California Debt and Investment Advisory Commission

PENSION MECHANICS AND MATHEMATICS

BOB MCCRORY
EFI ACTUARIES

May 3, 2012

Plan for Today

- Risk Pools
- Governance
- Actuarial Funding
- Board Choices
- Actuarial Disclosure
- Discount Rate
- Pension Behavior
- Pension Reforms

Risk Pools

- **How does a defined benefit plan work?**

Auto Insurance

- Suppose you could not insure your car
  - Forced to self-insure
  - Set aside an amount in an escrow account
- How much would you set aside?
  - If insufficient, you go bankrupt
  - If too much, it goes to your heirs
- Any amount set aside is wrong
- Solve this dilemma with a risk pool
  - Risks are combined into a single pool (an insurance company)
  - Everyone pays a modest premium
  - Pooling of risk results in much less waste and lower cost

Retirement Insurance

- Suppose you could not insure your retirement
  - Forced to self-insure through a defined contribution plan
  - Set aside an amount in a retirement account
- How much would you set aside through savings?
  - If insufficient, you go bankrupt before you die
  - If too much, it goes to your heirs
- Any amount set aside is wrong
- Solve this dilemma with a risk pool
  - Risks are combined into a single pool (a defined benefit pension plan)
  - Everyone – employer and employee – pays a modest premium
  - Pooling of mortality risk results in much lower risk and cost
  - Pooling of assets results in more professional management and better returns
  - Increase in efficiency – less waste and lower cost

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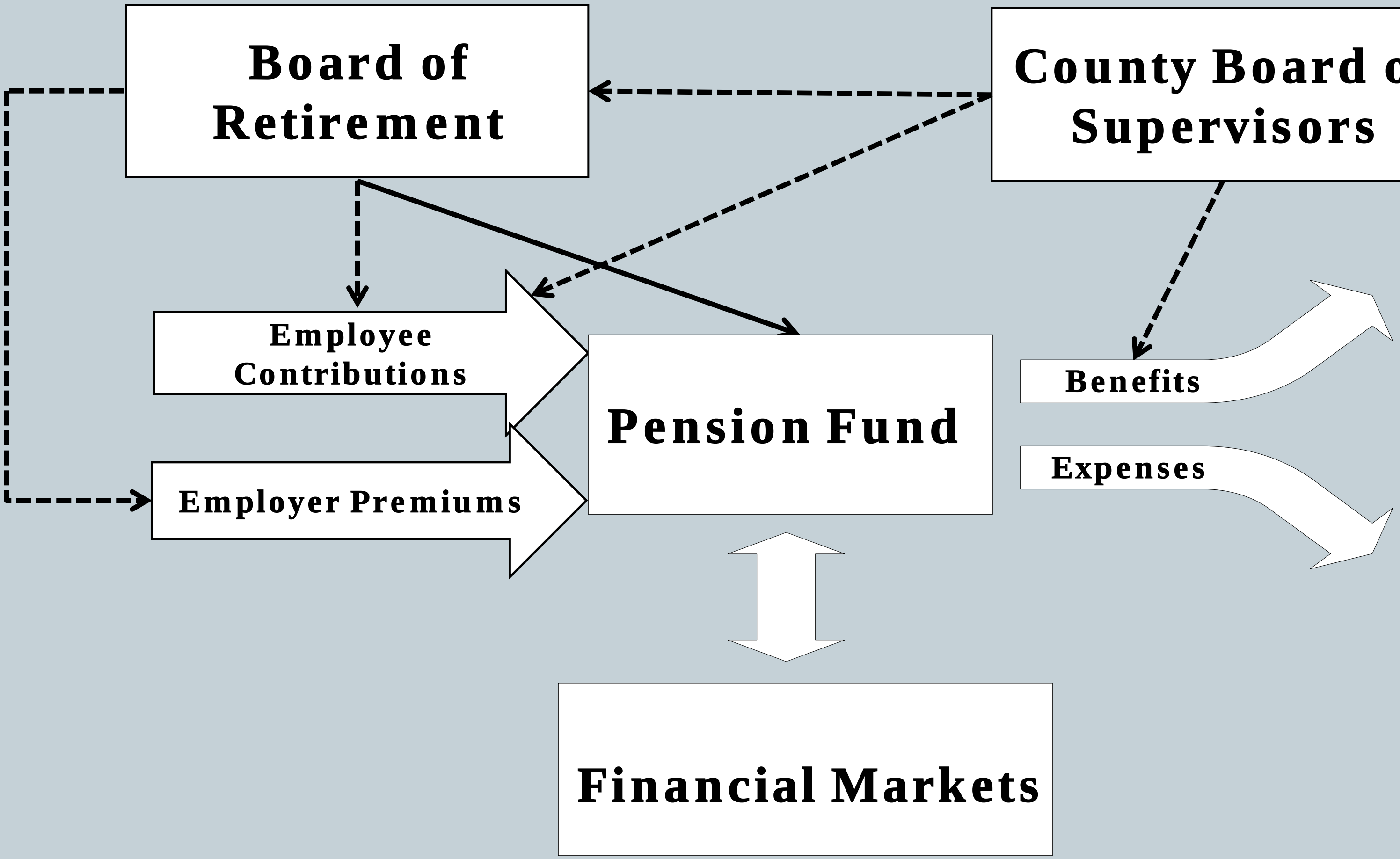
Governance

- Checks and Balances vs. Unity of Command

The SJCERA "Insurance Company"

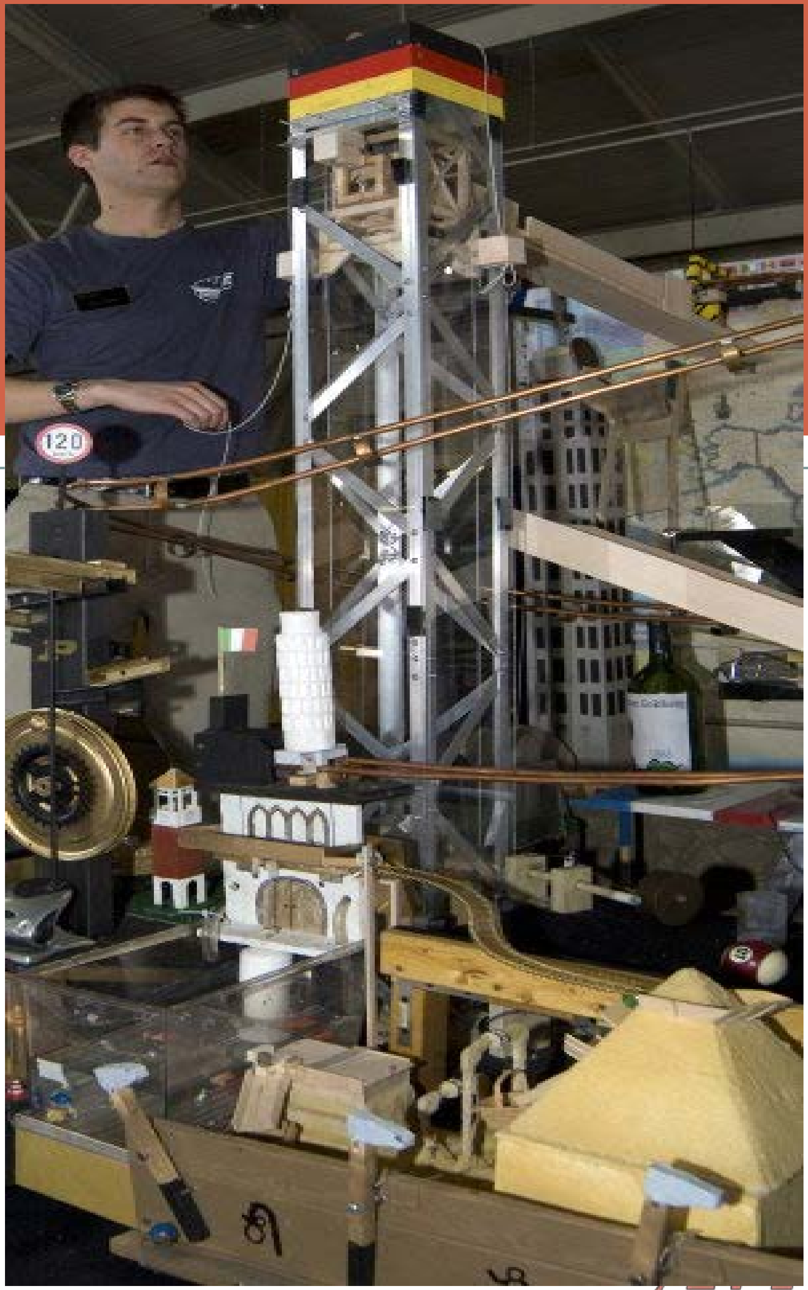


The SJCERA "Insurance Company"

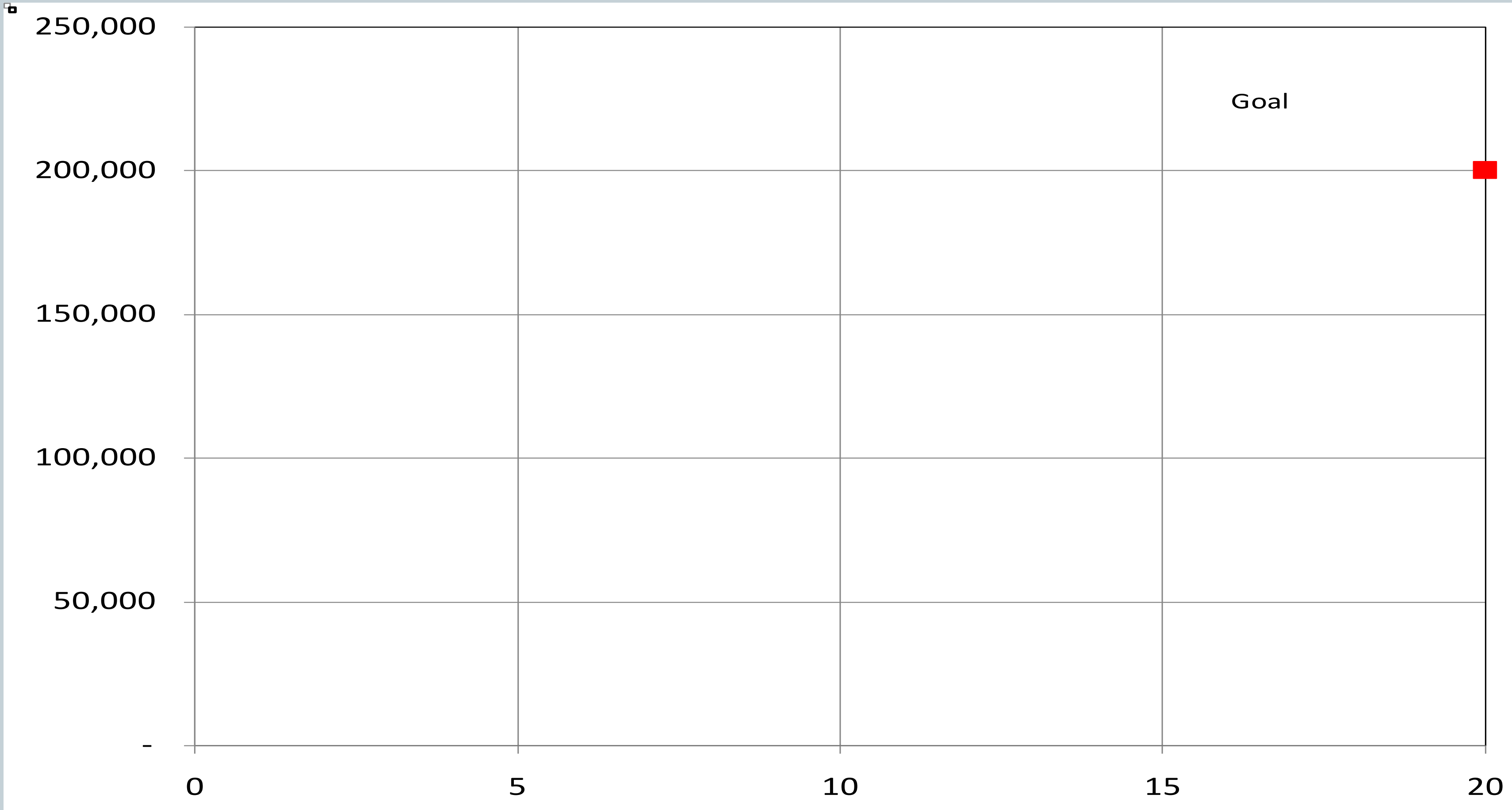
- Goals
  - Solvency
  - Low premiums
  - Stable premiums
- Controls
  - Benefit levels (Collective Bargaining)
  - Employee contributions (Retirement Board or Collective Bargaining)
  - Employer contributions (Retirement Board)
  - Investment policy (Retirement Board)
- Advantages
  - Non-profit
  - Comparative permanence
  - Ability to spread risk across generations
  - Unique advantages in investment markets

Actuarial Funding

- **How does actuarial funding work?**



Example: College Funding



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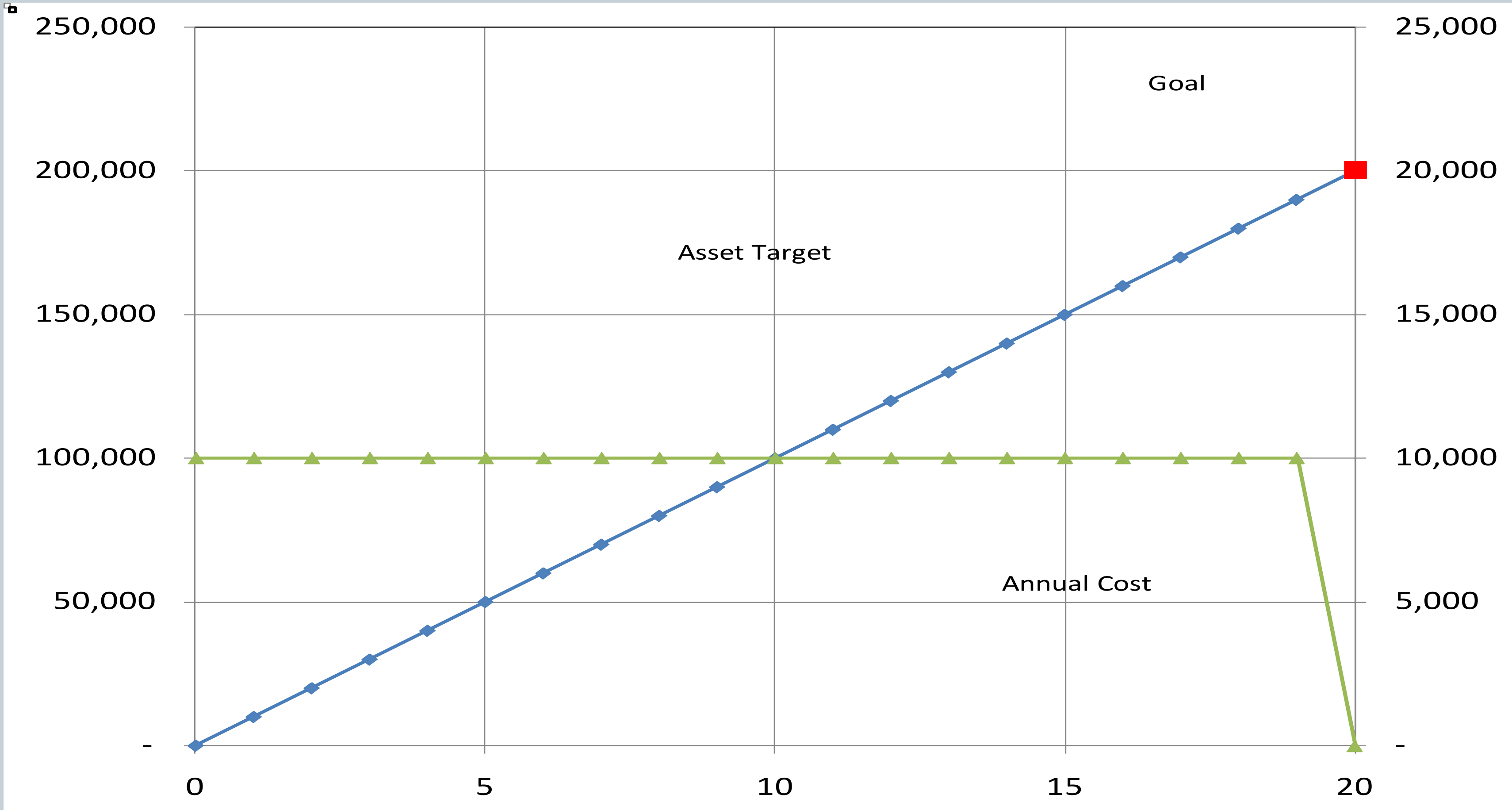

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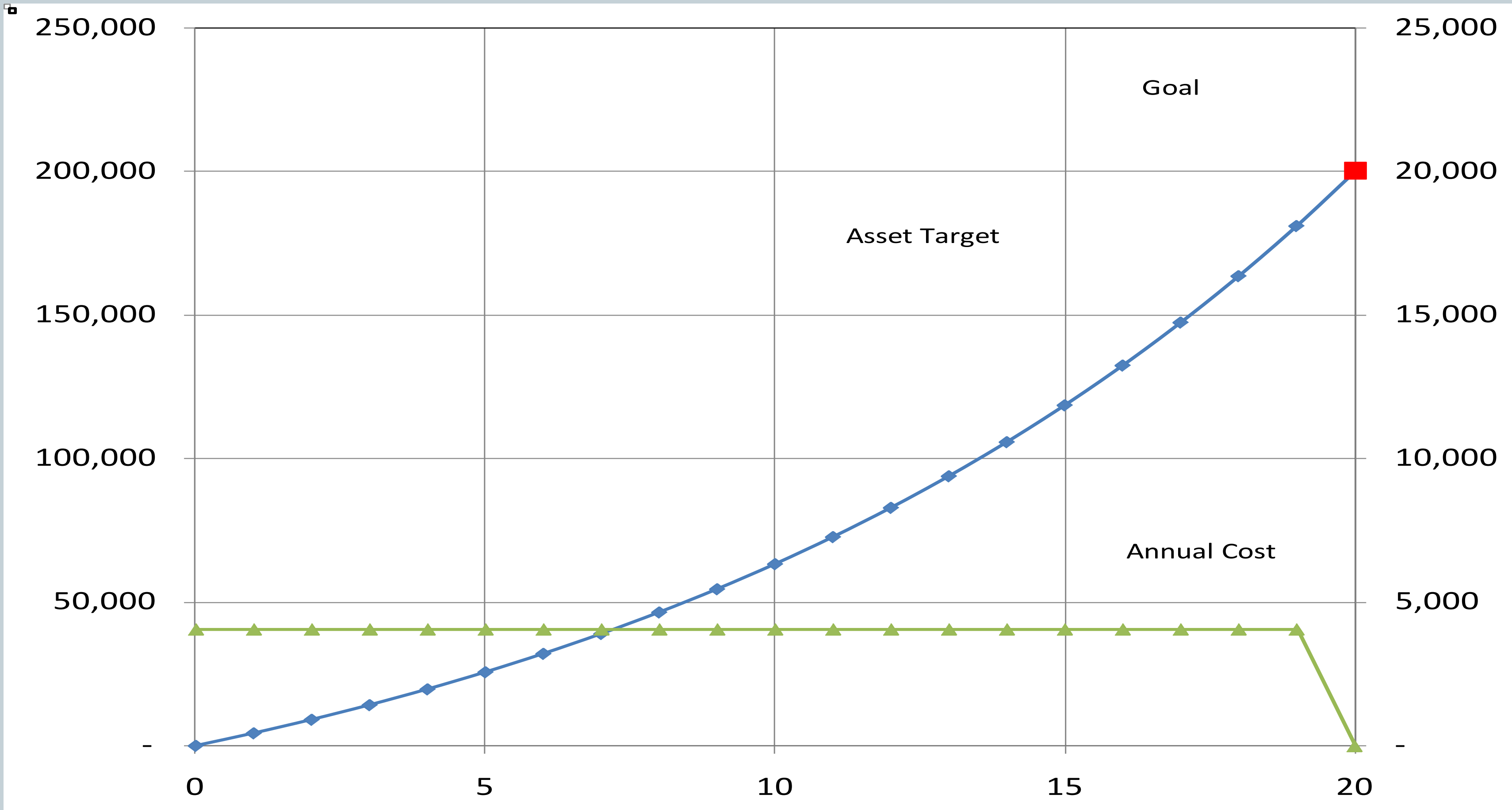

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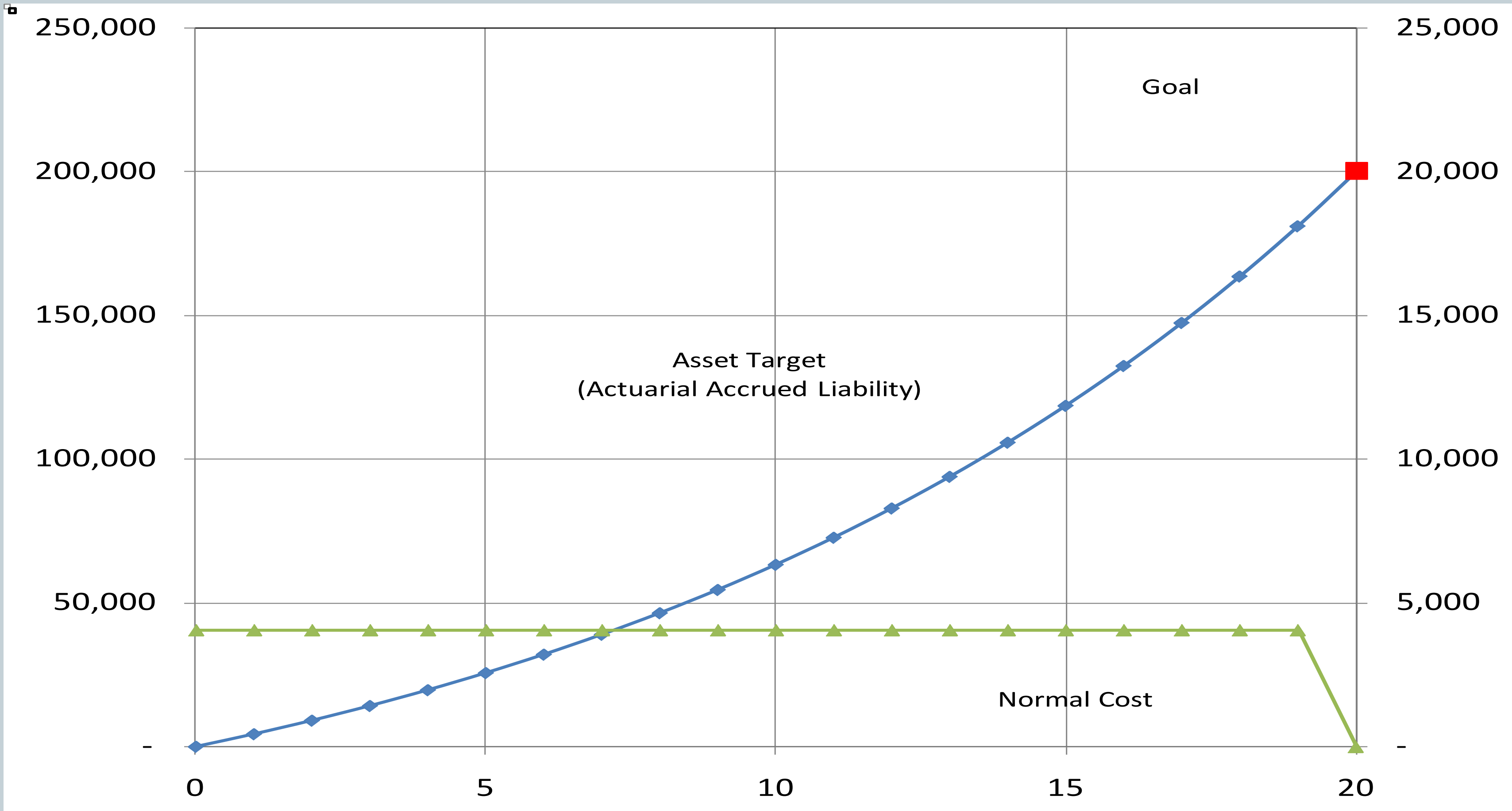

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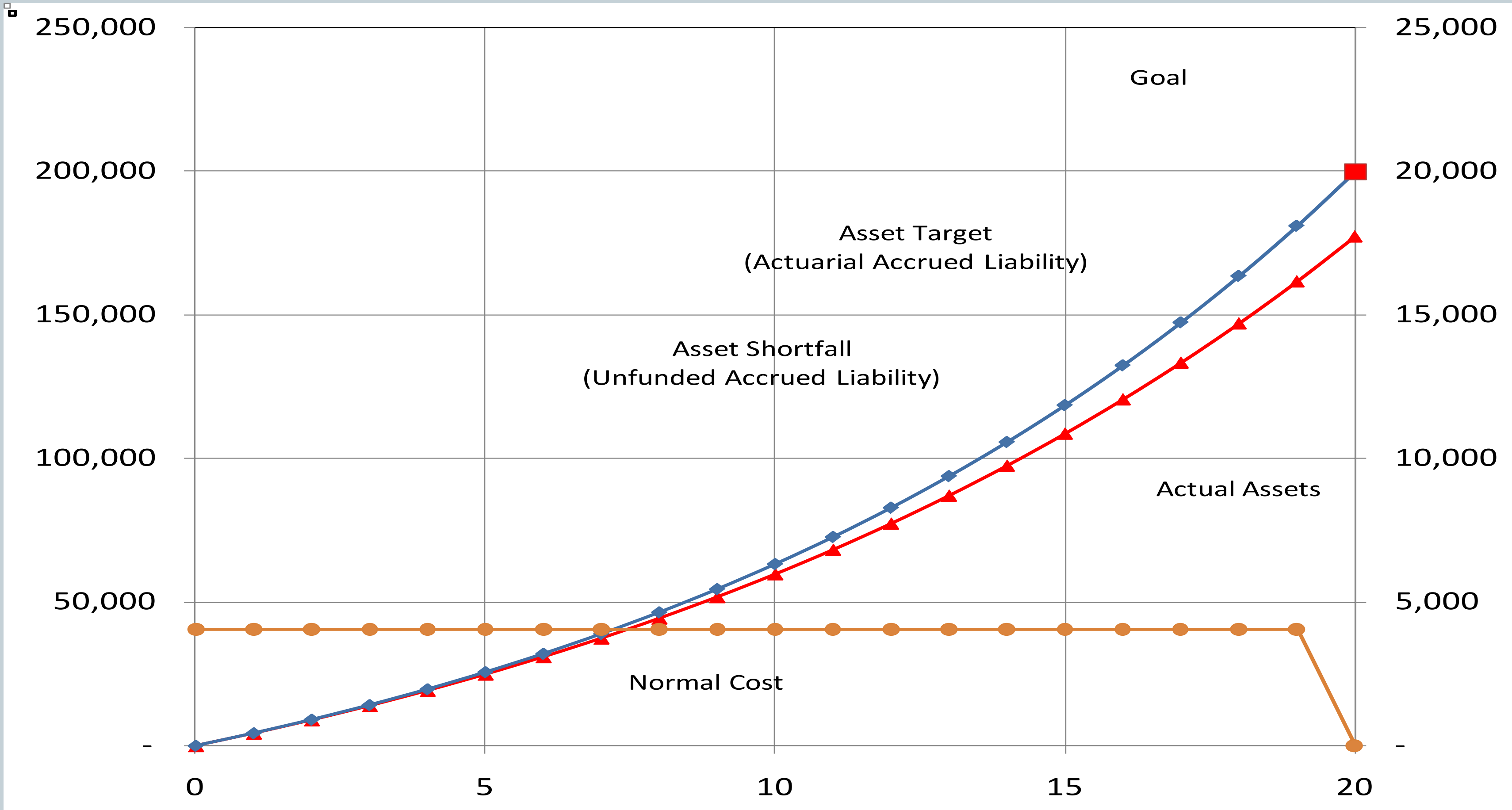

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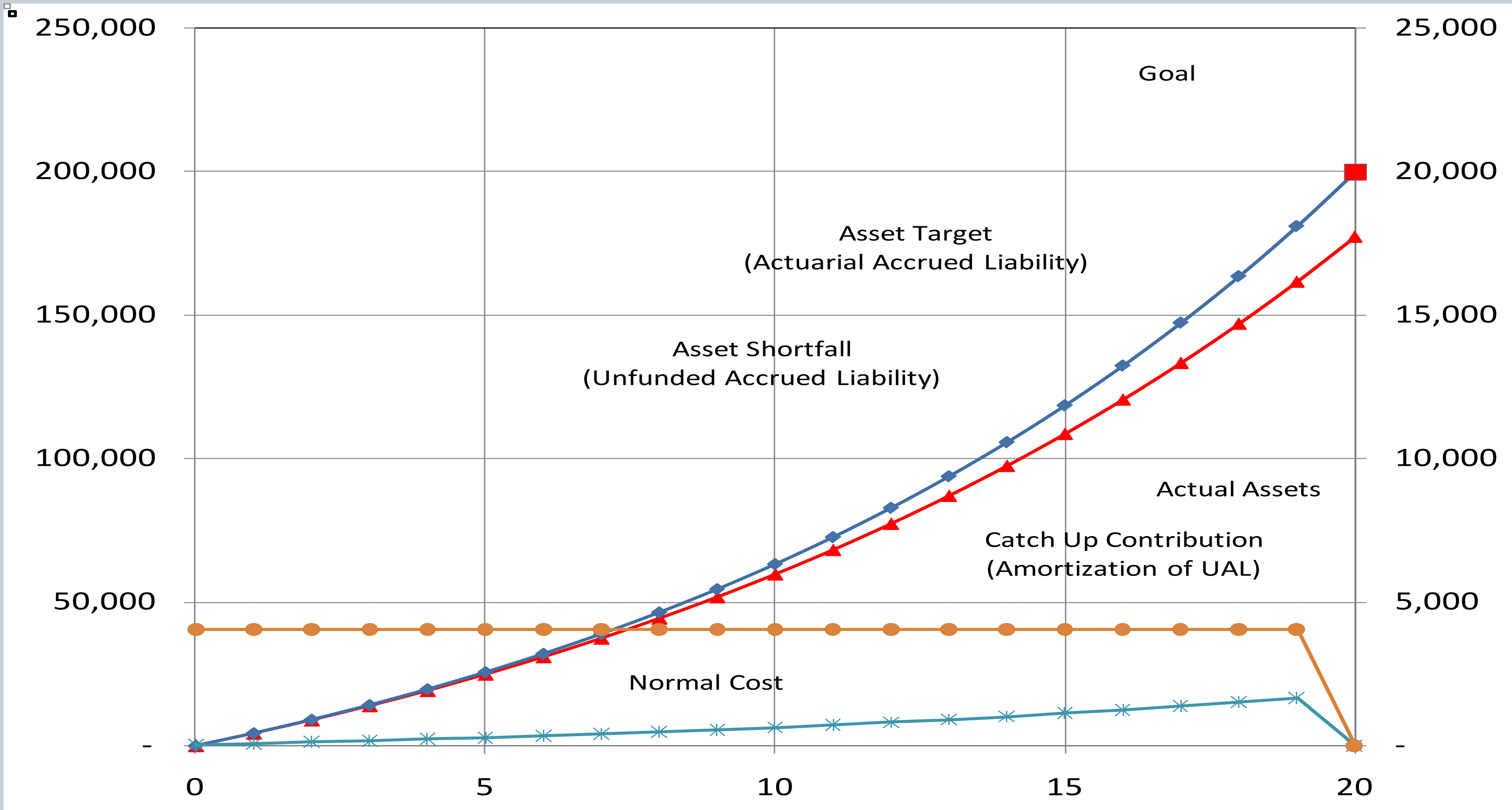

Example: College Funding

What did we do? We prefunded college:

- Set a goal
- Set a path to the goal
- Set an annual contribution
- Formulated a plan to make corrections for shortfalls or excesses in assets

This is nothing less than actuarial funding

This is nothing more than Management 101

Example: College Funding – Glossary

- Normal Cost = Annual Cost (Regular Contribution)
- Accrued Actuarial Liability = Asset Goal
- Unfunded Accrued Actuarial Liability (UAAL) = Asset Shortfall
- Amortization of UAAL = Catch Up Contribution
- Actuarial Cost = Normal Cost + Amortization of UAAL

Board Choices

- What can the Board do to affect employer contributions?

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What can the Board do?

- Equation:
  - <u>Contributions</u> equals
  - <u>Benefits</u>, plus
  - <u>Expenses</u>, minus
  - <u>Investment earnings</u>
- Reduce contributions <u>only</u> by increasing investment earnings or lowering Plan costs (benefits & expenses)
- Board can't control either
- Board can only accelerate or delay employer contributions
- The Plan costs what it costs

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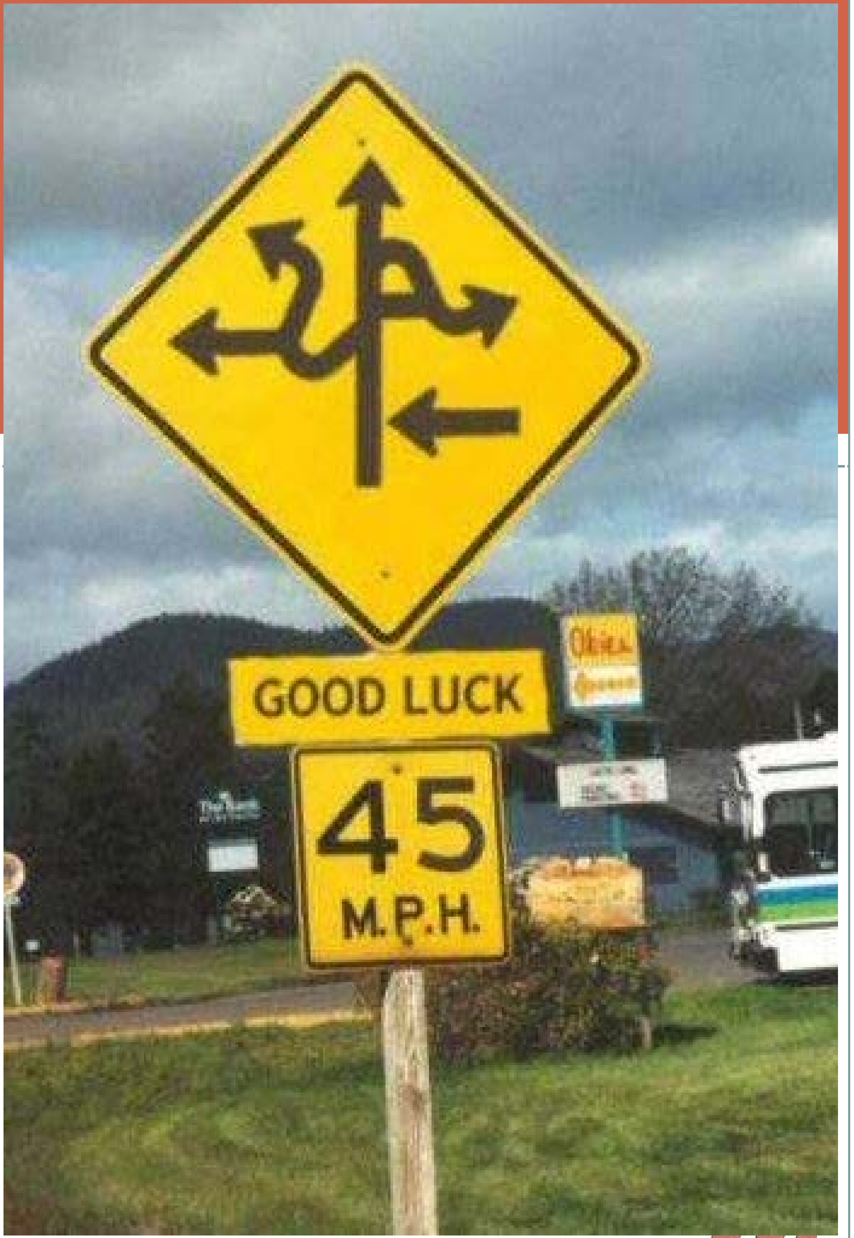
What can the Board do?

- Tools
  - Investment Policy
  - Asset Smoothing
  - Amortization Policy
  - Direct Cost Smoothing
- Mainly affecting timing of contributions, not the amount

Actuarial Disclosure

- What is the Funded Ratio?
- What are we disclosing?
- What are we not disclosing?



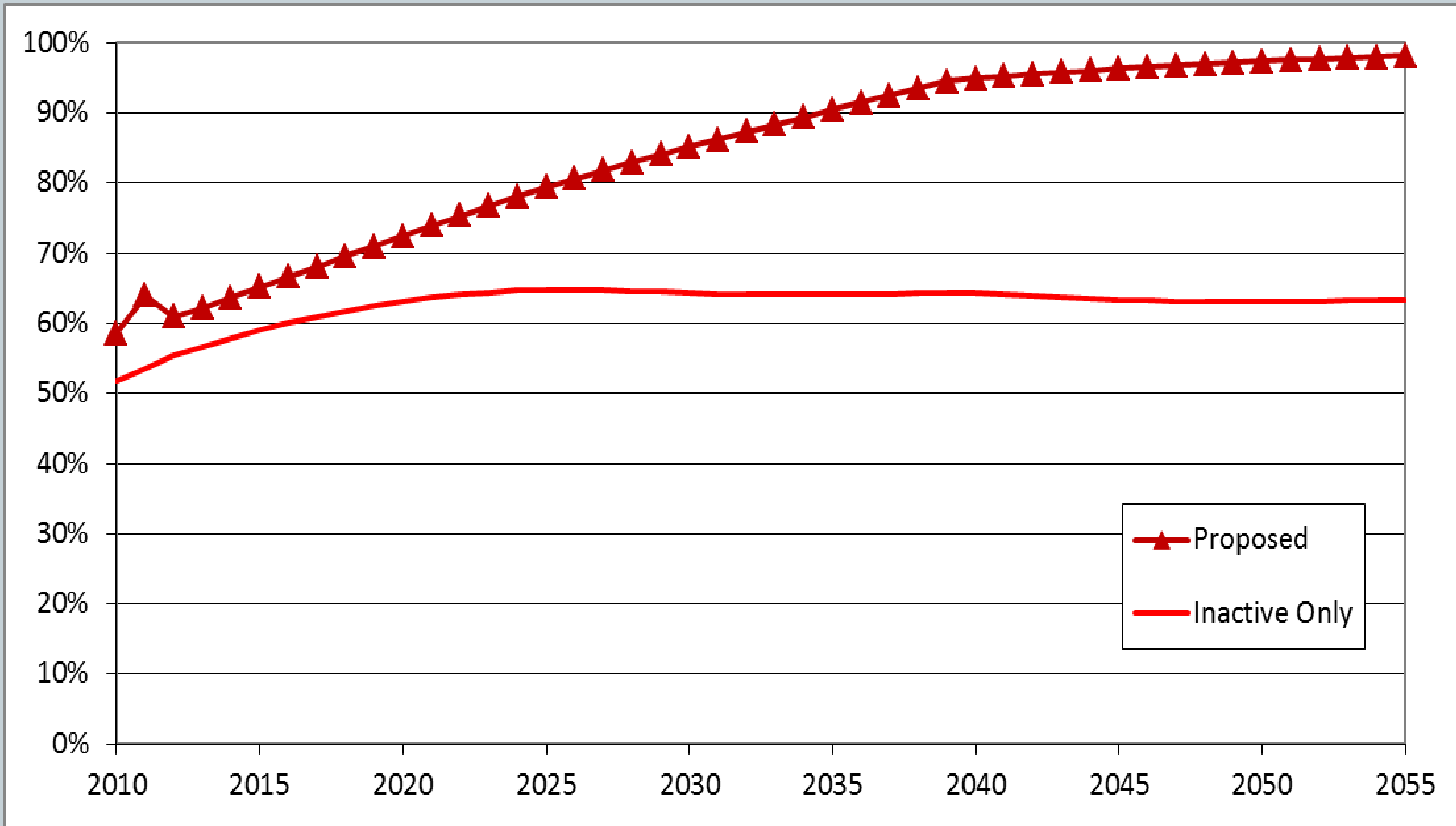
What is the Funded Ratio?

- The Funded Ratio compares Assets (either smoothed or market value) with the Asset Target (the Actuarial Accrued Liability)
- Assets can be shown at Actuarial Value (smoothed) or at Market
  - In order to smooth annual plan cost, actuaries usually smooth investment gains and losses over from five to ten years
  - Sometimes the actuary imposes a corridor, requiring the Actuarial Value of Assets to stay within a percentage (usually 20% to 50%) of the Market Value
  - Funded ratio is Assets ÷ Asset Target
- What are we disclosing?
  - Our funding plan – the Asset Target
  - Our Assets relative to our plan – the Funded Ratio

What is the Funded Ratio?

- The Funded Ratio changes over time (see next slide)
- Funded Ratios above and below 100% are a normal part of the life of a pension plan
  - Higher than expected asset returns, combined with employer and employee contributions, pushes the Assets above the Asset Target
  - Lower than expected asset returns can cause Assets to be below the Asset Target
  - There are no "surplus" assets or "excess" earnings
- When is the Funded Ratio too low?
  - When Assets are lower than the liability for retired, disabled, and terminated members and beneficiaries
  - Means you don't have enough Assets even for retirees
  - Means that you have no Assets set aside for active members; no prefunding at all

The Funded Ratio Over Time



What is Not Disclosed?

- The Funded Ratio misses a lot
  - The Economic Value of benefits
  - An accounting liability (depending on how the accounting profession defines it)
  - The trend of future plan costs
  - Plan solvency
  - Affordability/sustainability of plan benefits
  - Impact on plan sponsor
- What are we disclosing in the Funded Ratio?
  - Our funding plan – the Asset Target
  - Our Assets relative to our plan – the Funded Ratio
  - Actuaries do not compute liabilities

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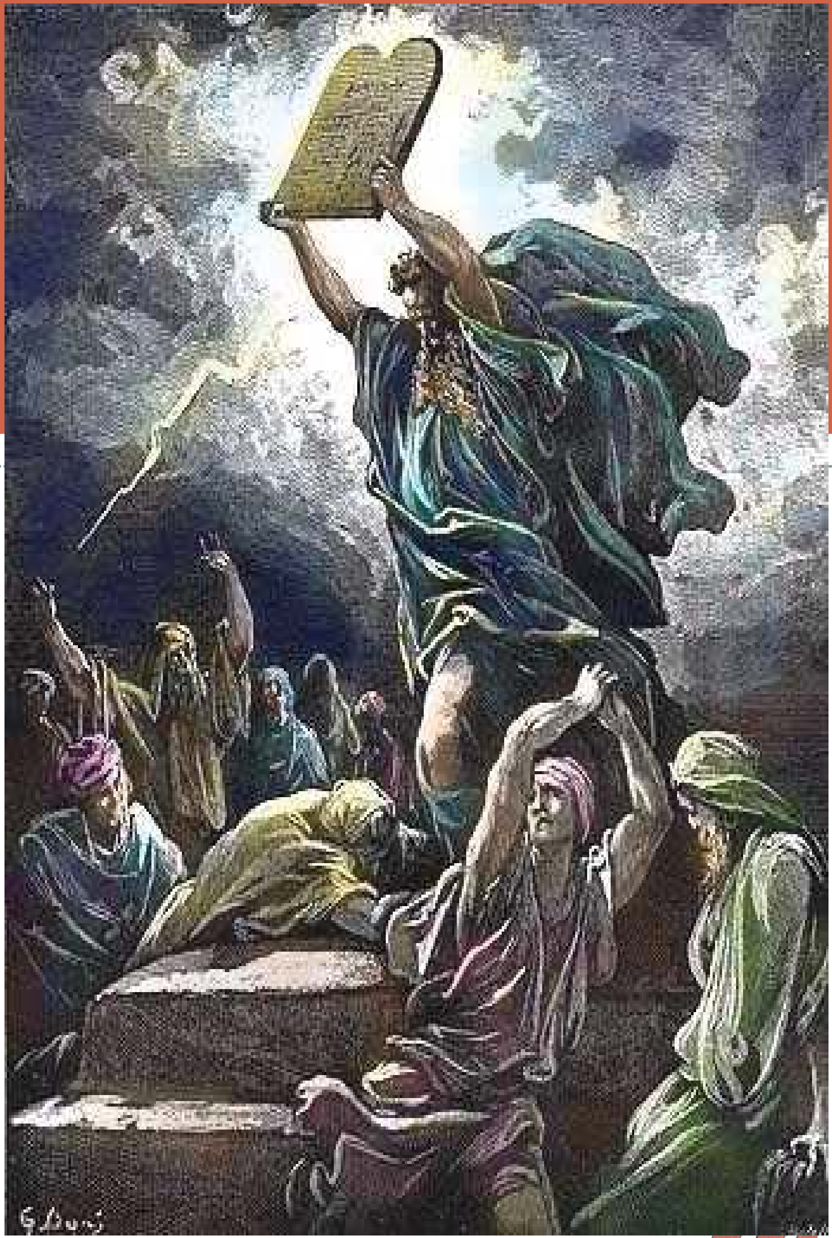
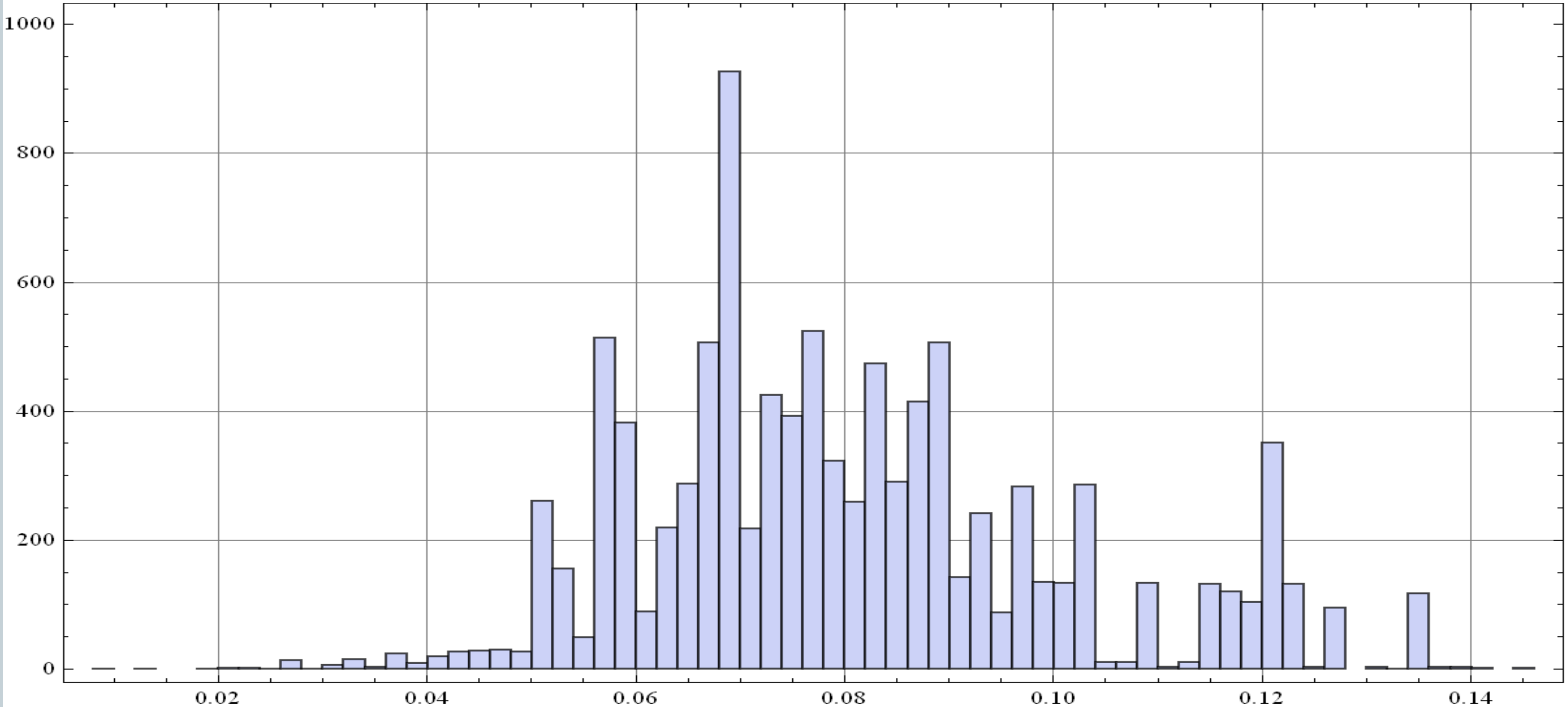
The Discount Rate



- Uncertainties
- Setting the Discount

Uncertainty in the Discount Rate



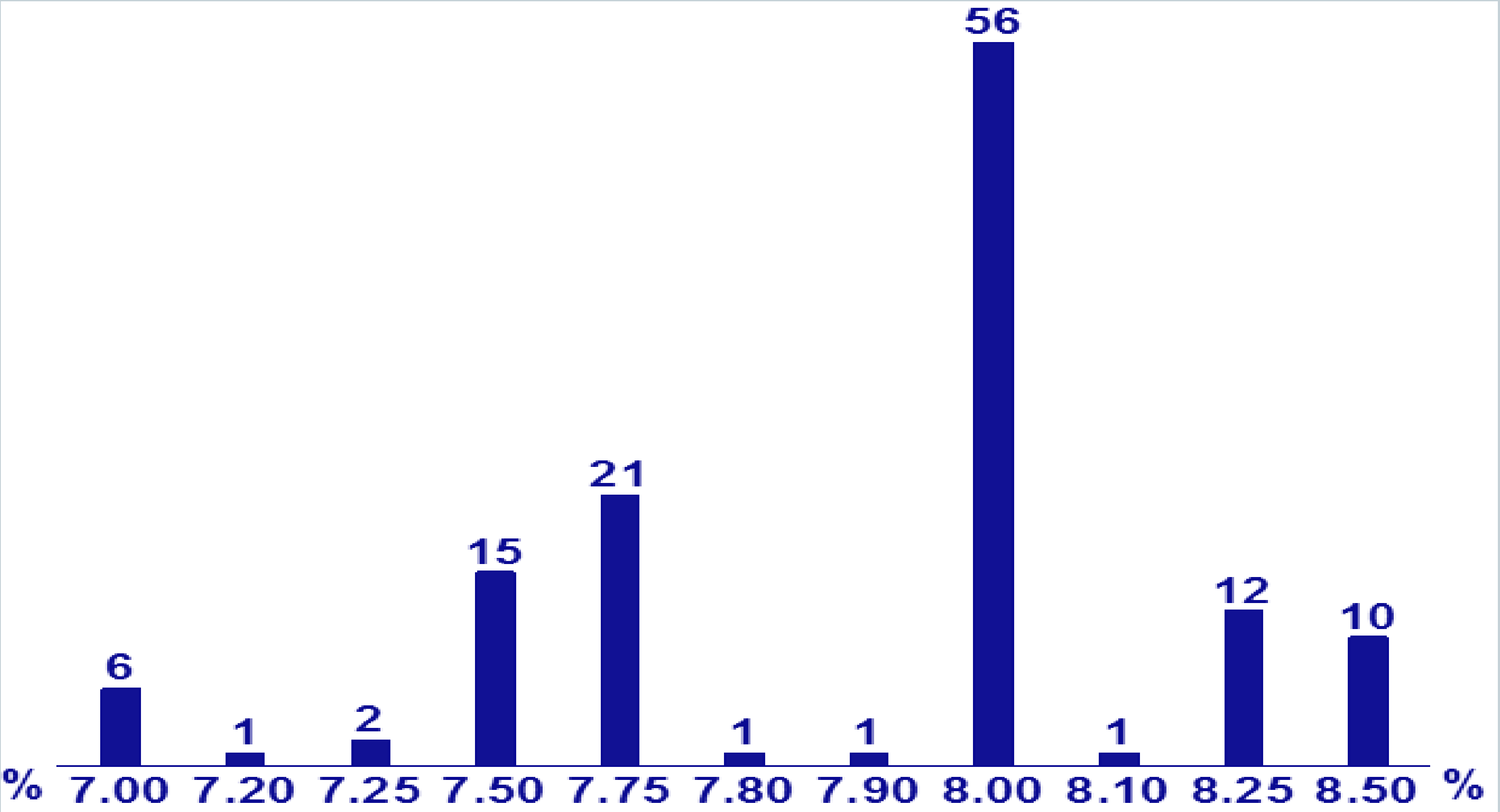
Distribution of the Internal Rates of Return using risky assets

The horizontal axis is the Internal Rate of Return (IRR) for each simulation trial, while the vertical axis is the number of simulation trials of 10,000 that produced the IRR on the horizontal axis. The average compound return is 8.1%, while the standard deviation is 2.0%.

Setting the Discount Rate

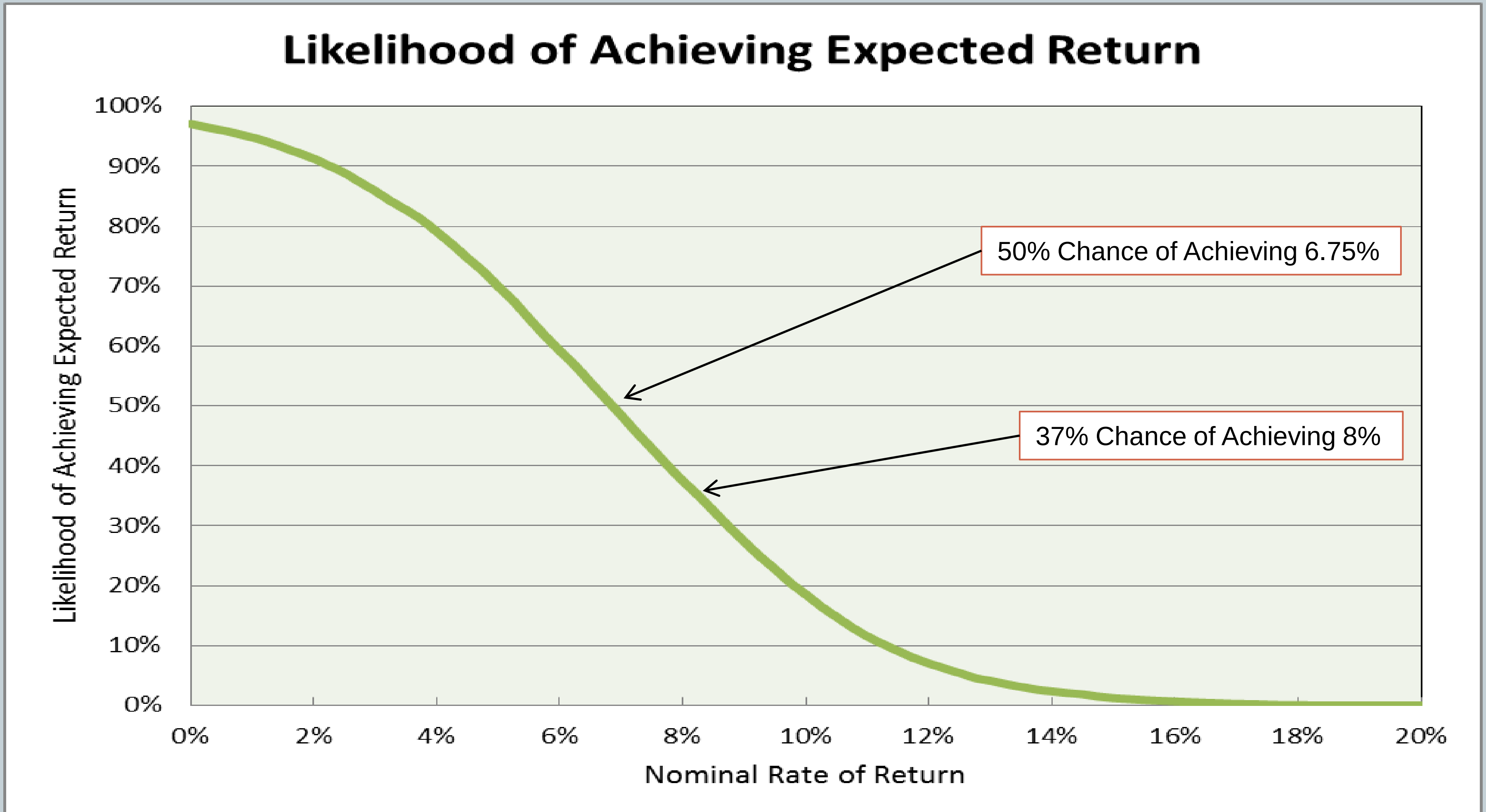
- What does your investment consultant expect?
  - Review consultant's capital market assumptions: Mean, standard deviation of returns by class, correlations
  - Apply these assumptions to your asset allocation
  - May add a margin for negative deviation
  - Determine how likely you are to achieve each assumption level
- What are other plans doing?
  - How are they the same as your plan? How are they different?
- What are trends nationally?
  - Studies by NASRA, Greenwich, Wilshire, others
- What are your attitudes toward cost?
  - Higher cost now, lower later? Vice versa?
- Remember: Every discount rate will be wrong.

Assumed Returns



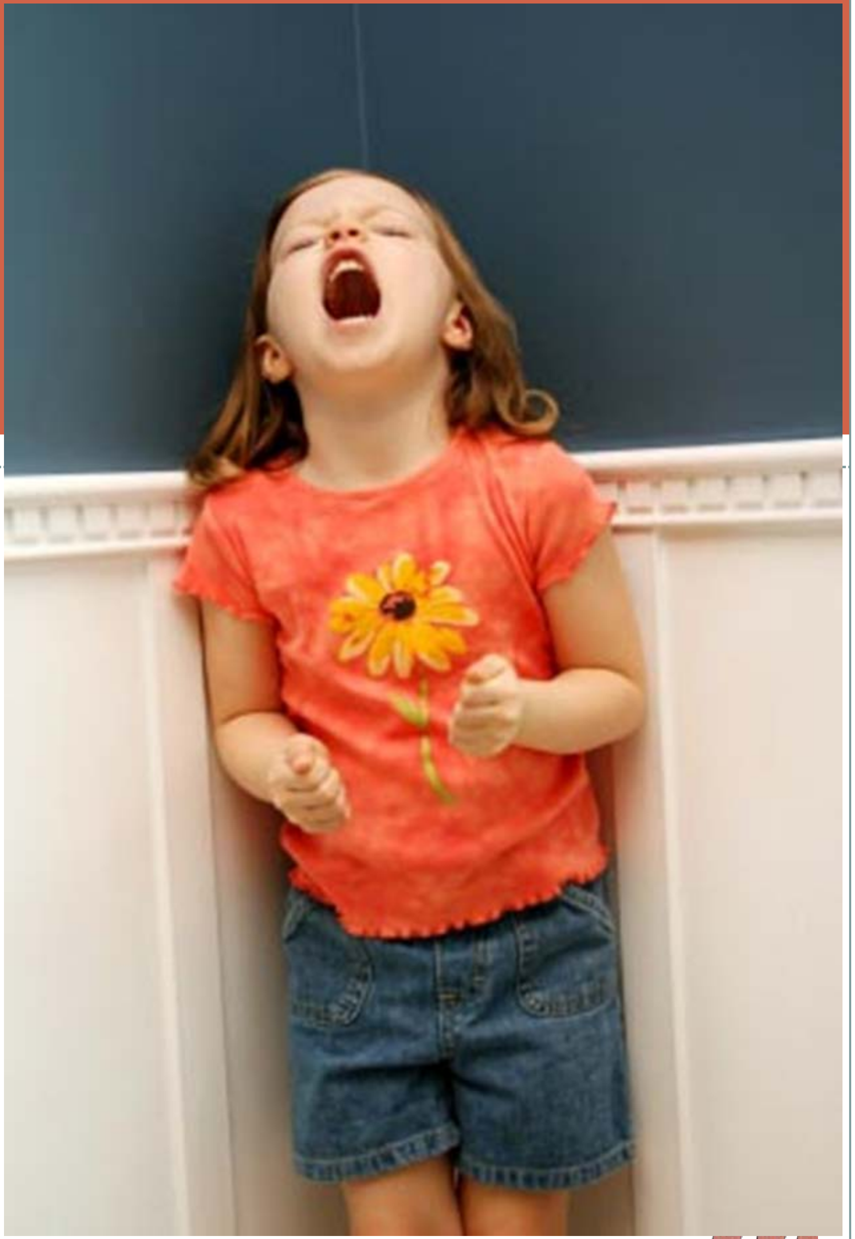
Source: NASRA Public Fund Survey

Simulated Returns

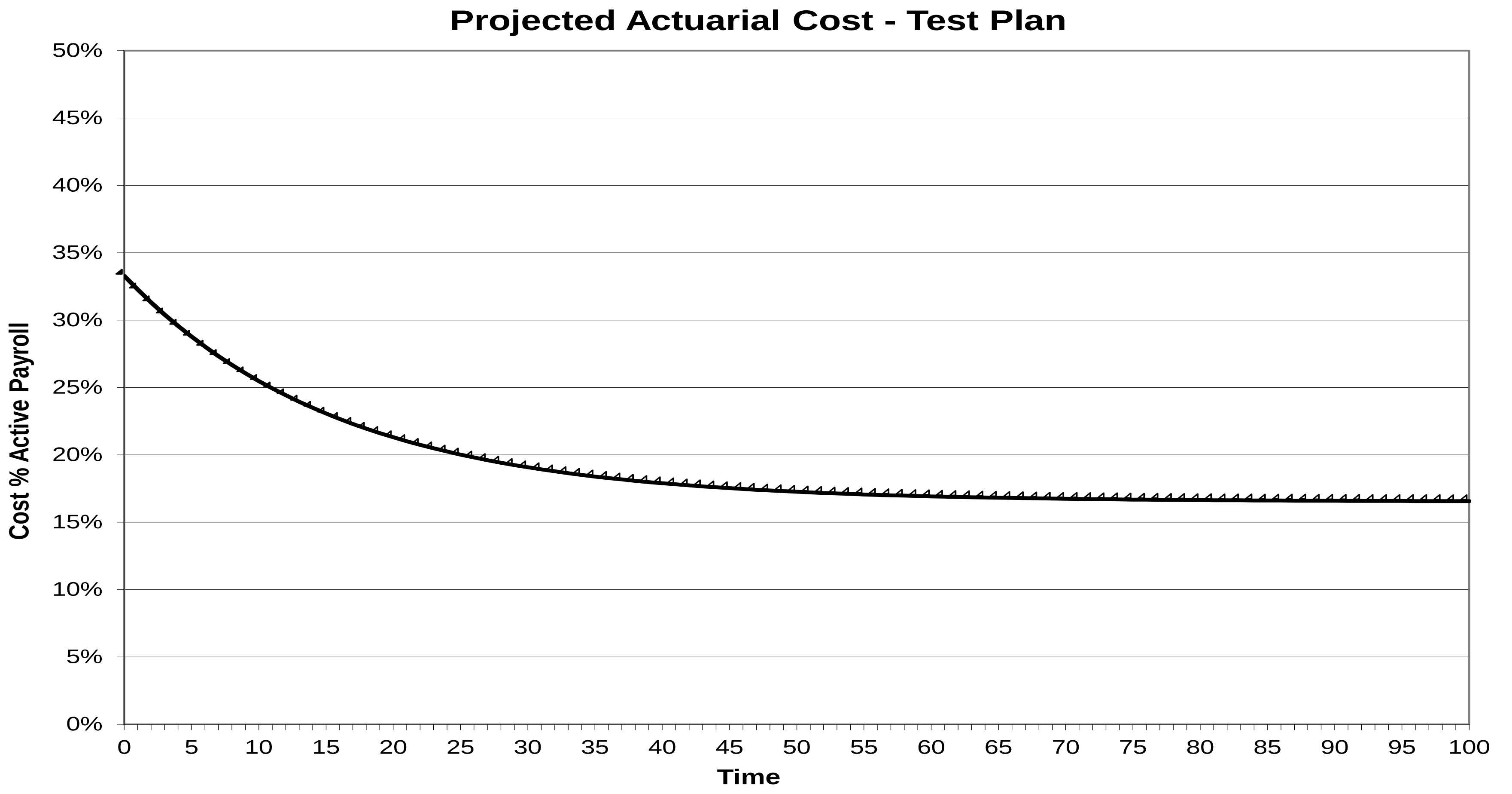


Pension Plan Behavior

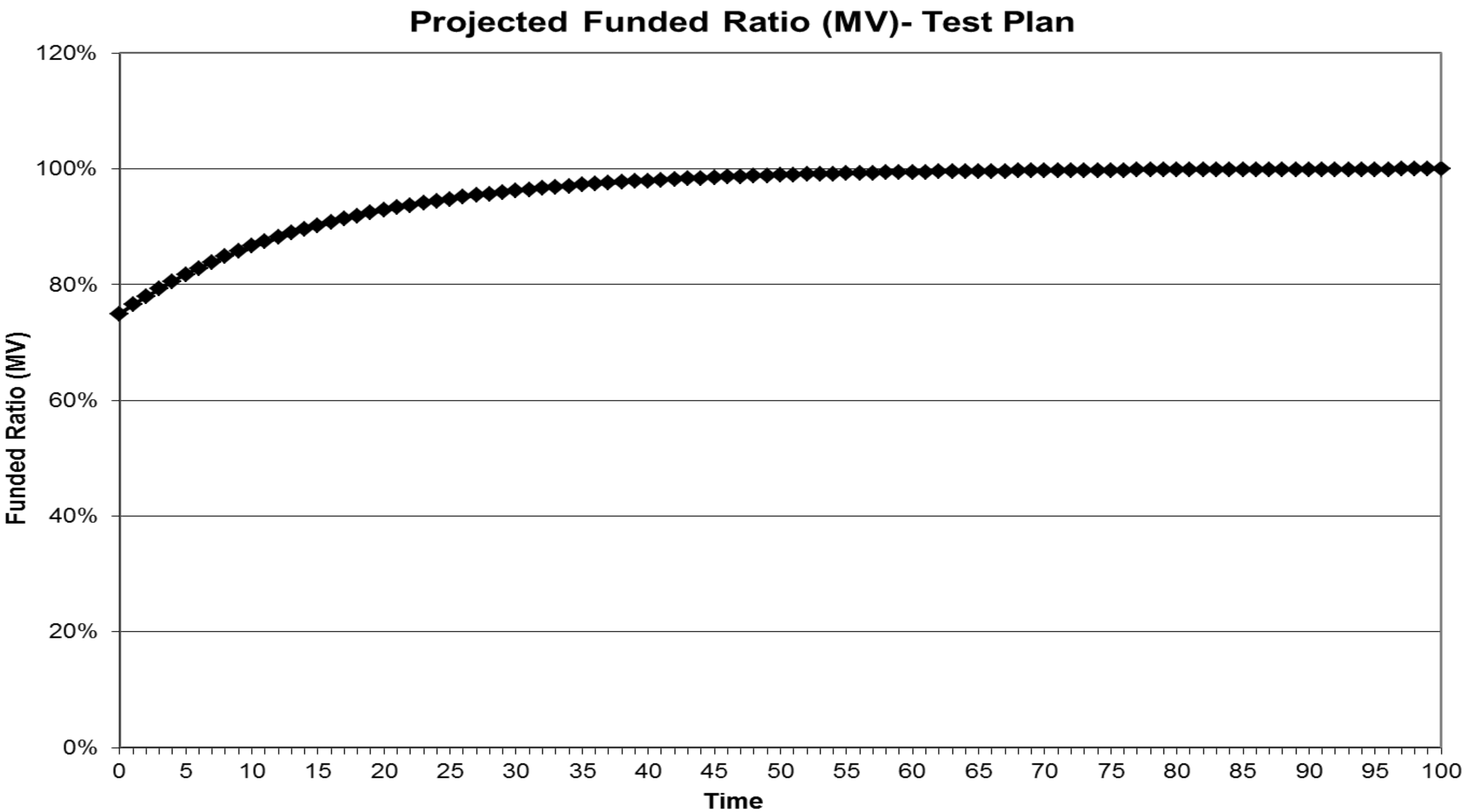
- **Dynamics**
- **Risk**



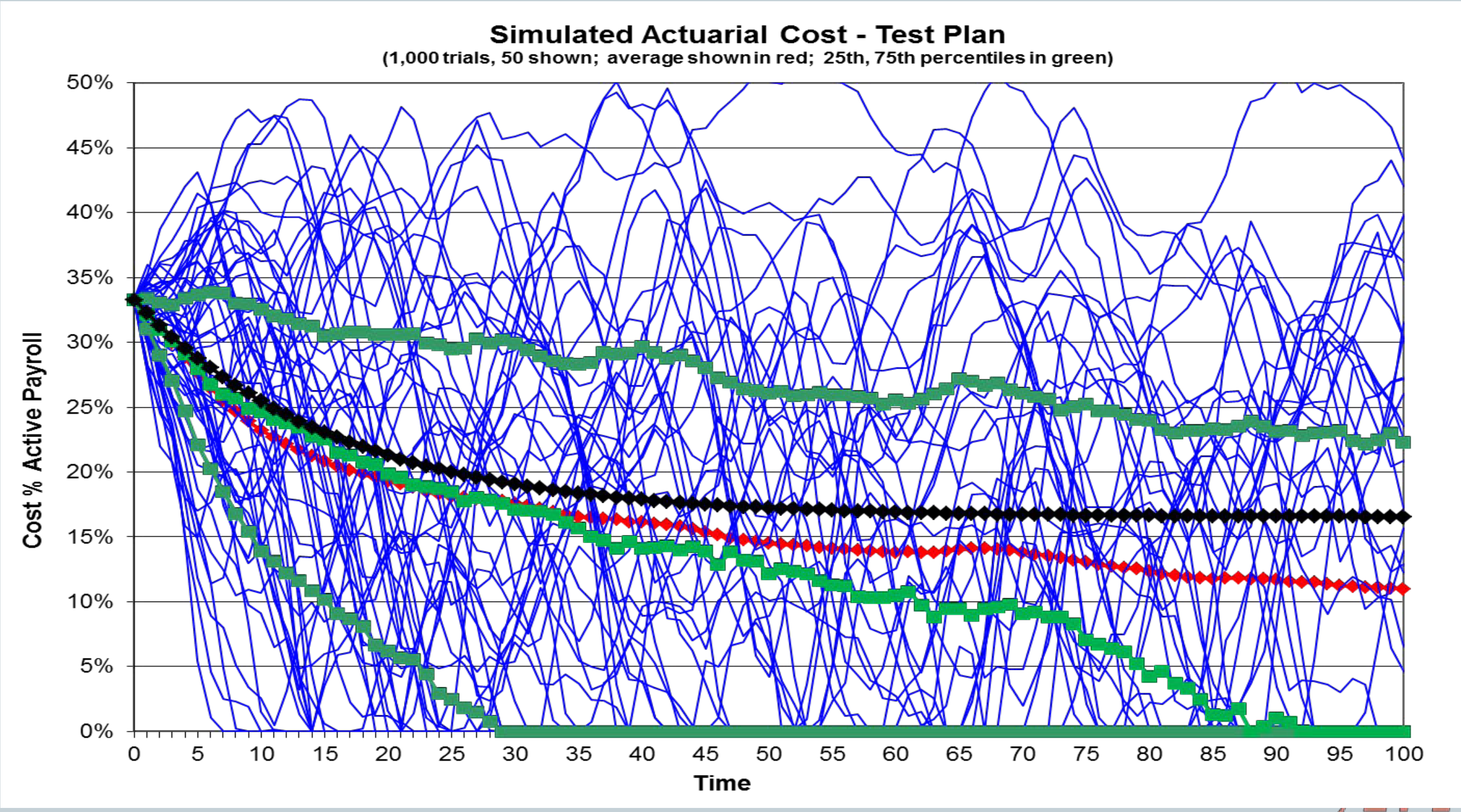
The Actuarial Fantasy: Cost



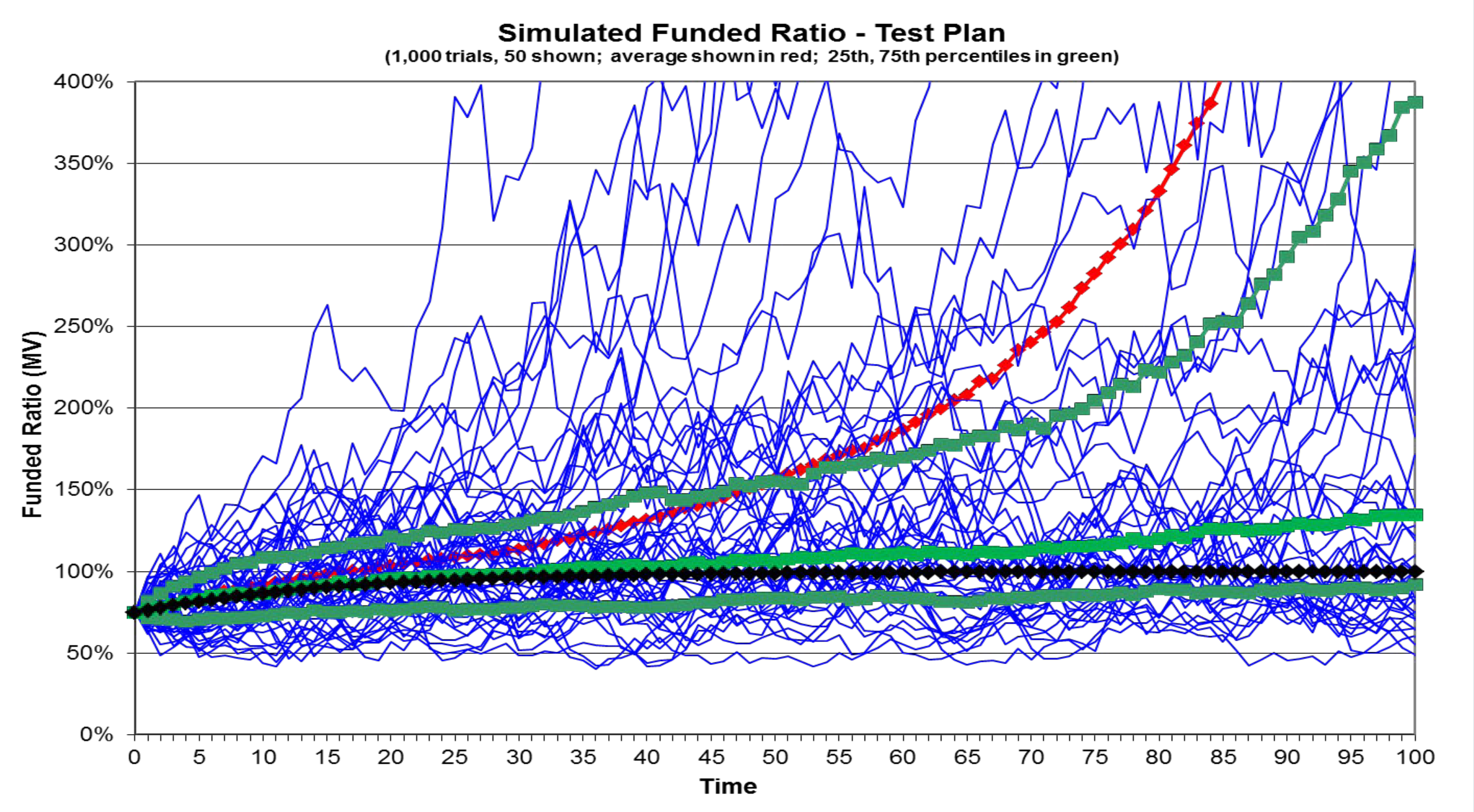
The Actuarial Fantasy: Funding



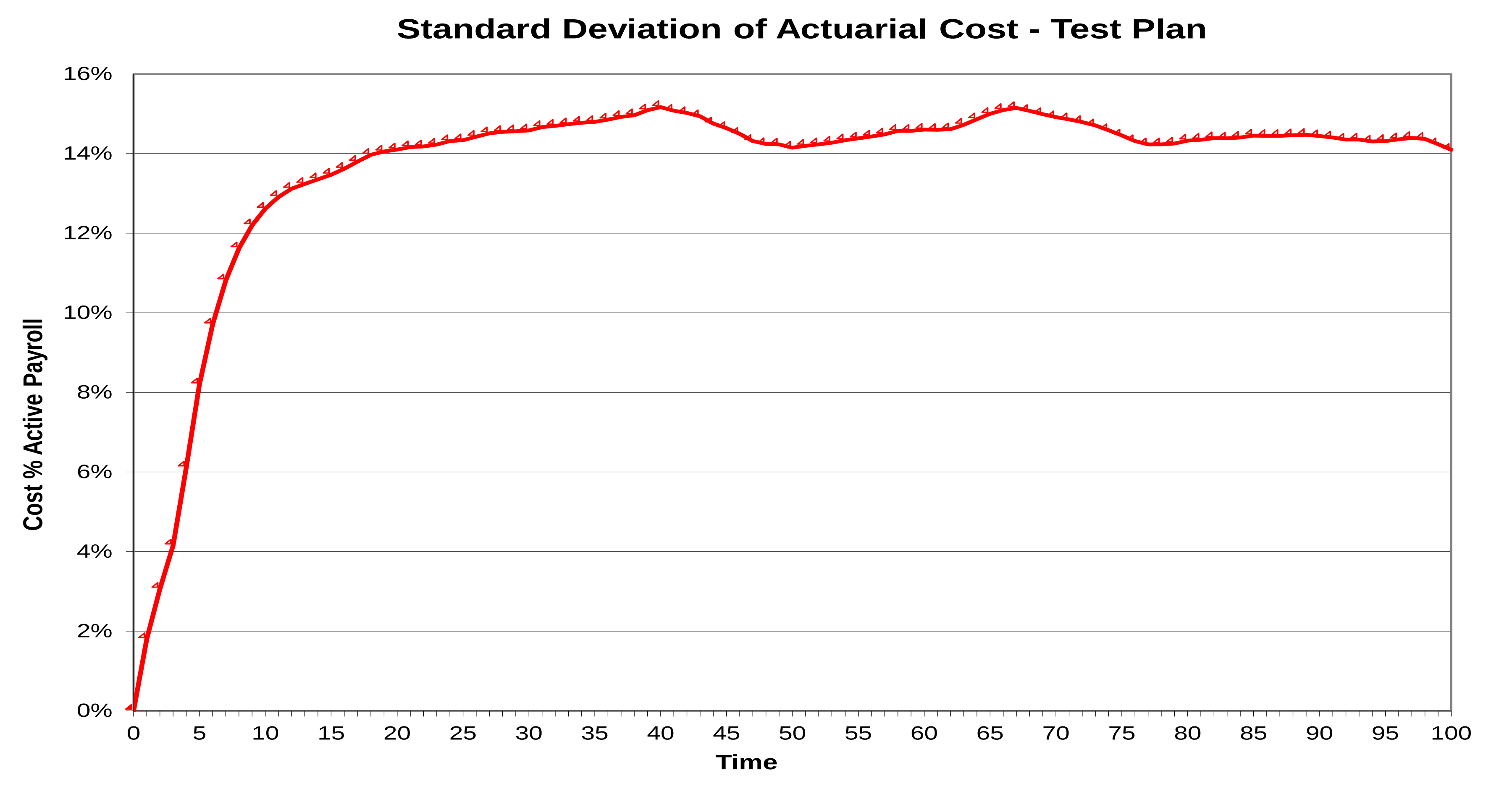
The Ugly Truth: Cost



The Ugly Trust: Funding



Risk Grows Over Time: Cost

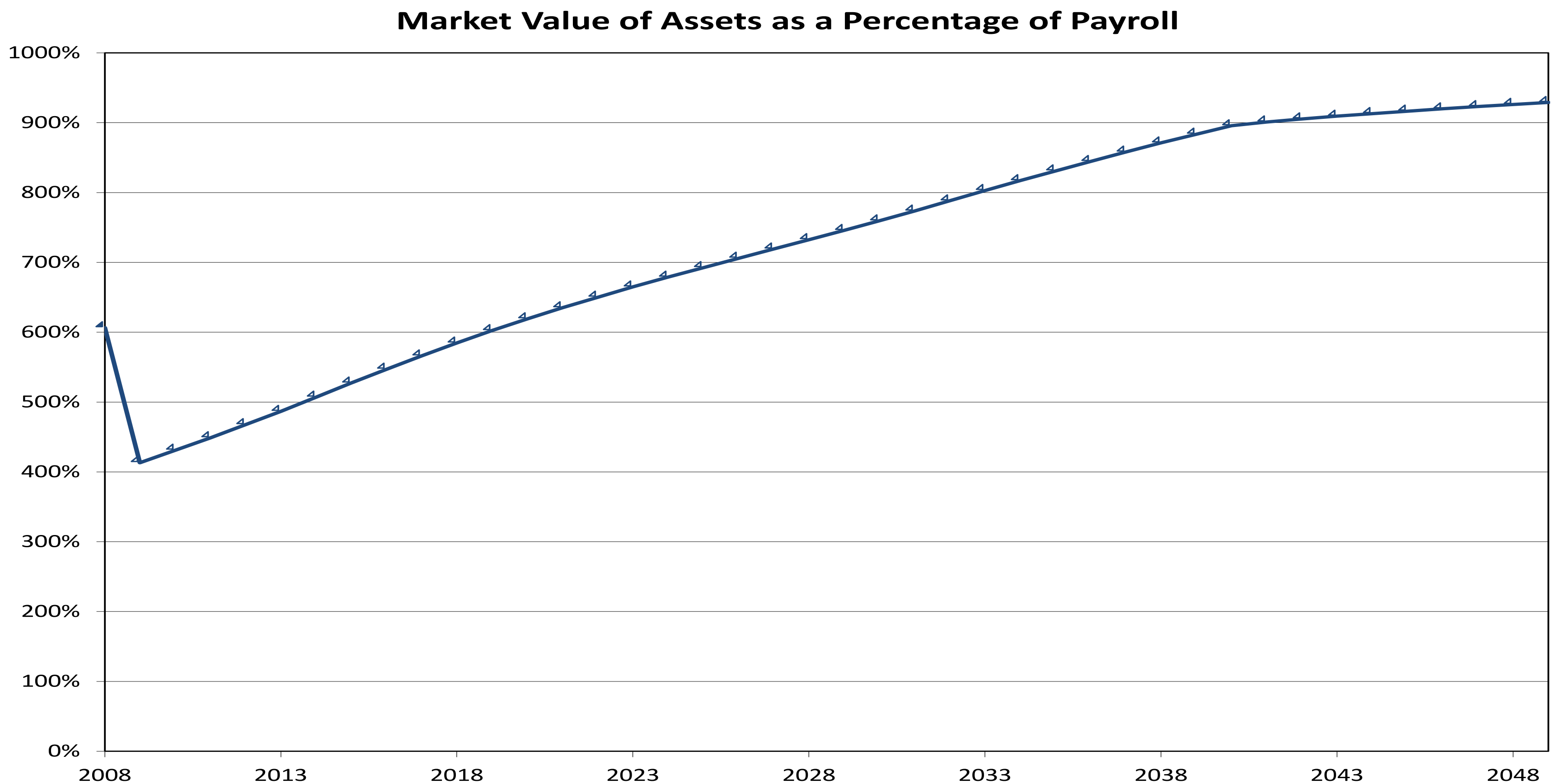


Principal Behavioral Characteristics

Even if all actuarial assumptions are met on average:

- Actuarial cost is not level
- Actuarial cost declines as funding improves
- Lots of volatility: Chance of exceeding twice current cost is at least 25%, higher as funding improves
- Lots of volatility: Standard deviation of cost increases to about the normal cost over time

Risks: Funding Risk

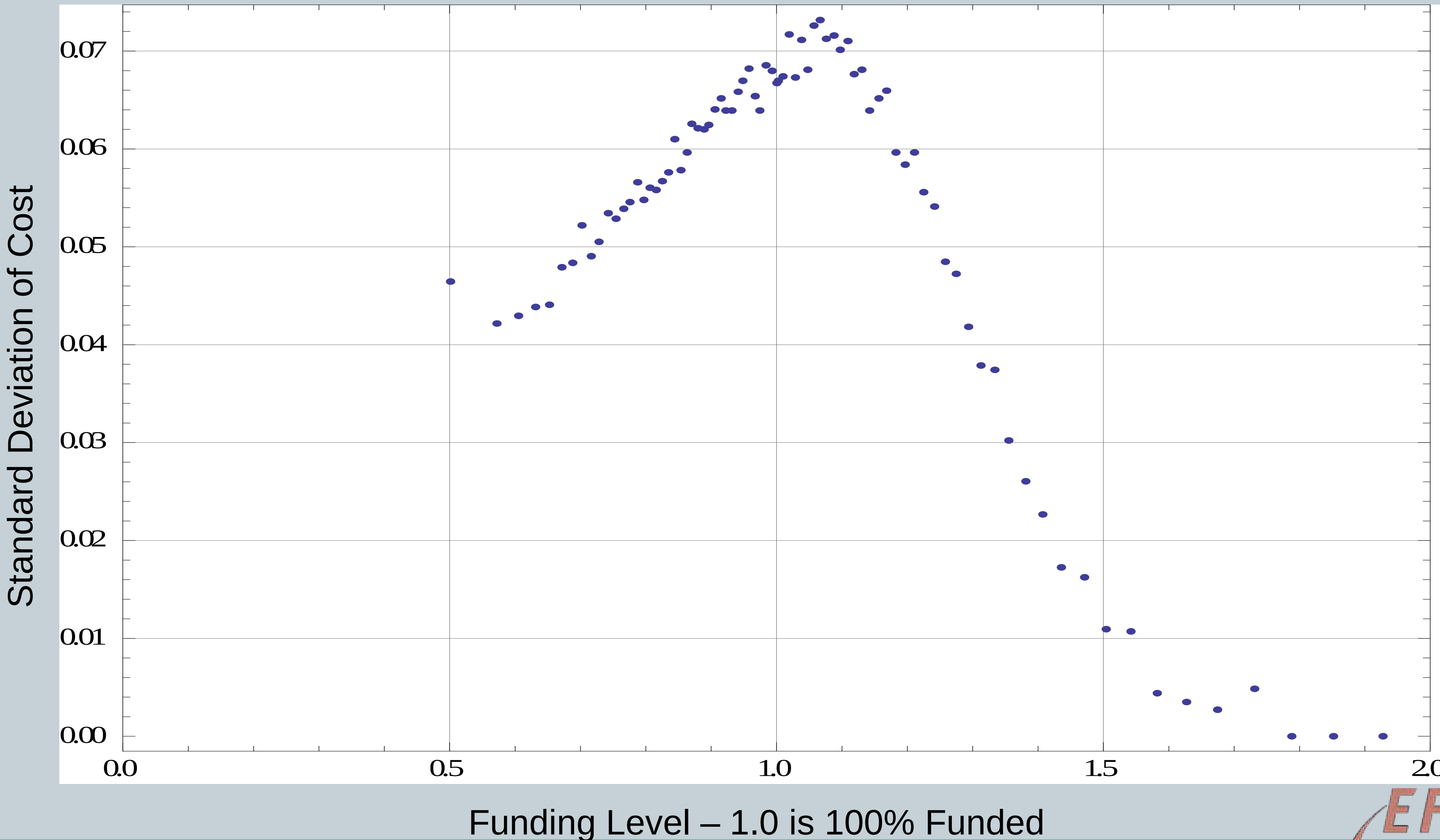


Risks: Funding Risk

Event/Impact	Assets = 500% Payroll	Assets = 1000% Payroll
Return of 0% vs. 8% assumed		
Actuarial Loss (Assets)	8% of Assets	8% of Assets
Actuarial Loss (Payroll)	8% X 5 = 40% of Payroll	8% X 10 = 80% of Payroll
Cost Impact (After Phase-In due to Asset Smoothing)	4% of Payroll	8% of Payroll

Note that the cost impact of market variation is directly proportional to the ratio of assets to covered payroll.
More assets = More risk

Risks: Funding Risk



Pension Reforms

- Accounting Standards
- Legal Foundations
- California Proposals
- Changes Nationwide

GASB Exposure Draft

Proposed significant changes from current pension accounting standards (GASB 25/27):

1. Net Pension Liability (formerly known as Unfunded Liability - UAAL) goes on balance sheet; currently only shown in notes to financial statements
2. Tighten rules governing pension expense; shorter amortization, increased volatility
3. Divorce accounting expense and funding; expense can be negative
4. Biggest impact may be in public relations
   - Most material is already known by rating agencies

Legal Foundations

- Source of legal protections varies by state
  - State constitution (Alabama, Arizona)
  - Implied or explicit contract rights (Washington)
  - Contractual subject to due process (Wyoming)
  - Statute (California)
- Members protected varies by state
  - All current members (Massachusetts)
  - Vested members (California)
  - Vested members eligible to retire (Florida)
  - Retirees only (Iowa)
- Benefit protected varies by state
  - All benefits, accrued or not (Oregon)
  - Accrued benefits only (Louisiana)
- California
  - "A public employee's pension constitutes an element of compensation, and a vested contractual right to pension benefits accrues upon acceptance of employment. Such a pension right may not be destroyed, once vested, without impairing a contractual obligation of the employing public entity." (Betts v. Board of Administration)

Governor Brown's Proposals

- Proposed February, 2012
  - Constitutional amendment by initiative petition
  - Revisions to California Government Code
  - Applies to Charter Cities
  - Could indirectly affect '37 Act Counties
- For current plan members:
  - Benefit increases can apply only to future service
  - Members must pay half of plan normal cost for all benefits
  - Convicted felons forfeit all benefits
  - Purchases of "air time" (additional service) no longer allowed
  - Unclear if these changes pass legal muster

Governor Brown's Proposals

- For new hires (after July 1, 2013):
  - New hybrid plan
    - Defined benefit, defined contribution, Social Security (?)
    - Designed to replace 75% of pay for a career employee
  - Benefits to be based on high 36 months of pay
  - Bonuses, unplanned overtime, unused sick leave and vacation is not to be included in pay for benefits
- Governance
  - Annual payments of normal cost required for employer and employees
  - Retirement board makeup could be changed by law

Changes Nationally – A Sample

- Increased member contributions
- Parity of employer and member contributions
- Longer period for average earnings
- Later retirement ages
- Longer vesting period
- Reduced benefit multipliers
- Restrictions on classes of compensation for benefits (“spiking”)
- Prohibition of service purchases (“airtime”)
- Restrictions on post-retirement employment (“double dipping”)
- COLA reductions
- Introduction of hybrid plan
- Replacement with defined contribution plan

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Contact Information

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