

Montana Legislative Week

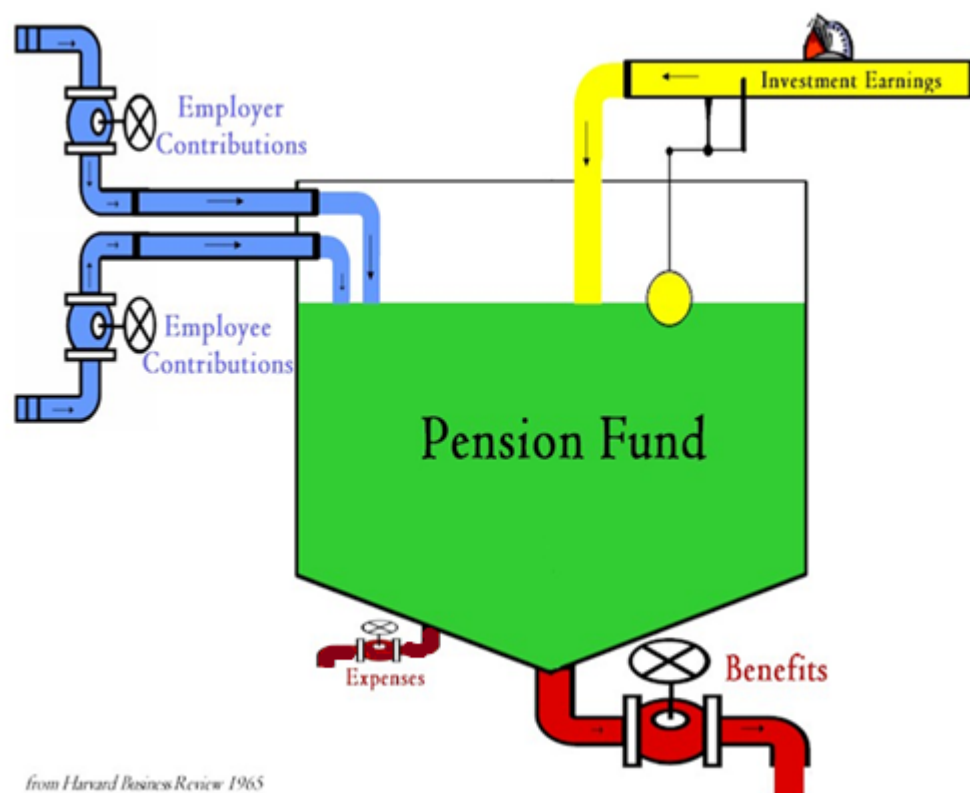
LFC & SAVA Joint Session

January 15, 2020

Evaluating Pension System Financial Risk
Elizabeth Wiley, FSA, EA, FCA, MAAA



$$C + I = B + E$$



from Harvard Business Review 1965

Ultimate Risk



The inability to pay the plan's promised benefits at funding levels that can be afforded.





A vintage wooden television set with a cartoon image on the screen and two long antennae. The screen shows a group of cartoon characters in a snowy landscape. The TV has a dark wood finish and two large circular speakers on the front panel.



Summary of Principal Results		
	$n = 2, 5$	$n = 5$
Effectiveness of the		
• $\beta = 0.05$	75%	85%
• $\beta = 0.10$	100%	95%
• $\beta = 0.15$	100%	100%
• $\beta = 0.20$	100%	100%
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• $\beta = 0.80$	100%	100%
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[illegible]

Annual Valuation

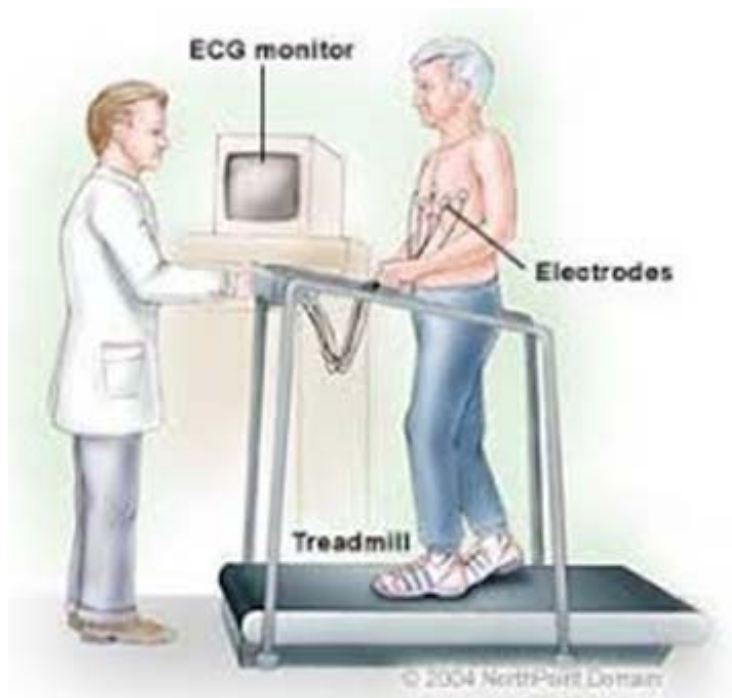


Summary of Principal Results

	<u>7/1/2015</u>	<u>7/1/2016</u>
Participant Counts		
Actives	295	268
Participants with Deferred Benefits	348	342
Retirees and Disableds	955	969
Beneficiaries	<u>2</u>	<u>222</u>
Total	1,821	1,801
Annual Salaries of Active Members	\$ 23,265,360	\$ 21,492,384
Annual Retirement Allowances	\$ 39,365,610	\$ 40,392,906
Assets and Liabilities		
Actuarial Accrued Liability	\$ 525,930,801	\$ 522,542,498
Actuarial Value of Assets	<u>376,332,776</u>	<u>375,071,975</u>
Unfunded Actuarial Liability / (Surplus)	\$ 149,598,025	\$ 147,470,523
Funding Ratio (Actuarial Value of Assets)	71.56%	71.78%
Funding Ratio (Market Value of Assets)	70.02%	67.09%
Present Value of Accrued Liability	\$ 509,442,056	\$ 508,437,615
Market Value of Assets	<u>368,266,074</u>	<u>350,581,323</u>
Unfunded FASB Accrued Liability	\$ 141,175,982	\$ 157,856,292
Accrued Benefit Funding Ratio	72.29%	68.95%
Actuarial gain/(loss)		
Liability gain/(loss)	\$ 5,093,044	\$ 1,608,028
Actuarial asset gain/(loss)	(2,016,676)	(6,626,834)
Net Transfer gain/(loss)	<u>24,173</u>	<u>(297,812)</u>
Total actuarial gain/(loss)	\$ 3,100,541	\$ (5,316,618)
Annual Contribution Requirement at End of Year		
	FYE 2016	FYE 2017
Normal Cost (with interest and expense load)	\$ 1,960,945	\$ 1,825,059
UAL Amortization (with interest)	<u>17,915,982</u>	<u>18,523,911</u>
Annual Contribution Requirement	\$ 19,876,927	\$ 20,348,970

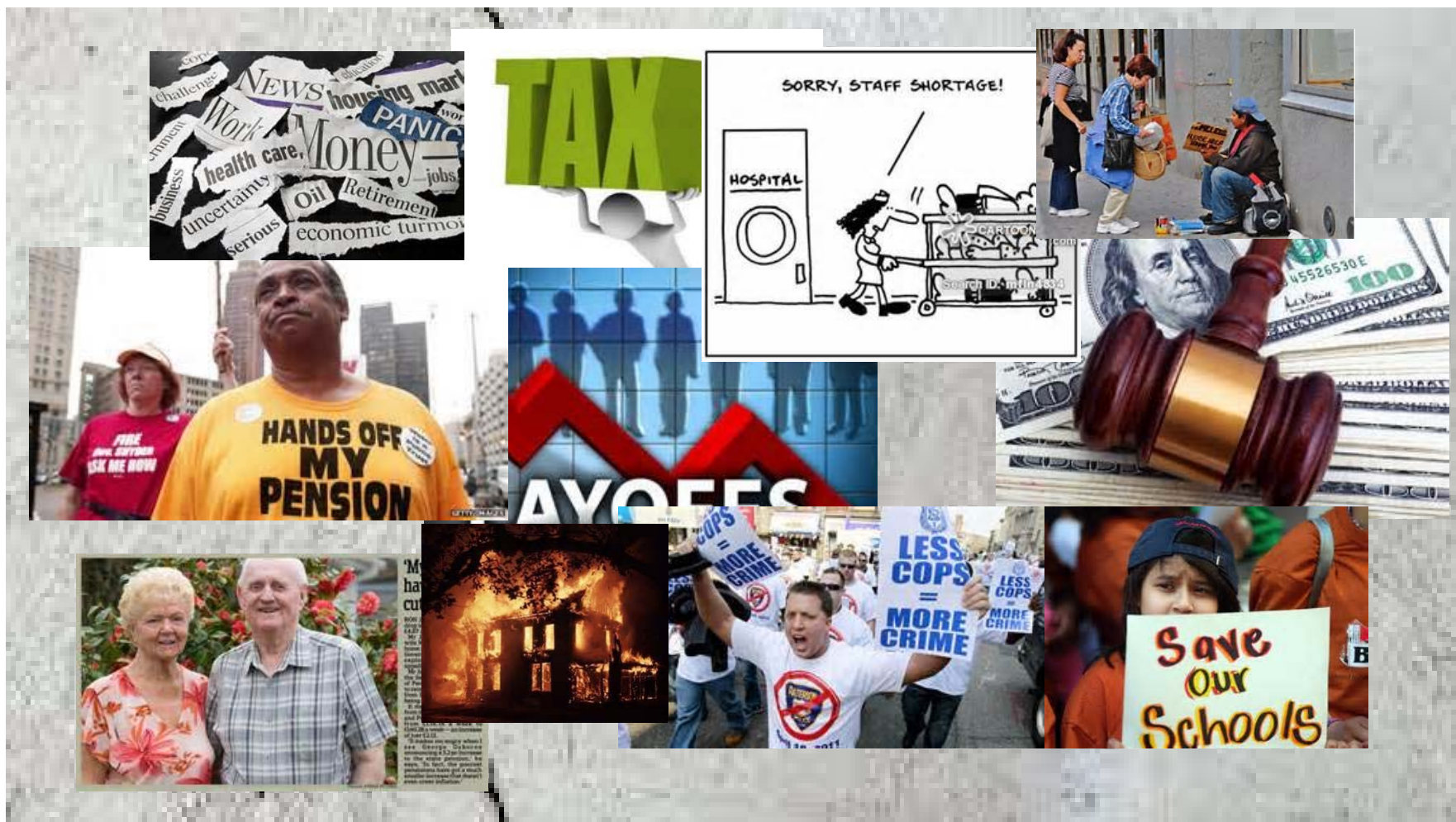


Why Assess Risk?



If you don't assess risk...







Actual \neq
Expected



Funding
status,
amortization
period,
contributions,
etc. being
different than
expected

Public Plans Database



- <https://publicplansdata.org/>
- Wealth of information
- Can be downloaded or browsed

Cheiron Public Pension Tool



Benchmarked Trends :

<https://cheiron.us/cheironHome/publicPlans.do?bilD=38>



CHEIRON Public Plans Risk Metrics

Cheiron created this interactive tool to help public pension plans understand and measure their risks, especially maturity, relative to other public pension plans.

To explore the tool, click on **Select Plan** and select a plan from the drop-down list. Data for the selected plan will then fill the page. Click on the other tabs at the bottom of the page to see the comparison charts. The gold diamond represents the selected plan, with its values shown below the diamond. The bars show the range of values in the database. The number of plans in each of the charts varies because all the data elements are not available for every plan for every year.

The raw data is from the [Public Plans Database](#) maintained by the Boston College's Center for Retirement Research, the Center for State and Local Government Excellence, and the National Association of State Retirement Administrators.

October 2019

Select Plan



Classic Values, Innovative Advice

15, 2020

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Averages – Useful and Dangerous



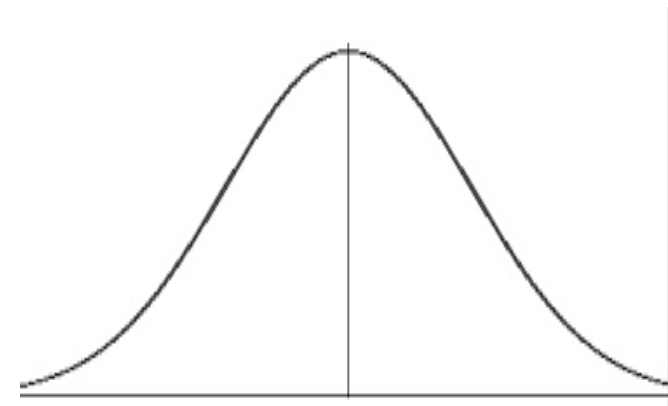
Dive in



- It can be useful to look at detail of part of a stochastic projection
- Can look at a given year and see more detail of the distribution
- Based on the previous example, with the increased contributions, we look at two years and ten years out



- Deterministic stress testing is based on one set of assumptions
- Stochastic testing expands to range of results
 - Demonstrates the likelihood of certain events under thousands of random return scenarios (contribution rates, funded status)
 - 1,000 to 10,000 trials



Questions rather than Distributions



- Frequently developing graphs answering “questions” can be superior to general distributions
- Such as what is the chance that the amortization period is over 100 years?
- Need to think about System (and Sponsor) to determine what these risks are
 - Sometimes thinking of them as “ruin” conditions is helpful

Demographic Testing



- In addition to testing economic assumptions and plan design (including contributions), can be useful to look at some key demographic assumption (aka things related to the members)
- Mortality is one frequently studied

No Universal Answer



- Appropriate stress testing will vary by System being studied, when it is being studied, who is studying it, and for what purpose
- Consider System and possibly State characteristics
- Recognize limited resources, prioritize!
- Identify key outcomes and key risks/concerns

Type of Forecasting Wanted?



- Deterministic
 - Advantages: simpler and easier to evaluate; can clearly convey directional trend of expectation
 - Disadvantages: give no idea of volatility or uncertainty; little insights into risk/reward
- Stochastic
 - Advantages: risk/reward tradeoffs with alternatives easier to tell; communicates information on volatility
 - Disadvantages: complicated; takes time to run
- Questions – often a good compromise
 - Dashboard