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Managing Pension Risk Within The Framework of Enterprise Risk Management

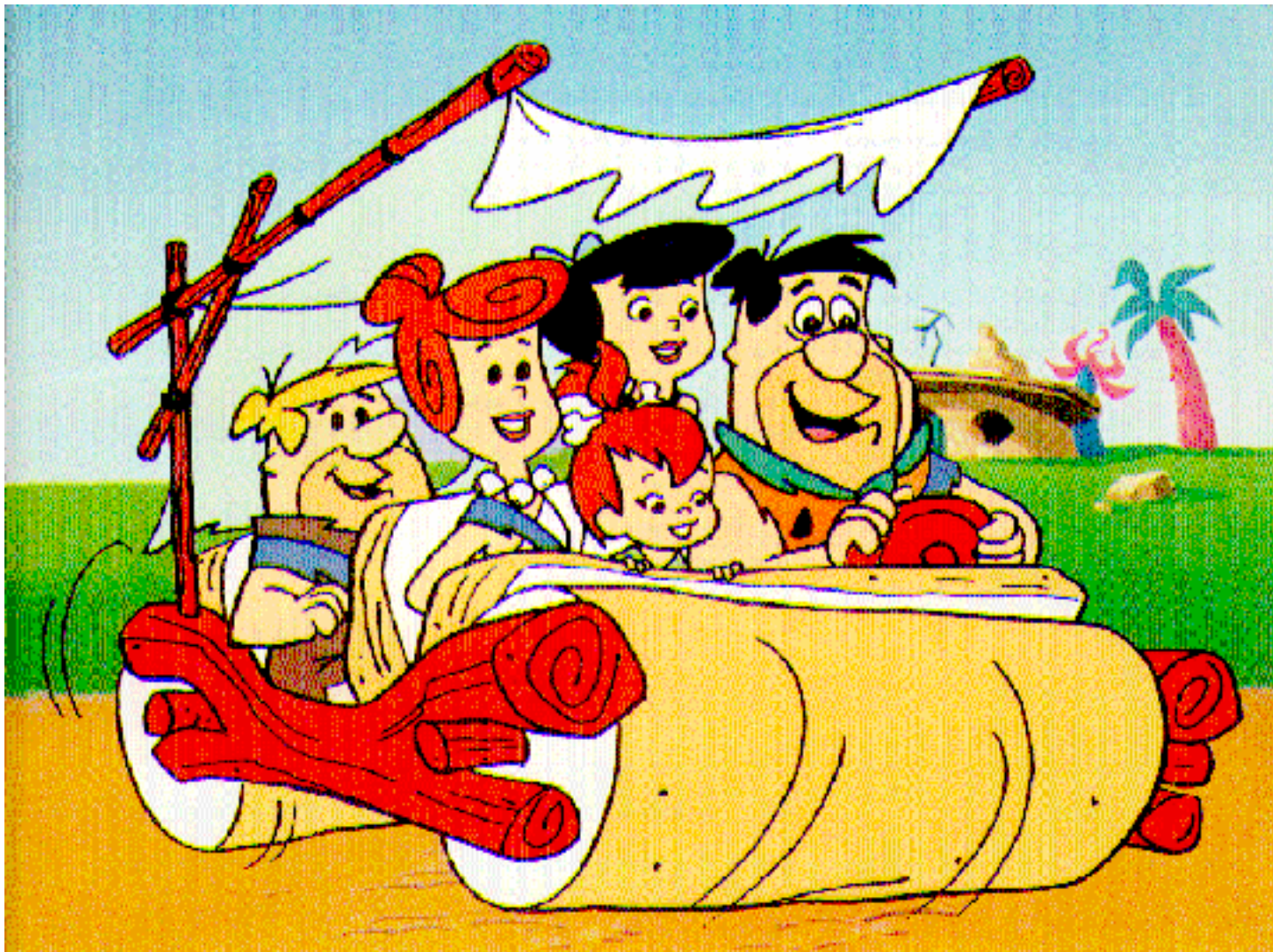
*Presented to PRMIA/QWAFEFW
April 19, 2007*

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Pension Risk Management

Asset Only Management

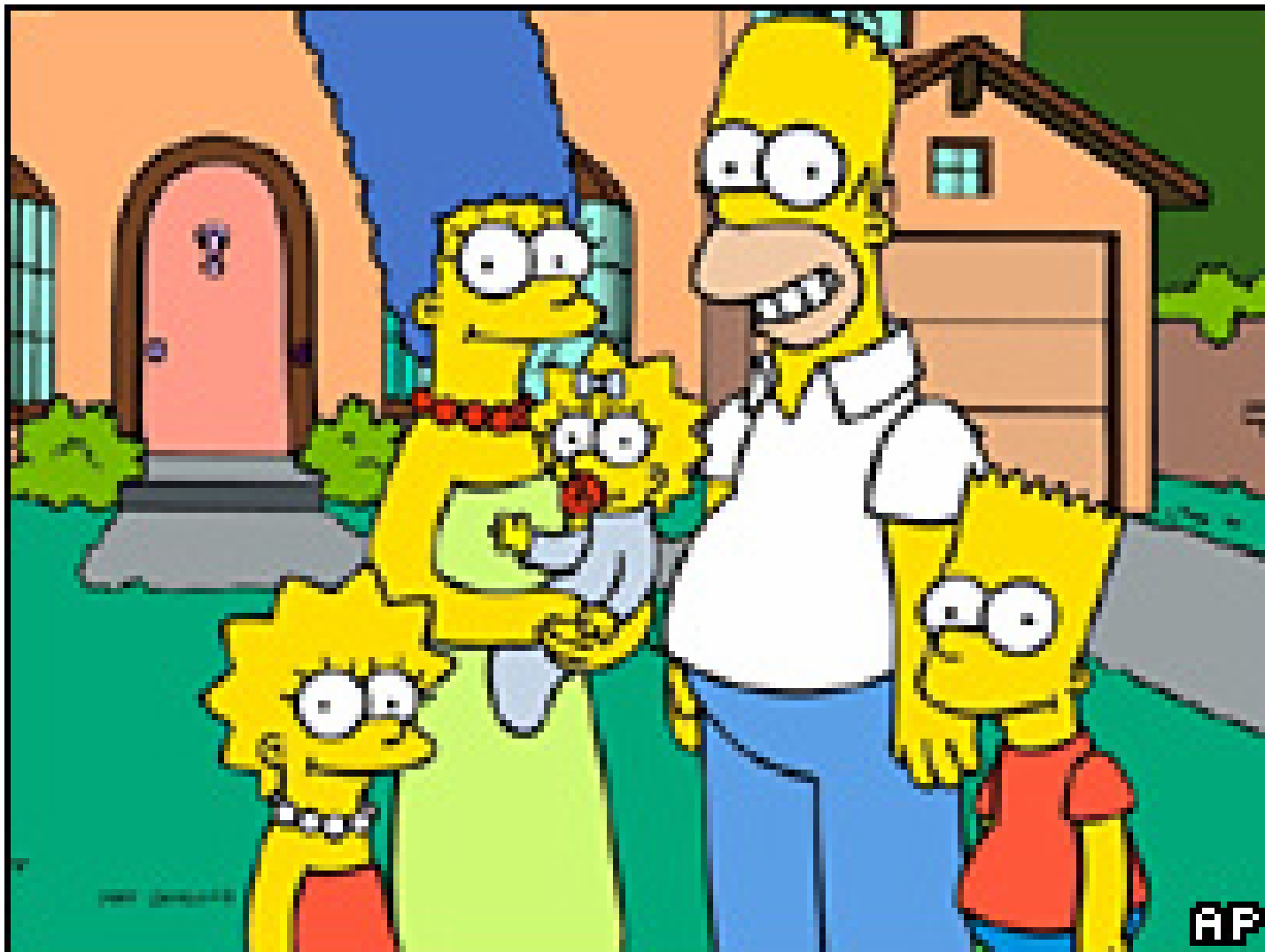


Pension Risk Management Asset Only Management

- Optimizes risk and return for the pension assets only
- Uses asset-only efficient frontiers
- Views 100% cash as the lowest investment strategy
 - Most appropriate for those focused on shorter horizons

Pension Risk Management

Asset/Liability Management



Pension Risk Management Asset/Liability Management

- Optimizes risk and return for the pension assets and liabilities together
- Asset/liability efficient frontiers
- Views immunization as the lowest risk investment strategy
 - Most appropriate for those focused on shorter horizons
- Considers how much pension risk management will tolerate
- Manages cost and volatility of future pension contributions, costs, and funding ratios

Pension Risk Management

Enterprise Risk Management



Enterprise Risk Management is:

“... the discipline by which an organization in any industry assesses, controls, exploits, finances, and monitors risk from all sources for the purpose of increasing the organization’s short- and long-term value to its stakeholders.”

--“Overview of Enterprise Risk Management,” Casualty Actuarial Society

Pension Risk Management

Enterprise Risk Management

- Optimizes risk and return for the entire enterprise (plan sponsor)
- Enterprise-wide efficient frontiers
- May not view immunization as the lowest risk investment strategy
 - Immunization may be appropriate for those focused on longer horizons if it allows more risk in other area of the enterprise
- Addresses the correlations/interrelations of pension risk and other risks in the enterprise
- Asks to what extent it is optimal to take risk in the pension plan, as opposed to other areas of the enterprise



ExxonMobil

Financial Economics

Modern Corporate Finance

- Used by corporations
- Primary Objective: Maximize shareholder value
- Focus on the core business
- Diversification?
- Efficient frontiers have limited uses

Portfolio Selection

- Used by investors
- Primary Objective: Optimize risk/return trade-off
- Spread across industries
- Diversification is vital
- Efficient frontiers are extremely useful

Under which umbrella should pension investment management fall?

Financial Economics

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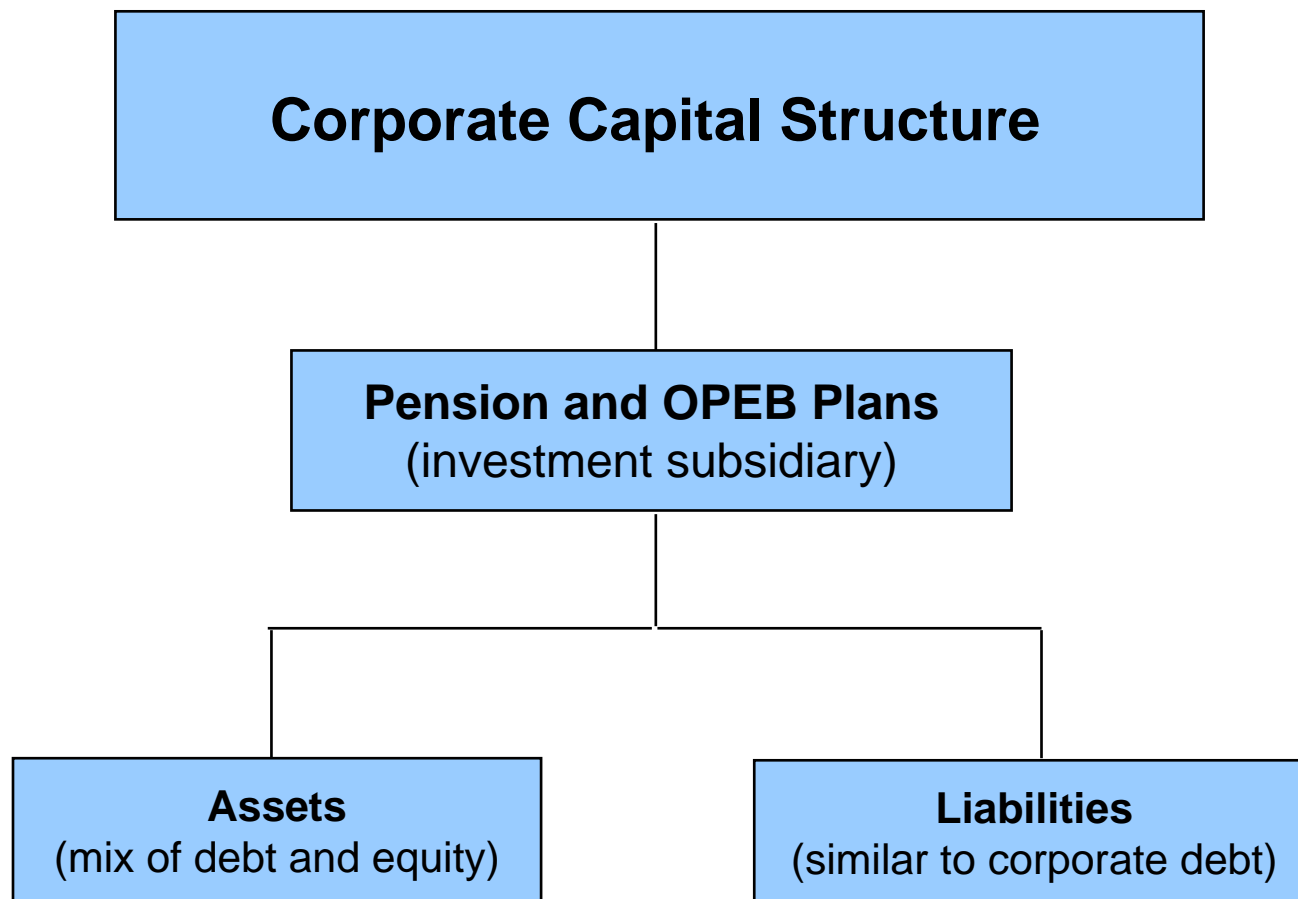
FASB: Account for pensions as a piece of the corporation

- ERM

DOL: Fiduciary duty to manage the plan for the participants

- ALM

ERM View of Retirement Plans



Like other risks, pension risk should be viewed on an enterprise-wide level

Economic View of Pension Finance

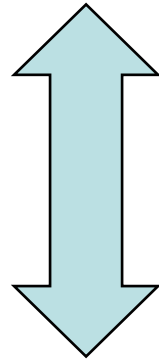
(\$millions)	Book Value Balance Sheet	Market Value	
		Net Balance Sheet	Consolidated Balance Sheet
Pension Asset	-	-	1,606
Other corporate assets (BV)	6,885	6,885	6,885
Additional Enterprise Value	N/A	4,296	4,296
Assets	<u>6,885</u>	<u>11,181</u>	<u>12,787</u>
Pension Liabilities	377	377	1,983
Other corporate liabilities	4,644	4,644	4,644
Total liabilities	<u>5,021</u>	<u>5,021</u>	<u>6,627</u>
Equity	<u>1,864</u>	<u>6,160</u>	<u>6,160</u>
Liabilities + Equity	6,885	11,181	12,787
Sample leverage measures:			
Preliminary Liabilities/Equity	2.69	0.82	1.08
Liabilities/Equity Adjusted for Pension Investment Policy	N/A	N/A	0.99

Observations

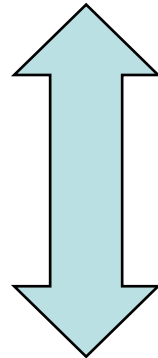
- Estimated impact of equity risk in pension plan is to increase EPS by about \$0.68/share
- De-risking plan (immunize) would reduce EPS by about \$0.68/share per year (on average)
 - Would also make company less risky (lower Beta?)
- Company could leverage the balance sheet directly (borrow and buy back shares)
 - Similar impact (\$0.60-\$1.00 per share)
- These numbers are illustrative only
 - Point is that pension leverage is just that
 - Alternative way to leverage shareholder return

Impact of Pensions on Cost of Capital

Pension Investment Policy



Corporate Beta



Cost of Capital

Pension Plan Impact on the Cost of Capital

	<u>Company 1</u>	<u>Company 2</u>	<u>Company 3</u>	<u>Company 4</u>
WACC - Conventional	8.8%	9.4%	9.8%	8.0%
WACC - Correct	6.6%	8.4%	7.9%	7.0%
Required Return on Equity <i>Typical Pension Asset Allocation</i>	9.8%	9.9%	11.1%	10.1%
Required Return on Equity <i>100% Bonds</i>	6.7%	8.8%	8.4%	8.0%
Required Return on Equity <i>100% Stocks</i>	13.0%	11.2%	13.8%	12.4%

This analysis is based on the CAPM theory and other parameters described in the paper "Do a Firm's Equity Returns Reflect the Risk of Its Pension Plan?" by Li Jin, Robert Merton, and Zvi Bodie.

Pension Investments and the Overall Corporate Risk/Return Profile

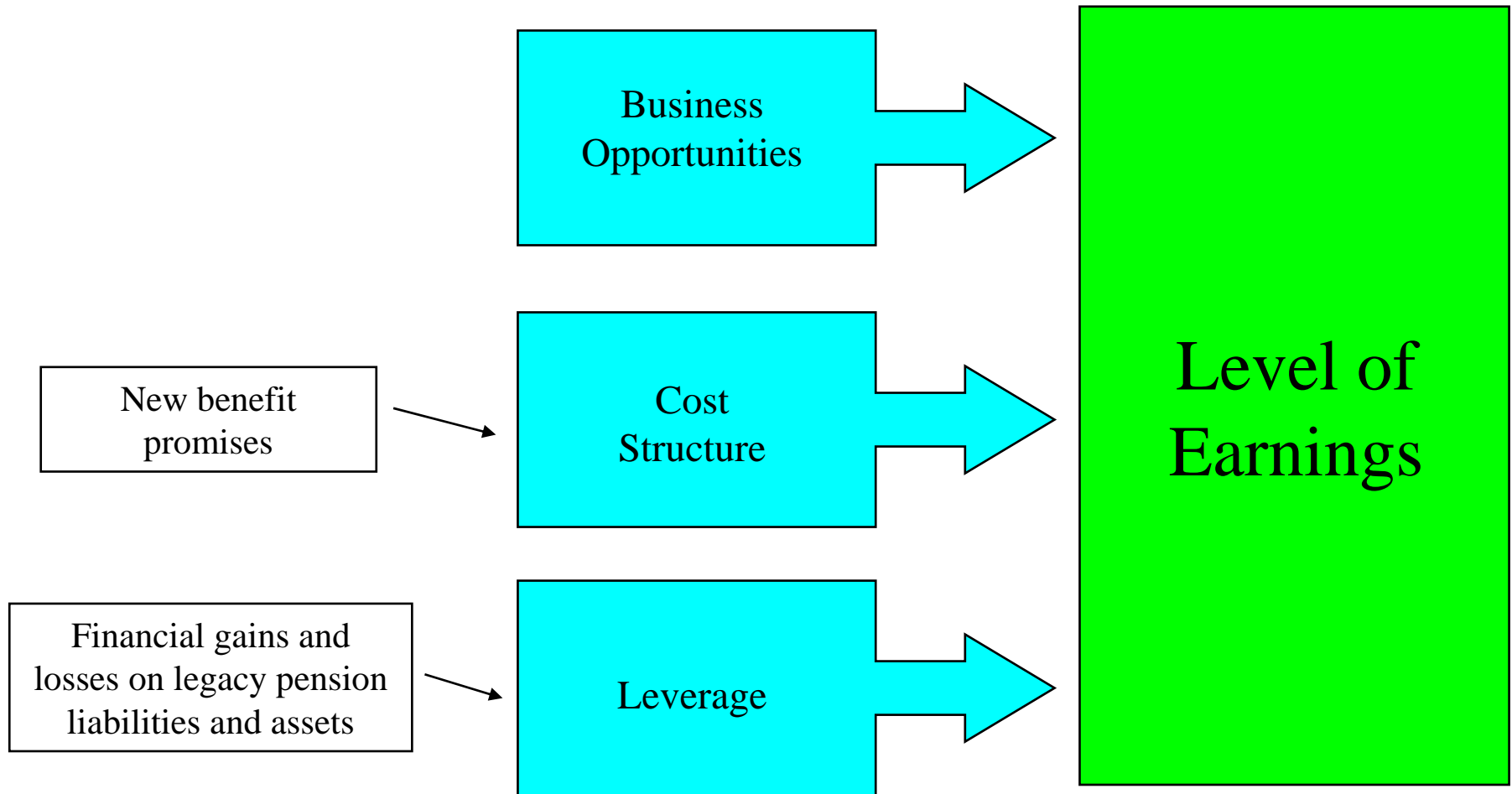
Risk-taking increases expected future earnings, dividends, and other measures of shareholder returns.

$$\text{Value of Firm} = \frac{D_1}{(1 + RR)} + \frac{D_2}{(1 + RR)^2} + \frac{D_3}{(1 + RR)^3} + \frac{D_4}{(1 + RR)^4} + \dots$$

Risk-taking increases the required return for calculating the present value of future dividends and other measures of shareholder returns.

- Plan sponsors must assess how shareholders value risk in the pension plan versus the core business
- How risky pension investments affects shareholder value is not a black-and-white issue

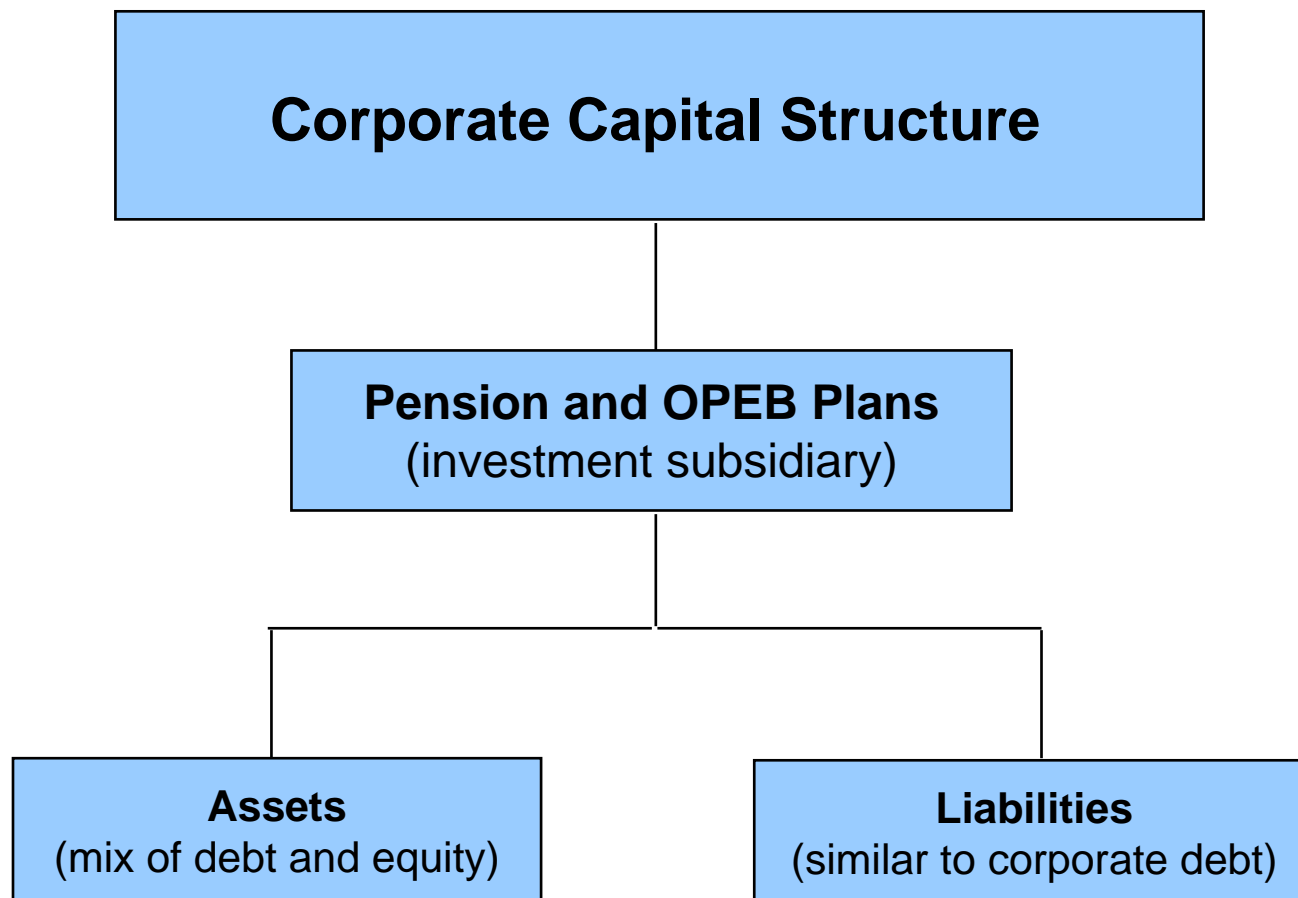
Pension Plan as Leverage



Pension Leverage

- Collateralizing debt-like pension liabilities with equity assets is one way to leverage capital structure
- Pension funding and investment policies represent decisions about the capital structure of the sponsor
 - Viewing pensions as an isolated line-item expense or cash outlay is inadequate
- Sponsors must decide how they want to allocate risk between their pension plan and their core business

ERM View of Retirement Plans



Like other risks, pension risk should be viewed on an enterprise-wide level

Capital Structure Decisions

- Many enterprises evaluate all capital structure decisions on an integrated basis
 - Debt structure
 - Dividend policy
 - Equity offerings
 - Share buybacks
 - Pension funding policy
 - Pension investment policy
- It is difficult to evaluate pension risk management strategies in isolation of other risks to the enterprise

Conclusion

- Managing pension risk within an ERM framework requires a fundamentally different analysis from ALM
- ERM and ALM analyses are both important
- Plan sponsors must balance the two competing frameworks

Appendix – Longevity Risk: Measurement and Management

- Mortality has improved steadily over many decades
- Some plan sponsors have chosen not to assume future improvements in mortality
- Eventually those sponsors will have to update their mortality assumption, and they will experience a spike in their measured liabilities
- Is this mortality risk, or simply mis-measurement?

Appendix – Longevity Risk: Pooling Among Participants

- Mortality is very unpredictable for individuals, but reasonably predictable for large groups
 - This makes it a very insurable risk
 - Social utility can be improved by pooling mortality risk in pension plans
- Do participants value life annuities?
- Do corporations get value for providing pension benefits?

Appendix – Longevity Risk Qualification

	<u>Present Value of a Life Annuity</u>	<u>Value of Improvements</u>
65 Year Old Male - Immediate Annuity @ 6%		
RP-2000 Mortality - No improvements	10.32	
Improvements at 50% of Historical Levels	10.45	1.3%
Improvements at 100% of Historical Levels	10.59	2.6%
Improvements at 150% of Historical Levels	10.72	3.9%
50 Year Old Male - Deferred to 65 Annuity @ 6%		
RP-2000 Mortality - No improvements	3.97	
Improvements at 50% of Historical Levels	4.13	4.0%
Improvements at 100% of Historical Levels	4.28	7.9%
Improvements at 150% of Historical Levels	4.43	11.6%

Appendix – Longevity Risk Management

- Residual mortality risk still exists
- Differences between broad population mortality and plan specific mortality cause additional uncertainty
- Mortality risks may be minimized because they are:
 - Gradually emerging over a multi-decade horizon
 - Uncorrelated with economic cycles or other business risks
 - Able to be hedged in financial markets?