

Lessons Learned From The Pension Crises

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Gene Kalwarski FSA, MAAA, EA





Topics

- Defined Benefit Pension Plan Crisis
- What Lessons Have We Learned?
- What Can Be Done?

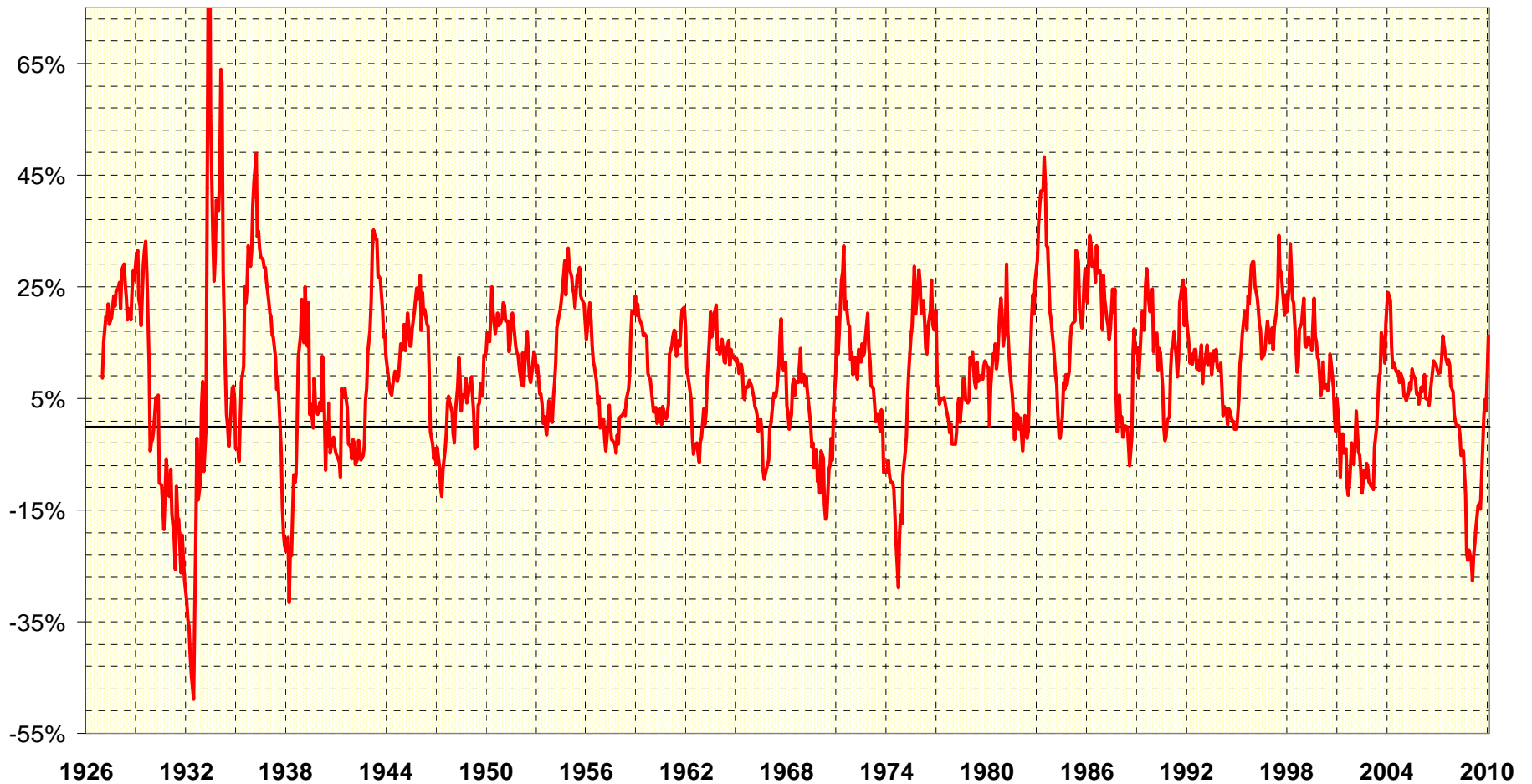


Defined Benefit Pension Plan Crisis

- [The coming private *pension plan crisis*: the unavoidable ...](#)
- [Required Reading on Multi-Employer *Pension Plan Crisis* | The Truth ...](#)
- [Corporate *Pension Plan Shortfall Crisis* Brewing - How to Play It](#)
- [Massive *Pension Fund Crisis* in the US](#)
- [America's Coming *Pension Crisis* \(55, *pension plan*, move, social ...\)](#)
- [U.S. *Pension Crisis*: the \\$3 Trillion Crisis](#)
- [Issue: Is There a US *Pension Crisis*?](#)
- [Solving the Global *Pension Crisis*](#)
- [The Economist on the U.S. *Pension Crisis*](#)
- [The US *Pension Crisis* is here – now](#)
- [Massive Taxpayer Backlash Over *Pension Crisis* is Coming](#)



S&P 500 12 Month Rolling Returns





Extraordinary Market Environment

Fiscal Yr Ending	S&P 500 Return
6/30/1932	-67.6%
6/30/2009	-26.4%
6/30/1931	-23.4%
6/30/1930	-22.9%
6/30/1970	-22.8%
6/30/1938	-20.0%
6/30/2002	-18.0%

Fiscal Yr Ending	S&P 500 Return
6/30/2001	-14.8%
6/30/1974	-14.5%
6/30/1947	-13.3%
6/30/2008	-13.1%
6/30/1962	-12.7%
6/30/1982	-11.4%
6/30/1949	-9.5%

Fiscal Yr Ending	S&P 500 Return
6/30/1942	-9.3%
6/30/1988	-6.9%
6/30/1934	-6.1%
6/30/1984	-4.6%
6/30/1940	-2.7%
6/30/1939	-1.9%
6/30/1958	-0.6%

Number of negative July fiscal years by decade

1930's	6	1970's	2
1940's	4	1980's	3
1950's	1	1990's	0
1960's	1	2000-2009	4



What Made This Downturn So Different?

- Highest level of assets ever
- Highest allocation to risky assets ever
- Highest level of retiree liability ever
- Most aggressive actuarial assumptions ever
- Highest benefit levels ever
- More competition for the pension contribution
- All the above combined to drastically *leverage* the impacts of the 2008 market downturn



What Lessons Have We Learned?



Lessons We Have Learned

- Measuring success through peer investment performance ranking is a recipe for disaster
- Baseline actuarial projections are never right
- Surplus spending on benefit enhancements and contribution holidays is not sound
- Increasing discount rates during the 1980s and 1990s increased the level of risk in DB Plans
- Negative cash flows can have a major impact on investment performance and contribution volatility
- The traditional investment/actuarial models are broken
- Too few DB Plans understood how much risk they absorbed



Measuring Success through Peer Investment Return Rankings is a Recipe for Disaster

- Each plan has a unique liability structure
- Each plan has a unique risk appetite
- Focusing on return ranking led many plans to seek riskier asset classes

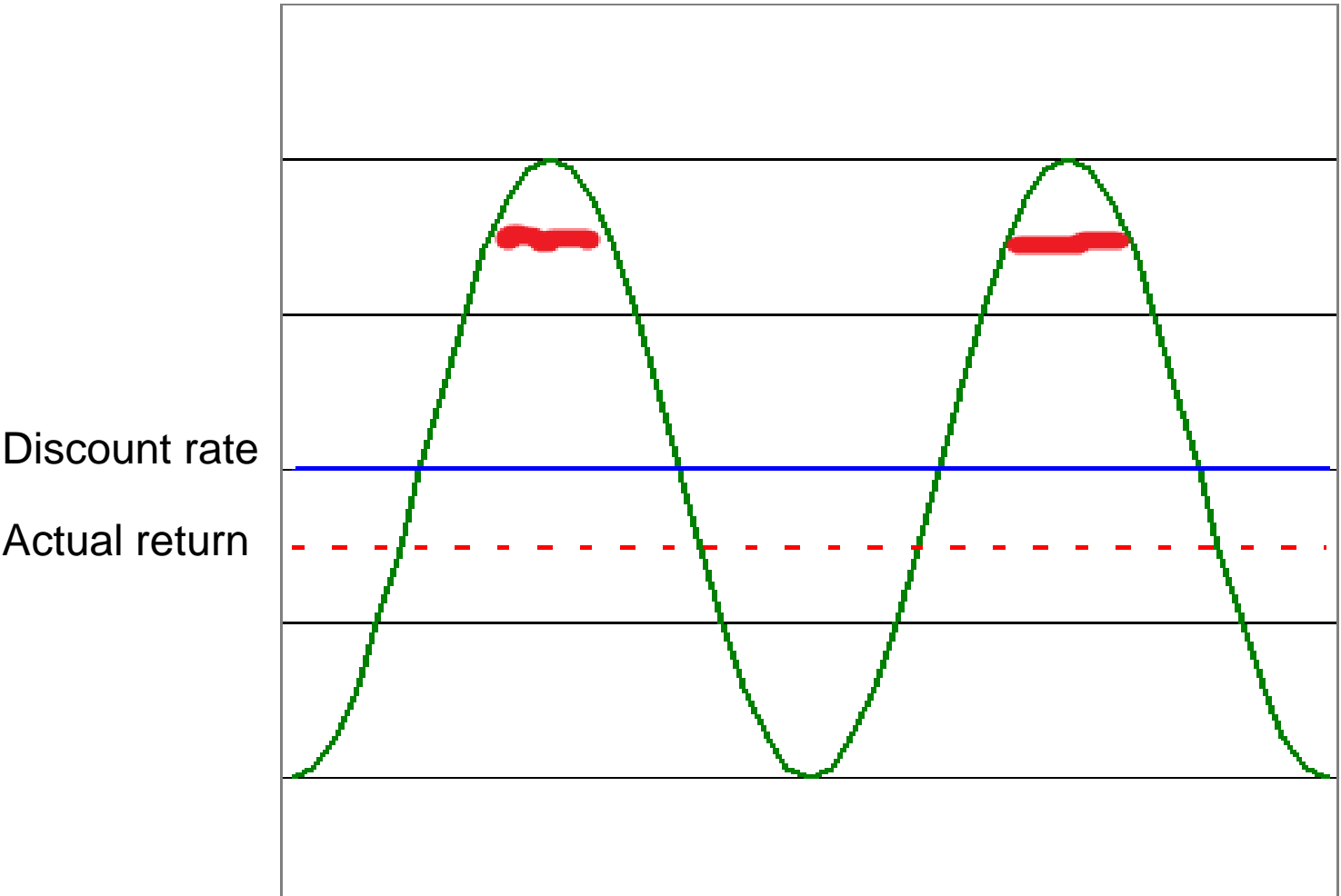


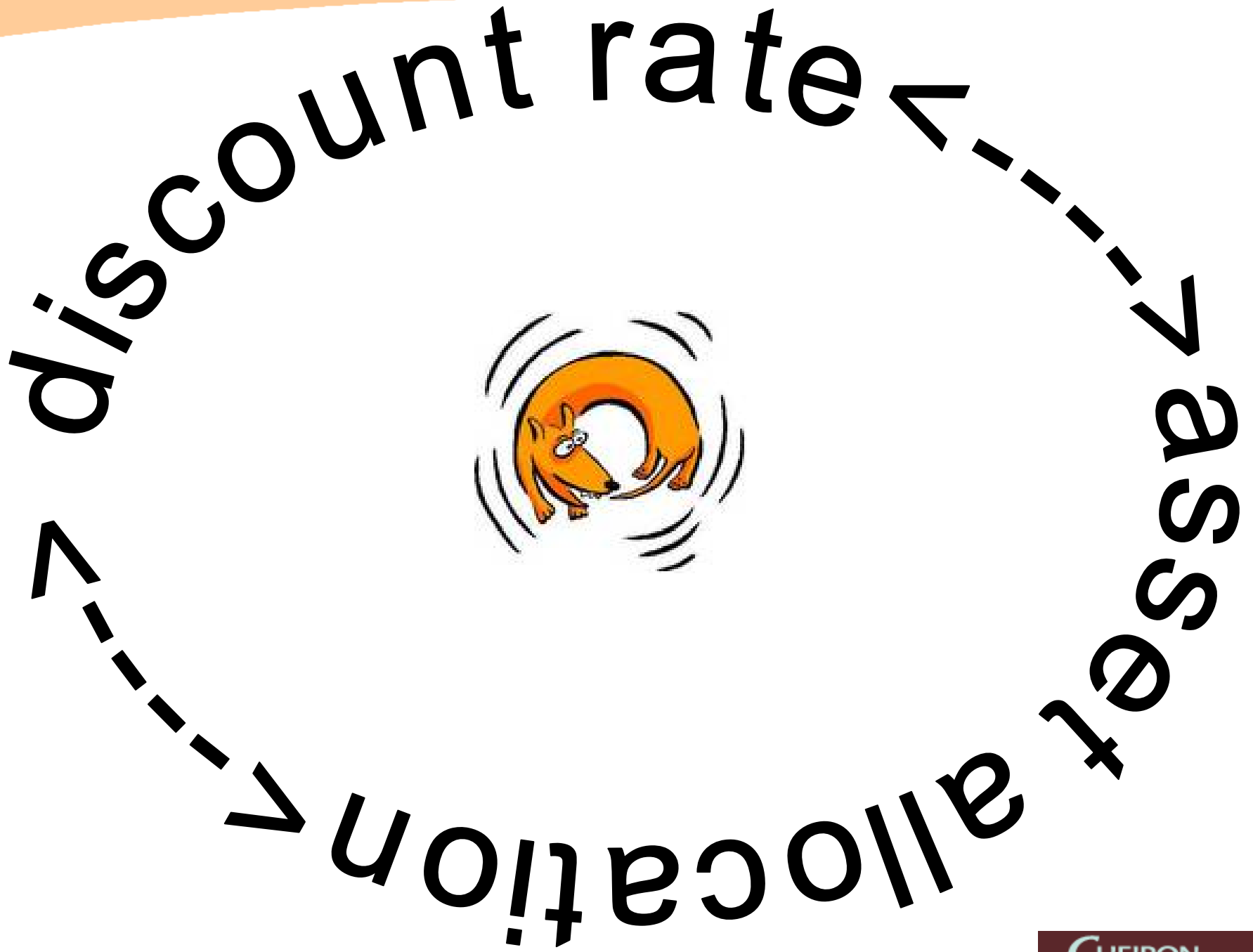
Baseline (as Assumed) Actuarial Projections are Never Right

July 1,	Assets-MV	AVA final	FR	UAL	AL	ER Contrib	EE Contrib	Benefits
2012	13,136,702,034	16,069,058,488	91.1%	1,574,335,838	17,643,394,326	325,280,404	179,911,728	920,640,139
2013	13,712,345,010	15,935,239,356	86.1%	2,565,586,433	18,500,825,789	451,202,673	187,108,197	969,781,249
2014	14,419,323,152	15,498,829,817	79.9%	3,892,697,283	19,391,527,100	550,365,763	194,592,525	1,029,497,891
2015	15,229,341,375	15,443,062,936	76.0%	4,864,749,198	20,307,812,134	690,973,503	202,376,226	1,089,074,888
2016	16,193,843,018	16,410,187,169	77.2%	4,842,363,090	21,252,550,259	805,002,794	210,471,275	1,141,896,308
2017	17,304,527,666	17,434,333,730	78.4%	4,801,396,672	22,235,730,402	823,454,095	218,890,126	1,210,574,307
2018	18,457,368,361	18,537,369,166	79.7%	4,707,305,290	23,244,674,456	844,726,336	227,645,731	1,285,038,282
2019	19,652,882,996	19,712,433,486	81.2%	4,563,773,924	24,276,207,410	852,750,865	236,751,560	1,363,027,779
2020	20,877,309,463	20,930,634,058	82.6%	4,398,653,912	25,329,287,970	866,794,567	246,221,622	1,444,773,495
2021	22,135,592,832	22,184,695,179	84.0%	4,217,894,199	26,402,589,377	873,537,092	256,070,487	1,528,810,855
2022	23,420,769,025	23,467,914,146	85.3%	4,028,324,270	27,496,238,416	887,218,359	266,313,307	1,616,231,737
2023	24,738,997,045	24,785,314,502	86.6%	3,823,961,330	28,609,275,831	856,210,666	276,965,839	1,704,240,005
2024	26,046,240,118	26,092,187,857	87.7%	3,651,421,677	29,743,609,534	866,179,926	288,044,473	1,794,422,175
2025	27,382,341,290	27,428,101,502	88.8%	3,471,587,548	30,899,689,050	830,660,736	299,566,252	1,885,071,284
2026	28,702,266,527	28,747,941,925	89.6%	3,331,870,918	32,079,812,844	840,405,946	311,548,902	1,975,656,589
2027	30,052,263,787	30,097,900,917	90.4%	3,189,151,435	33,287,052,351	863,653,489	324,010,858	2,066,111,136
2028	31,449,282,847	31,494,902,116	91.2%	3,029,930,098	34,524,832,215	875,868,622	336,971,292	2,154,169,143
2029	32,888,490,017	32,934,100,864	92.0%	2,865,141,062	35,799,241,927	891,479,252	350,450,144	2,239,642,819
2030	34,379,867,944	34,425,474,937	92.7%	2,691,612,308	37,117,087,246	909,329,762	364,468,149	2,320,262,687
2031	35,935,349,379	35,980,954,595	93.5%	2,507,153,934	38,488,108,529	802,545,717	379,046,875	2,397,213,115
2032	37,434,884,410	37,480,488,798	93.9%	2,441,136,234	39,921,625,033	807,059,965	394,208,750	2,471,027,583
2033	38,993,492,037	39,039,096,042	94.2%	2,388,084,014	41,427,180,056	823,636,913	409,977,100	2,539,207,146
2034	40,634,712,744	40,680,316,571	94.6%	2,337,391,691	43,017,708,262	842,350,761	426,376,184	2,602,108,597
2035	42,373,261,461	42,418,865,206	94.9%	2,287,971,286	44,706,836,492	862,236,434	443,431,232	2,657,385,348
2036	44,226,452,193	44,272,055,900	95.2%	2,239,690,091	46,511,745,991	883,229,143	461,168,481	2,704,132,239
2037	46,213,838,710	46,259,442,399	95.5%	2,192,511,737	48,451,954,137	905,355,833	479,615,220	2,741,428,099
2038	48,357,500,995	48,403,104,676	95.8%	2,146,410,031	50,549,514,707	928,654,124	498,799,829	2,771,246,336
2039	50,679,248,520	50,724,852,198	96.0%	2,101,360,306	52,826,212,504	953,164,242	518,751,822	2,793,204,478
2040	53,203,048,562	53,248,652,238	96.3%	2,057,338,553	55,305,990,791	978,928,262	539,501,895	2,807,279,440
2041	55,954,823,453	56,000,427,128	96.5%	2,014,321,313	58,014,748,441	1,005,990,100	561,081,971	2,811,578,134
2042	58,964,546,314	59,010,149,988	96.8%	1,972,285,666	60,982,435,655	1,034,395,569	583,525,250	2,805,966,177



Surplus Spending on Benefit Enhancements and Contribution Holidays is Not Sound

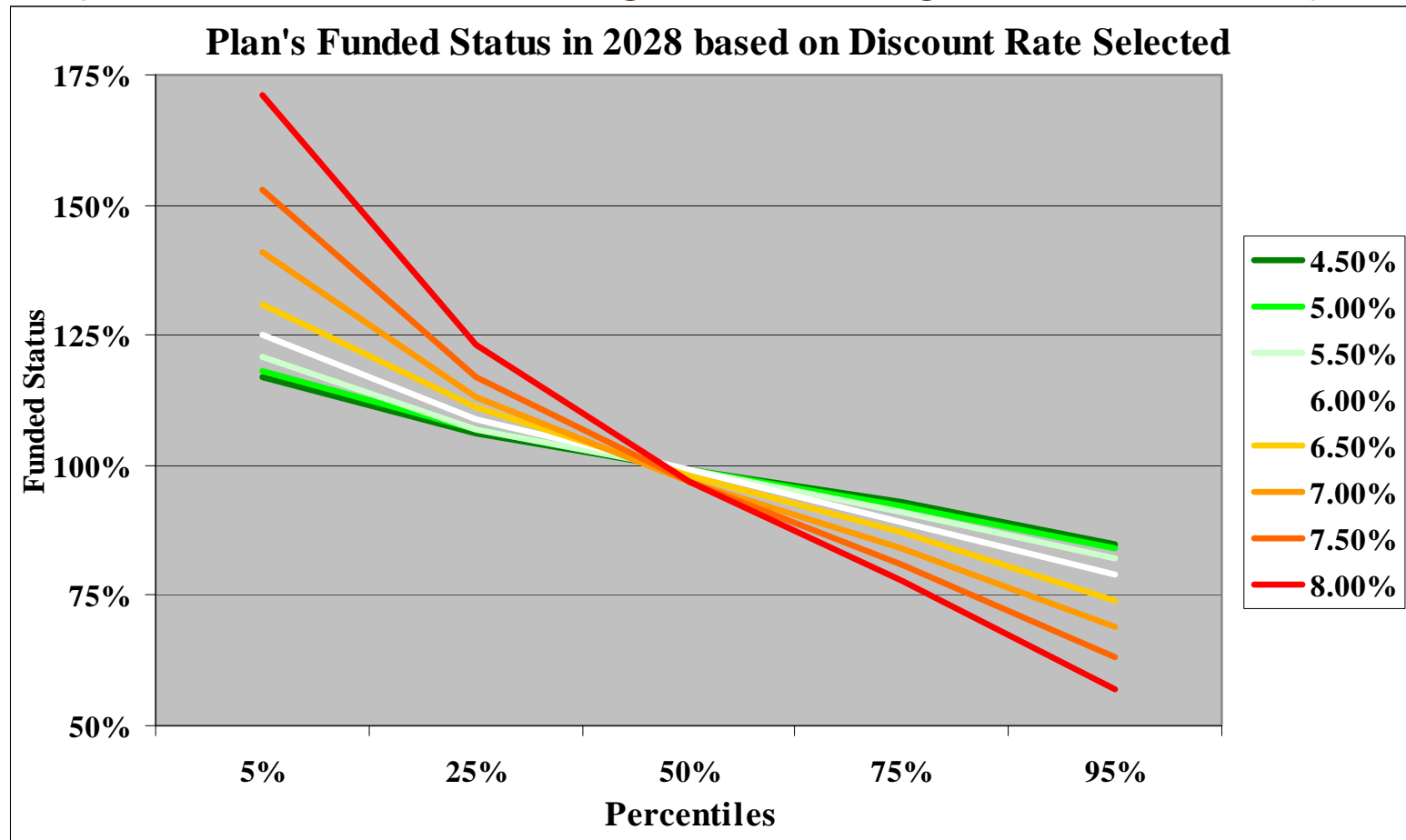






Increasing Discount Rates During the 1990s Increased the Level of Risk in DB Plans

(assumes asset mix changes with change in discount rate)



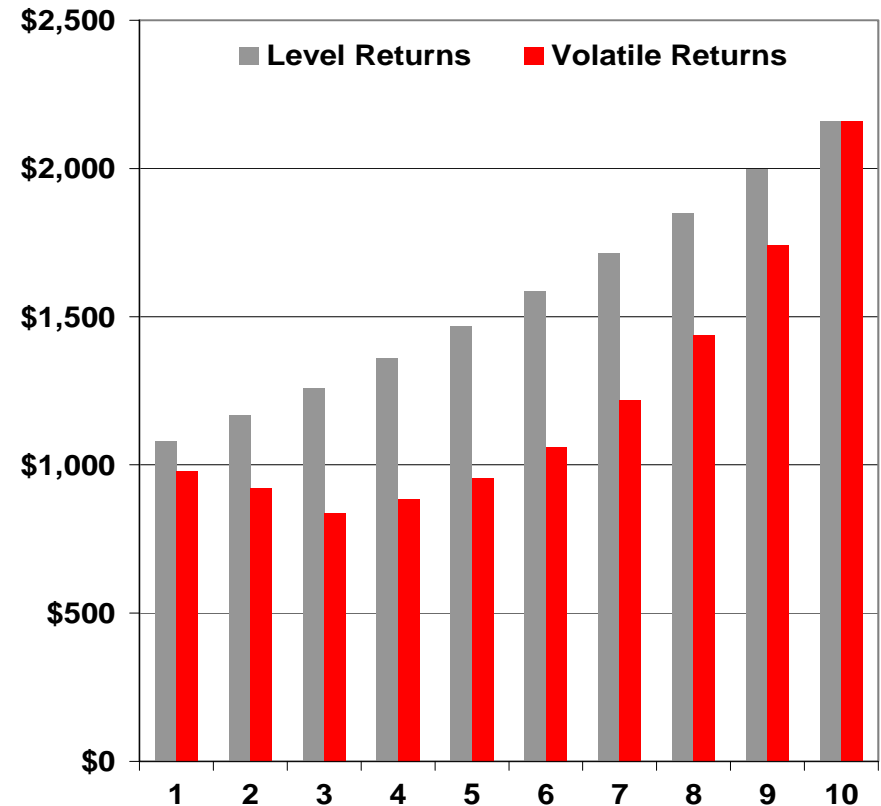


Without **Negative** Cash Flows, Market Volatility Can be Managed

Starting Assets	\$ 1,000
Net Cash Flow	0.0%
Net Cash Flow Growth	0.0%
Market Cycle	du

Year	New Cash Flow	Level Returns	Volatile Returns	ASSETS	
				level	volatile
1	\$ -	8.0%	-2.0%	\$1,080	\$980
2	\$ -	8.0%	-6.0%	\$1,166	\$921
3	\$ -	8.0%	-9.0%	\$1,260	\$838
4	\$ -	8.0%	5.5%	\$1,360	\$885
5	\$ -	8.0%	8.0%	\$1,469	\$955
6	\$ -	8.0%	11.0%	\$1,587	\$1,060
7	\$ -	8.0%	15.0%	\$1,714	\$1,219
8	\$ -	8.0%	18.0%	\$1,851	\$1,439
9	\$ -	8.0%	21.0%	\$1,999	\$1,741
10	\$ -	8.0%	24.0%	\$2,159	\$2,159

reported return=	8.0%	8.0%
actual return =	8.0%	8.0%
Asset Loss/(Gain)	\$0	
% of Level Assets	100%	





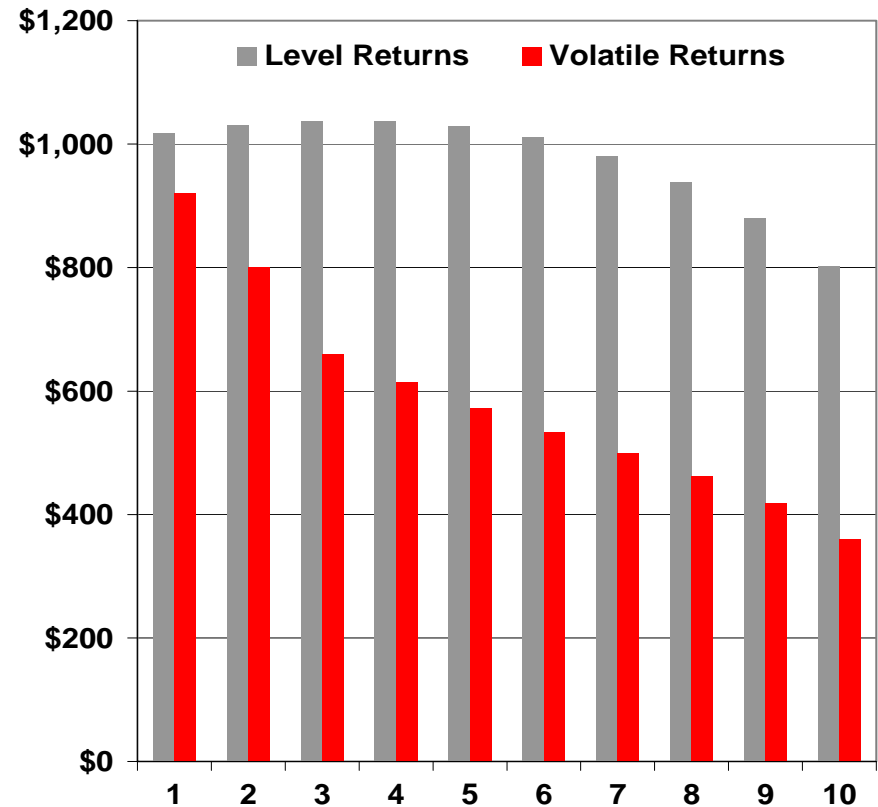
With **Negative** Cash Flows, *Market Volatility Difficult to Manage*

Starting Assets	\$ 1,000
Net Cash Flow	-6.0%
Net Cash Flow Growth	10.0%
Market Cycle	du

Year	New Cash Flow	Level Returns	Volatile Returns	ASSETS	
				level	volatile
1	\$ (60.0)	8.0%	-2.0%	\$1,018	\$921
2	\$ (66.0)	8.0%	-6.0%	\$1,030	\$801
3	\$ (72.6)	8.0%	-9.0%	\$1,037	\$660
4	\$ (79.9)	8.0%	5.5%	\$1,037	\$614
5	\$ (87.8)	8.0%	8.0%	\$1,029	\$572
6	\$ (96.6)	8.0%	11.0%	\$1,011	\$533
7	\$ (106.3)	8.0%	15.0%	\$982	\$499
8	\$ (116.9)	8.0%	18.0%	\$939	\$462
9	\$ (128.6)	8.0%	21.0%	\$880	\$418
10	\$ (141.5)	8.0%	24.0%	\$803	\$361

reported return= 8.0% 8.0%
 actual return = 8.0% **4.2%**

Asset Loss/(Gain) **\$443**
 % of Level Assets **45%**





With **Negative** Cash Flows, *Up Down Markets Don't Fully Restore*

Starting Assets	\$ 1,000
Net Cash Flow	-6.0%
Net Cash Flow Growth	10.0%
Market Cycle	UD

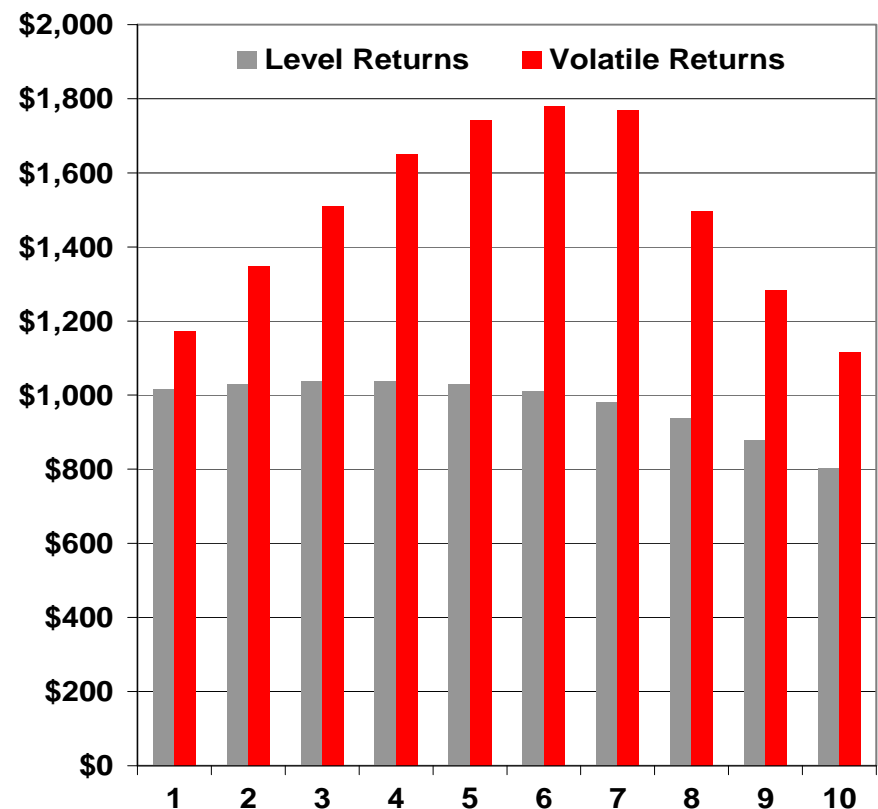
Year	New Cash Flow	Level Returns	Volatile Returns	ASSETS	
				level	volatile
1	\$ (60.0)	8.0%	24.0%	\$1,018	\$1,173
2	\$ (66.0)	8.0%	21.0%	\$1,030	\$1,347
3	\$ (72.6)	8.0%	18.0%	\$1,057	\$1,511
4	\$ (79.9)	8.0%	15.0%	\$1,037	\$1,651
5	\$ (87.8)	8.0%	11.0%	\$1,029	\$1,741
6	\$ (96.6)	8.0%	8.0%	\$1,011	\$1,779
7	\$ (106.3)	8.0%	5.5%	\$982	\$1,768
8	\$ (116.9)	8.0%	-9.0%	\$939	\$1,498
9	\$ (128.6)	8.0%	-6.0%	\$880	\$1,283
10	\$ (141.5)	8.0%	-2.0%	\$803	\$1,117

reported return = 8.0% 8.0%

actual return = 8.0% **10.0%**

Asset Loss/(Gain) **(\$314)**

% of Level Assets **139%**





Traditional Investment/Actuarial Models are Broken

- Investment Side Deficiencies
 - Quarterly returns chasing
 - Too much focus on peer comparisons
 - It's contribution volatility that matters, not investment volatility
 - Managers are hired and fired at the worst possible times
- Actuarial Side Deficiencies
 - Actuarial Valuation Process is antiquated
 - Actuarial Valuation Process focuses too much on a single measurement at a single point in time.
 - Traditional baseline actuarial projections will almost always be wrong, and rarely focus on the range of potential outcomes
- Actuarial and Investment advice are not adequately connected



What Can Be Done?





What Can Be Done?

- Increase the transparency and awareness of risk
- Revamp the traditional investment and actuarial models of reporting and analysis



Focus on Better Risk Measures

- *The single greatest risk to all defined benefit pension plans is the inability to pay benefits without having to increase contributions to unsustainable levels*
- *When a pension plan's contributions reach unsustainable levels, bad things happen to the plan sponsor and plan members*



Better Risk Measure = Leverage Ratios

- Ratio of assets to payroll
- Ratio of liabilities to payroll

Rationale:

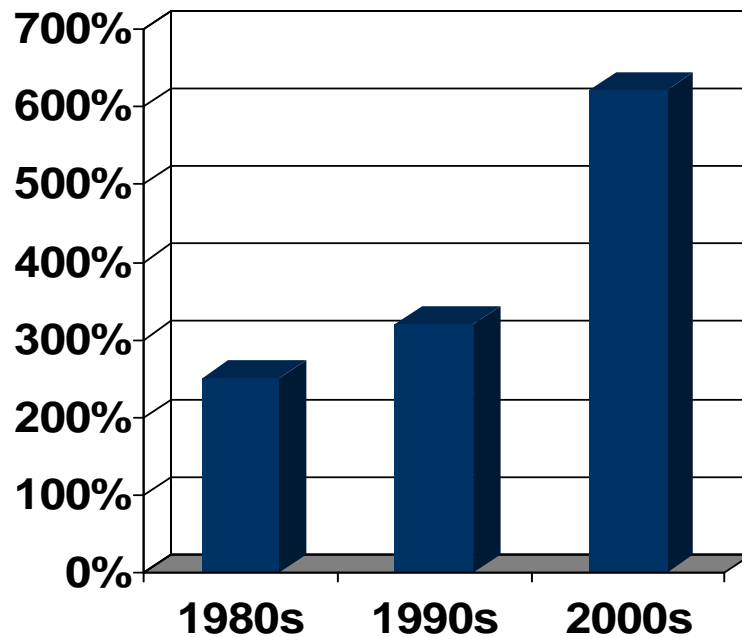
With all other things being equal, when Plan A has a leverage ratio twice as large as Plan B, then for the same unfavorable experience the impact on Plan A's contribution will be twice as large



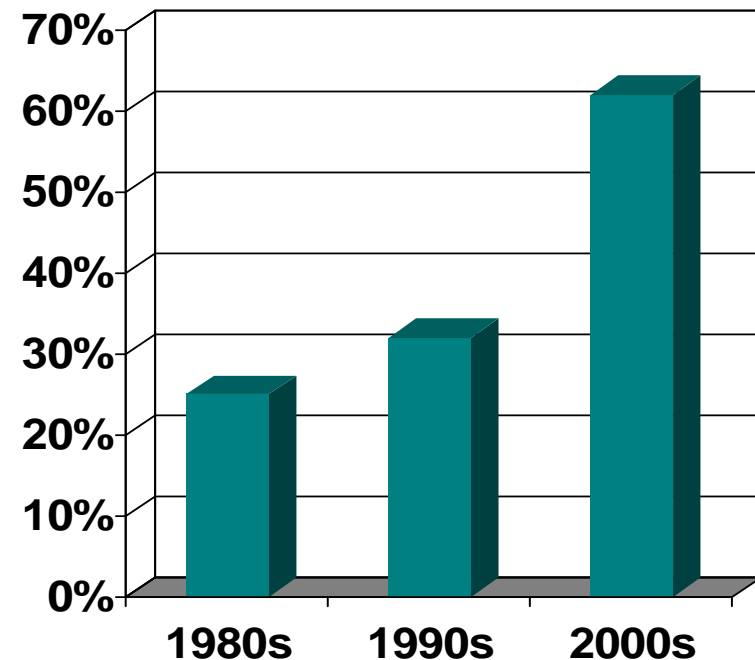
Changes and Issues

Maturity and Risk

Plan Assets as a % of Payroll

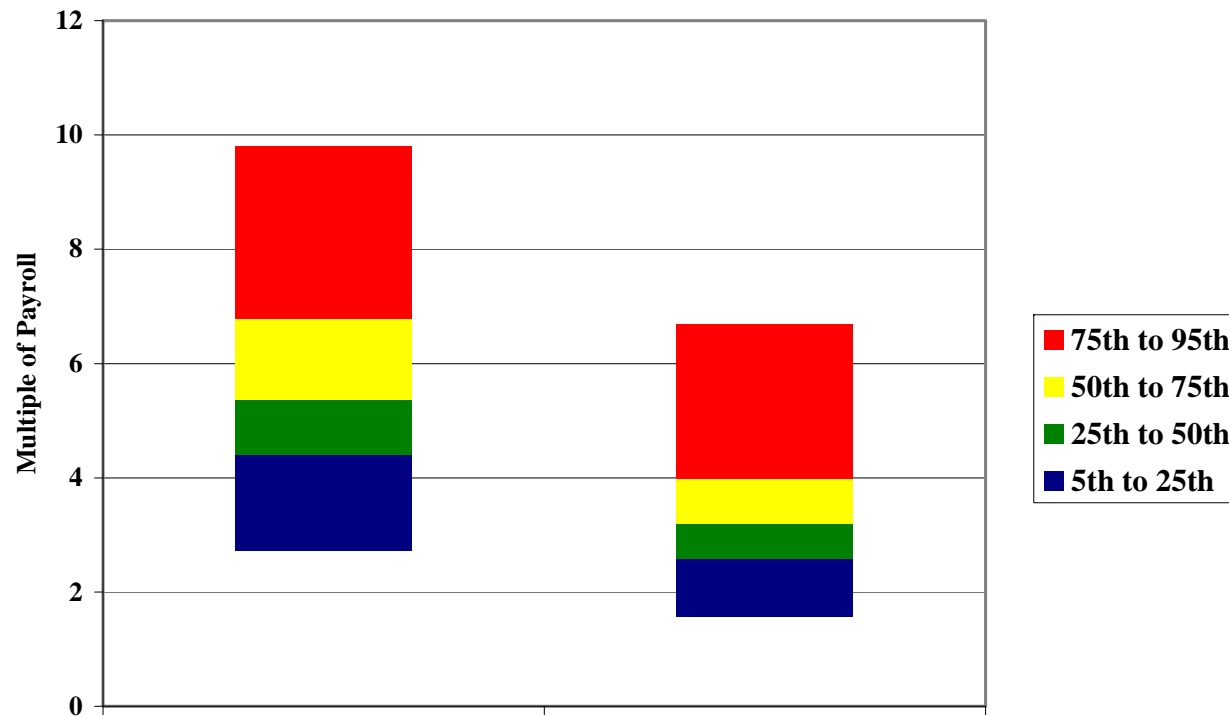


10% Asset Loss as % of Payroll





Leverage Ratios Using Center Of Retirement Research (Boston College) Data Base Results



Percentile	AAL	MVA
5th	2.72	1.56
25th	4.39	2.58
50th	5.37	3.19
75th	6.79	3.99
95th	9.81	6.69

National data extracted from 2009 Public Plans Database, Center for Retirement Research, Boston College



Traditional Actuarial Model

- Annual Valuation performed much like those in the 1960s
- Performed usually 6-9 months after the fact
- Produces a single number based on where you have been
- No actuarial risk analysis
- Disconnect with monthly investment reporting and asset allocation
- 100% funding is the holy grail

Valuation Date	June 30, 2005		June 30, 2004*		
Number of active members		72,281		71,950	
Annual salaries	\$	2,703,430	\$	2,641,533	
Number of annuitants and beneficiaries		37,402		35,803	
Annual allowances	\$	994,745	\$	914,879	
Assets:					
Market value	\$	13,456,026	\$	12,858,540	
Actuarial value	\$	14,598,843	\$	14,255,131	
Unfunded actuarial accrued liability	\$	4,536,027	\$	3,362,495	
Amortization period (years)		30		30	
		Univ.	Non-Univ.	Univ.	Non-Univ.
Pension Plan:					
Normal		14.39%	17.84%	14.19%	18.02%
Accrued liability		<u>9.43</u>	<u>8.94</u>	<u>8.18</u>	<u>7.31</u>
Total		<u>23.82%</u>	<u>26.78%</u>	<u>22.37%</u>	<u>25.33%</u>
Member		7.625%	9.105%	7.625%	9.105%
State (ARC)		<u>16.195</u>	<u>17.675</u>	<u>14.745</u>	<u>16.225</u>
Total		23.82%	26.78%	22.37%	25.33%
Life Insurance Fund:					
State		0.17%	0.17%	0.17%	0.17%
Medical Insurance Fund:					
Member		0.75%	0.75%	0.75%	0.75%
State Match		0.75	0.75	0.75	0.75
State Additional		<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
Total		<u>1.50%</u>	<u>1.50%</u>	<u>1.50%</u>	<u>1.50%</u>
Total Contributions		<u>25.49%</u>	<u>28.45%</u>	<u>24.04%</u>	<u>27.00%</u>
Contribution rates for fiscal year ending:		June 30, 2008		June 30, 2007	
Member Statutory		8.375%	9.855%	8.375%	9.855%
State Statutory		11.625	13.105	11.625	13.105
Required Increase		1.32	1.32	0.11	0.11
State Special		<u>4.17</u>	<u>4.17</u>	<u>3.93</u>	<u>3.93</u>
Total		<u>25.49%</u>	<u>28.45%</u>	<u>24.04%</u>	<u>27.00%</u>



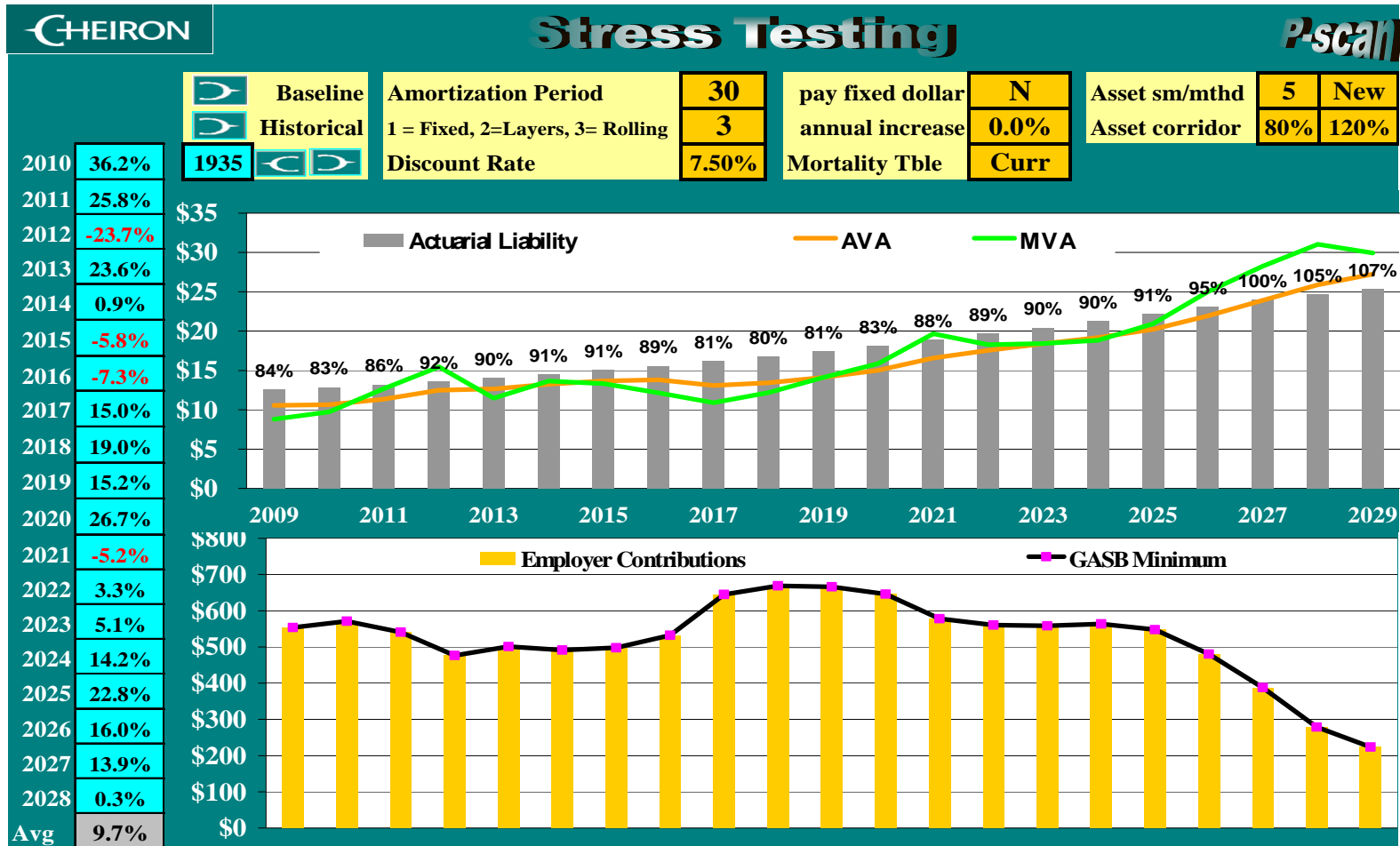
Revamp the Traditional Model

- Analyze risk of not meeting goals
 - Exceeding affordable contribution levels
 - Avoiding extremely volatile contributions patterns
- 100% funding is an illusion
- Technology allows for continuous examination of Plan's financial prospects
- Can be based on today's assets
- Look forward and produce a variety of possible results
- Integrate investment policy with Board's funding goals (*and track them!*)



Actuarial Tools

Can Stress Test Future Returns





Actuarial Tools

Can Give You Probabilities of Success

