UNDERSTANDING & IMPLEMENTING ACTUARIAL ASSUMPTIONS

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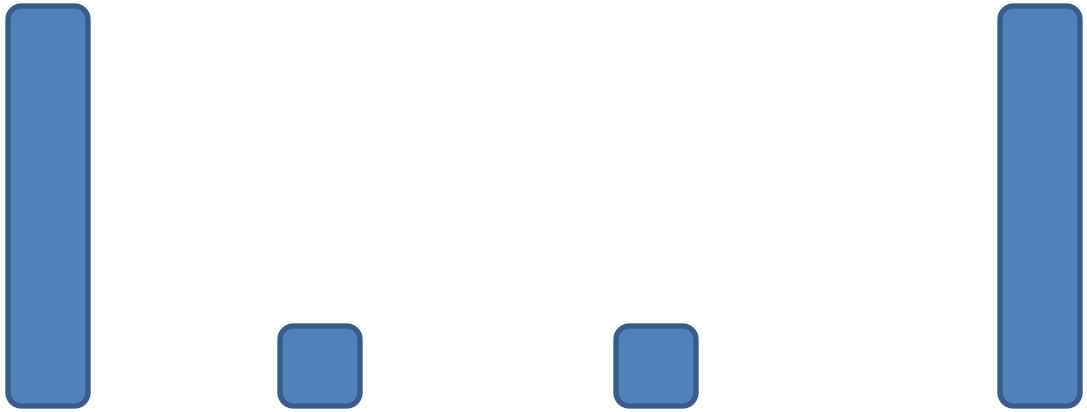
Fundamental Equation

What comes out = What goes in

Benefits + Expenses = Contributions + Investment Earnings

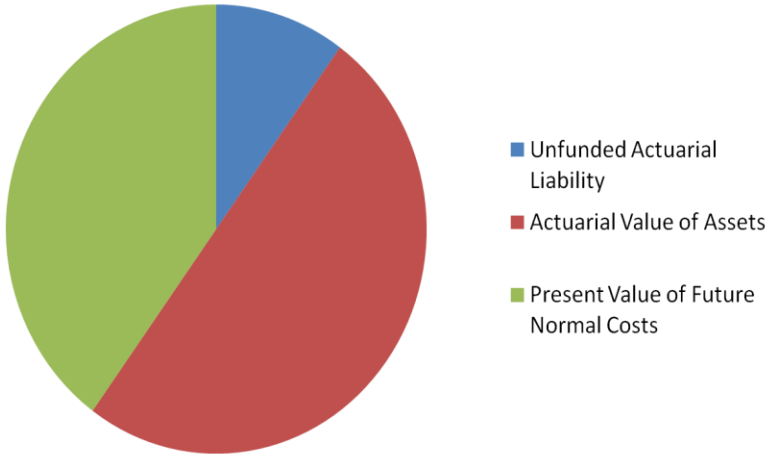


Actuarial assumptions don't change the fundamental equation, just the timing of contributions

Actuarial Valuation in a Nutshell

Fiscal Year	Benefit Payments
2010	**$ 250,000**
2012	**300,000**
2014	**360,000**
2016	**430,000**
2018	**500,000**
2020	**580,000**

PVB



Funding Basics

- Actuary's role:

  Help determine the timing/pattern of contributions

- Actuary's toolkit:

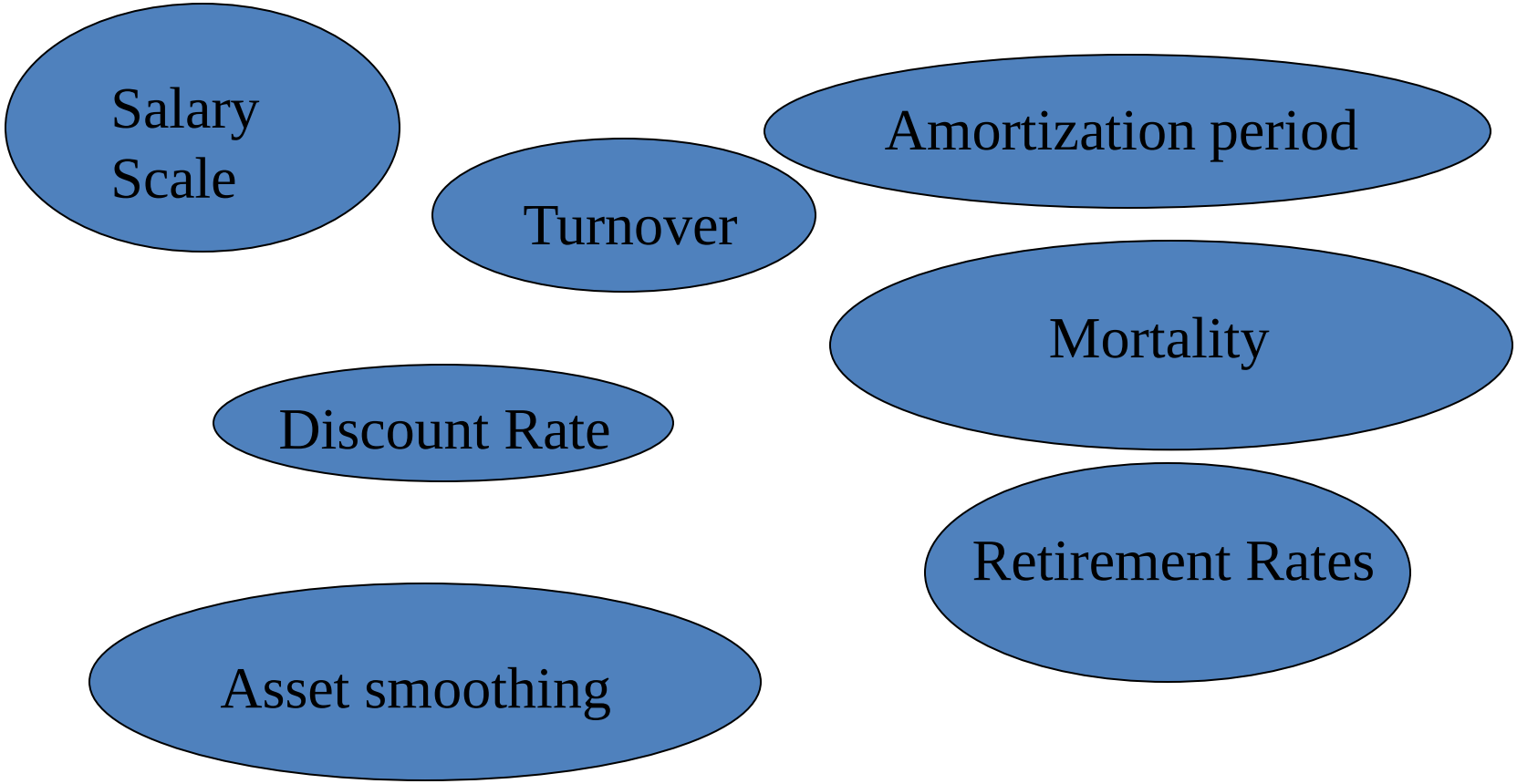
  Assumptions

  Asset smoothing

  Cost allocation methods

  Amortization periods

Key Assumptions/Methods



Actuarial Standards of Practice

ASOP No. 27 Economic Assumptions

- Inflation
- Investment return (valuation interest rate or discount rate)
- Salary scale

ASOP No. 27

Economic Assumptions : Interest rate

- Building block method (real return for each asset class + inflation; weighted for expected asset class mix)
- Determine best estimate range
- Consider recent economic data; But don’t give undue weight
- Long term assumption

ASOP No. 27

Economic Assumptions : Interest rate

- Purpose of Measurement
- Investment Policy
- Manager Performance
- Volatility
- Expenses
- Benefit Volatility

ASOP No. 27

Economic Assumptions : Interest rate

How do we get 8% with a 60/40 mix?

.6 x 10% + .4 x 5%

Is this realistic?

A 60/30/10 mix for the period 1960-2009 returned 8.6% (source: T. Rowe Price)

What Difference Can .5% Make?

Active Liability : 6-7%

Retiree Liability: 3-4%

Percent of Payroll: 4-6%

Contribution: Depends on funded status

ASOP No. 27

Economic Assumptions : Salary Scale

- Inflation, productivity, merit
- Current practice of sponsor
- Historical practice – sponsor, industry, area
- National wage & productivity
- Single rate
- Rate varies by age & service, duration

INTEREST RATE AND SALARY SCALE ASSUMPTIONS [1]

Distribution by Asset Size

Asset Size	No. of Plans	Interest Rate			Salary Scale		
		MIN	MAX	AVG	MIN	MAX	AVG
<= $100,000	173	5.0%	8.0%	6.1%	3.0%	6.5%	4.6%
> $100,000 - $1,000,000	893	5.0%	8.5%	6.6%	2.0%	7.0%	4.6%
> $1,000,000 - $5,000,000	753	5.0%	8.5%	7.0%	3.0%	6.0%	4.8%
> $5,000,000	322	6.0%	8.5%	7.4%	3.0%	6.0%	4.9%

Frequency within Specified Ranges

Interest Rate Range	No. of Plans	Percent	Salary Rate Range	No. of Plans	Percent
5.0 to 5.4%	36	1.7	0.1 to 3.9%	31	1.4
5.5 to 5.9%	16	0.7	4.0 to 4.4%	161	7.5
6.0 to 6.4%	866	40.4	4.5 to 4.9%	989	46.2
6.5 to 6.9%	72	3.4	5.0 to 5.4%	773	36.1
7.0 to 7.4%	317	14.8	5.5 to 5.9%	118	5.5
7.5 to 7.9%	512	23.9	6.0 to 6.4%	67	3.1
8.0 to 8.4%	306	14.3	6.5 to 6.9%	1	0
8.5 to 8.9%	16	0.7	7.0 to 7.4%	1	0
9.0%	0	0			

[1] Forty defined benefit plans that do not have a salary related benefit and use no salary scale have been excluded

AVERAGE INTEREST RATE AND AVERAGE SALARY SCALE ASSUMPTIONS

	2009	2007	2005	2003	2001
Interest Rate	6.78%	6.80%	6.80%	7.03%	7.03%
Salary Scale	4.73%	4.80%	4.80%	5.03%	5.07%
Difference	2.05%	2.00%	2.00%	2.00%	1.96%

ASOP No. 35

Demographic and other non-economic assumptions

- Turnover
- Retirement
- Mortality
- Disability

"The actuary should use professional judgment to estimate possible future outcomes based on past experience and future expectations."

Demographic Assumptions

Overall

- Plan experience
- Plan provisions
- Economic conditions
- Published tables

Turnover

- Employer specific or job related factors

Retirement

- Availability of healthcare

Sample Assumptions

- Investment Return : 6.5-7.5%
- Salary Scale: 4.5-5.5%
- Retirement:

  First eligibility - 50 %, [Elig. + 1] - 50%, [Elig. + 2] – 100%
- Mortality: RP 2000
- Turnover

Age	% Term	Age	%Term
20	6.0	40	2.6
30	5.0	50	0.8

Experience studies

Review of current assumptions to determine if any changes are needed – goal to have best estimate assumptions and costs that are stable and predictable.

Assumption review can run the gamut – and cover all econ. and demographic assumptions.

Multi – year review

Experience Study Example

Retire. assumption: 100% retire at 1st eligibility

Experience review: Delayed retirement

Recommendation : 50/50/100

“Cost savings” 3% of payroll

Turnover Assumption: Table

Experience review: 6 expected, 21 actual

Recommendation : Higher turnover rates

“Cost savings” 6% of payroll

Asset Smoothing/Cost Methods

Actuarial Asset Value

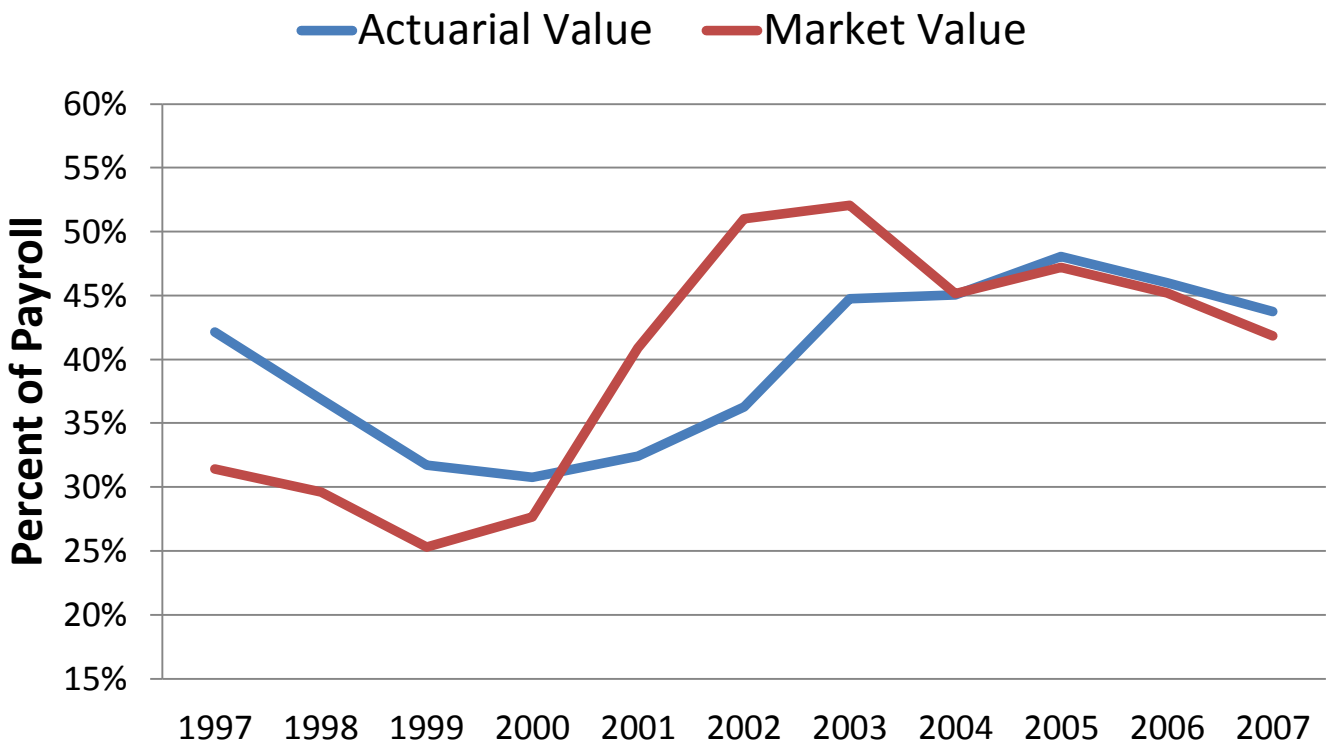
- Dampen Volatility
- Does not change ultimate cost
- Typically limited to 120% of Market Value
- Smoothing period limited to 5 years

Cost Methods

- EANC, PUC, Aggregate
- Does not change ultimate cost

Actuarial Magic

- 10 year line chart of contribution as % of payroll using market value of assets and actuarial asset value



Amortization Periods

Recent Amendments:

- Actuarial Gains/Losses - Increases from 15 to 20 years
- Change in Assumptions - Decreases from 20 to 15 years
- State Mandated Benefit Changes - 20 years
- Local Benefit Changes for Active Employees - 10 years
- Local Benefit Changes for Retired Employees - 1 year

The amort. payment is about twice as much under a 10-yr vs. 30-yr amortization period

Does not change ultimate cost of the program