



On the Implications of Modern Risk Management for Equity and Credit Analysis

Robert C. Merton

Harvard Business School

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Introduction

- Much written on implications for internal corporate decision-makers of implementing modern enterprise risk management
- This talk explores its implications for external equity and credit analysts in evaluating the intrinsic values and risk profiles of those firms
- Inadequate analytical tools and over-reliance on accounting and actuarial conventions has caused systematic distortions of estimates of economic risk and value for firms.
- Case studies examined here:
 - Past: Pension funding surplus/deficits pre-FAS 87
Employee options pre-FAS 123 (2004)
 - Present: Neglecting value and risk of corporate pension plans
 - Future: Derivative technologies for greatly expanded implementation of strategic risk management
- Historical fragmentation between credit and equity analyses and the forces for future convergence



Past Distortions: Pension Funding Surplus/Deficits Pre-FAS 87 and Employee Options Pre-Option- Expensing

- Before 1987, the actuarial discount rate used to determine the PV of pension liabilities was a matter of judgment and was “backward-looking” and sluggish in changes through time.
- In a rising and high interest rate environment [70s-81], the discount rate will be lower than the market rate and the PV of liabilities will be overstated. In a declining interest rate environment [81-86], the discount rate will be higher and the PV of liabilities understated.
- There was a significant and systematic distortion of the funding surplus of corporate pensions [M. Leibowitz, “Pension Fund Management Under FAS 87”, 1987]
- Compensation cost from employee options was not reflected in either corporate earnings or ratios of labor cost-to-revenues and other measures of operating profitability and cost efficiency prior to FAS 123(2004).
- Corporate profits and operating efficiencies in certain sectors were greatly overstated and innovation in incentive and retention compensation designs were inhibited by preferential accounting treatment for at-the-money options



Present: Not Recognizing Value and Risk of Corporate Pension Plans Distorts Systemic Risk and Cost of Capital Estimates for the Firm

- Pension assets are encumbered assets of the firm and pension liabilities are liabilities of the firm
- Traditional estimate of beta of operating assets
 - $\text{BetaOA} = (E \text{ BetaE} + D \text{ BetaD}) / (D + E)$
- Correct estimate of beta of operating assets
 - $\text{BetaOA} = [E(\text{BetaE} + \text{BetaD}) + (D - E)\text{BetaD} - \text{PA}(\text{BetaPA} - \text{BetaPL}) - (\text{PA} - \text{PL})\text{BetaPL}] / \text{OA}$
- Distortion in beta from traditional estimate
 - $\text{Error} = [\text{PA}(\text{BetaPA} - \text{BetaPL}) - (\text{PA} - \text{PL})(\text{BetaOA} - \text{BetaPL})] / (\text{OA} + \text{PA} - \text{PL})$
- Distortion in cost of capital for operating assets is directly related to the error in systematic risk

Effect of Pension Asset Risk Mismatch on Equity Risk and Cost of Capital: LT Corporation (with Fully-Funded Pension Plan)

Standard Balance Sheet Estimates

	Value \$ Billions	Risk, Beta		Value \$ Billions	Risk, Beta
Operating Assets	\$40	1.05	Debt	\$19	0.00
			Equity	\$21	2.00
Total Assets	\$40	1.05	Total L&E	\$40	1.05

Estimated WACC Operating Assets = 12.35%

Effect of Pension Asset Risk Mismatch on Equity Risk and Cost of Capital: LT Corporation (with Fully-Funded Pension Plan)

Full Economic Balance Sheet Estimates

	Value \$ Billions	Risk, Beta		Value \$ Billions	Risk, Beta
Operating Assets	\$40	0.36	Debt	\$19	0.00
Pension Assets	\$46	0.60	Pension Liabilities	\$46	0.00
			Equity	\$21	2.00
Total Assets	\$86	0.49	Total L&E	\$86	0.49

Estimated WACC Operating Assets = 7.52%



Effect of Pension Fund Asset Allocation on Asset and Equity Risk: LT Corporation

Fraction of Pension Assets in Equities	Pension Asset Beta	Total Asset Beta	Firm Equity Beta
0.00	0.00	0.17	0.70
0.25	0.25	0.30	1.23
0.60	0.60	0.49	2.00
0.75	0.75	0.57	2.34
1.00	1.00	0.70	2.88

Tradeoff Between Pension Asset Allocation and Firm Capital Structure

Fraction of Pension Assets in Equities	Total Asset Beta	Hold Fixed Firm Equity Beta	Equity Capital \$ Billions	Debt/Equity Ratio
0.00	0.17	2.00	7.3	4.48
0.25	0.30	2.00	12.9	2.10
0.60	0.49	2.00	21.0	0.90
0.75	0.57	2.00	24.5	0.63
1.00	0.70	2.00	30.1	0.33



Errors in Estimates of Equity and Operating Asset Betas: Examples from 2001

Beta of equity estimated using capital asset pricing model, using data on three-year monthly stock returns, obtained from the Center for Research in Security Prices, and the value-weighted return on all stocks on NYSE, AMEX and Nasdaq as the proxy for the market. Beta of corporate debt is assumed to be 0.175. "Operating asset beta correct" is the operation asset beta estimate when correctly accounting for pension assets and liability values and risks; and "Operating asset beta traditional" is the operating asset beta estimate, ignoring the pension plan altogether, which is standard methodology.

Company	Equity beta	Operating asset beta correct	Operating asset beta traditional	Percentage overestimation error for traditional
Boeing	.689	0.228	0.543	139
Du Pont	0.707	0.482	0.634	32
Eastman Kodak	0.867	0.416	0.679	63
Textron	0.732	0.292	0.426	46

Errors in Estimates of Weighted Average Cost of Capital: Examples from 2001

	Pension Assets (\$ bn)	Pension Liabilities	Pension Surplus/ Deficit (\$ bn)	Market Cap (\$ bn)	Book Value of Debt (\$ bn)	Standard WAAC*	WACC Adjusted for Pensions Risks*
Boeing	33.8	32.7	1.1	30.9	12.3	8.80%	6.09%
Du Pont	17.9	18.8	(0.9)	42.6	6.8	9.44%	8.15%
Eastman Kodak	7.9	7.4	0.5	8.6	3.2	9.75%	7.47%
Textron	4.5	3.9	0.6	5.9	7.1	7.98%	6.81%

*WACC numbers are based on a risk-free rate of 5% and a market risk premium of 7%.



Future Distortions: Application of Derivatives to Implement Strategic Risk Management

- Large transformations in the risk of the firm can be implemented by use of derivative securities without impact on earnings statement or balance sheet
- Value created by eliminating passive risks from firms by reduction in equity capital needed to support the risk of the firm's assets [RC Merton, "You Have More Capital than you Think," *Harvard Business Review*, November 2005.
- Interest rate swaps: Banks
- Equity swaps: pension fund assets
- Credit default swaps: airline engine manufacturer
- CDS causing convergence of credit and equity analysis