



SOCIETY OF ACTUARIES

**SOA 2010 Annual Meeting & Exhibit  
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**Session 28 OF, Public Finance—How Actuaries  
Should Consider Helping**

**Moderator:**

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**Presenters:**

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Robert C. North, Jr., FSA, EA, FCA, FSPA, MAAA

Michel Rochette, FSA

# Public Finance

SOA 2010 Annual Meeting  
Session 28



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## Presenters

- Emily Kessler, FSA, FCA, MAAA, EA
  - Senior Fellow, Intellectual Capital, Society of Actuaries
- Robert C. North Jr., FSA, FSPA, FCA, MAAA, EA
  - Chief Actuary, New York City Retirement Systems
- Michel Rochette, FSA,
  - PhD Student, Risk Management and Public Policy
- Moderator, Jeremy Gold, FSA, MAAA, CERA
  - Jeremy Gold Pensions, pension finance, financial economics, pension enterprise risk management



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## Today

- What is public finance
- Actuarial science & public finance
- Public finance case studies
  - Social Security
  - Public sector employee pension plans
- What role can actuaries play



## What is public finance?

- “Field of economics concerned with paying for collective or governmental activities, and with the administration and design of those activities”  
(Wikipedia)
- Essentially, what governments do and how to pay for it.



## What is public finance?

- Balancing government expenditures:
  - Consumption (annual)
  - Investment (long-term)
  - Transfer payments
  - Government operations
- With sources of funding
  - Taxes (income, sales)
  - Non-tax revenues (government entities)
  - Borrowing, seigniorage (printing money)



## Public finance: examples

- Infrastructure (roads, schools, parks, libraries)
- Social insurance programs
- Public employee pensions & post-retirement welfare



## What is public finance?

- Public finance has no one responsible party
  - The executive proposes
  - The legislative body appropriates
  - The bureaucracy implements



## What is public finance?

- Public finance occurs in a fishbowl
- The press provides constant scrutiny
- There is never enough revenue and there are always too many expenses
- The public never wants to pay more taxes but never wants services reduced



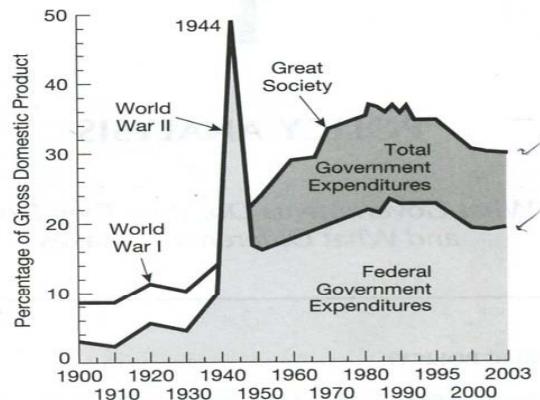
## Public Finance principles

- Is **not** the same as private sector finance
- Has its own terminology
- Involves multiple entities and interrelationships
- Sophistication varies widely from jurisdiction to jurisdiction



## Size of Government

FIGURE 1-1 The Growth of Government



Source: Dye, *Understanding Public Policy*



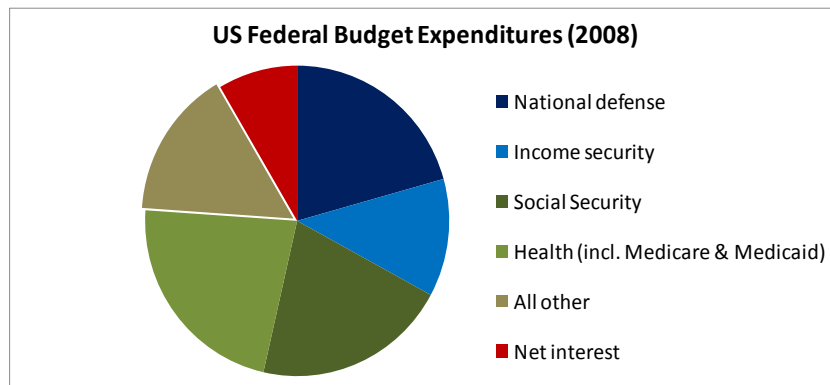
## Public finance: who spends

	1967	1987	2007
U.S. government	1	1	1
State government	50	50	50
Local governments			
County	3,049	3,042	3,033
Municipal	18,048	19,200	19,492
Township and town	17,105	16,691	16,519
School district	21,782	14,721	13,051
Special district	21,264	29,532	37,381
<b>TOTAL</b>	<b>81,299</b>	<b>83,237</b>	<b>89,527</b>

Source: Statistical Abstract of the US (accessed on-line)



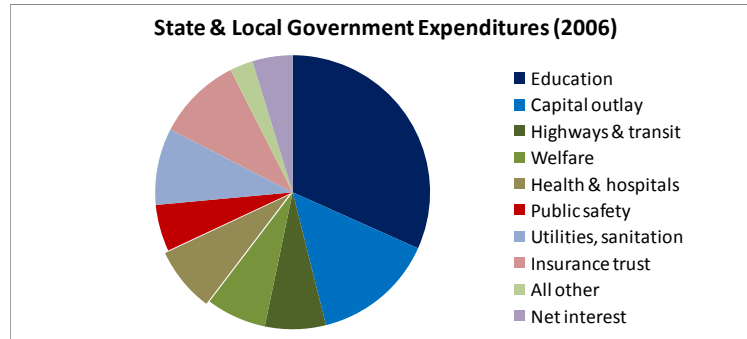
## Public finance – what is spent



Source: Statistical Abstract of the US (accessed on-line)



## Public Finance – what is spent



Source: Statistical Abstract of the US (accessed on-line)  
Expenditures are NET Federal Transfers



## What drives actuarial science?

- Statistical framework: law of large numbers & credibility
- Economic and behavioral framework: stakeholder preferences, time value of money, behavior of insured
- Facts: substitute facts for appearances
- Model outcomes and effects





## What drives financial security systems?

- Participants pool idiosyncratic risk
- Participants transfer one or more undesirable actuarial risks to a second party
- Risk experience: data and facts
- Anti-selection & moral hazard
- Actuarial soundness and degree
- Intergenerational equity



## Actuarial science in public finance

- How do we marry actuarial principles with financial security systems in the public arena?
- How do the actuarial principles apply?
- How do we modify actuarial practice to fit the needs of public finance?



## Actuarial principles in public finance: the landscape

- Stakeholders
- Objectives
- Value of risk taking/risk budget
- Risk mitigation
- Feedback loop



## Stakeholders

- Taxpayers
  - Future taxpayers have no voice
- Legislative body
  - Primarily, (should be) agents of taxpayers
- Sometimes includes
  - Public sector employers (bureaucracy)
  - Public sector employees
  - Businesses (larger economic sphere)



## Objectives

- Public good (public health, education)
  - Social security
- Public goods (infrastructure, libraries)
  - Public pensions (employee compensation)
- Sustainability
- Governance
- Inter-period equity
- Intergenerational equity



## Value of risk taking

- Does risk taking add public value?
  - Achieve an objective that cannot be achieved (more easily) by private enterprises that will provide long-term good (e.g. space flight)
  - Lower “cost” of providing the good in a way that preserves inter-period equity



## Value of risk budget

- Systematic risks
- Anti-selection
- Risks that can be hedged
- Effect of tail scenarios
  - Susceptibility to economic recessions
- Constraints of public budgets



## Evaluating risk mitigation

- System discipline
  - Governance
- Pricing discipline
- Budgetary discipline
- Traditional risk mitigation
  - Effect of downside risks



## Feedback process

- Vagaries of working within public space
  - Sunshine laws
  - Media interpretations
  - Political gains
  - Difficulty of nuanced decisions



## Feedback process

- Dysfunctional control structures
- Lack of regulatory standards
- Time horizon (long-term projects vs. short-term political objectives)
- Economic and demographic cycles



## Reality check: budgeting process

- A public sector budget is an explanation of revenue and expenses that changes throughout the year
- A private enterprise budget is a target set against which revenues, expenses and managers are measured
- Operating budgets vs. capital budgets
  - Most operating budgets must be balanced each year



## Reality check: budgeting process

- Government financial affairs are intertwined
  - Local budgets depend on state, federal resources
  - Most intergovernmental aid is restricted
  - Component units roll-up into Comprehensive Annual Financial Statement (CAFR)



## A tale of two systems

- Look at differences between social security and public pension plan
- Many concerns expressed today with public pension plans, particularly state & local
  - Pension plan for government employees
  - Deferred compensation
  - Public employees often don't receive Social Security



## Social security

- Not a pension plan
- Economic wealth transfer system
  - Working to retired & disabled
  - Rich to poor
- Stakeholders: taxpayers (current), legislative body, recipients



## Social security: objectives

- Reduce elderly poverty (redistribution)
- Provide baseline retirement income
- System sustainability



## Social security: risks faced

- Longevity improvements (systematic)
- Disability rates
- Birth rates
- Economic downturns (payroll levels)
- Wage disparities
- Political risk





## Social security: risk mitigation

- Benefit levels (cost-of-living)
- Degree of redistribution
- Period of payment (longevity)
- Revenue stream (rate of taxation, tax base)



## Public pensions: stakeholders

- Taxpayers
- Legislative body
- Public employees
- Unions
- Public employer (bureaucracy)
- Retirement system governing body



## Public pensions: objectives

- Sustainability
- Adequacy (public employees)
  - Social security plus pensions
- Inter-period equity
- Intergenerational equity
- Attraction, retention, retirement



## Public pensions: risk taking

- What are risks?
  - Anti-selection (final pay plans)
  - Systematic mortality risk
  - Interest rate/investment risk
  - Economic scenarios
  - Other demands on revenue
- What benefit risk taking?



## Public pensions: risk taking

- Big debate: use of long-term assumptions (rather than implied market rates)
  - Risk adjusted rate: less than 4.0%
  - Typical long-term rate used: 7.5 – 8.0%



## Public plans & risk taking **Actuaries** Risk Is Opportunity.™

### Why use implied market rate (less than 4.0%)?

- True value of benefits
- Can't "claim" returns until realized
- Past no predictor future performance
- Unfair to overcharge future generations who pay for higher benefits, equity losses
- Aligns benefits with other forms of compensation

### Why use long-term averages (7.5 - 8.0%)?

- Plan can't go bankrupt – can realize return, eventually
- Unfair to current generations to "overcharge" when later generations get benefit of equity return



## Public plans & risk taking

- Constraints of public budgets
  - Stability in annual budgeting
  - Upper limits on use of taxpayer funds
- Lack of regulatory structures
  - Politicians reallocate funds
- Susceptibility to economic decline



## Public plan: risk mitigation

- System discipline
  - Use of surplus
  - Using plan for other purposes (e.g. DROPs)
  - Changing benefit levels
- Pricing discipline
  - Using risk-adjusted rates as “baseline” in risk-taking decisions
- Budget discipline
- Traditional risk mitigation



## Reality check: risk mitigation

- GASB – Government Accounting Standards Board
  - Similar to FASB in concept
  - Different in structure, resources and concepts
  - Establishes rules for governmental accounting
  - Historically, focused on cash contribution budgeting
- Most pension and OPEB information is in Notes to the Financial Statements and CAFRs but portions are on the balance sheet
- PERS accounting impacts employer accounting
  - PERS = Public Employee Retirement System



## Public plan: feedback loop

- Pension plans take a long time to go broke
- Limited options during economic decline
- Mature plans shouldn't take same risks



## What role can actuaries play (general)?

- Policy evaluations:
  - Measure and model impacts of public policies,
    - ◆ Short- and long- term
    - ◆ Go beyond outputs (what government does)
  - Evaluate ex-ante and ex-post
- Participate in long-term financing decisions:
  - Especially relevant for local governments
  - Focus on long-term liabilities, e.g. water systems



## What role can actuaries play (general)?

- Advise on long-term financial and non financial costs/benefits of:
  - Different funding policies: PPP vs debt issue
  - Assessment of different public policies
  - Regulation vs direct government involvement
- Advise on emerging social risks (e.g. longevity)
- Bring independence, credibility and non biased views and recommendations: Work for the public interest!



## What role can actuaries play (public pensions)?

- Provide information
  - Pension numbers
  - OPEB numbers
  - Pension and OPEB notes language
  - Bond offerings language
  - For PERS and employers



## What role can actuaries play (public pensions)?

- Provide ideas
  - Projected pension contributions
  - Projected OPEB obligations and payouts
  - Plan design
  - Financing alternatives
  - Financing implications

