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An Actuarial Review of Public Pension Challenges

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September 14, 2016



Agenda of Sections

Pension Plan Fundamentals

Public Sector Funding Trends

Pension Plan Headlines

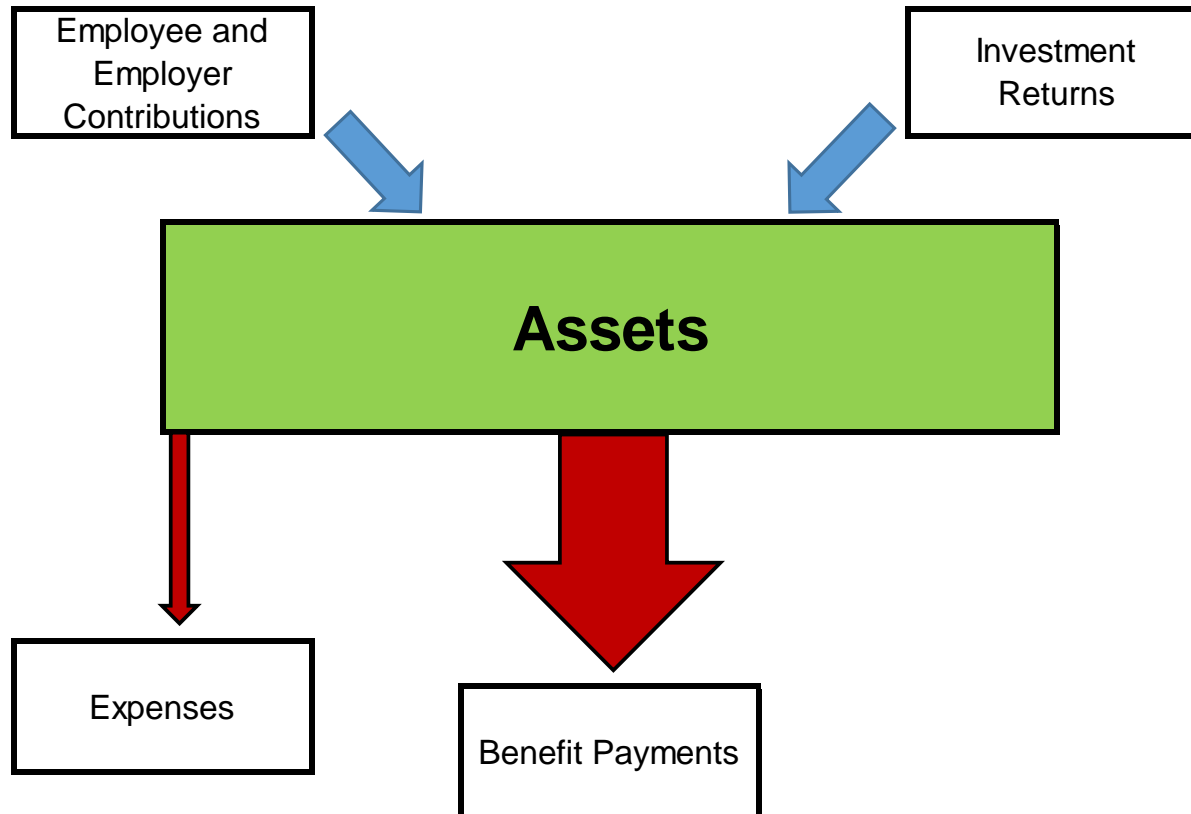
Actuarial Standards Board

Credit Ratings

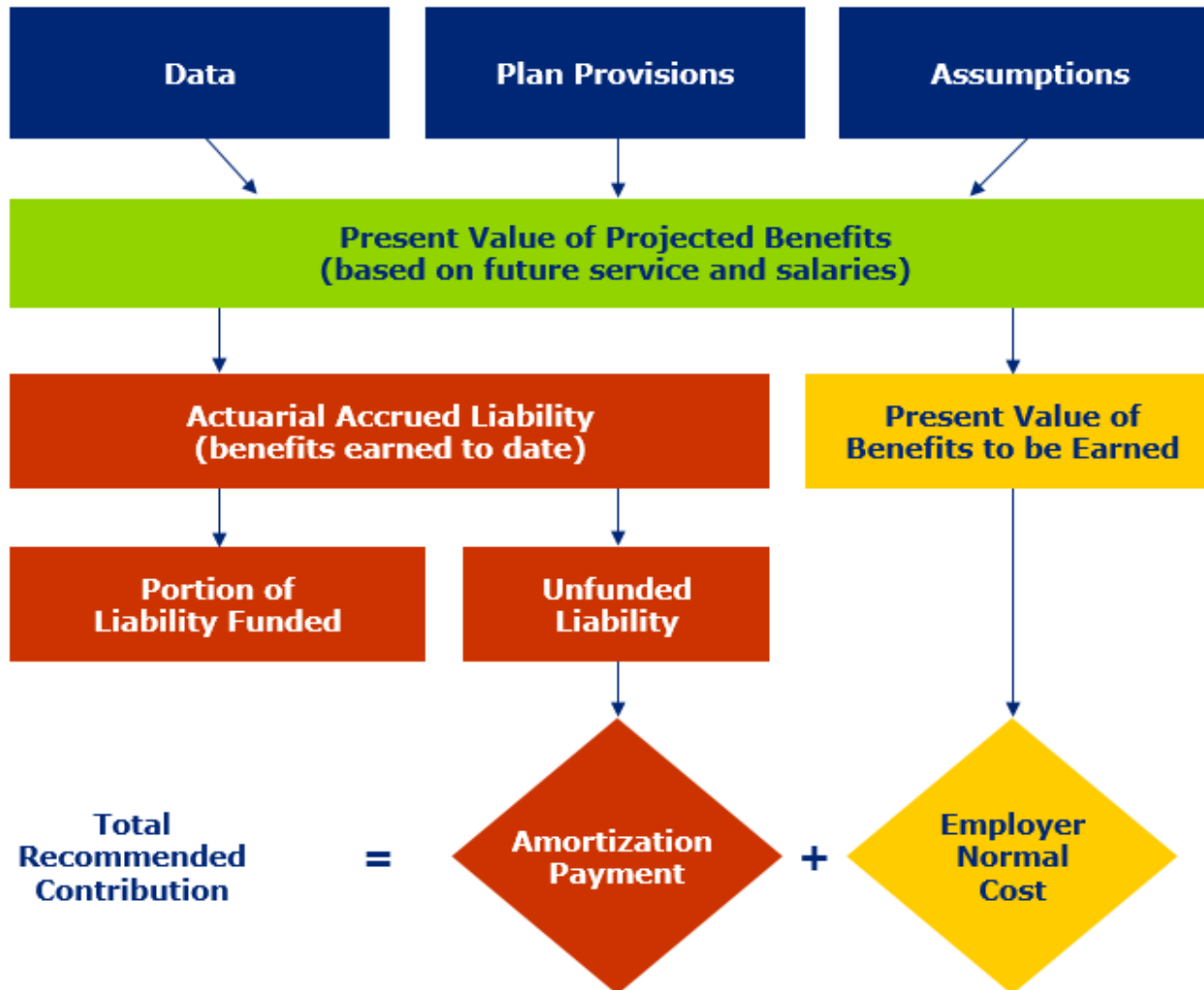
Pension Plan Fundamentals

Pension Plan Axiom

$$\text{Contribution} + \text{Investments} = \text{Benefit Payments} + \text{Expenses}$$



Valuation Process – How the Contribution is Determined



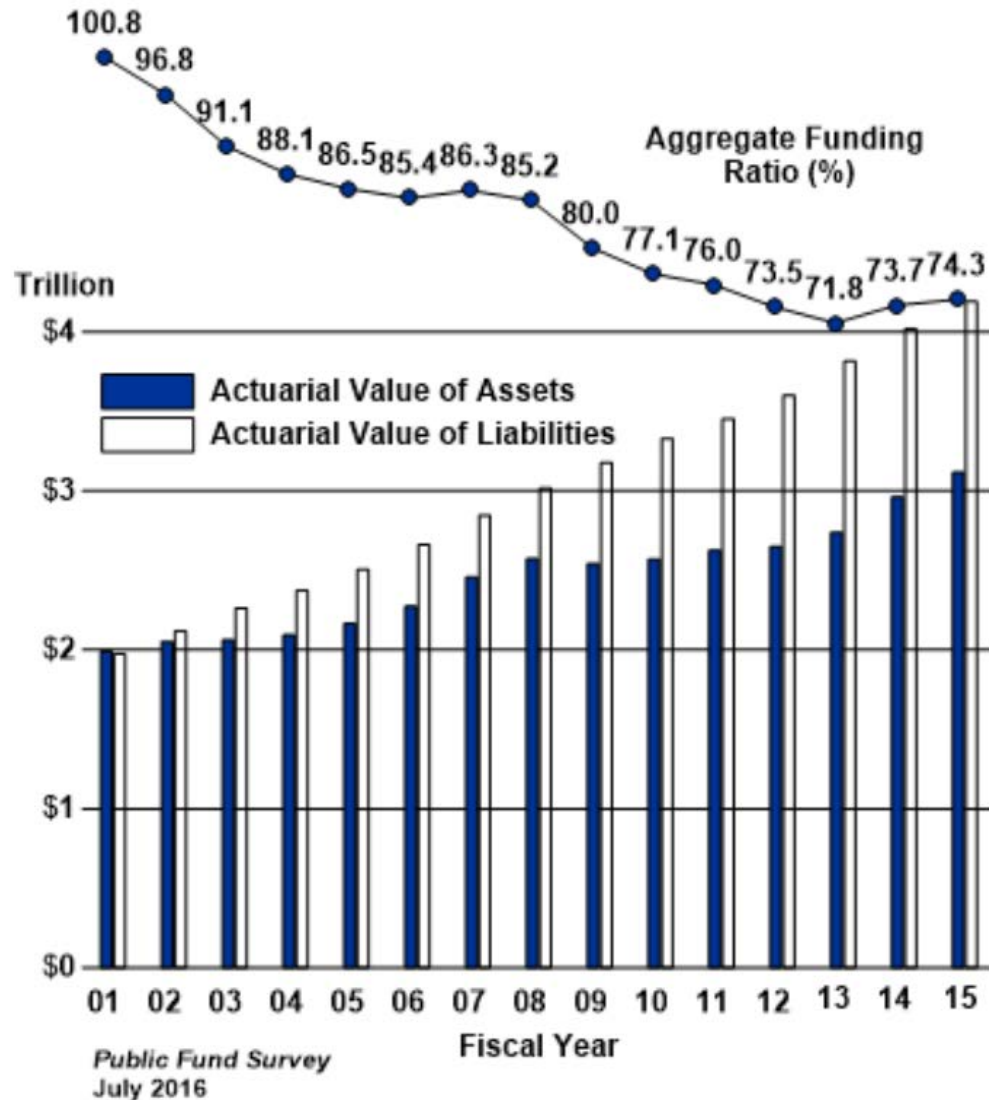
Public Sector Funding Trends

Notable Funding Trends

- Stabilization of funding levels after more than a decade of decline
- Required costs are still rising for some plans due to higher unfunded pension liabilities and insufficient contributions
- Gradual movement from open amortization periods to closed and fixed periods, and toward shorter amortization periods
- Assumption: lower inflation and nominal investment return
- Growing use of phased-in lower investment return assumptions

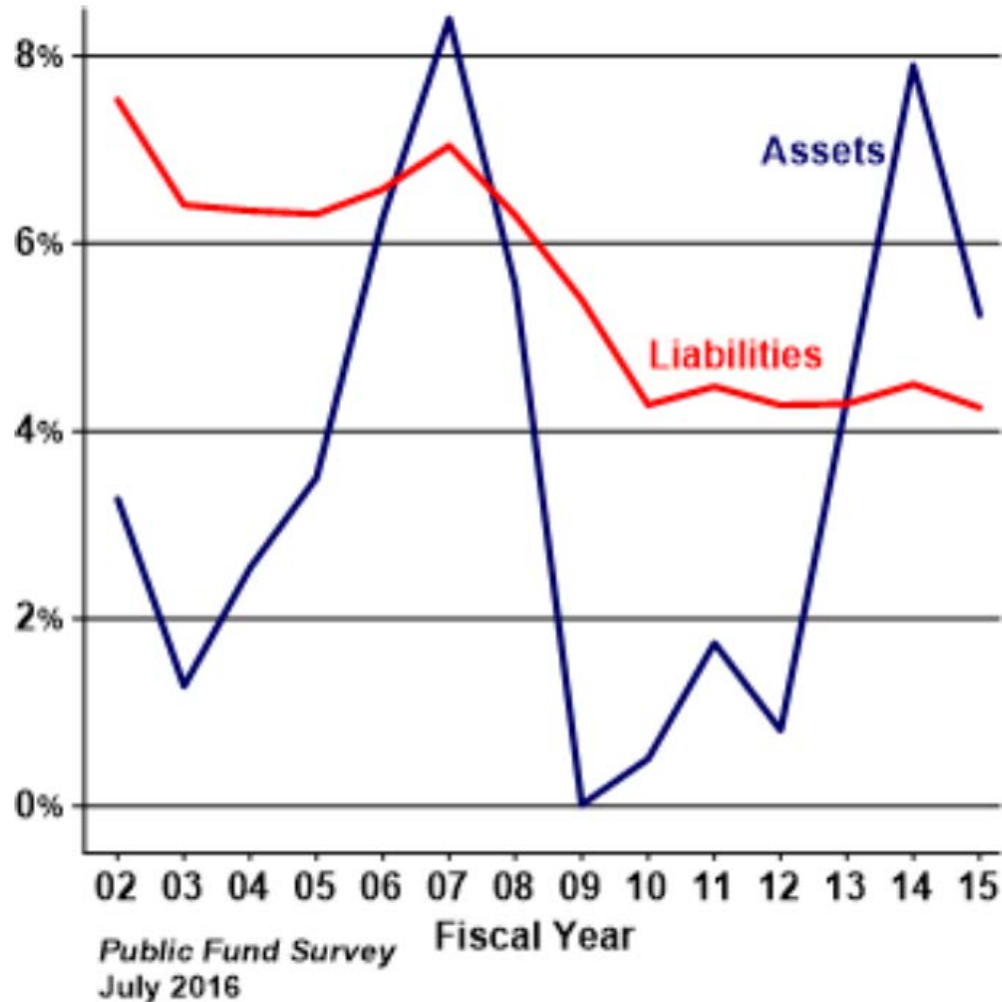
Source: “Overview of Public Pension Funding Issues” 2016 NASRA Convention

Aggregate Public Pension Funding Level, FY01 to FY15



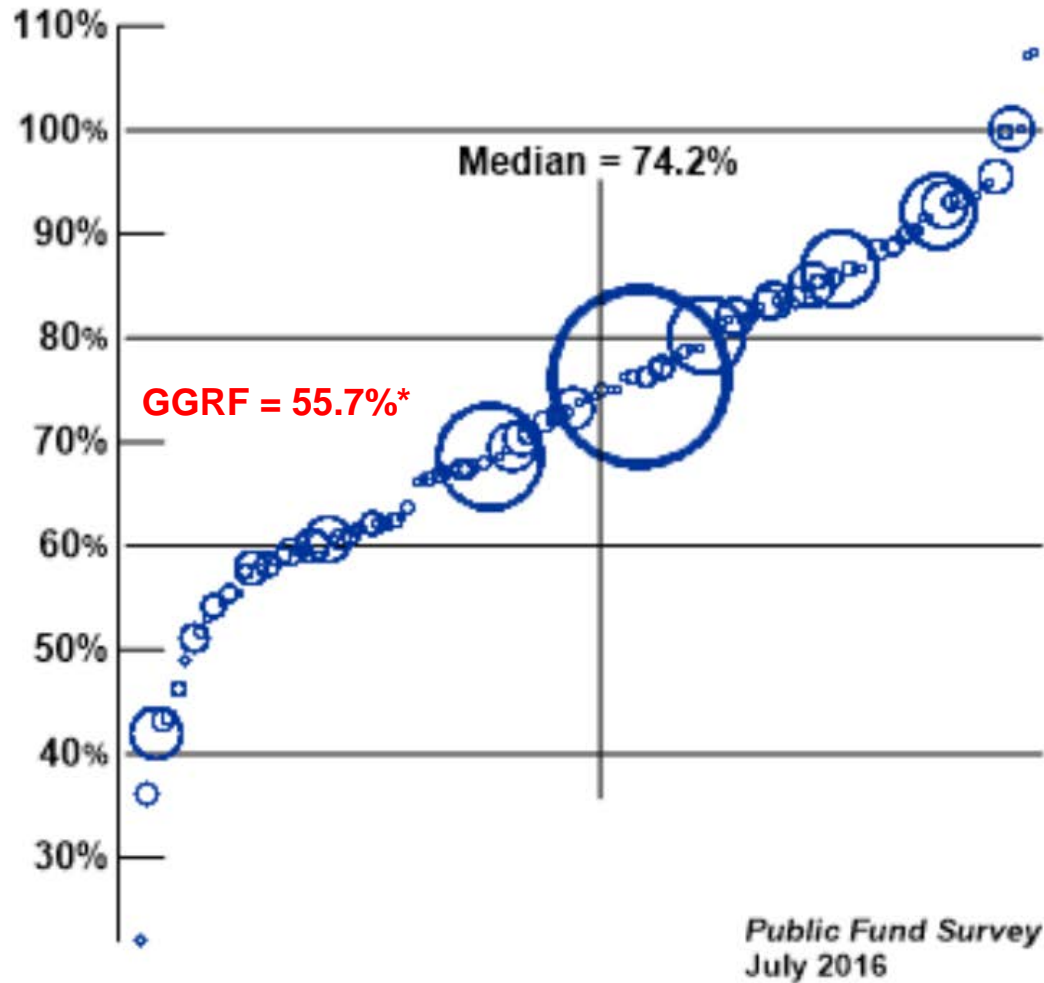
Source: "Overview of Public Pension Funding Issues" 2016 NASRA Convention

Median Change in Actuarial Value of Assets and Liabilities, FY02 to FY15



Source: "Overview of Public Pension Funding Issues" 2016 NASRA Convention

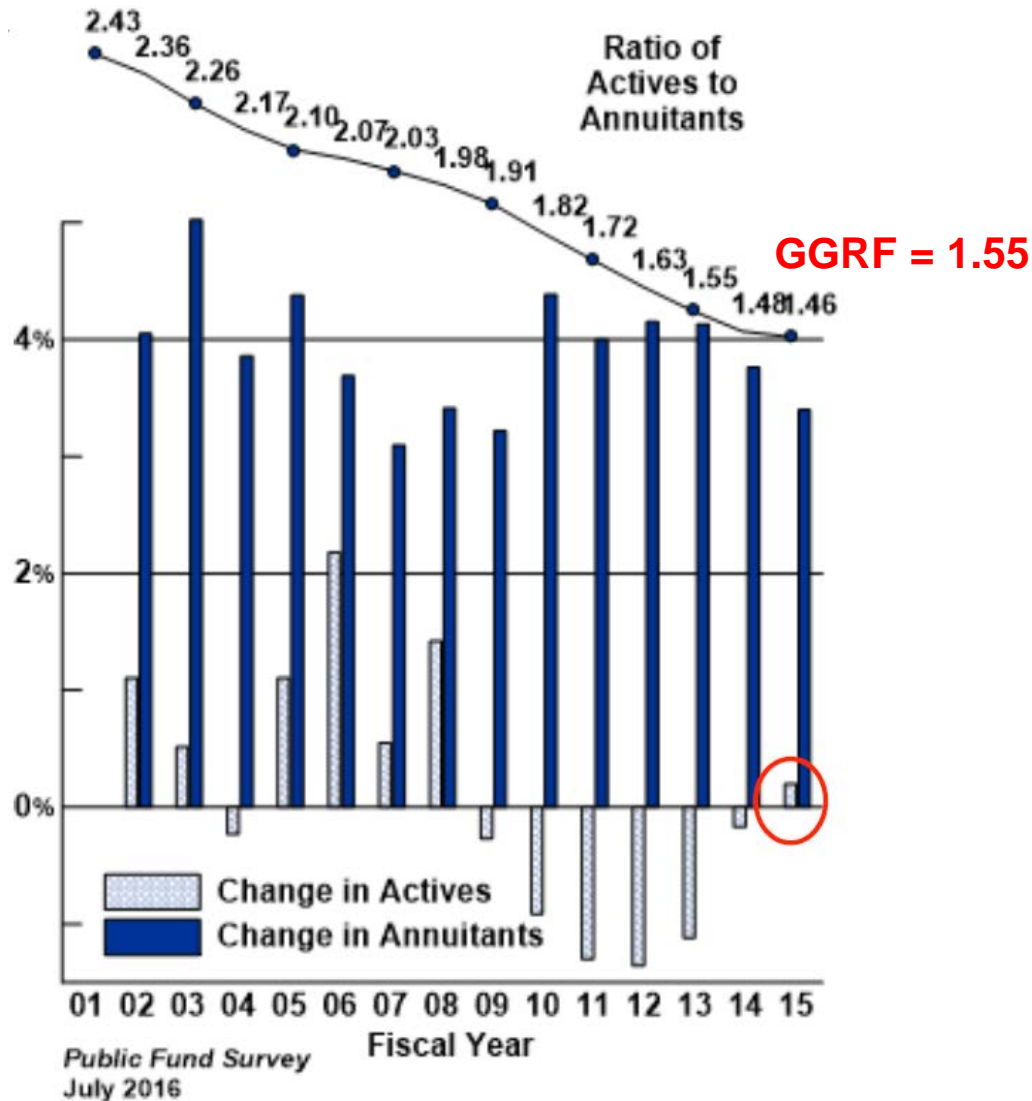
Latest Public Pension Funding Levels



*Size of bubbles
is roughly
proportionate
to size of plan
liabilities*

Source: "Overview of Public Pension Funding Issues" 2016 NASRA Convention
*GGRF values in this presentation based on the 9/30/2015 actuarial valuation report

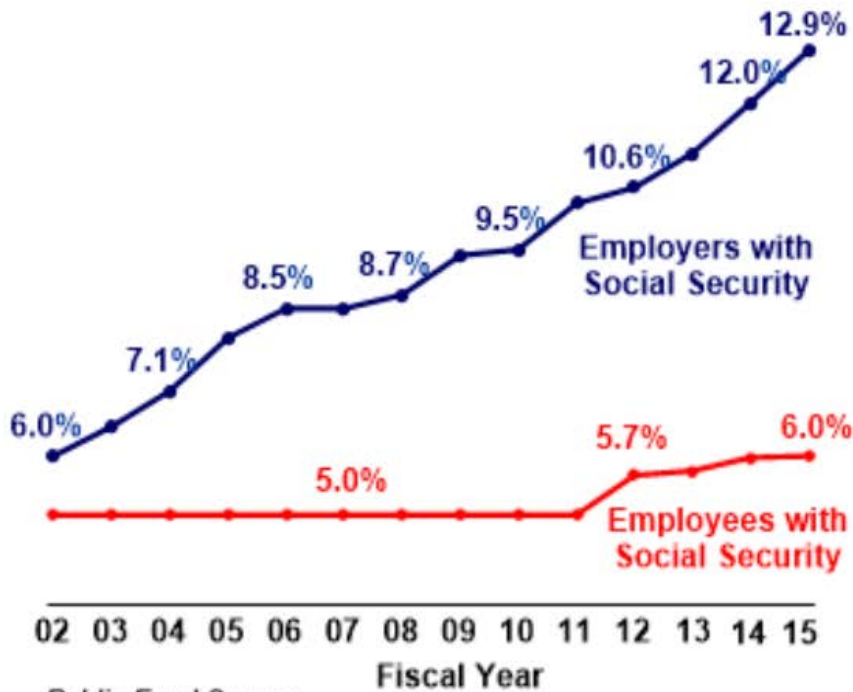
Median change in membership, FY01 to FY15



Source: "Overview of Public Pension Funding Issues" 2016 NASRA Convention

Median Contribution Rates, FY02 to FY15

Social Security – Eligible



Public Fund Survey
July 2016

Social Security – Ineligible

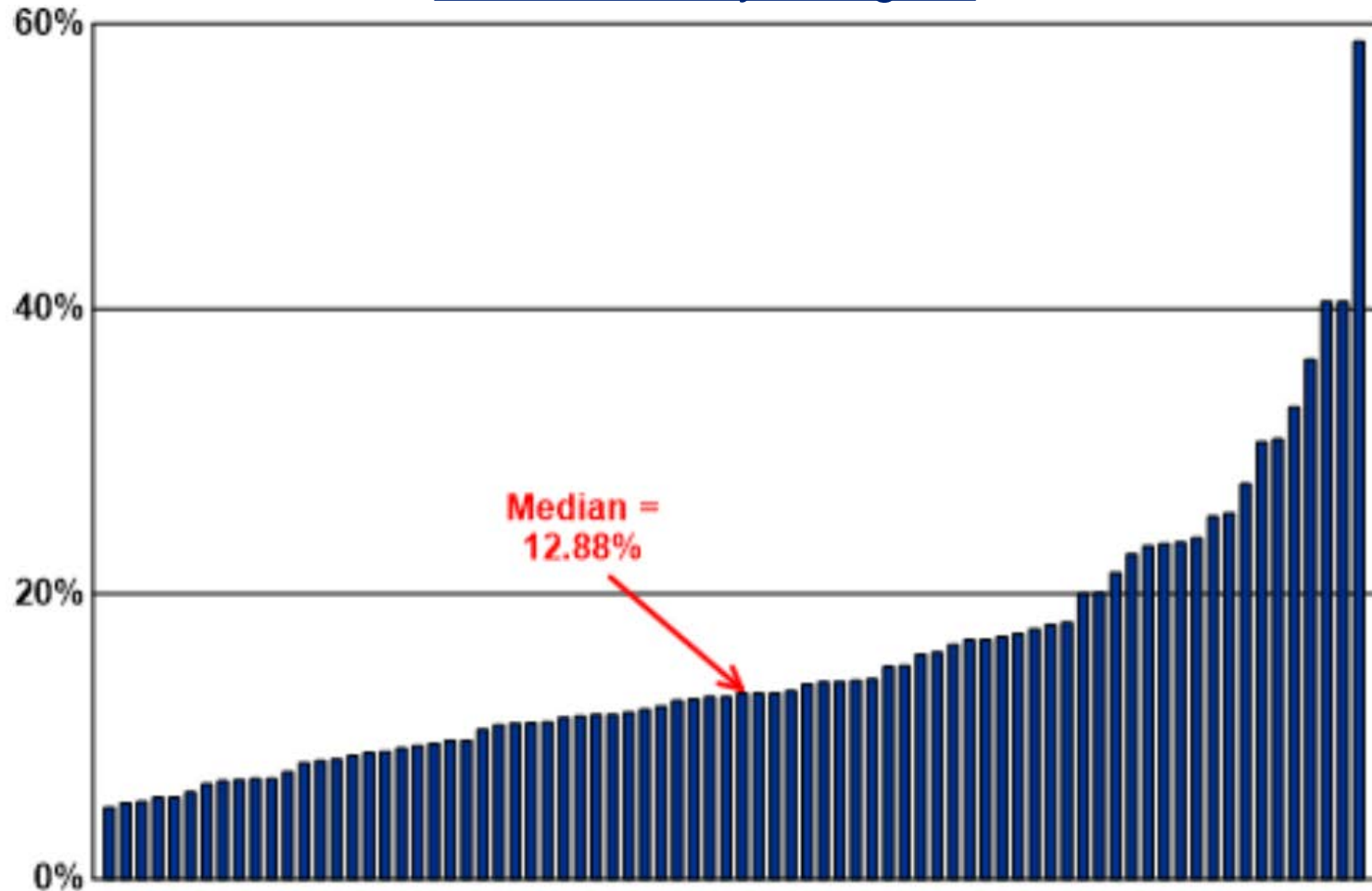


Public Fund Survey
July 2016

Source: “Overview of Public Pension Funding Issues” 2016 NASRA Convention

Distribution of Employer Contribution Rates, FY 15 (General Employees and Teachers)

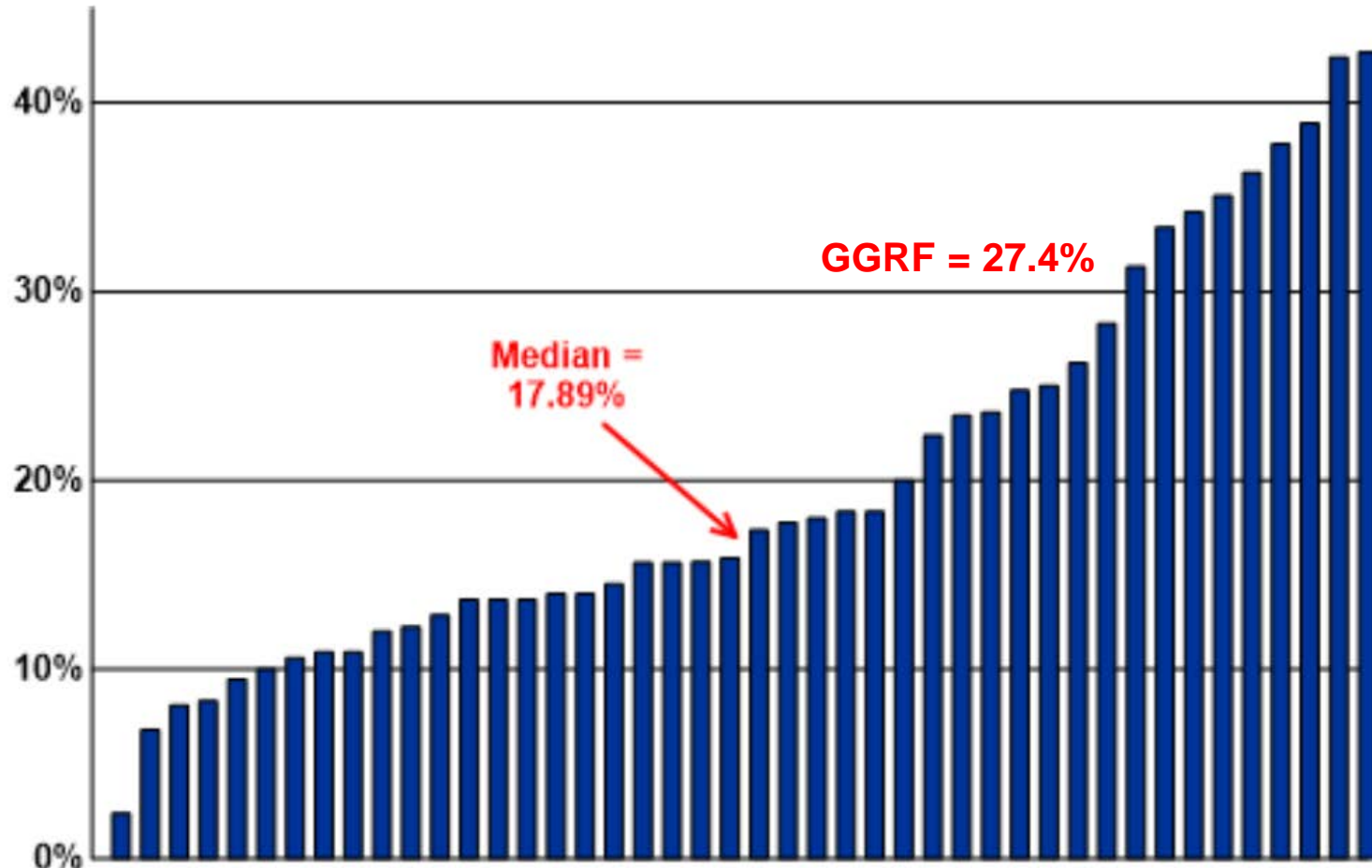
Social Security – Eligible



Source: "Overview of Public Pension Funding Issues" 2016 NASRA Convention

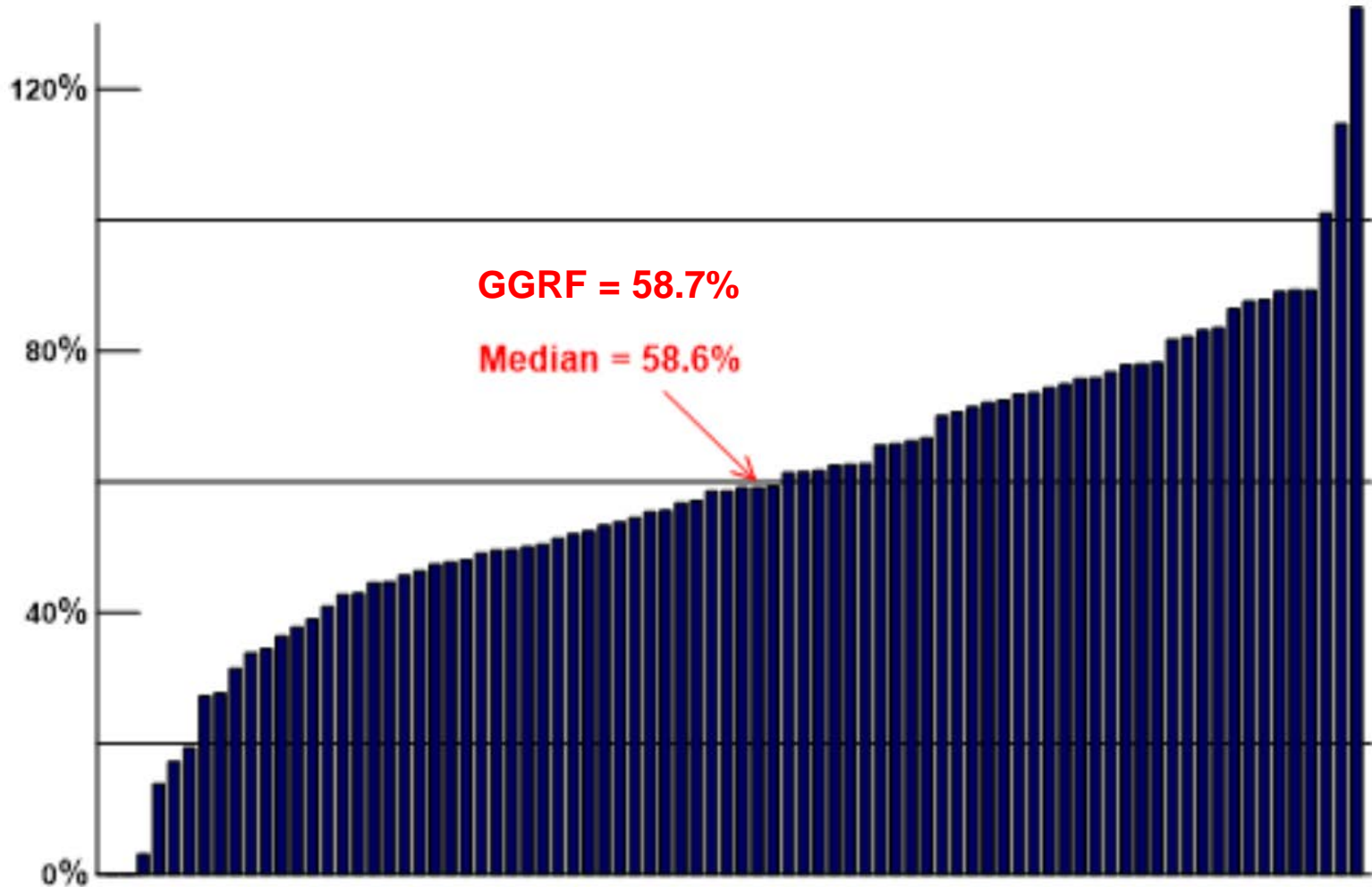
Distribution of Employer Contribution Rates, FY 15 (General Employees and Teachers)

Social Security – Ineligible



Source: "Overview of Public Pension Funding Issues" 2016 NASRA Convention

Distribution of Percentage of Pension Plan Normal Cost Paid by Employees



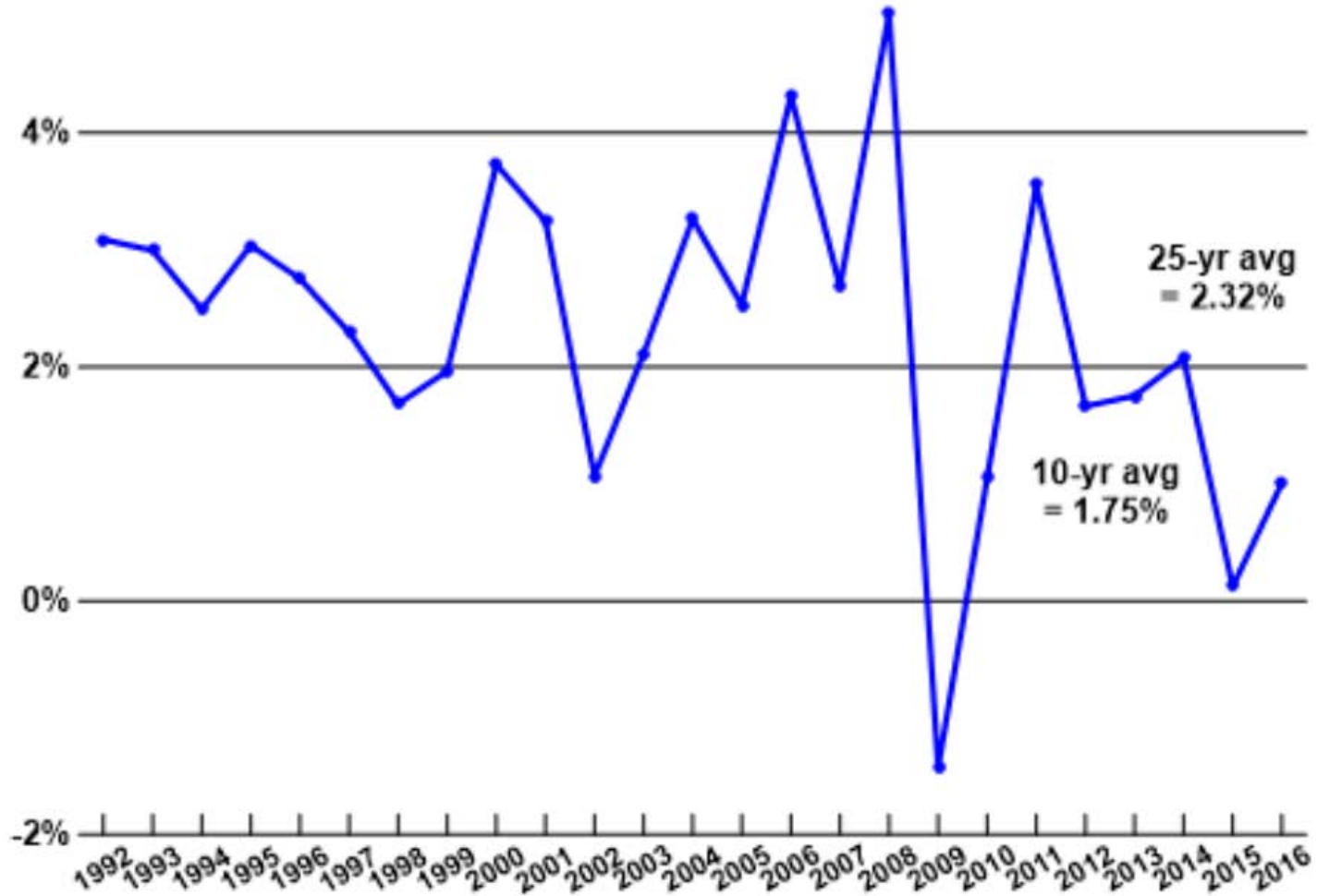
Source: "Overview of Public Pension Funding Issues" 2016 NASRA Convention

Role of Inflation in Public Pension Funding

- The inflation assumption typically serves as the basis of actuarial assumptions for payroll growth and investment return
- Payroll growth is a major driver of liability growth
- The investment return assumption has a major effect on a pension plan's cost and funding level

Source: "Overview of Public Pension Funding Issues" 2016 NASRA Convention

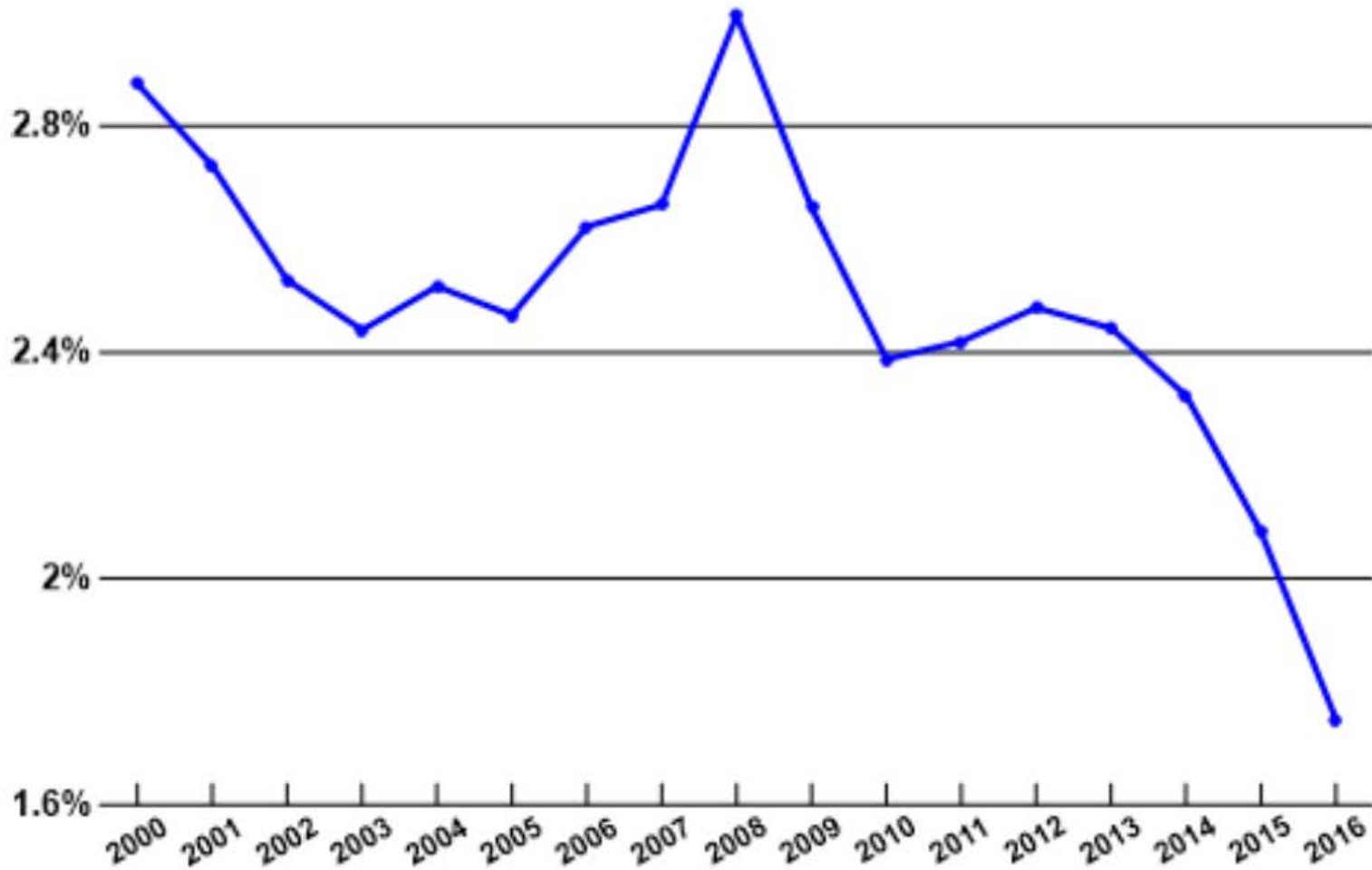
Annual Change in CPI-U for Periods Ended in June, 1992-2016



US Bureau of Labor Statistics

Source: "Overview of Public Pension Funding Issues" 2016 NASRA Convention

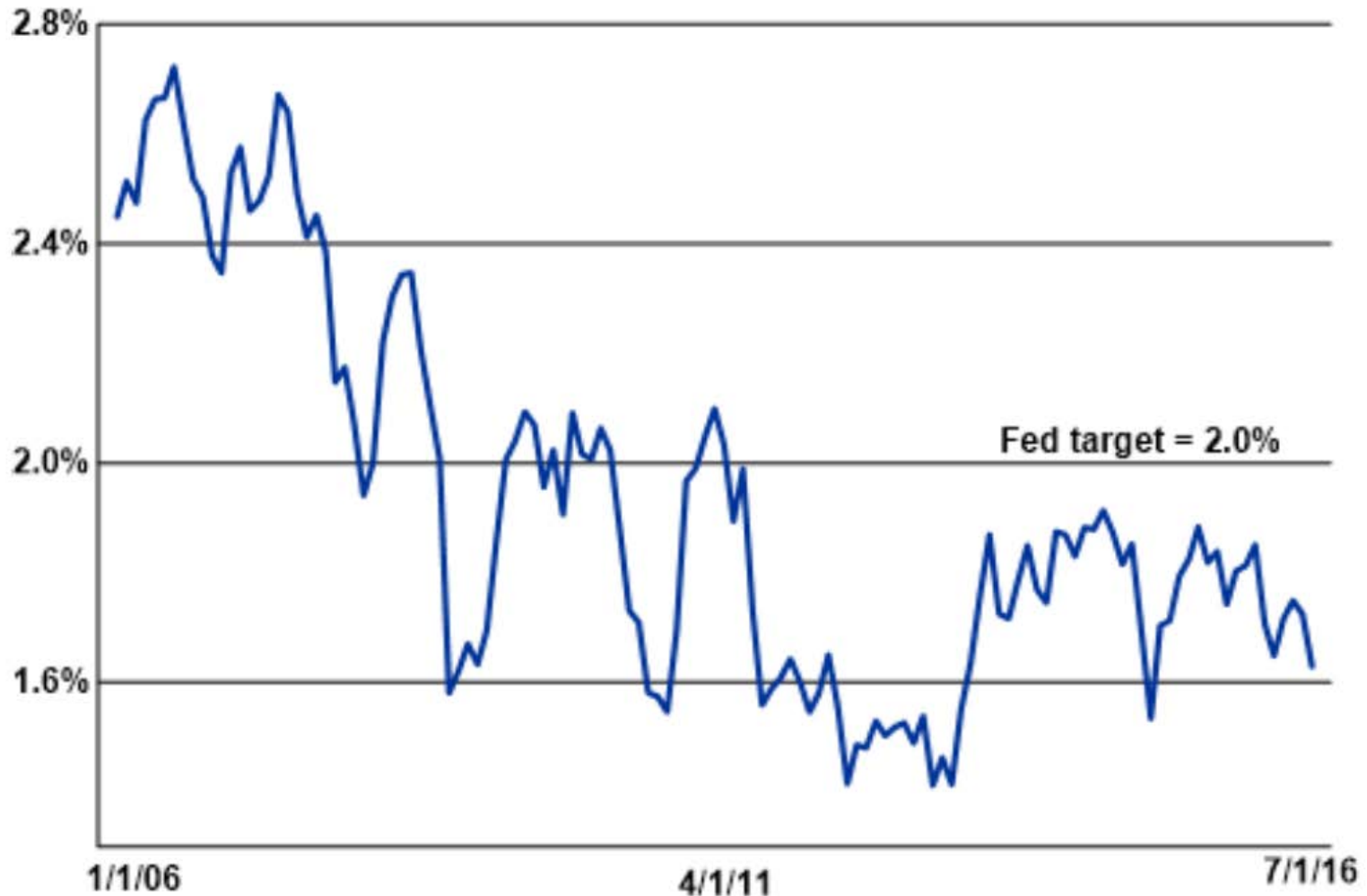
10-Year Rolling Average Inflation (CPI-U)



US Bureau of Labor Statistics

Source: "Overview of Public Pension Funding Issues" 2016 NASRA Convention

Expectations for Inflation Over the Next 10 Years



Cleveland Fed

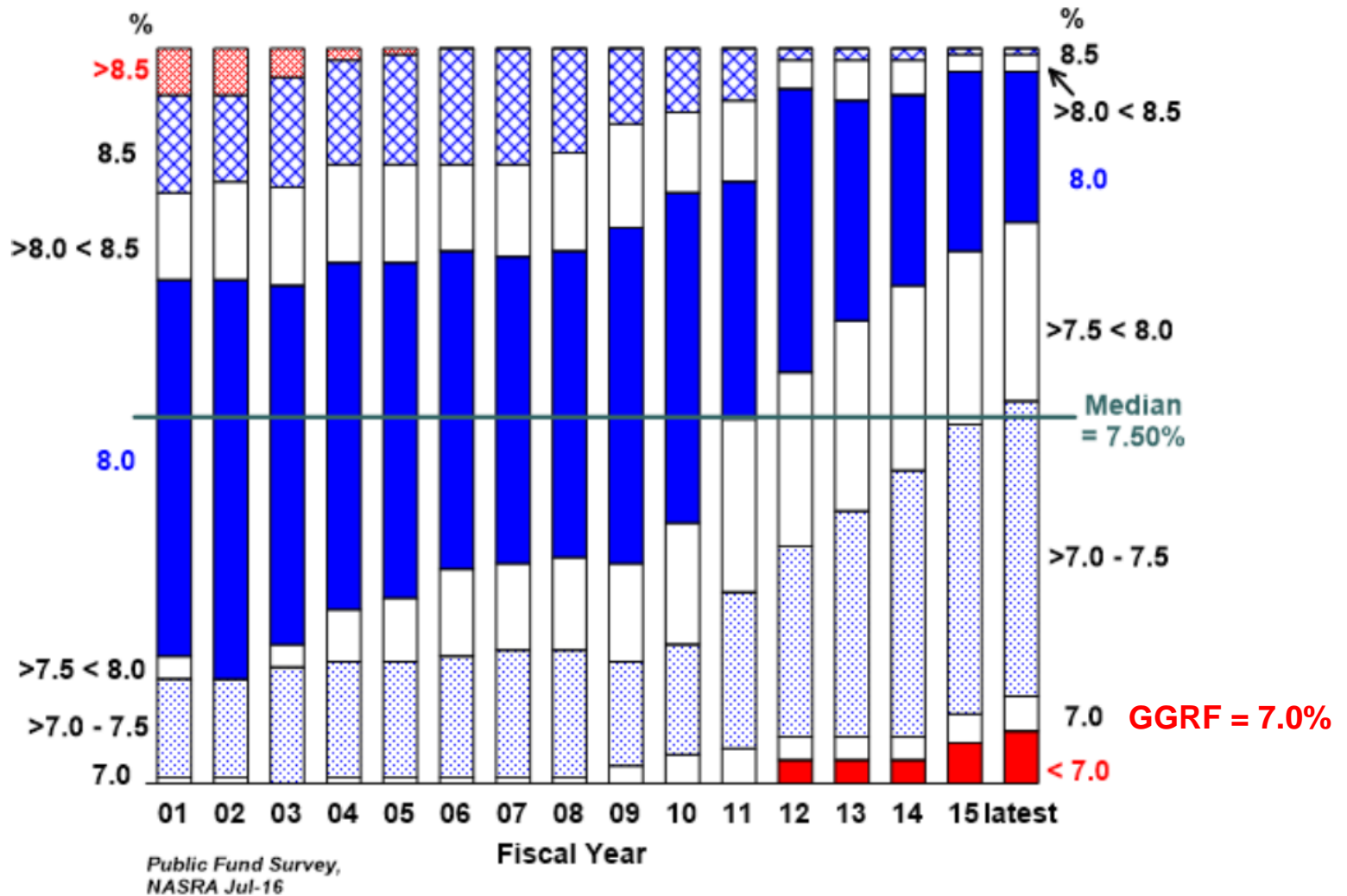
Source: "Overview of Public Pension Funding Issues" 2016 NASRA Convention

Comparison of US to Guam CPI for 2000-2014: Change in Annual Average



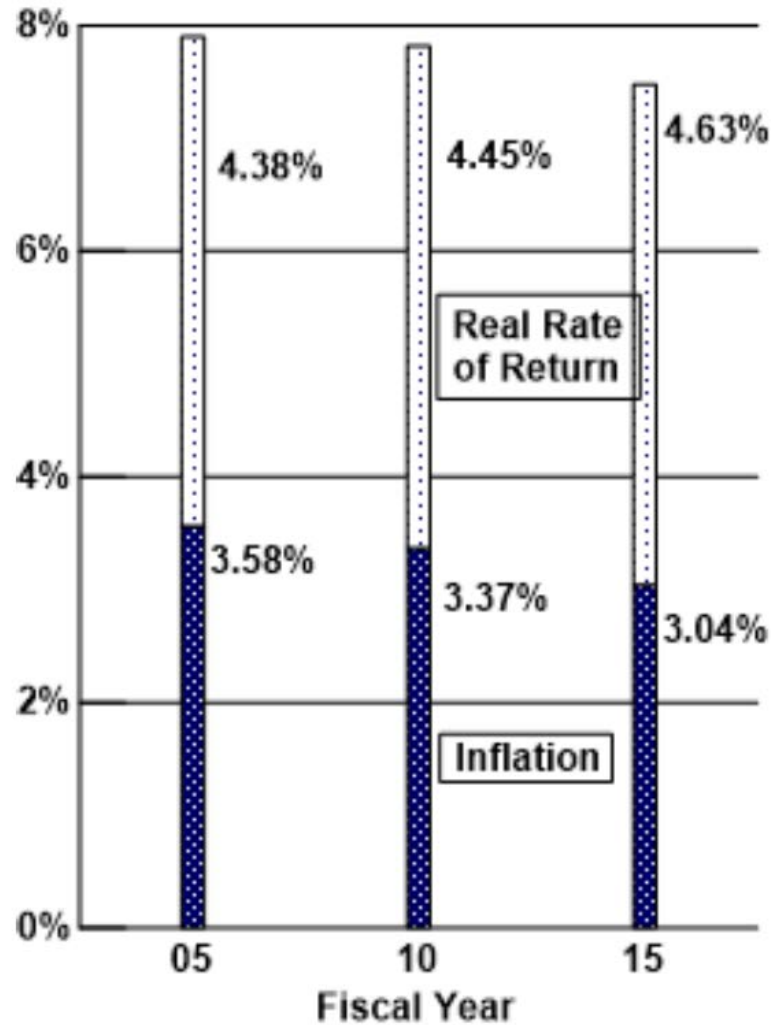
Source: Guam Statistical Yearbook – 2014; U.S. Bureau of Labor Statistics

Change in Distribution of Investment Return Assumptions



Source: "Overview of Public Pension Funding Issues" 2016 NASRA Convention

Change in Average Assumption for Inflation and Real Rate of Return



**GGRF =
4.25% Real Return
2.75% inflation**

Source: "Overview of Public Pension Funding Issues" 2016 NASRA Convention

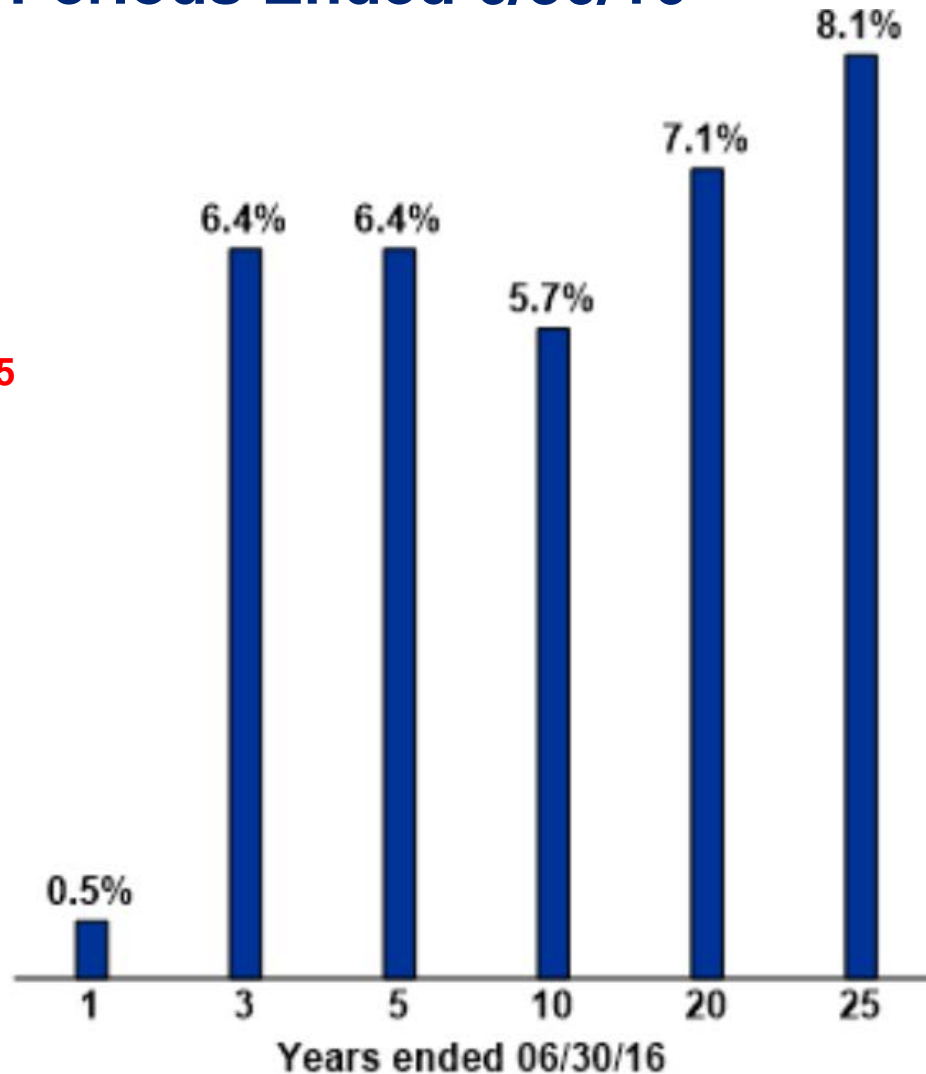
Median Annualized Public Pension Fund Investment Returns for Periods Ended 6/30/16

GGRF as of 9/30/2015

1 Year = 0.6%

5 Year = 8.1%

10 Year = 6.5%



Source: "Overview of Public Pension Funding Issues" 2016 NASRA Convention

Summary

- Funding levels are stabilizing, but funding experience and required costs vary widely
- Inflation remains very low, reducing wage growth rates and rates of liability growth
- Liability growth rates remain low due to slow hiring, low inflation and salary growth, and benefit reductions
- Liability growth rates would be lower still were it not for the headwind of lower investment return assumptions
- Assumed rates for inflation and nominal investment returns have decreased and may continue
- Required contribution rates will remain high for plans with large unfunded liabilities
- Pension challenges vary from state to state and plan to plan; every case is unique

Source: “Overview of Public Pension Funding Issues” 2016 NASRA Convention

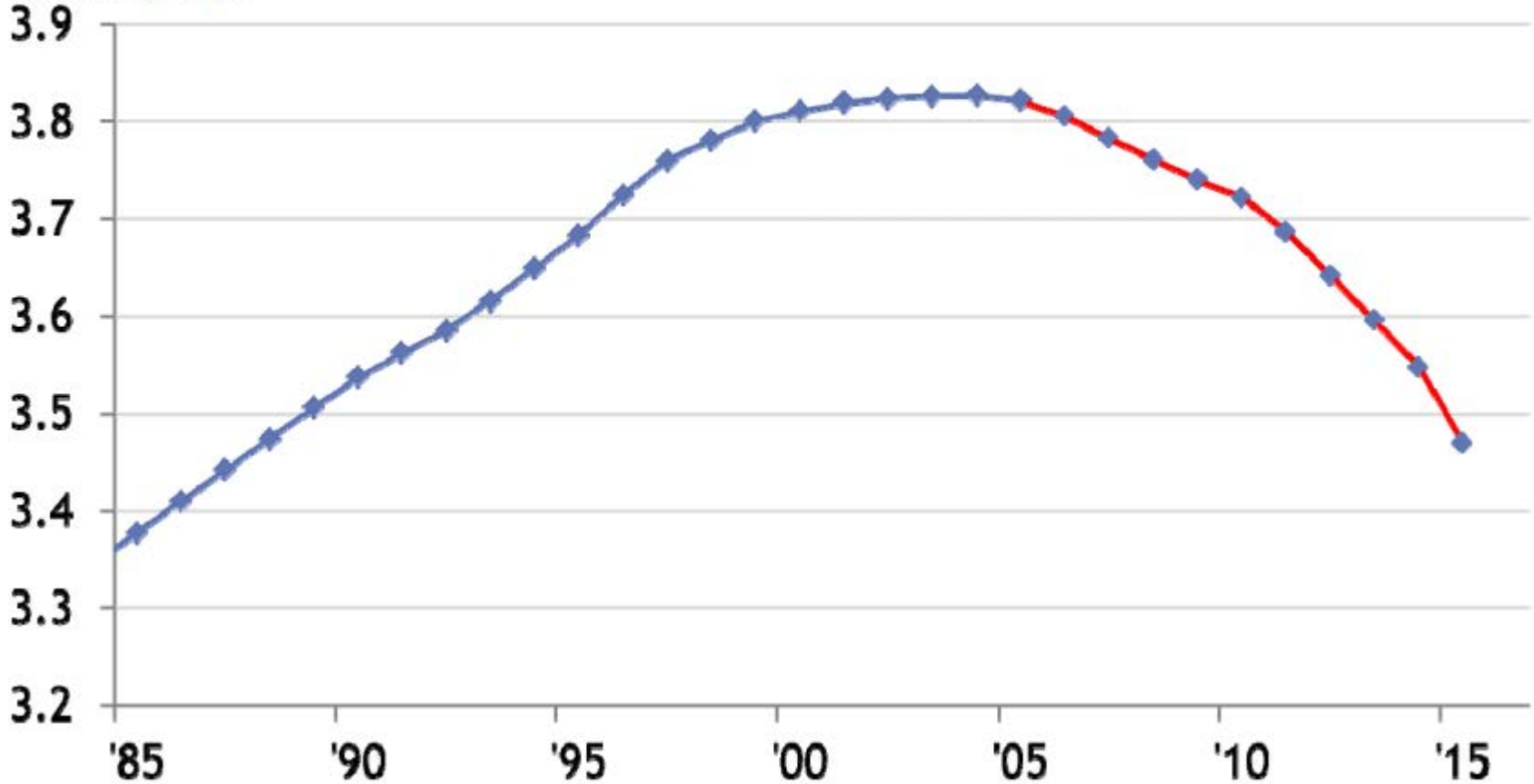
Pension Plan Headlines

Puerto Rico

Overview

Puerto Rico's population decreased over the last 10 years

Millions of People



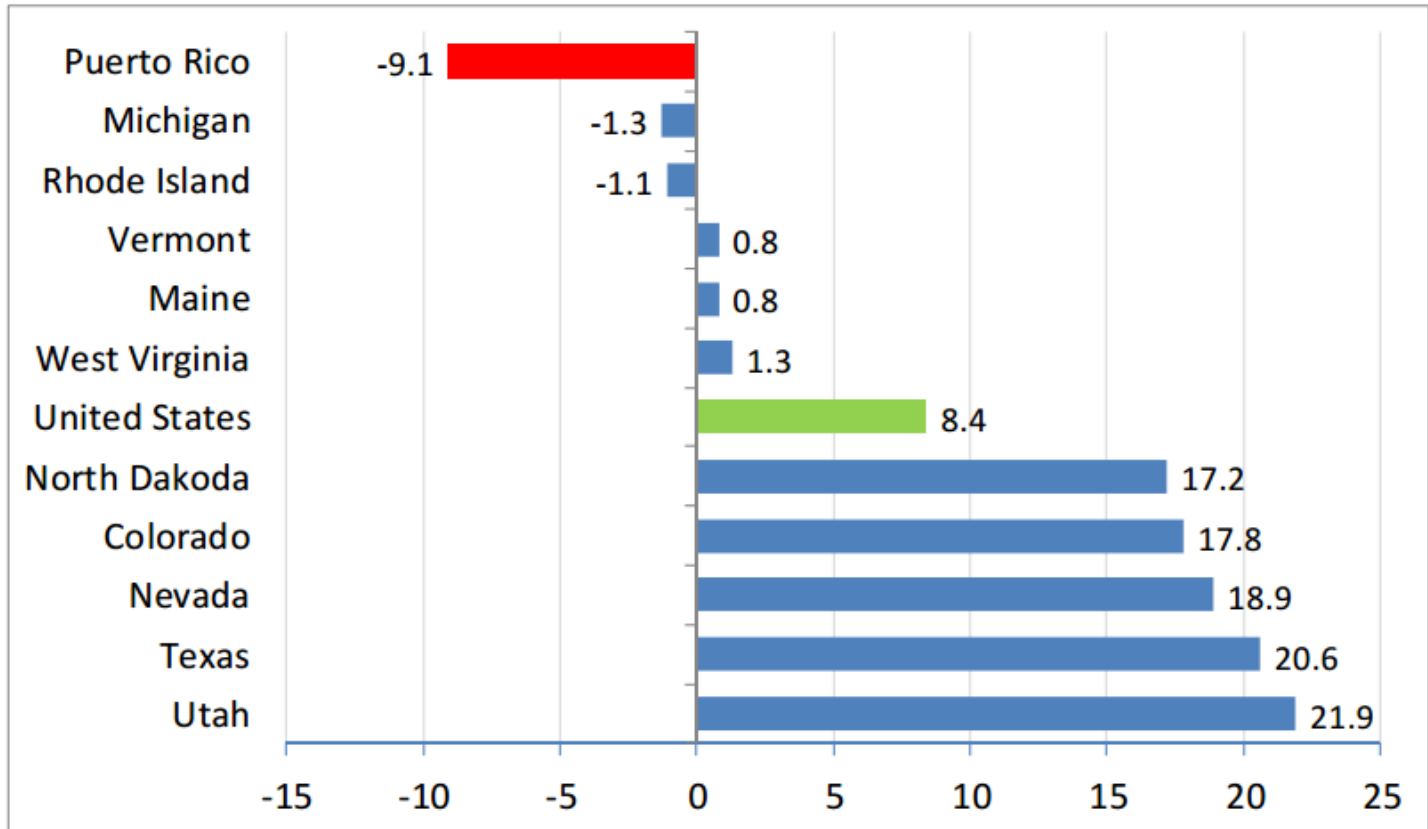
Source: World Bank; Census Bureau

Overview (cont.)

Puerto Rico's population change in last 10 years compared to other US States

Population Change of U.S. States, 2005-2015

In percent

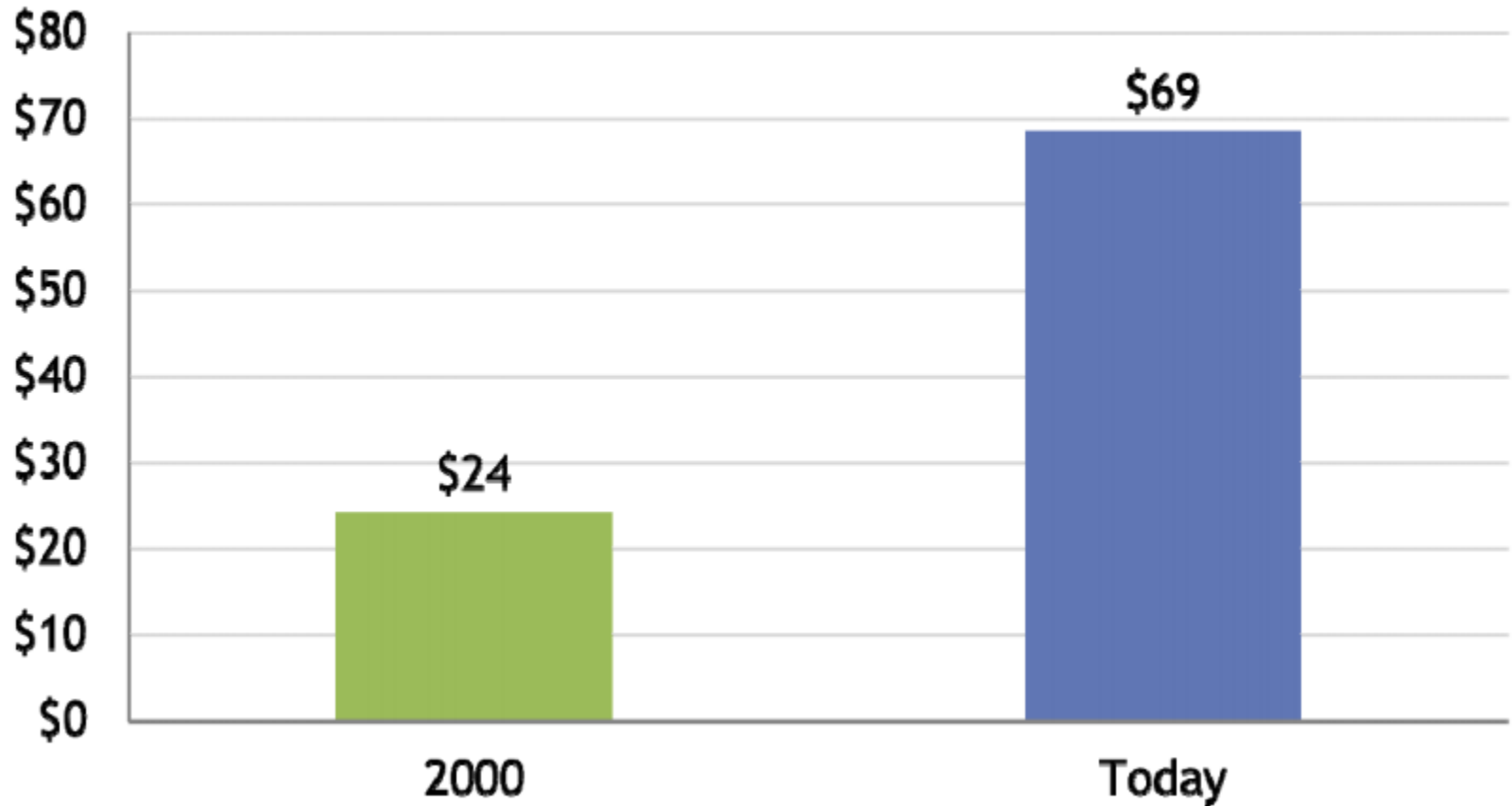


Source: Wall Street Journal; Census Bureau

Overview (cont.)

Puerto Rico's debt stock has almost tripled since 2000

Dollars in Billions



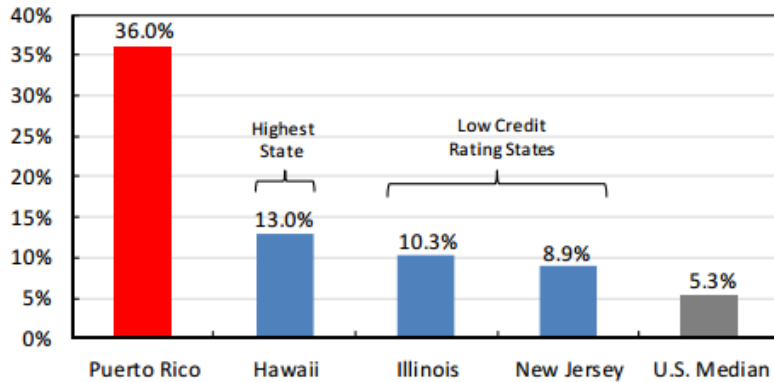
Source: Commonwealth Financial Information and Operating Data Report – Nov. 6, 2015

Overview (cont.)

Puerto Rico's debt compared to other US States

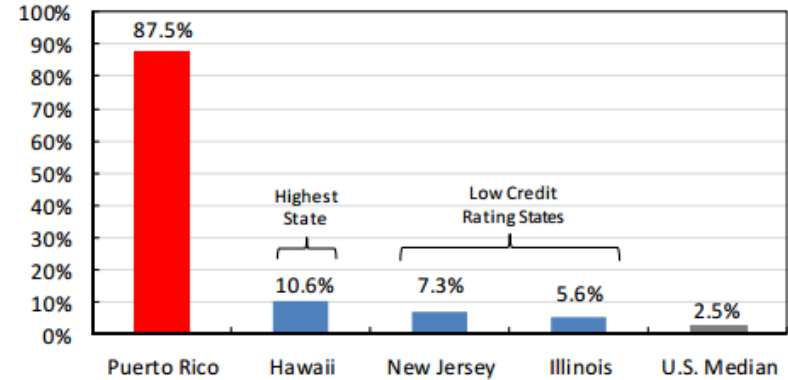
Debt-to-Revenues*

Percent



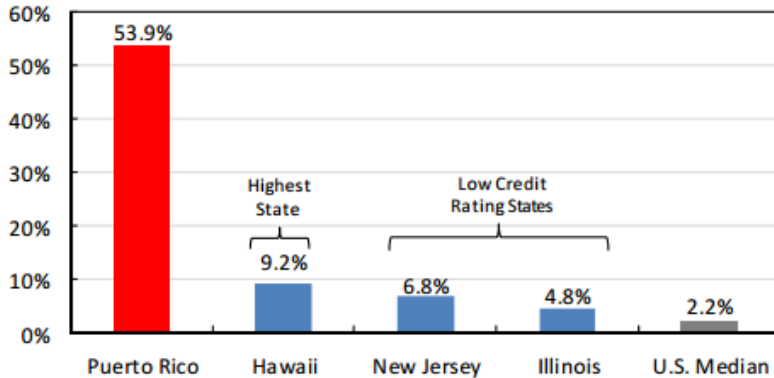
Tax-Supported Debt as a Share of Personal Income

Percent



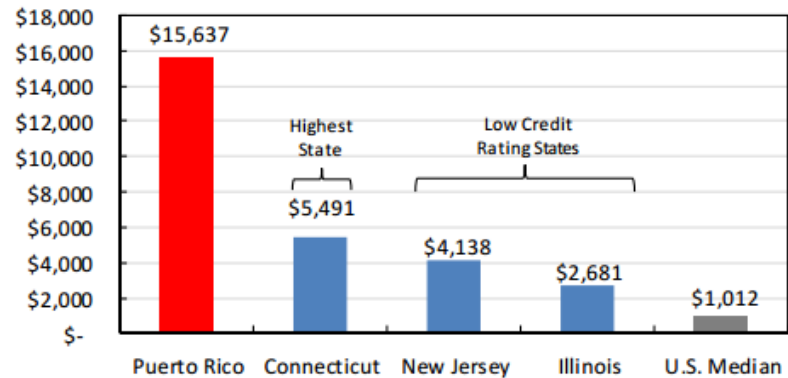
Tax-Supported Debt as a Share of GDP

Percent



Tax-Supported Debt Per Capita

Dollars



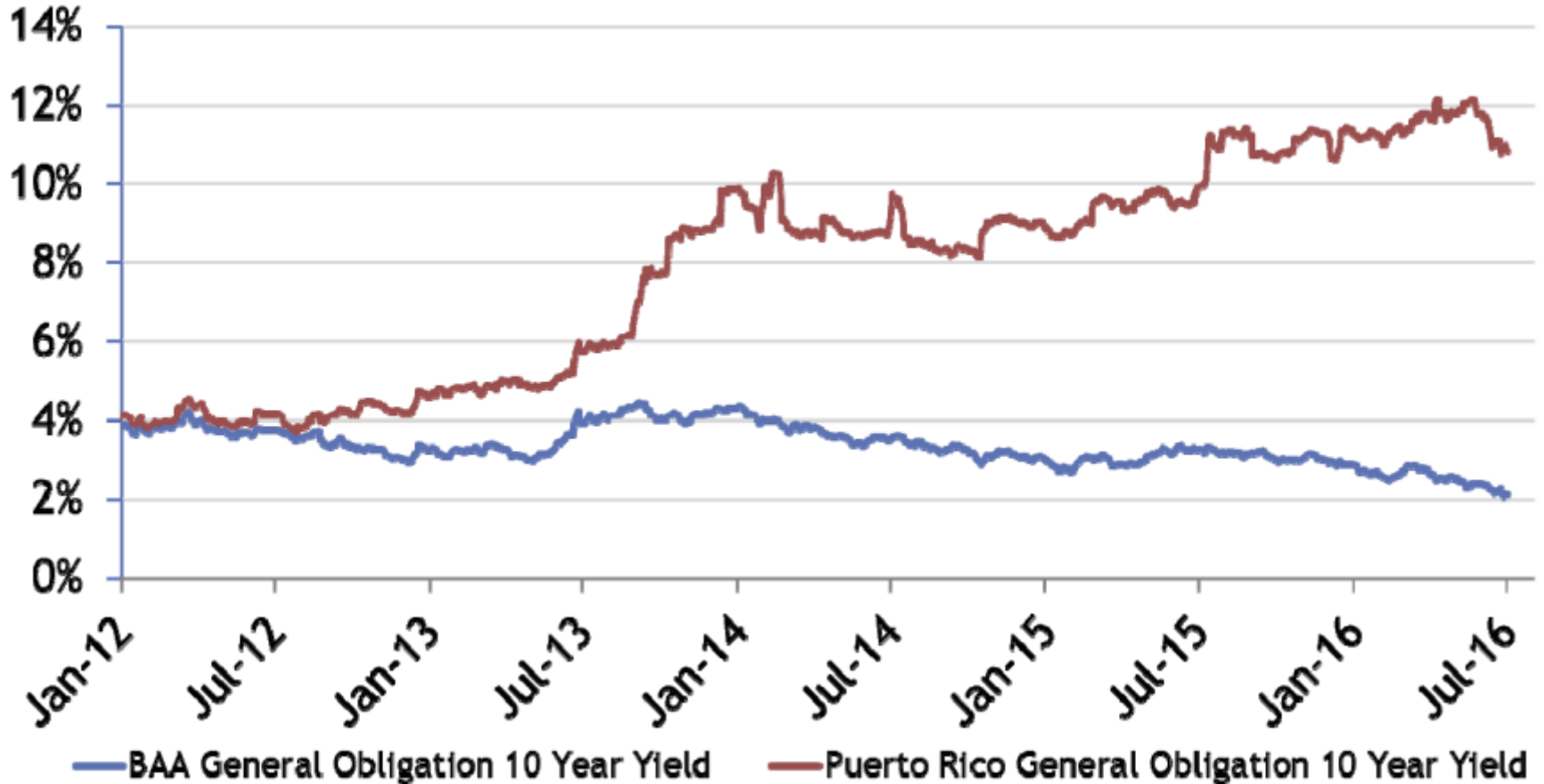
* Both debt and revenues for Puerto Rico calculated on a tax-supported basis. Includes COFINA, HTA, PRIFA, and other tax-supported government entities.

Source: Moody's State Debt Medians – 6/24/15; Puerto Rico Government Presentation – 3/1/16.

Overview (cont.)

Puerto Rico debt yields vs. broader market yields

In Percent



Source: Thompson Reuters, The Municipal Market Monitor

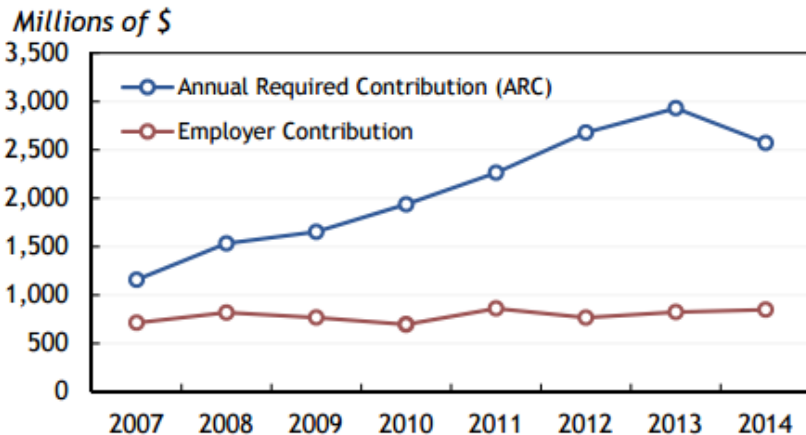
Puerto Rico's Public Pension Plans

Overview of Plan Structures:

- Lowest funded status of any state or territory
- Selling assets to pay benefits
- No guarantee or priority in the Puerto Rico Constitution
- Reformed pension systems in 2013, but partially overturned by the courts
- Government has not made additional contributions required under 2013 reforms (Employer Contributions are established by Puerto Rico Statutes)

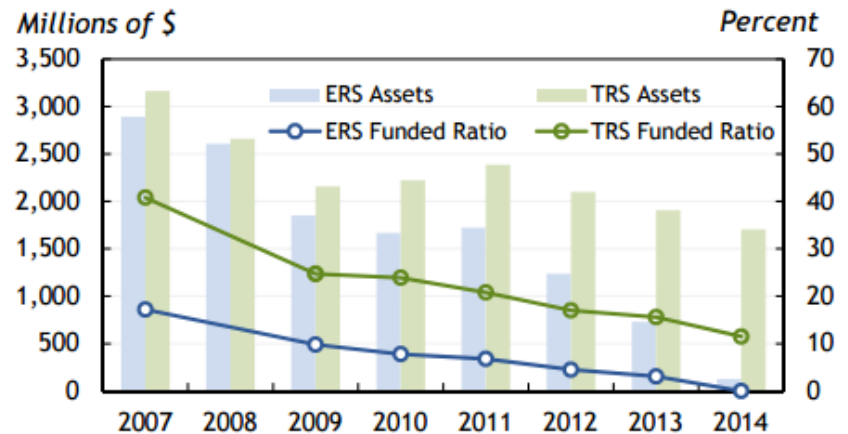
Source: Commonwealth Quarterly Report - May 7, 2015; "The Numbers Speak for Themselves," Government Development Bank – February 25, 2013.

ERS & TRS Employer Contributions



Note: Includes contributions from municipalities and public corporations (~25% of total).
Source: ERS, TRS Actuarial Reports - June 30, 2014.

Pension Assets (left axis) & Funded Ratios (right axis)



Note: Reflects actuarial value of assets. 2008 assets and funded ratios interpolated.
Source: ERS, TRS Actuarial Reports - June 30, 2014.

Puerto Rico's Public Pension Plans (cont.)

GASB 67 Summary as of June 30, 2014

(in millions)	PRGERS	PRTRS	PRJRS
Total Pension Liability	30,220	14,808	504
Fiduciary Net Position	127	1,704	62
Net Pension Liability	30,092	13,104	442
Fiduciary net position as % of Total Pension Liability	0.4%	11.5%	12.3%
Net pension liability as % of covered payroll	862.5%	1118.9%	1395.0%
Covered Payroll	3,489	1,171	32
Actual Employer Contribution	660	189	12
% of covered payroll	36.2%	16.2%	37.2%
Actuarially-Determined Contribution	1,823	749	41
% of covered payroll	52.2%	63.9%	128.6%
Discount Rate*	4.29%	4.33%	4.30%

*20-Bond GO Municipal Bond Index Rate as of June 30, 2014 is 4.29%

Source: PRGERS, PRTRS and PRJRS 2014 Financial Statements and Actuarial Valuation Reports

Puerto Rico's Public Pension Plans (cont.)

Commonwealth of Puerto Rico Independent Auditors' Report Financial Statements as of June 30, 2014

- As of June 30, 2014, the fiduciary net position as a percentage of the total pension liability for JRS and TRS were 12.31% and 11.51%, respectively. In the opinion of management, based on information prepared by consulting actuaries, if measures are not taken to significantly increase contributions, JRS will become insolvent by fiscal year 2018 while TRS will become insolvent between fiscal years 2018 and 2019 depending on the timing of receipt of contributions and TRS' ability to dispose of illiquid assets.
- In addition, ERS' fiduciary net position has been exhausted in the 2014-2015 fiscal year. If the increasing and additional contributions stipulated by law are not paid in full on an annual basis, ERS will continue being rapidly defunded and gross assets will be exhausted. Further, annual cash flow estimates for the foreseeable future are presently estimated to be insufficient to cover ERS' obligations. Finally, future employers' contributions have been pledged to debt service, consequently, further depletion of ERS' assets could result in an inability to pay benefits.

Source: Commonwealth of Puerto Rico Basic Financial Statements and Required Supplementary Information, pages 5-6 of Independent Auditors' Report.

Puerto Rico's Public Pension Plans (cont.)

PRGERS Employer Contributions History

Fiscal Year Ended June 30	Actuarially-Determined Contributions (in millions)	Actual contributions (in millions)	Actual contributions as % of ADC
2008	\$1,191	\$662	56
2009	1,259	596	47
2010	1,460	531	36
2011	1,735	701	40
2012	2,020	590	29
2013	2,193	629	29
2014	1,823	660	36

Causes of underfunding

- Actuarially-determined contributions (ADC) not made
 - Statutory employer contributions inconsistent with ADC
 - Fewer actives carrying more pensioners liability (lower than expected covered payroll)
- Early retirement benefits offered without a corresponding increase in contributions
- Special benefit laws approved without permanent funding
- Lower than expected investment returns
- When GERS was formed in 1951, it absorbed existing unfunded liabilities from the legacy retirement systems

Source: PRGRS 2014 Financial Statements and Actuarial Valuation Reports

Puerto Rico's Public Pension Plans (cont.)

Puerto Rico Government Employee Retirement System (PRGERS)

Plan Characteristics

- Average pension - \$1,131 per month
- \$200 annual bonus
- Traditional defined benefit plan was closed to new entrants in 2000
- Accruals of pre-2000 hires frozen as of 2000
- Partial defined benefit is owed at their retirement, with the rest of their hybrid benefit taking the form of a defined contribution balance.
- Employees hired since 2000 have no defined benefit.
- Prior to reforms employees were required to contribute 8.275% of their salary to the pension fund, with that amount increasing to 10% in 2013.

After Act 3 of 2013

- Froze the defined benefit plan, eliminating all future accruals for current employees
- Moved all employees to a hybrid plan based on the employee's contribution plus investment return going forward
- Increased the retirement age to 67 years for new employees, 65 for most existing employees and 61 for those hired before 1990
- Eliminated special law benefits for future retirees and reduced them for current retirees
- Charged members for survivor benefits and added an 'anti-spiking' salary provision

Source: PRGERS 2014 Financial Statements and 2014 Actuarial Valuation Report

Puerto Rico's Public Pension Plans (cont.)

Puerto Rico Teachers' Retirement System (PRTRS)

Plan Characteristics

- Average pension - \$1,511
- \$200 annual bonus
- Teachers are not participating in Social Security
- Defined Benefits are soft closed. Hires prior to August 1, 2014 are in traditional defined benefit plan. Later hires have a hybrid plan based on members' defined contribution accounts.
- Hires prior to August 1, 2014 contribute 9% of salary. Those hired thereafter contribute 10%, rising to 14% over 5 years.

After Act 160 of 2013

- Changes to TRS benefits for future employees were upheld in court; many changes applying to existing employees and retirees were blocked
- For members hired before the law's effective date in 2014, the TRS is a traditional defined benefit plan
- For members hired after this date, the TRS is a hybrid plan based on defined contribution accounts
- The Act eliminated special law bonuses
- The Act reduced early retirement provisions for existing teachers

Source: PRTRS 2014 Financial Statements and 2014 Actuarial Valuation Report

Puerto Rico Oversight, Management, and Economic Stability Act (PROMESA)

- Signed into law on June 30, 2016
- Overview
 - Title I - Establishment and Organization of Oversight Board
 - Title II - Responsibilities of Oversight Board
 - Section 201. Approval of Fiscal Plans
 - Section 202. Approval of budgets
 - Section 209. Termination of Oversight Board
 - Section 211. Analysis of pensions
 - Title III – Adjustments of Debts
 - Title IV - Miscellaneous Provisions
 - Title V – Puerto Rico Infrastructure Revitalization
 - Title VI – Creditor Collective Action
 - Title VII – Sense of Congress Regarding Permanent, Pro-Growth Fiscal Reforms

Source: Public Law No: 114-187

Puerto Rico Oversight, Management, and Economic Stability Act (PROMESA) (cont.)

Fiscal Plan requirements according to Title II, Section 201(b)

- A Fiscal Plan certified by the Oversight Board shall:
 1. Provide for estimates of revenues and expenditures in conformance with agreed upon accounting standards and be based on— (i) applicable laws; or (ii) specific bills that require enactment in order to reasonably achieve the projections of the Fiscal Plan
 2. Ensure the funding of essential public services.
 3. Provide adequate funding for public pension systems.
 4. Provide for the elimination of structural deficits.
 5. For fiscal years covered by a Fiscal Plan in which a stay under titles III or IV is not effective, provide for a debt burden that is sustainable.
 6. Improve fiscal governance, accountability, and internal controls.
 7. Enable the achievement of fiscal targets.
 8. Create independent forecasts of revenue for the period covered by the Fiscal Plan.
 9. Include a debt sustainability analysis.
 10. Provide for capital expenditures and investments necessary to promote economic growth.
 11. Adopt appropriate recommendations submitted by the Oversight Board under section 205(a).
 12. Include such additional information as the Oversight Board deems necessary.
 13. Ensure that assets, funds, or resources of a territorial instrumentality are not loaned to, transferred to, or otherwise used for the benefit of a covered territory or another covered territorial instrumentality of a covered territory, unless permitted by the constitution of the territory, an approved plan of adjustment under title III, or a Qualifying Modification approved under title VI.
 14. Respect the relative lawful priorities or lawful liens, as may be applicable, in the constitution, other laws, or agreements of a covered territory or covered territorial instrumentality in effect prior to the date of enactment of this Act.

Source: Public Law No: 114-187

Puerto Rico Oversight, Management, and Economic Stability Act (PROMESA) (cont.)

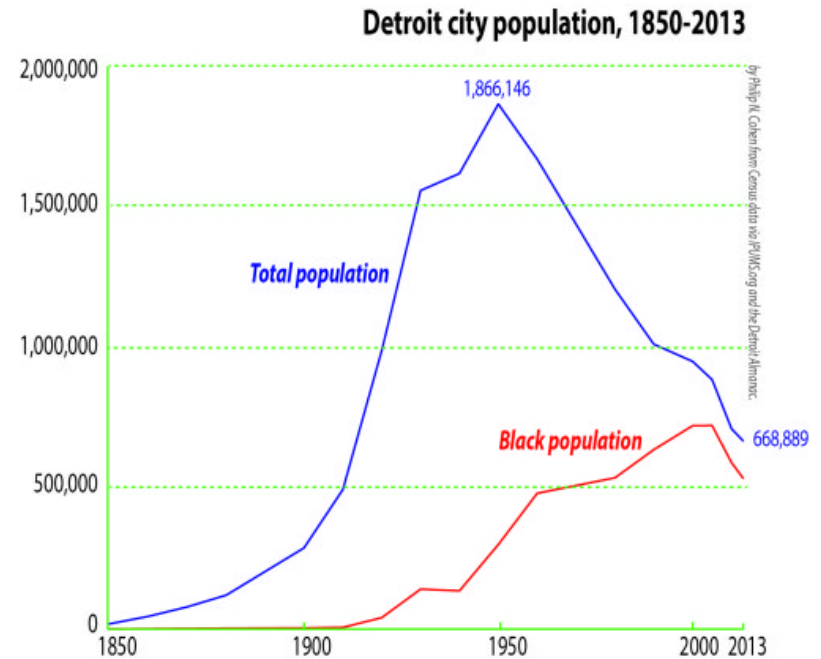
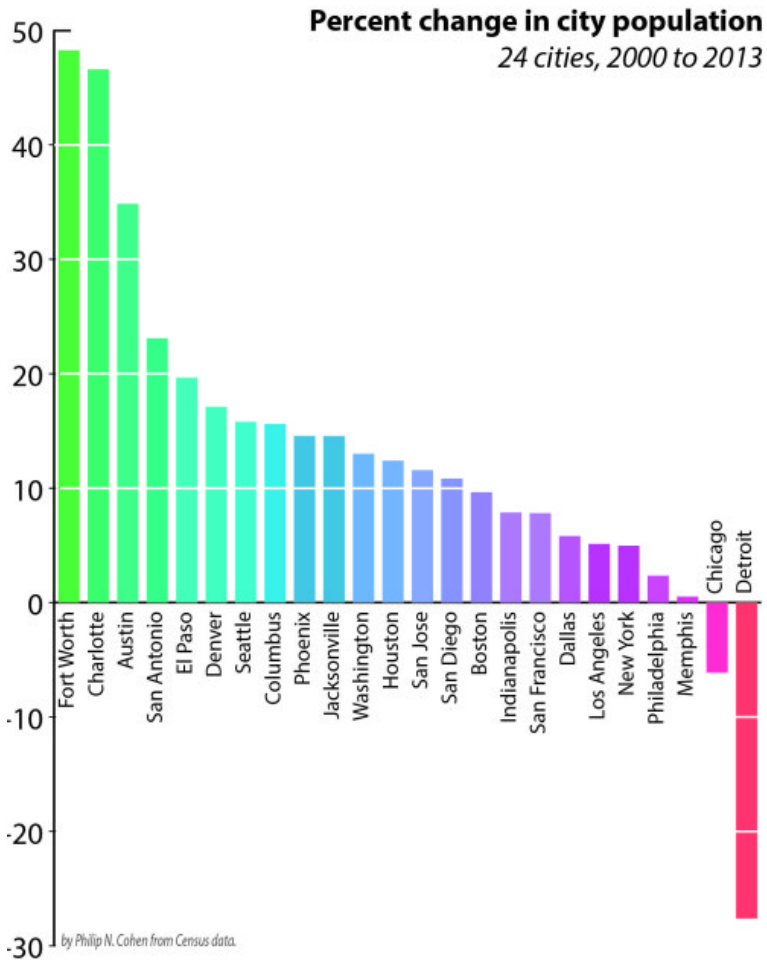
Section 211 Analysis of Pensions

- a) DETERMINATION.—If the Oversight Board determines, in its sole discretion, that a pension system of the territorial government is materially underfunded, the Oversight Board shall conduct an analysis prepared by an independent actuary of such pension system to assist the Oversight Board in evaluating the fiscal and economic impact of the pension cash flows.
- b) PROVISIONS OF ANALYSIS.—An analysis conducted under subsection (a) shall include—
 - 1. an actuarial study of the pension liabilities and funding strategy that includes a forward looking projection of payments of at least 30 years of benefit payments and funding strategy to cover such payments;
 - 2. sources of funding to cover such payments;
 - 3. a review of the existing benefits and their sustainability; and
 - 4. a review of the system’s legal structure and operational arrangements, and any other studies of the pension system the Oversight Board shall deem necessary.
- c) SUPPLEMENTARY INFORMATION.—In any case, the analysis conducted under subsection (a) shall include information regarding the fair market value and liabilities using an appropriate discount rate as determined by the Oversight Board.

City of Detroit

Overview

City of Detroit's population change



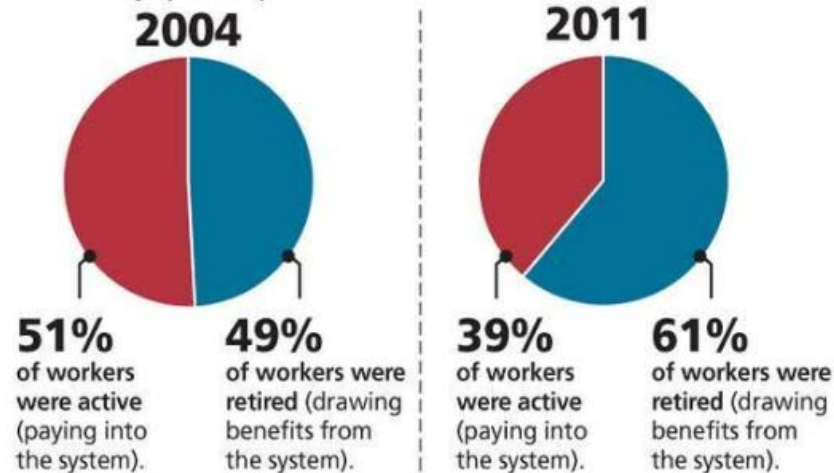
Source: Census Bureau

Overview (cont.)

There are fewer actives carrying more pensioners liability

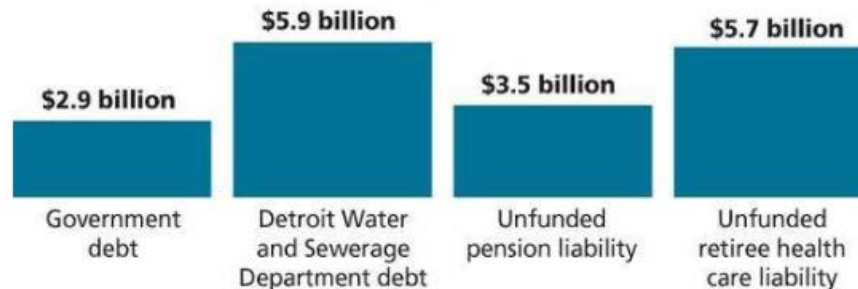
FEWER WORKERS, MORE RETIREES

Over time, the balance between active workers and retired workers has tipped. Here is a look at the make up of Detroit's general retirement system, one of two of the city's pension plans.



DEBT BREAKDOWN

How the city's debt and long-term obligations break down:



Source: Emergency manager Kevyn Orr's 45-day report and proposal for creditors

Timeline

2005-2006

- Detroit issues \$1.44 billion of new debt in the form of pension obligation certificates to fund the city's two retirement systems. A 30-year repayment schedule is negotiated. Then-Mayor Kwame Kilpatrick agrees to swap a fixed interest rate for a variable one. A market rate increase would be to the city's benefit. Falling rates mean Detroit would pay more.
- City issues \$250 million in bond debt and begins seven-year run of posting at least \$150 million in annual budget deficits. The cumulative deficit between 2005 and 2011 equaled \$1.38 billion.

2008

- Interest rates begin to fall during national recession.

2009

- Due to falling interest rates, Detroit is required to pay an additional \$1.14 billion in interest and hedging derivatives as part of the certificate of participation and swaps agreements. City pledges casino wagering tax revenue for future payments to avoid defaulting on the agreements and \$400 million lump sum termination payment. Detroit loses about \$11 million monthly in casino tax revenue.

Source: "Timeline of Detroit's financial crisis" The Associated Press November 7, 2014

Timeline (cont.)

2010

- Short term cash flow shortages become more severe. Detroit receives \$250 million in fiscal stabilization bonds, \$55 million in delinquent property tax receipts from Wayne County and \$20 million from the DTE escrow account.
- The city has no deficit reduction plan and debt continues to soar. The city borrows \$447 million from specific budget items to fund other budget items.
- Questionable balances appear in audit report of pension plans.

2011

- A financial review team is recommended on Dec. 21 after state performs preliminary review of Detroit's finances.

2012

- Gov. Rick Snyder appoints review team in January.
- Review team determines on March 26 that Detroit is in "severe financial distress."
- Consent agreement giving the state limited oversight of Detroit's finances put in place in April. This allows Mayor Dave Bing to avoid financial emergency declaration. The city is required to produce, among other things, a three-year revenue and expenditure plan.
- A second preliminary review determines Detroit has a "severe financial problem" and in December recommends appointment of review team.

Source: "Timeline of Detroit's financial crisis" The Associated Press November 7, 2014

Timeline (cont.)

2013

- Review team determines in Feb. 10 report that Detroit is in a “financial emergency,” another step necessary for the eventual appointment of an emergency manager. Snyder confirms the report and on March 1 informs Bing and Detroit City Council.
- Snyder appoints turnaround specialist Kevyn Orr as Detroit’s emergency manager on March 25.
- Orr submits Financial and Operating Plan to state on May 12. He holds a public meeting in Detroit on the plan on June 10.
- Orr and his team meet with representatives of banks, unions and other Detroit creditors on June 14 at Detroit Metropolitan Airport; releases proposal to creditors.
- Orr makes Detroit the largest U.S. city to file for bankruptcy on July 18; cites debt of \$18 billion or more.
- U.S. Bankruptcy Judge Steven Rhodes on July 24 grants Orr’s request to put a permanent freeze on three lawsuits filed in Ingham County, including another judge’s decision that Snyder trampled the Michigan Constitution and acted illegally in approving the Chapter 9 filing. That ruling and others had threatened to derail the bankruptcy.
- Dozens of creditors, including banks, bond holders and employee pension systems, meet Aug. 19 deadline to file objections to bankruptcy petition.
- Nine-day trial before Rhodes begins to determine if Detroit is eligible for bankruptcy begins Oct. 23.
- Orr testifies on Oct. 25 that he did not promise to seek bankruptcy protection for the city as a condition of getting Detroit’s emergency manager job.
- Rhodes on Dec. 3 rules that Detroit is eligible to fix its finances in bankruptcy court.

Source: “Timeline of Detroit’s financial crisis” The Associated Press November 7, 2014

Timeline (cont.)

2014:

- Orr files a plan Feb. 21 to restructure the Detroit's \$18 billion debt by making cuts to pensions and creditors while offering a blueprint for emerging from bankruptcy. The goal: A leaner, cleaner and safer Detroit.
- An effort by philanthropists to save Detroit's art treasures culminates June 20 when Snyder signs a bill authorizing millions in state help. It is part of what has been called the Grand Bargain, which still needs approval from the city's pensioners and workers.
- City workers and retirees approve pension cuts by a landslide on July 22, a crucial step to emerging from the Detroit's bankruptcy.
- Rhodes on Sept. 2 begins hearing evidence on whether he should approve the city's plan to emerge from billions of dollars in debt.
- Detroit reaches a tentative deal on Sept. 9 to pay a key creditor, bond insurer Syncora Guarantee, 26 cents on the dollar, a move that could clear the biggest hurdle in the city's plan to reduce its debts and emerge from bankruptcy protection.
- Detroit's plan to get out of bankruptcy is feasible, a court-appointed expert testifies Oct. 22, the last witness in the trial to determine whether Detroit can get back on its feet.
- Judge Steven Rhodes on Nov. 7 approves Detroit's plan to get out of bankruptcy, ending the largest public filing in U.S. history.

Source: "Timeline of Detroit's financial crisis" The Associated Press November 7, 2014

Pension Plan Changes in Bankruptcy Plan

General Retirement System

- A 4.5% reduction in pension benefits
- Cost-of-living adjustments were eliminated
- Repayment of excess interest accrued in the Annuity Savings Fund (a voluntary, individual account pension program)
 - ASF accounts were credited with the actuarially assumed rate of investment return, regardless of the plan's performance

Police & Fire Retirement System

- Cost-of-living adjustments decreased from 2.25% to 1%

Source: City of Detroit General Retirement System and Police & Fire Retirement System 2014 Independent Auditor's Report

City of Detroit's Public Pension Plans

GASB 67 Summary as of June 30, 2014

Pre-Bankruptcy	General	Police & Fire
Total Pension Liability	3,802	4,408
Fiduciary Net Position	2,015	3,276
Net Pension Liability	1,787	1,132
Fiduciary net position as % of Total Pension Liability	53.0%	74.3%
Net pension liability as % of covered payroll	837.56%	753.5%
Covered Payroll	213	150
Actual Employer Contribution	25	-
% of covered payroll	11.8%	0%
Actuarially-Determined Contribution	81	63
% of covered payroll	37.8%	41.9%
Discount Rate	7.20%	7.20%
Impact of Bankruptcy		
Total Pension Liability	3,015	3,868
Net Pension Liability	1,000	591
Change from pre-bankruptcy liability	(787)	(540)
Fiduciary net position as % of Total Pension Liability	66.8%	84.7%
Net pension liability as % of covered payroll	469.5%	394%

Source: City of Detroit General Retirement System and Police & Fire Retirement System 2014 Actuarial Valuation Reports

State of Illinois

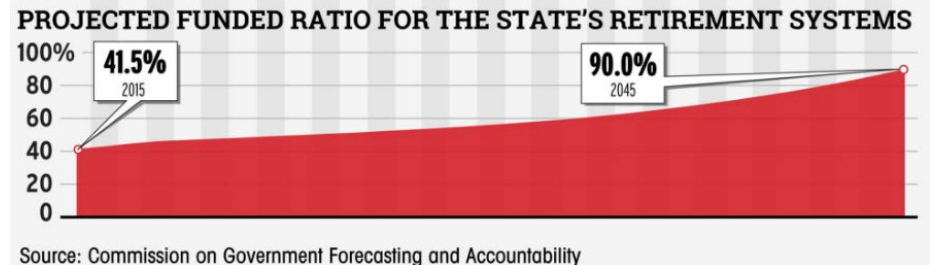
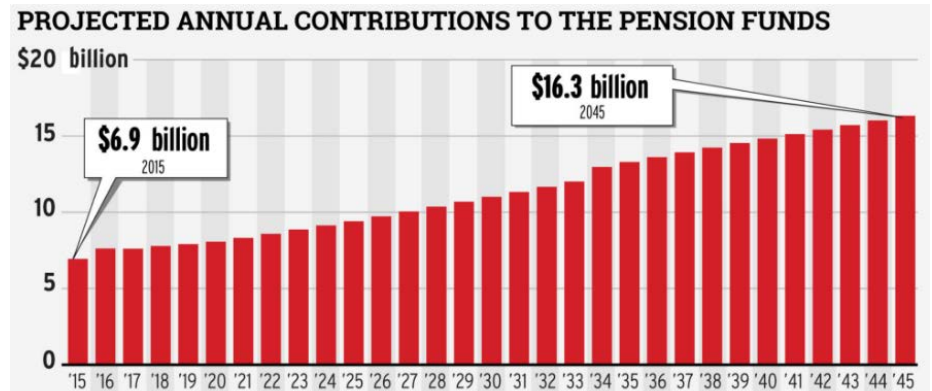
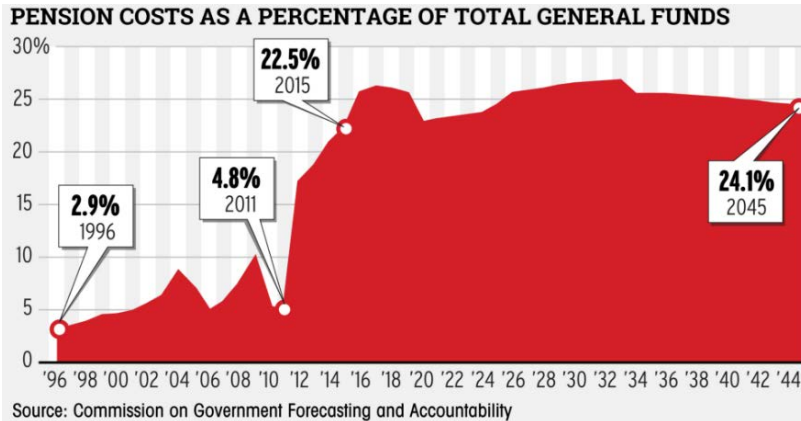
Timeline

1989 – Compounding Problem

- Gov. James R. Thompson signs legislation that gives state retirees a compounding, annual 3 percent COLA adjustment

1994 – The Edgar Ramp

- Gov. Jim Edgar and House Speaker Michael Madigan create a pension-payment ramp designed for the state retirement systems to reach 90% funding level by 2045
 - Employer contributions were set to be artificially low in early years and ramp up significantly in future years to attain goal.



Source: Crain's Chicago Business, August 2015

Timeline (cont.)

1997 and 1998 – Formula Upgrade

- Edgar approves pension-formula upgrades for members of the State Employees Retirement System and the State Teachers Retirement System

2000

- Pension funds relatively healthy at \$15.6 billion unfunded plan liability, 74.7% funded and \$46 billion plan assets

2001 – Losses mount

- Investment losses driven by 9/11 and collapse of dot-com bubble drive up unfunded liabilities by \$6.5 billion
- \$25.0 billion unfunded plan liability, 63.1% funded and \$42.9 billion plan assets

2002 – Quicker Retirements

- Gov. George Ryan enacts an incentive that allows more than 11,000 state employees to speed up retirements
- \$35.0 billion unfunded plan liability, 53.5% funded and \$40 billion plan assets

Source: Crain's Chicago Business, August 2015

Timeline (cont.)

2003 – Blagojevich borrows

- Gov. Rod Blagojevich wins legislative approval to borrow \$10 billion, of which \$7.3 billion goes toward lowering the pension systems' unfunded liabilities. Interest on the loan ends up contributing to future chronic underfunding
- \$35.1 billion unfunded plan liability, 60.9% funded and \$54.6 billion plan assets

2006 and 2007 – Pension Holidays

- Lawmakers approve a “partial pension holiday” in 2006 and 2007. State contributions made are about half the amount required. State skips paying \$2.3 billion into pensions over these two years
- 2007: \$42.2 billion unfunded plan liability, 62.6% funded and \$70.7 billion plan assets

2008 – More investment losses

- Another stock market meltdown results in record investment losses for the retirement systems, driving up unfunded pension liabilities by \$9.3 billion
- \$54.4 billion unfunded plan liability, 54.3% funded and \$64.9 billion plan assets

Source: Crain's Chicago Business, August 2015

Timeline (cont.)

2008 to 2010 – Make up Contributions after Pension Holidays

- Ramped up payments coincide with the Great Recession. State takes out a loan to cover 2010 payments
- 2010: \$85.6 billion unfunded plan liability, 38.3% funded and \$53.3 billion plan assets

2013 – Making Changes

- Gov. Pat Quinn signs legislation that ends the automatic compounded annual cost-of-living increase for retirees, extends the retirement age for current state workers
- \$97.5 billion unfunded plan liability, 41.1% funded and \$68.0 billion plan assets

2015 – Unconstitutional

- The Illinois Supreme Court unanimously rules that the 2013 legislation violates the state constitution and that the state is obligated to pay all promised benefits
- \$111.0 billion unfunded plan liability, 41.9% funded and \$80.0 billion plan assets

Source: Crain's Chicago Business, August 2015

Pension Plan Changes

- Law passed in December 2013 to set a cap on pension-eligible income and ties payments of cost-of-living adjustments (COLAs) to actual inflation, creates pauses of up to five years as to when those COLAs are funded, and raises the retirement age for workers age 45 and under.
- Illinois Supreme Court ruling on May 2015 held the changes unconstitutional because it violates the state constitution's pension clause:

“Membership in any pension or retirement system of the State, any unit of local government or school district, or any agency or instrumentality thereof, shall be an enforceable contractual relationship, the benefits of which shall not be diminished or impaired.” — Illinois Constitution of 1970, Article 13, Section 5

Moody's, S&P downgrade Illinois rating

- Moody's downgraded Illinois' credit to Baa2 from Baa1
Rating rationale: "Illinois' rating and negative outlook are consistent with our view that the state's pension funding pressures are likely to persist and perhaps worsen in the near term. Lawmakers' repeated inability to reach consensus on retiree benefit measures last year underscored the task's extreme difficulty. Any meaningful pension reforms enacted in coming months are likely to be challenged in court, given the state constitution's pension protection clause. This litigation threat and accompanying political pressures may once again deter action altogether or lead to reforms with little effect... Illinois is heading towards an unsustainable combination of higher pension contribution needs and reduced tax revenues."
- S&P lowered Illinois' credit to BBB+ from A-
“(t)he downgrade reflects what we view as the state’s weakened pension funded ratios and lack of action on reform measures intended to improve funding levels and diminish cost pressures associated with annual contributions”
- Fitch Ratings maintained Illinois' BBB+ rating but placed the state on negative watch.
“The rating watch *negative* reflects the ongoing inability of the state to address its large and growing unfunded pension liability...Fitch believes that the burden of large unfunded pension liabilities and growing annual pension expenses is unsustainable. This large unfunded pension liability is despite the issuance of pension obligation bonds and passage of bipartisan comprehensive pension reform affecting new employees.”

3 Largest Retirement Systems in Illinois

GASB 67 Summary as of June 30, 2015

(in millions)	TRS	SERS	SURS
Total Pension Liability	111,917	43,267	41,219
Fiduciary Net Position	46,407	15,259	17,463
Net Pension Liability	65,510	28,088	23,756
Fiduciary net position as % of Total Pension Liability	41.5%	35.3%	42.4%
Net pension liability as % of covered payroll	679.5%	628.9%	658.7%
Covered Payroll	9,641	4,454	3,607
Actual Employer Contribution	3,521	1,804	1,529
% of covered payroll	36.5%	40.5%	42.4%
Actuarially-Determined Contribution	4,120	2,045	1,623
% of covered payroll	42.7%	45.9%	44.5%
Discount Rate	7.47%	7.02%	7.12%

Source: TRS, SERS and SURS 2015 Financial Statements and Actuarial Valuation Reports

Actuarial Standards Board

Emerging Trends in Public Sector Funding Policy

- **A number of entities have weighed in on best practices in Public Sector Funding Policy recently**
 - Society of Actuaries Blue Ribbon Panel
 - Government Finance Officers Association
 - “Big 7” State and Local government associations
 - National Governors Association
 - National Conference of State Legislatures
 - Council of State Governments
 - National Association of Counties
 - National League of Cities
 - The United States Conference of Mayors
 - International City / County Management Association
 - California Actuarial Advisory Panel
 - American Academy of Actuaries
- **These entities agree on some broad topics**
 - Benefit Security and Adequacy
 - Intergenerational Equity
 - Contribution Stability
 - Transparency

Emerging Trends in Public Sector Funding Policy (cont.)

- **These entities agree on three elements of a funding policy that are in line with objectives in prior slide:**
 - A fixed asset smoothing period of 5 or less years
 - Gain-loss amortization periods of around 15 to 20 years
 - This is consistent with the goal of intergenerational equity
 - Entry age method – level percentage of pay
 - Recommended by the GFOA, “Big 7”, and CAAP. SOA and AAA did not specifying a model practice.

Recent Actuarial Standards Board Activities

- 2013 and 2014 – Key pension ASOPs (4, 27, 35) updated
 - ASOP 4: Measuring Pension Obligations and Determining Pension Plan Costs or Contributions
 - ASOP 27: Selection of Economic Assumptions for Measuring Pension Obligations
 - ASOP 35: Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations
- July 2014 – Request for Comments – ASOPs and Public Pension Plan Funding and Accounting
- December 2014 – Exposure draft of proposed ASOP on Assessment and Disclosure of Risk
- July 2015 – Hearing on Public Pension Issues
- July 2016 – Release Pension Task Force Report
- July 2016 – 2nd exposure draft of proposed ASOP on Assessment and Disclosure of Risk

Source: “Environment Driving Actuarial Standards Board’s Process” 2016 NASRA Convention

Drivers of Recent Actuarial Standards Board Activities

- Normal periodic review of standards
- Request from SOA's Blue Ribbon Panel
- Other factors that may have contributed to a more rigorous review:
 - Market Value of Liabilities (MVL) debate
 - Rauh, et. al. – projections of insolvency for public plans, \$3 trillion gap
 - Rating agency attention to public pension issues
 - Meredith Whitney on 60 Minutes – “This will amount to hundreds of billions of dollars worth of defaults.”
 - GASB Changes – elimination of the Annual Required Contribution
 - Bankruptcies – Detroit, Stockton, San Bernardino
 - Puerto Rico
 - Multiemployer pension plans (Central States)

Source: “Environment Driving Actuarial Standards Board’s Process” 2016 NASRA Convention

Pension Task Force (PTF) Report

Pension Task Force Charge

Review public pension input from specific sources, including the responses to the ASB's Request for Comments on ASOPs and Public Pension Plan Funding and Accounting, and other relevant reports and input to develop recommendations for ASB next steps. Next steps should include rationale for areas where the task force is recommending action as well as areas where the task force is recommending no action.

Source: ASB Activities on Public Plans Issues, Enrolled Actuaries Meeting 2016

Pension Task Force Suggestions

- Solvency Value
- Statement of Opinion
- Reasonable Actuarially Determined Contribution (ADC)
- Assumptions
- General Guidance
- Additional Conditional Disclosures

Source: ASB Activities on Public Plans Issues, Enrolled Actuaries Meeting 2016

Solvency Value

Suggestion

- Require a market-based alternative liability in funding valuations
 - Estimate of cost to defease liabilities accrued under plan in marketplace
 - Acceptable proxy for this calculation:
 - Unit Credit cost method
 - U.S. Treasury rates
 - Other assumptions determined according to ASOP Nos. 27 and 35

Rationale

- Information intended users need to make good decisions about plan
 - Assets needed to fully secure promises to members
 - Understanding of risk to member's benefits
 - Helpful in understanding investment risk being taken

Source: ASB Activities on Public Plans Issues, Enrolled Actuaries Meeting 2016

Statement of Opinion

Suggestion

- Require an opinion statement about the reasonableness and consistency of the assumptions and methods
 - Individually, in aggregate and in combination
 - Includes interaction of any smoothing techniques
 - Excludes federally mandated assumptions and methods
 - Current standard only requires disclosure statement if unreasonable

Rationale

- Actuary should take ownership of the methods and assumptions used or explicitly disclaim them
 - Require a positive statement
- Increases confidence that the actuary believes that the work product is a reasonable result

Source: ASB Activities on Public Plans Issues, Enrolled Actuaries Meeting 2016

Reasonable ADC

Suggestion

- Define what can be a reasonable ADC
 - Meets the requirements of ASOPs 4, 27 and 35
 - Normal cost must reflect benefits applicable to the member (i.e. may not use ultimate entry age method)
 - amortization payments must either be greater than the nominal interest on the unfunded liability or pay off all of the unfunded liability in a reasonable fixed (finite) time period.
- Require the disclosure of contribution requirements and funded status on a reasonable ADC
 - Whenever a funding valuation is performed
 - Exception if assumptions or methods are mandated by federal government

Reasonable ADC (cont.)

Rationale

- Will assist intended users in understanding the appropriateness of the current contribution levels
- The PTF believes that users will come to see a reasonable ADC as being stronger and more appropriate than a contribution requirement which does not meet the criteria of a reasonable ADC
- Useful for fixed rate plans

Source: ASB Activities on Public Plans Issues, Enrolled Actuaries Meeting 2016

Assumptions

Suggestions related to improved management of assumptions:

- Clarification that the requirement to “disclose the information and analysis used in selecting” each assumption includes disclosing why the actuary thinks the assumption is reasonable
- Clarification that phase-in of assumptions is only allowed if the assumption actually used is itself reasonable
- Related to significant assumptions:
 - That the actuary should consider whether techniques such as experience studies or gain/loss analysis are warranted when setting demographic assumptions
 - Determination and disclosure of the length of time since an assumption was last analyzed and the availability of credible data
 - Disclosure of the basis of each material assumption (e.g., experience study or other) and, if study-based the date of the study
- Disclosure of the justification for using pension mortality tables (or variations on such tables) that substantially pre-date more recent published pension mortality tables

Assumptions (cont.)

Rationale

- Anecdotal evidence indicates that some practitioners may be interpreting the “rationale” requirement as only requiring a list of information sources
- Anecdotal evidence indicates that some practitioners may be phasing in assumption changes over a period of years and PTF believes that guidance is needed in this situation
- Suggestions may help assure that assumptions are reasonable and may help the intended user understand them
- Suggestions will help assure that mortality assumptions are set based on reasonably current experience unless an assumption based on an older study is appropriate to the situation

General Guidance

Suggestions dealing with additional guidance regarding methods:

- Calculation and disclosure of a partial gain and loss analysis (separating investment and other gain/loss)
- When selecting a contribution allocation procedure, consider three goals and balance among them:
 - Benefit security
 - Intergenerational equity
 - Contribution stability and predictability
- Specific reference to direct rate smoothing with general guidance that is consistent with that for asset smoothing
- Extension of the concept to disclose the information and analysis used in selecting each assumption to the selection of aspects of the method that have a significant effect on the measurement

Additional Conditional Disclosures

Suggestions that are applicable only in certain situations:

- Extension of the requirement to disclose situations where current funding policy/practice is expected to result in plan exhaustion to require a qualitative estimate of when assets will be exhausted
- Disclosure of the implicit amortization period in fixed-rate contribution situations under the current funding policy
- Disclosure of any situation where the contribution requirement is less than the normal cost plus interest on the unfunded accrued liability calculated using the market value of assets, and how long before the contribution requirement is expected to exceed that amount
- Disclosure of a historical scorecard comparing actual contributions to recommended contributions if this information is available to the actuary and there is a history of significant underfunding

Commentary on Changes Not Suggested

- The ASOPs should not require information for the benefit of users other than the intended users
- The ASOPs should continue to be principles based, not prescriptive
- Additional market-based value of liability measures other than the solvency value should not be required
- The ASOPs cannot require actuaries to regulate the behavior of plan sponsor

Source: “Environment Driving Actuarial Standards Board’s Process” 2016 NASRA Convention

**Proposed Pension Risk ASOP –
2nd Exposure Draft**

Assessment and Disclosure of Risk – Second Exposure Draft

- **Why is the standard needed?**
 - Actuarial calculations require use of assumptions regarding future economic and demographic experience
 - Intended user of these measurements may not understand the effect of future experience differing from the assumptions
- **When does this standard apply to actuaries?**
 - When performing a funding valuation
 - When performing a pricing valuation of a proposed change that would, in the actuaries opinion, significantly change the types of levels of risk
- **What does the actuary need to do to comply?**
 - Include an assessment of each of the risks that the actuary identifies
 - Assessment need not be based on numerical calculations
 - Assessment should account for applicable plan circumstances – funding policy, investment policy, funded status, demographics, etc.

Source: “Environment Driving Actuarial Standards Board’s Process” 2016 NASRA Convention

Steps the Actuary Needs to Take

- Identify risks that may affect the plan's future financial conditions
- If assessment requires a selection of assumptions:
 - Assumptions should differ from those expected and result in plausible outcomes
 - Consider information from variety of sources
 - Become familiar with range of views
 - But should reflect actuary's professional judgment
- Recommend a more detailed assessment if actuary believes it would be beneficial to intended users
- Calculate and disclose historical values of actuarial measurements that are significant in understanding plan risks
- Identify and disclose historical values of actuarial measurements that are significant in understanding plan risks
- Prepare actuarial communication

Source: "Environment Driving Actuarial Standards Board's Process" 2016 NASRA Convention

Examples of Risks

- **Risks related to economic variables**
 - Investment return
 - Inflation
 - Interest rates
- **Risks related to demographic variables**
 - Longevity
 - Payroll and/or population growth
 - Retirement, disability, termination
- **Other risks**
 - Asset/liability mismatch
 - Contribution risk

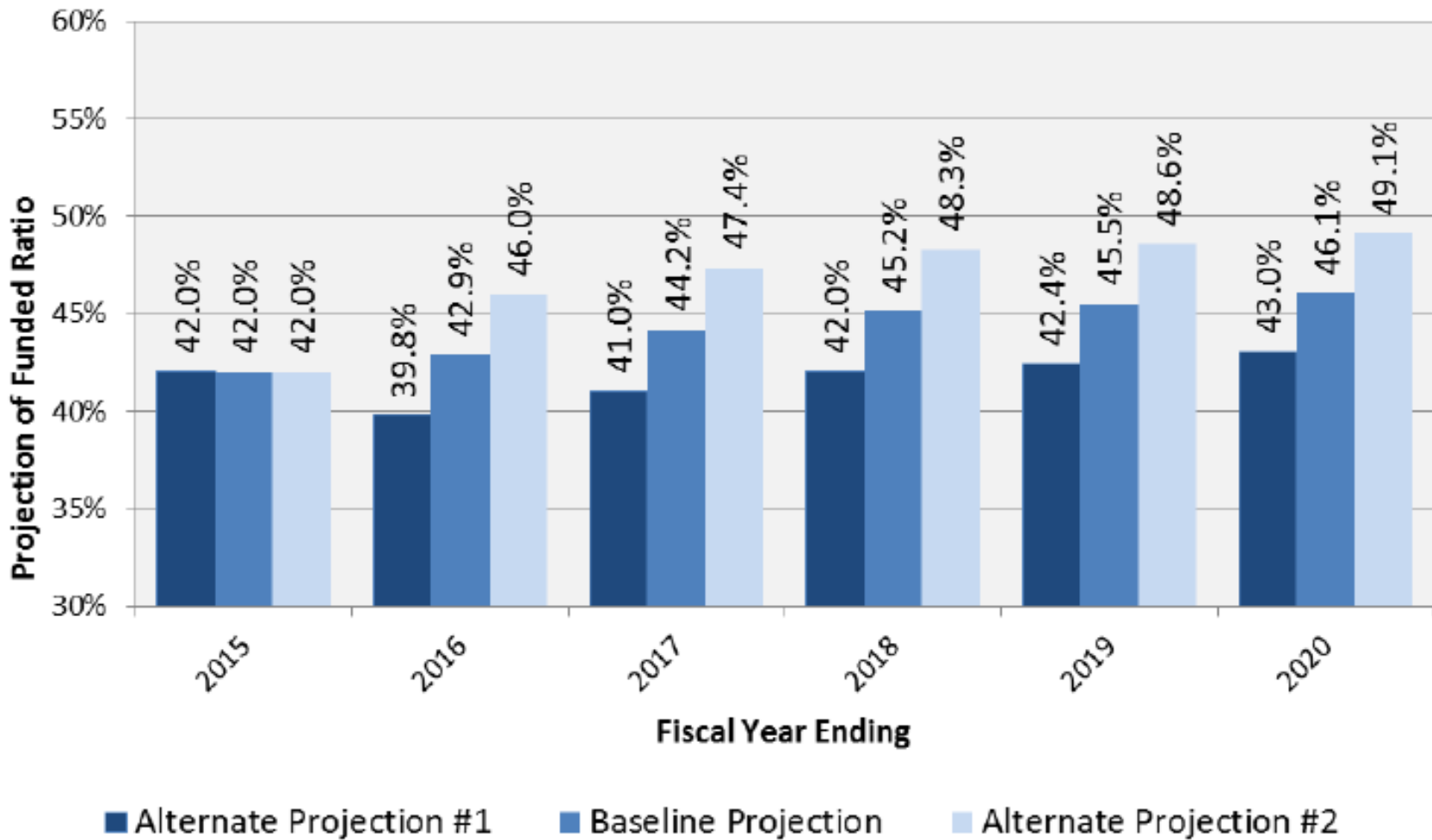
Source: “Environment Driving Actuarial Standards Board’s Process” 2016 NASRA Convention

Methods for Assessing Risk

- **Scenario tests**
 - Impact of one possible event, several simultaneous events, or several sequential events
- **Sensitivity tests**
 - Impact of change in actuarial assumption or method
- **Stochastic modeling**
 - Estimate probability distributions of potential outcomes by allowing for random variation in one or more inputs over time, such as investment returns
- **Stress test**
 - Impact of adverse changes in one or a few factors

Source: “Environment Driving Actuarial Standards Board’s Process” 2016 NASRA Convention

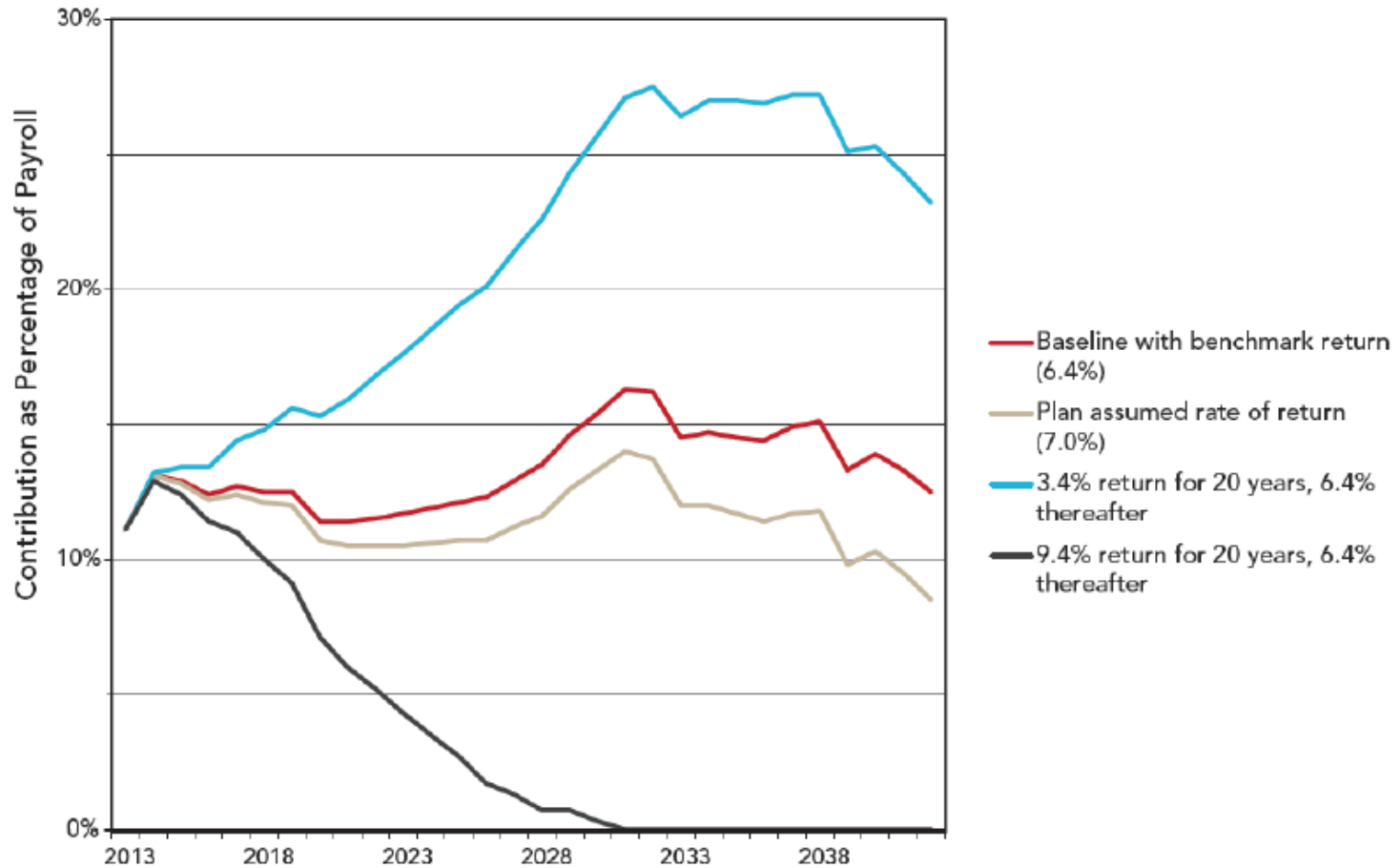
Example of Sensitivity or Scenario Test



Source: "Environment Driving Actuarial Standards Board's Process" 2016 NASRA Convention

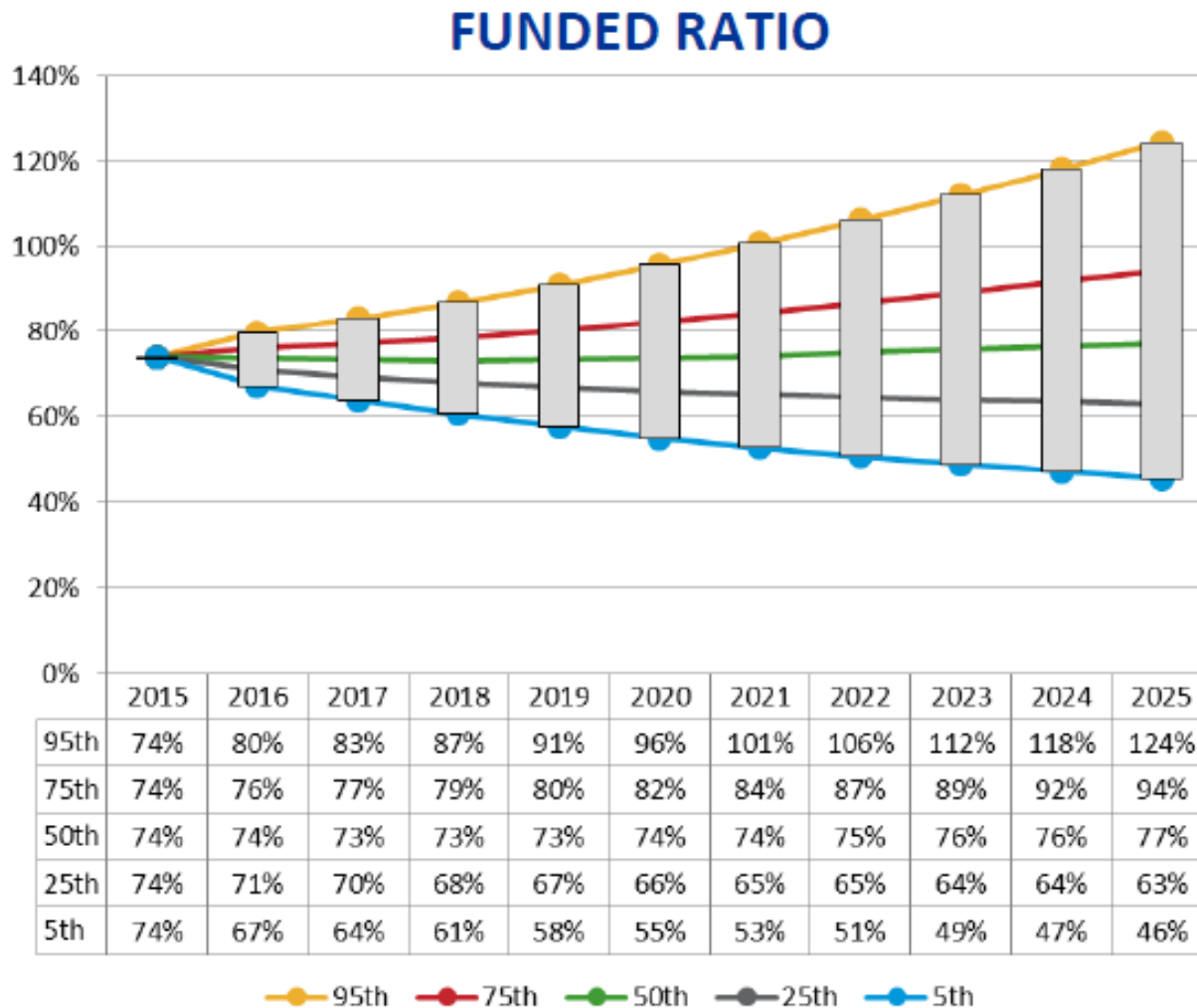
Example of Stress Test

Figure 14
Sample Plan: Projected Employer Contributions,
With Investment Return Stress Tests



Source: "Environment Driving Actuarial Standards Board's Process" 2016 NASRA Convention

Example of Stochastic Model



Source: “Environment Driving Actuarial Standards Board’s Process” 2016 NASRA Convention

Examples of Plan Maturity Measures

- Ratio of market value of assets to payroll
- Ratio of retiree liability to total liability
- Ratio of net cash flow to market value of assets
- Ratio of benefit payments to contributions
- Duration of actuarial accrued liability

Source: “Environment Driving Actuarial Standards Board’s Process” 2016 NASRA Convention

Examples of Historical Information

- Funded ratio
- Actuarially determined contribution
- Actuarial gains and losses
- Normal cost
- Plan settlement liability
- Comparison of actual contributions to actuarially determined contributions
- Plan participant count
- Covered payroll

Source: “Environment Driving Actuarial Standards Board’s Process” 2016 NASRA Convention

Credit Ratings

What is a Credit Rating?

- Credit Ratings are assigned by Credit Rating Agencies to individual entities and debt instruments and are designed to gauge the likelihood that they will default on their obligations to creditors.
- Credit ratings are forward-looking opinions about credit risk. They express the agency's opinion about the ability of an issuer to meet its financial obligations in full and on time.
- A Credit Rating effects the interest rate a security pays out, with higher ratings leading to lower interest rates.

A Credit Rating establishes a link between risk and return.

The “Big Three”

The “Big Three” credit rating agencies have 95% of the credit rating market share globally. They are:

- Moody’s
- Standard & Poor’s (S&P)
- Fitch Ratings

Rating Categories

- Ratings represent the risk of default, a high rating implies a low probability of default
- Investment grade refers to the safest levels of financial securities.
- Speculative grade, or noninvestment grade, refers to the riskier securities; often called junk bonds.

	Moody's	S&P	Fitch	Meaning
Investment Grade	Aaa	AAA	AAA	Prime
	Aa1	AA+	AA+	High Grade
	Aa2	AA	AA	
	Aa3	AA-	AA-	
	A1	A+	A+	Upper Medium Grade
	A2	A	A	
	A3	A-	A-	
	Baa1	BBB+	BBB+	Lower Medium Grade
	Baa2	BBB	BBB	
Baa3	BBB-	BBB-		
Junk	Ba1	BB+	BB+	Non Investment Grade Speculative
	Ba2	BB	BB	
	Ba3	BB-	BB-	
	B1	B+	B+	Highly Speculative
	B2	B	B	
	B3	B-	B-	
	Caa1	CCC+	CCC+	Substantial Risks
	Caa2	CCC	CCC	Extremely Speculative
	Caa3	CCC-	CCC-	In Default w/ Little Prospect for Recovery
	Ca	CC	CC+	
		C	CC	
			CC-	In Default
D	D	DDD		

Source: Bond Credit Ratings Table. *LearnBonds*

Rating Categories (ctd.)

- Within these major ratings categories (AA, A, etc.), credit ratings are modified to show relative standing within a category
- Long-term credit ratings tend to be more indicative of an entity's ability to honor its debt responsibilities

	Moody's	S&P	Fitch	Meaning
Investment Grade	Aaa	AAA	AAA	Prime
	Aa1	AA+	AA+	High Grade
	Aa2	AA	AA	
	Aa3	AA-	AA-	
	A1	A+	A+	Upper Medium Grade
	A2	A	A	
	A3	A-	A-	
	Baa1	BBB+	BBB+	Lower Medium Grade
	Baa2	BBB	BBB	
Baa3	BBB-	BBB-		
Junk	Ba1	BB+	BB+	Non Investment Grade Speculative
	Ba2	BB	BB	
	Ba3	BB-	BB-	
	B1	B+	B+	Highly Speculative
	B2	B	B	
	B3	B-	B-	
	Caa1	CCC+	CCC+	Substantial Risks
	Caa2	CCC	CCC	Extremely Speculative
	Caa3	CCC-	CCC-	In Default w/ Little Prospect for Recovery
	Ca	CC	CC+	
		C	CC	
			CC-	In Default
D	D	DDD		

Rating Agencies Effect on the Pension World

Fitch

“State Pension Update: Credit Risk of Pensions Continues,” July 2013

“Pensions remain a growing pressure for numerous states’ budgets. The vast majority of states with pension pressures are pursuing reforms to improve the sustainability of their plans and Fitch believes that most states are well positioned to address the pressures they face from unfunded pension liabilities and rising contributions. In only a few cases are reforms having an immediate, beneficial impact on funded ratios.”

- **Fitch recalculates pension plan funding levels using a 7 percent investment return assumption, then combines pension obligations with state debt**

Source: “What’s Trending: States.” 2013 NASRA Convention, Keith Brainard

Standard & Poor's

“A Bumpy Road Lies Ahead for US Public Pension Funded Levels,” July 2013

- ***“Efforts to reform pension systems are far from over and, if anything, are intensifying as more and more policymakers look to make structural changes to their systems that will significantly lower liabilities.***
- ***Most states have sufficient assets in their pension trusts to fund benefits payments over the near to medium term and in many cases, long term.”***
- **S&P relies on traditional public pension measures: funded ratio, commitment to required contribution, and unfunded liability and as percentage of personal income**

Source: “What’s Trending: States.” 2013 NASRA Convention, Keith Brainard

Moody's

- **Moody's recently announced a new methodology for assessing public pensions:**
 - **Market value of assets (no smoothing)**
 - **Uniform 20-year amortization period**
 - **Risk-free discount rate (currently below four percent)**
 - **Proportional assignment of pension liabilities to employers (for cost-sharing plans)**
- **Moody's acknowledges that their number is not intended to serve as a funding number**
- **Pensions accounts for 10 percent of Moody's state credit analysis**
- **Moody's combines pensions with state indebtedness and ranks states on the basis of various metrics, e.g. debt as a percentage of GDP, income, etc.**

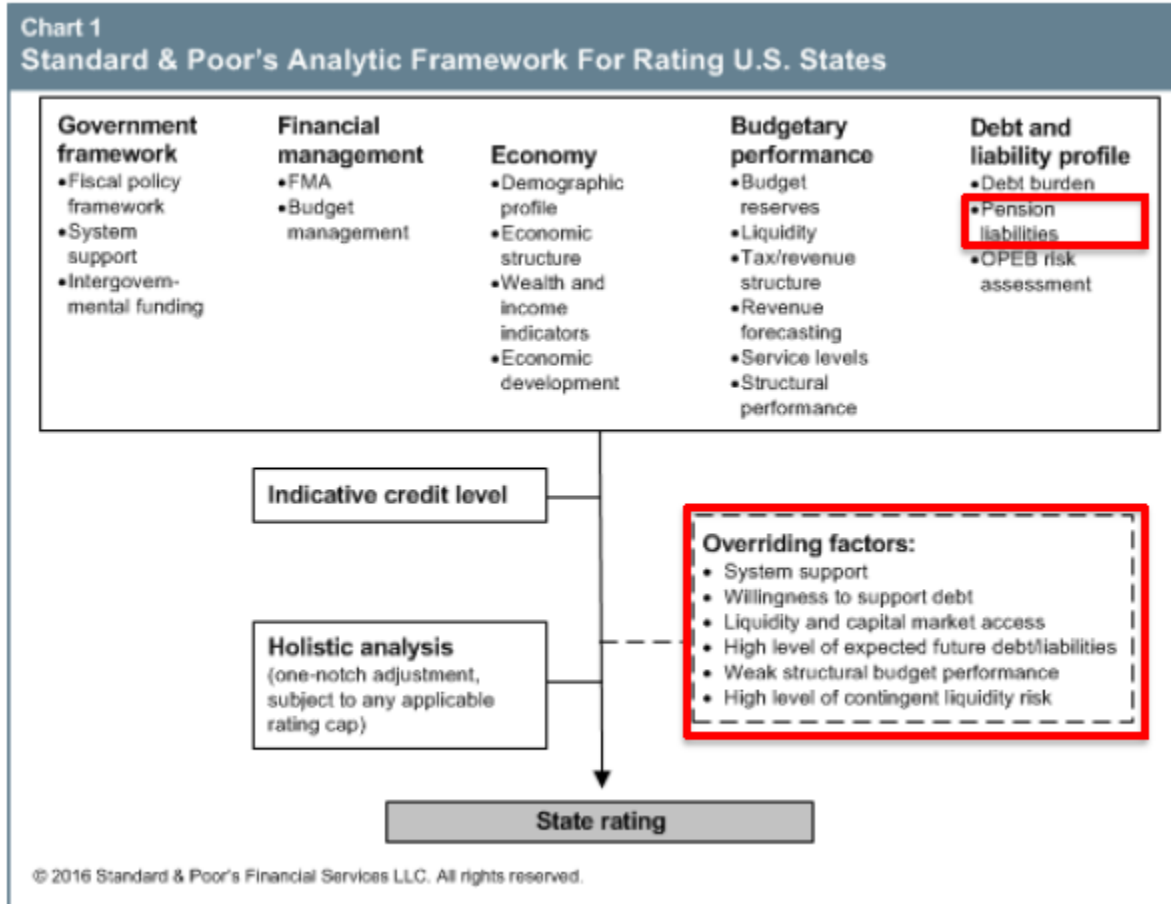
Source: "What's Trending: States." *2013 NASRA Convention, Keith Brainard*

**Proposed Changes to Standard
& Poor's U.S. State Rating
Methodology**

Objectives of Proposed Revisions

- Incorporate changes to our current criteria that align with the new pension reporting and disclosure and use related disclosure for more extensive and forward-looking assessment of pension funding discipline.
- Revise several caps and overrides for clarification and provide additional transparency and guidance.
- Other than these proposals, they are not proposing to change the general framework for rating U.S. states.

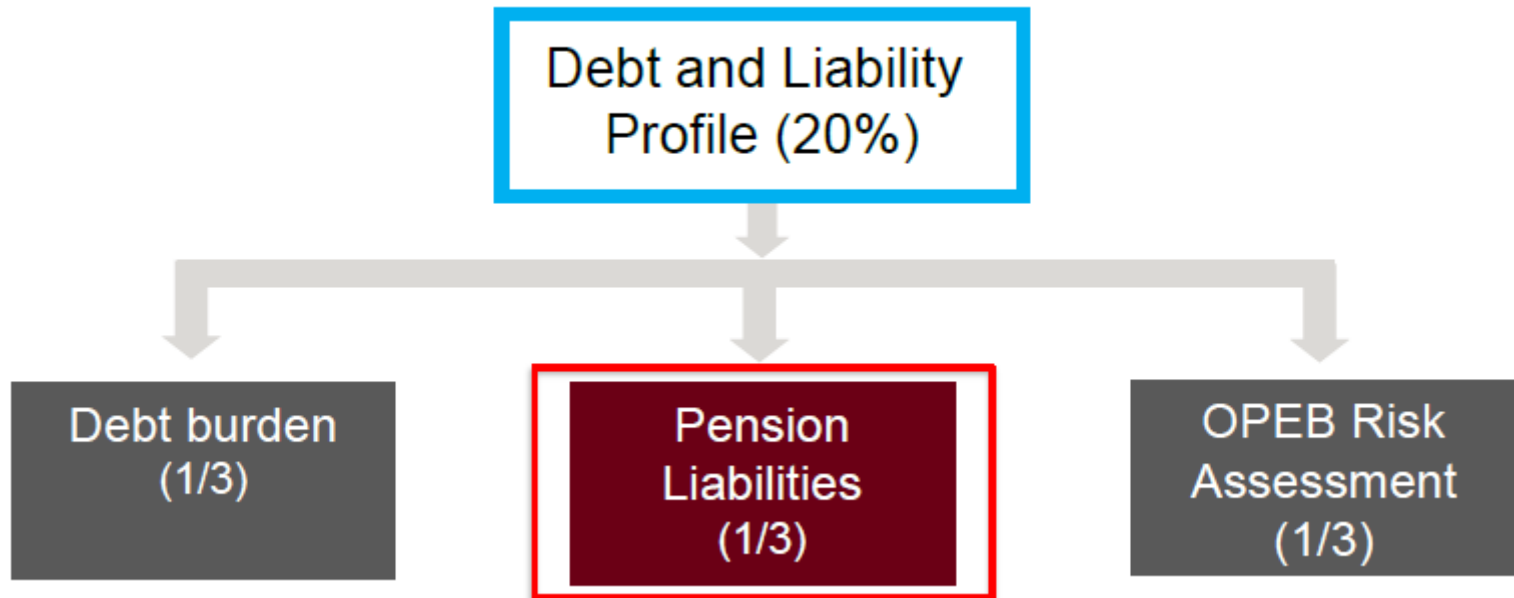
Overall Framework



Source: S&P Global Ratings Request for Comment: U.S. State Ratings Methodology, May 25, 2016

Debt and Liability Profile: Framework

The proposed pension liabilities score is weighed equally as a component of the debt and liability profile. This does not differ from the existing criteria framework.



Current Pension Assessment

Averaging four indicators to arrive at the overall pension assessment

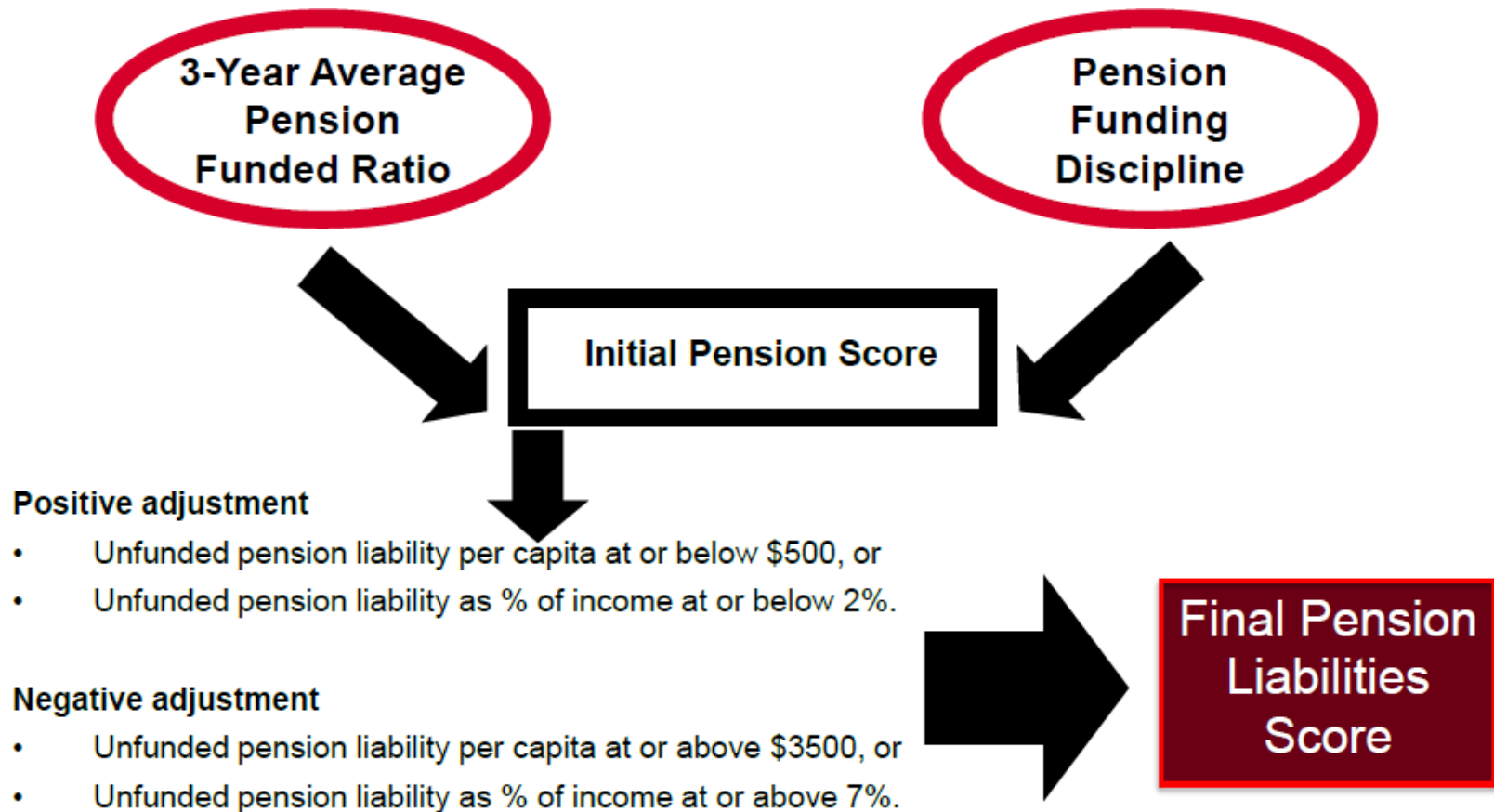
Pension Funded Ratio:	
Strong (1)	90% +
Above Average (2)	80% - 90%
Below Average (3)	60% - 80%
Weak (4)	up to 60%

Pension Funding Levels	
Strong (1)	Consistently Funds ARC
Above Average (2)	Typically Funds ARC, occasionally contributes less
Below Average (3)	Has not funded ARC for 3 years
Weak (4)	Has not funded ARC for more than 3 years

Unfunded State Pension Liabilities Per Capita	
Strong (1)	Below \$500
Above Average (2)	\$501 - \$2,000
Below Average (3)	\$2,001 - \$3,500
Weak (4)	Above \$3,500

Ratio of State Pension Liabilities to Personal Income	
Strong (1)	Below 2.0%
Above Average (2)	2.1% - 4.0%
Below Average (3)	4.1% - 7.0%
Weak (4)	Above 7.0%

Proposed Pension Liabilities



Source: S&P Global Ratings Request for Comment: U.S. State Ratings Methodology, May 25, 2016
Credit FAQ: Proposed Changes in U.S. State Ratings Methodology, May 25, 2016.

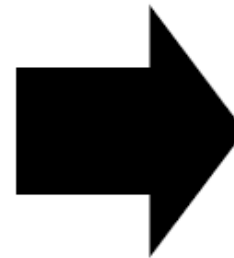
Proposed Pension Funding Discipline

Pension Funding Discipline

	State pension contribution is actuarially based and state's full actuarially determined contribution is usually funded.	State's pension contribution is not actuarially based or its full actuarially determined pension contribution is not usually funded.
Total plan contributions usually > service cost + interest cost + amortization component§	1	2
Total plan contributions usually < or equal to service cost + interest cost + amortization component	3	4



- **Positive adjustment:** Largest plan(s) with majority of positive adjustment factors
- **Negative adjustment:** Largest plan(s) with majority of negative adjustment factors or significant credit risk posed by one negative adjustment factor



Source: S&P Global Ratings Request for Comment: U.S. State Ratings Methodology, May 25, 2016

Proposed Pension Funding Discipline Adjustment

Largest Plan(s) with majority of factors, or if one negative factor poses significant credit risk

Positive adjustment factors	Negative adjustment factors
Pension funding based on closed/fixed level dollar amortization assumption < 20 years	Pension funding based on open/rolling level percentage of pay amortization or > 20 years
Assumed long-term plan rate of return is well below five-year average rate of return	Assumed long-term plan rate of return significantly exceeds five-year average rate of return
Future plan contribution assumptions used in projections to determine potential crossover date are realistic and align with historical track record or credible commitment to funding	Future plan contribution assumptions used in projections to determine potential crossover date do not align with historical track record or are unlikely, in our view, due to weak funding commitment or projected significant future budget pressures
Active to beneficiaries ratio is significantly higher than median, coupled with a strong funded ratio	Active to beneficiaries ratio is well below median, coupled with a relatively low plan funded ratio
Experience studies are updated at least biannually and incorporate experience trends and industry standards	Experience studies are not updated at least every five years or repeatedly fail to incorporate experience trends or industry standards

Source: S&P Global Ratings Request for Comment: U.S. State Ratings Methodology, May 25, 2016

Effect on Borrowing Rates

Effect on Borrowing Rates

The higher a debt issuer's Credit Rating, the lower the yield rate they need to offer on their debt obligations. The average yield rates for tax-free municipal bonds (as of 8/7/2013) are:

Rating	10-Year	20-Year	30-Year
AAA	2.73%	3.97%	4.28%
AA	2.98%	4.27%	4.58%
A	3.46%	4.75%	5.04%
BBB	4.10%	5.21%	5.47%

Source: Thomson Reuters MMD, Municipal Strategy as of 8/7/2013

Questions?



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