts higher than 5%. Also, ad hoc COLAs are possible, but have a strong funding policy.
# COLAs are tied to actual CPI, which is usually correlated to economic growth. Annuity Purchase Rates adjust to reflect changes in mortality.

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# Sustainability Checklist

- TMRS grades out well on the checklist
  - Required actuarial contributions
  - Closed amortization periods in the 20-25 year range
  - Reasonable investment return and payroll growth assumptions
  - Manageable short and long term cash flow needs
  - Benefit that automatically adjusts to changing mortality patterns

- Items to pay attention to
  - Longer term liability (or asset) to payroll ratios will increase contribution rate volatility
  - As the System achieves higher funded ratios, could be pressure to enhance benefits in ways not currently anticipated in the funding policy
    - May or may not be based on good experience

# In Summary

- Overall System-wide "health" continues to improve
  - Overall funded levels continue to improve
  - Even with the lower discount rate, contributions rates have remained relatively stable
- With no changes in assumptions, the expectation is for an increasing funded ratio over the next few valuations and continued stability in the contribution rates, System-wide



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