



2015 PAPERS Forum

Understanding the Impact of Negative Cash Flow

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Agenda

- ◆ Public Pension Plan Financing
- ◆ Net Cash Flow Defined
- ◆ Net Cash Flow Impact
- ◆ Liquidity Issue
- ◆ Cash Flow Examples
- ◆ Additional Considerations
- ◆ Questions



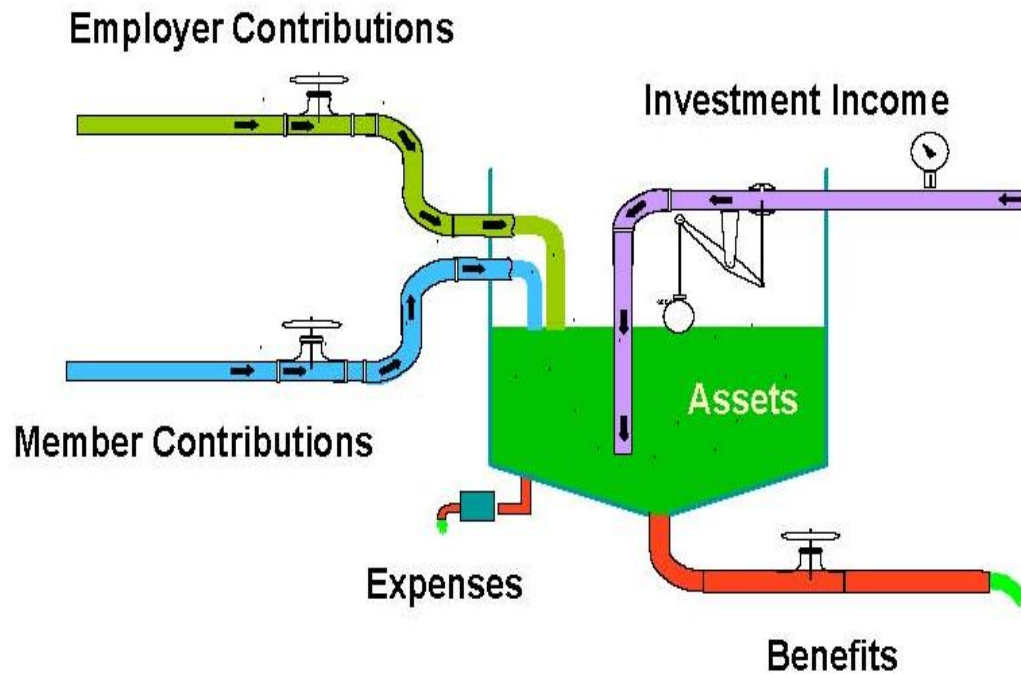
Public Pension Plans

- ◆ Designed to provide public employees with a pension *upon retirement*
- ◆ The ultimate goal of the plan is to receive contributions from both the employees and the employer, **which together with investment returns** will be sufficient to pay all promised benefits upon retirement



Public Pension Plan Financing

The Actuary as a Plumber





Public Pension Plan Financing

$$B + E = I + C$$

B = Benefits Paid

E = Administrative Expenses

I = Investment Return on Plan Assets

C = Contributions

- ◆ Benefits paid determined by negotiated and/or legislated plan provisions
- ◆ Administrative expenses determined by System policies
- ◆ Investment return determined by investment policies (including liquidity issues)



Public Pension Plan Financing

$$B + E = I + C$$

B = Benefits Paid

E = Administrative Expenses

I = Investment Return on Plan Assets

C = Contributions

- ◆ Contributions generally shared by employees and employer
- ◆ Amount of employee and employer contributions generally set by statute or plan document
- ◆ Annual employee and employer contributions represent a systematic means of pre-funding the ultimate system costs
- ◆ The primary benefit of pre-funding is that investment return on the pre-funded plan assets reduces the ultimate plan cost



Net Cash Flow Defined





Net Cash Flow Defined

- ◆ Retirement plans generally have contributions coming in and benefits being paid out
- ◆ The net (non-investment) cash flow is the difference between (1) contributions and (2) benefits and expenses
- ◆ These cash flows will be different for each plan since all plans have different plan provisions, membership characteristics and contribution policies



Net Cash Flow Defined

$$\text{Net Cash Flow} = C - B - E$$

- ◆ C = Contributions
- ◆ B = Benefits Paid
- ◆ E = Administrative Expenses

- ◆ If $C - B - E$ is negative = Negative Cash Flow
- ◆ If $C - B - E$ is positive = Positive Cash Flow
- ◆ Younger plans tend to have positive cash flows, whereas older, more mature plans may have negative cash flows.



Net Cash Flow Impact

- ◆ When assessing the impact of cash flow on a pension plan, it is important to remember why a pension plan has assets -- **TO PAY BENEFITS**
- ◆ So just because a plan has negative cash does not necessarily imply it is in trouble
- ◆ In fact, some would say that the primary purpose of pre-funding is so the investment return can pay a significant portion of the benefit payments



Net Cash Flow Impact

- ◆ For example, a mature plan with a one-to-one ratio of actives to retirees that is well funded may have negative cash flow but be actuarially sound
- ◆ On the other hand, a poorly funded plan that has negative cash flow may be indicative of a plan that is in need of significant (and potentially unaffordable) increases in annual employer contributions



Net Cash Flow Impact *on Liquidity*

- ◆ The real issue with negative cash flow has to do with whether the plan has enough liquidity to make all the required benefit payments without changing its investment portfolio to one comprised of a larger percentage of short term (cash generating) investments
- ◆ For example, an investment portfolio comprised of a significant percentage of short term investments may not support an investment return assumption of 7.0 % or more



Net Cash Flow Impact on Investment Return Assumption

Investment Consultant A					
Capital Market Assumptions					
20-Yr Horizon	Shift from 65/35 to 20/80 Equity/Fixed Investment Mix				
		Current		Revised	
	Expected	Asset	Arithmetic	Asset	Arithmetic
Asset Mix	Return	Mix	Return	Mix	Return
US Large Cap Equity	8.20%	15.00%	1.23%	10.00%	0.82%
US Small Cap Equity	9.10%	10.00%	0.91%	10.00%	0.91%
Non-US Developed All Cap Equity Unhedged	9.70%	15.00%	1.46%	0.00%	0.00%
Emerging Markets Equity Unhedged	12.70%	10.00%	1.27%	0.00%	0.00%
US Govt/Credit Fixed Income	4.60%	10.00%	0.46%	30.00%	1.38%
US Aggregate Fixed Income	4.80%	10.00%	0.48%	20.00%	0.96%
US High Yield Fixed Income	6.10%	13.50%	0.82%	0.00%	0.00%
US Cash	3.00%	1.50%	0.05%	30.00%	0.90%
US Real Estate - Core	8.40%	5.00%	0.42%	0.00%	0.00%
Private Equity - Total	12.80%	5.00%	0.64%	0.00%	0.00%
Hedge Funds - Macro	9.10%	5.00%	0.46%	0.00%	0.00%
		100.00%	8.19%	100.00%	4.97%



Net Cash Flow Impact

on Annual Contribution Requirement

- ◆ As this simplified example illustrates, an actuary for a plan that changes its investment policy and allocates a greater percentage of its investments into cash/short term investments to pay benefits will likely recommend a reduction in the investment return assumption
 - ▶ The result could be a significant increase in the annual contribution requirement of the plan



Cash Flow Impact

Examples

- ◆ Three examples:
 - ▶ A Plan with approximately a zero net cash flow
 - ▶ A Plan with a large negative net cash flow
 - ▶ A Plan with a large positive net cash flow
- ◆ Which plan is in “trouble”?
- ◆ Why?



Net Cash Flow Impact Example 1

Additions			
	Total Contributions	\$	11,756,614
	Net Investment Income	\$	3,377,443
	Total Additions	\$	15,134,057
Deductions			
	Benefit Payments	\$	11,702,439
	Total Deductions	\$	11,702,439
	Net Increase in Net Position	\$	3,431,618
Net Position Restricted for Pensions (Plan Assets)			
	Beginning of Year	\$	189,260,114
	End of Year	\$	192,691,732
	Net Cash Flow (Non-Investment)	\$	54,175
	Net Cash Flow as % of BOY Assets		0.03%
	Total Pension Liability	\$	264,620,512
	Net Pension Liability	\$	71,928,780
	Funded Ratio		72.82%
	Normal Cost	\$	6,284,525
	Amortization of unfunded liability	\$	6,239,152
	Total Contribution Requirement	\$	12,523,677



Net Cash Flow Impact Example 2

Additions			
	Total Contributions	\$	6,443,674
	Net Investment Income	\$	3,377,443
	Total Additions	\$	9,821,117
Deductions			
	Benefit Payments	\$	11,702,439
	Total Deductions	\$	11,702,439
	Net Increase in Net Position	\$	(1,881,322)
Net Position Restricted for Pensions (Plan Assets)			
	Beginning of Year	\$	258,754,698
	End of Year	\$	256,873,376
	Net Cash Flow (Non-Investment)	\$	(5,258,765)
	Net Cash Flow as % of BOY Assets		-2.03%
	Total Pension Liability		\$264,620,512
	Net Pension Liability		\$7,747,136
	Funded Ratio		97.07%
	Normal Cost	\$	6,284,525
	Amortization of unfunded liability		\$671,992
	Total Contribution Requirement	\$	6,956,517



Net Cash Flow Impact Example 3

Additions			
	Total Contributions	\$	18,626,778
	Net Investment Income	\$	3,377,443
	Total Additions	\$	22,004,221
Deductions			
	Benefit Payments	\$	11,702,439
	Total Deductions	\$	11,702,439
Net Increase in Net Position		\$	10,301,782
Net Position Restricted for Pensions (Plan Assets)			
	Beginning of Year	\$	116,967,239
	End of Year	\$	127,269,021
Net Cash Flow (Non-Investment)		\$	6,924,339
Net Cash Flow as % of BOY Assets			5.92%
Total Pension Liability			\$264,620,512
Net Pension Liability			\$137,351,491
Funded Ratio			48.09%
Normal Cost		\$	6,284,525
Amortization of unfunded liability			\$11,913,963
Total Contribution Requirement		\$	18,198,488



Cash Flow Trend

Examples

◆ Three examples:

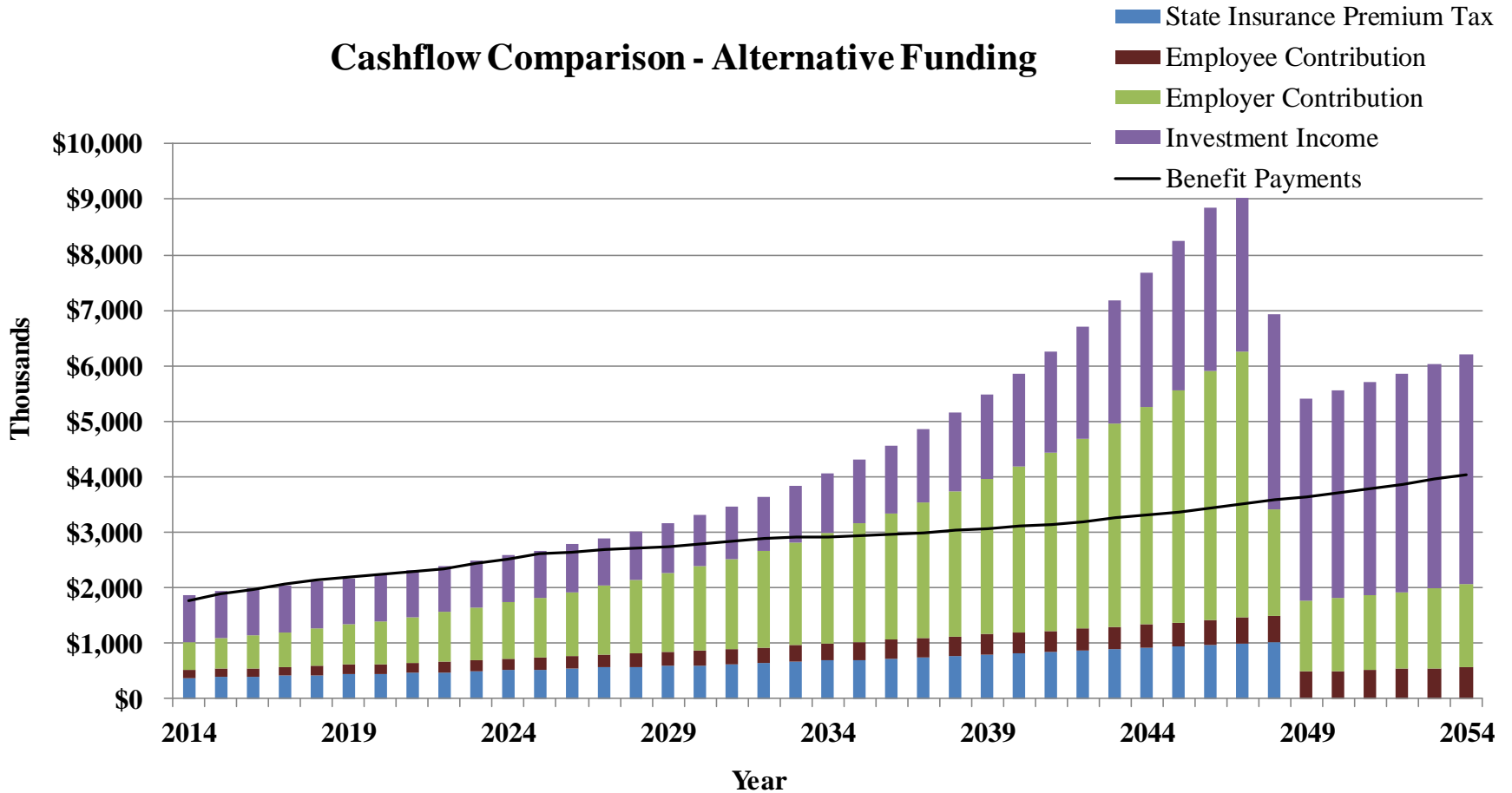
- ▶ A Plan that goes from negative cash flow to positive cash flow to negative cash flow (when it reaches 100% funding)
- ▶ A Plan that goes from positive cash flow to negative cash flow (when it reaches 100% funding)
- ▶ A Plan that is always in a negative cash flow position (yet still reaches 100% funding)

◆ Are any of these plans in trouble?

◆ Why?

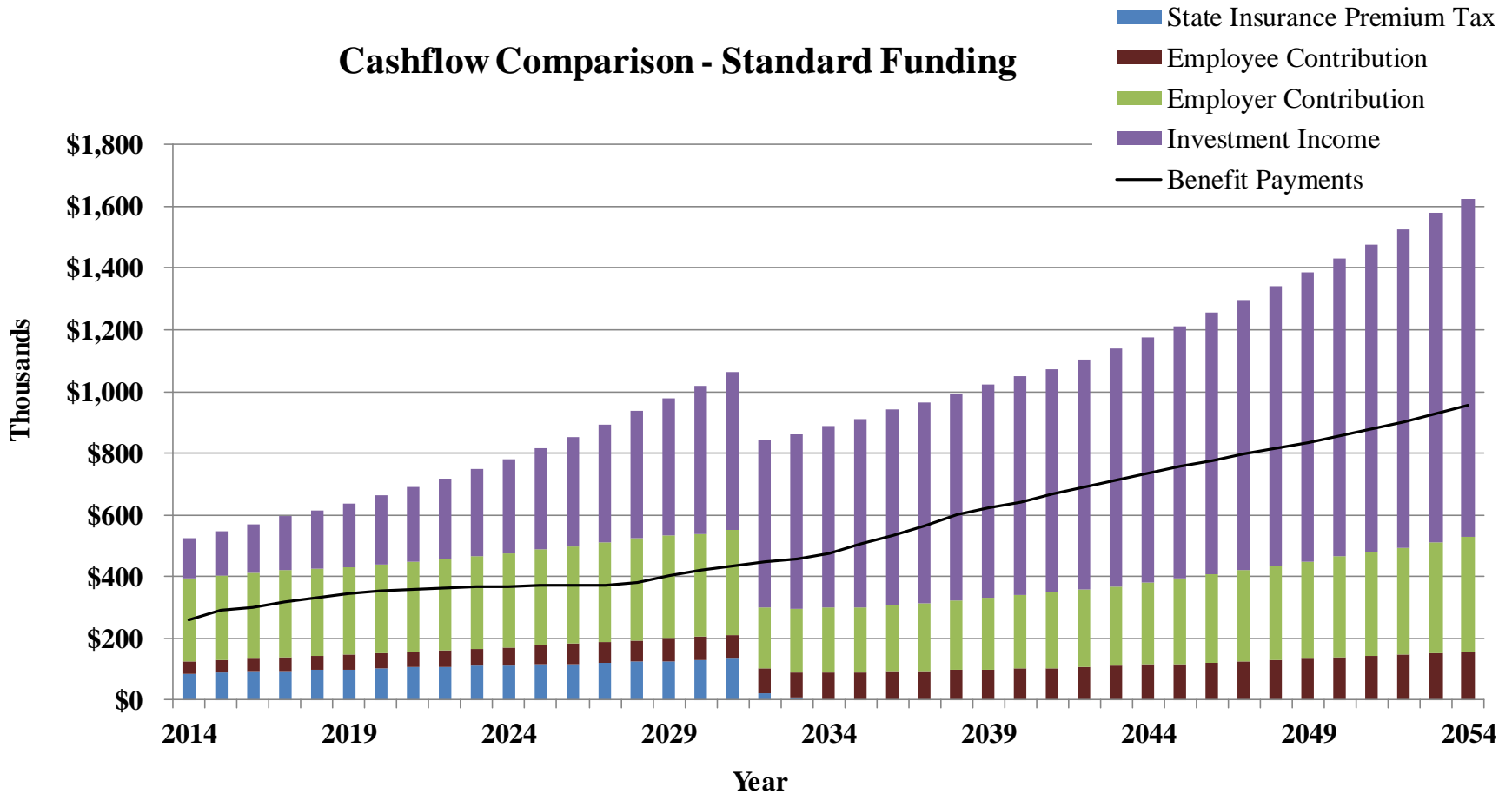
Cash Flow Trend Example 1

Cashflow Comparison - Alternative Funding



Cash Flow Trend Example 2

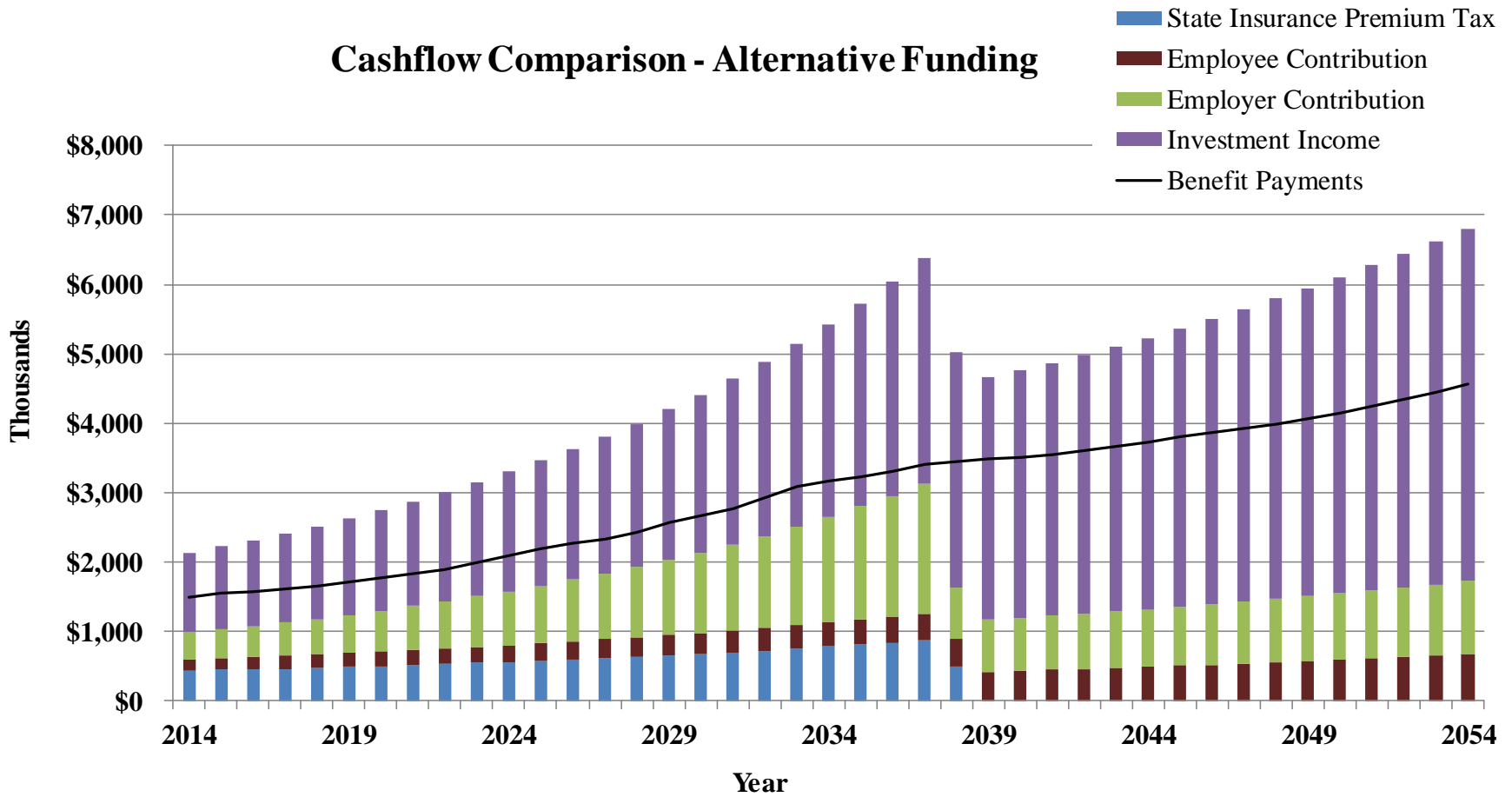
Cashflow Comparison - Standard Funding





Cash Flow Trend Example 3

Cashflow Comparison - Alternative Funding





Additional Considerations

- ◆ Investment risk/volatility
- ◆ Retiree only plans
- ◆ Closed (to new entrant) plans
- ◆ Frozen (benefit accruals) plans
- ◆ Investment policy changes for maturing plans
- ◆ Fixed rate (non-actuarial) contribution policies



Questions?





For More Information...

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Glossary of Terms

- ◆ **Actuarial Accrued Liability (AAL).** The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as “accrued liability” or “past service liability.”
- ◆ **Actuarial Assumptions.** Estimates of future plan experience such as investment return, expected lifetimes and the likelihood of receiving a pension from the Pension Plan.
- ◆ **Actuarial Cost Method.** A mathematical budgeting procedure for allocating the dollar amount of the “actuarial present value of future plan benefits” between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the “actuarial funding method.”



Glossary of Terms

- ◆ **Actuarial Present Value of Future Plan Benefits.** The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.
- ◆ **Actuarial Value of Assets (AVA).** Smoothed value of assets that recognizes the difference between the expected investment return assumption and the actual investment return over a x-year period. Dampens volatility of asset value over time.
- ◆ **Amortization.** Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.



Glossary of Terms

- ◆ **Annual Required Contribution.** The sum of the normal cost and amortization of the unfunded actuarial accrued liability.
- ◆ **Asset Return.** The net investment return for the asset divided by the mean asset value. Example: if \$1.00 is invested and yields \$1.08 after a year, the asset return is 8.00 percent.
- ◆ **Funded Ratio.** The actuarial value of assets divided by the actuarial accrued liability. Measures the portion of the actuarial accrued liability that is currently funded.
- ◆ **Market Value of Assets (MVA).** The value of assets currently held in the trust available to pay for benefits of the Pension Plan. Each of the investments in the trust is valued at market price which is the price at which buyers and sellers trade similar items in the open market.
- ◆ **Net Cash Flow.** Contributions minus benefits minus expenses.



Glossary of Terms

- ◆ **Normal Cost (NC).** The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as “current service cost.” Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.
- ◆ **Unfunded Actuarial Accrued Liability (UAAL).** The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as “unfunded accrued liability.”



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