

Pensions and Corporate Finance: An Empirical Perspective

Presentation by Mike Orszag at the Seminar
on Pension Finance and Economics
June 11, 2004, Staple Inn, London

Corporate pension finance

- Proposition 1 (Slide 3 of Bodie): Pensions are an integral part of the sponsoring firm and are viewed by the market as debt.
- Proposition 2: (Slide 7 of Bodie): Because pensions are bond-like companies should invest in bonds to hedge risk ("For a healthy company, the optimal pension policy is to immunize its defined-benefit liabilities with a fixed-income portfolio.")
- Proposition 3: (Slide 7 of Bodie): Optimal policy is to fully fund.

... and there are a lot of obstacles to why this does not happen in practice (like accounting bias).

Corporate Pension Finance: Comments

- Proposition 3: Optimal policy is to fully fund?
Modigliani-Miller: value of company invariant to funding (Sharpe 1976). However, because deferred members cannot negotiate, shareholders may gain from underfunding, especially with closed schemes (deferred members).
- Proposition 2: Are pensions really bond like?
Are rents bond like?

Propositions

- Proposition 1: Pensions are viewed by the market as debt.
- Proposition 2: Healthy companies should invest in bonds.
- Proposition 3: Healthy companies should be closer to full funding.

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Research Literature

- Largely US based
- Somewhat dated in cases
- Concentrates on proposition 1 and 3

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Empirical Evidence

- Thies-Sturrock (JRI, 1988). Do profitable firms with high tax rates overfund their pension plans?
- Bodie (FAJ, 1985). Key conclusions:
 - Corporations manage their pension funds as if the funds were an integral part of overall corporate financial policy.
 - Reported fund liabilities linked to company profitability by management's discount rate choice.
 - Profitability and the proportion of pension assets invested in fixed securities have positive associations with funding level.
- Bulow-Morck-Summers (1985, NBER volume),
- Feldstein-Morck (1985, NBER Volume).
- Feldstein-Seligman (1981)

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Empirical Evidence

- Bulow-Morck-Summers (1985, NBER volume),
- Feldstein-Morck (1985, NBER Volume).
- Feldstein-Seligman (1981) They also find that the type of adjustment performed on the liabilities to set these onto a standard interest rate significantly affects the results.

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Empirical Evidence

- Coronado and Sharpe (2003)
 - Market does not see through accounting veil - accounting earnings matter more than financial earnings.
 - Multiplier on pension earnings higher than normal earnings.

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Empirical Evidence

Other studies:

- Chen & Arcy (JRI 1986). Event study examines the impact of mandated publication of plan assets, liabilities and interest rate assumption on share prices. Finds that low- interest rate assumption share prices out performed high interest rate assumption share prices.

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Empirical Evidence

- Thies-Sturrock (JRI, 1988). Do profitable firms with high tax rates overfund their pension plans?
- Bodie (FAJ, 1985). Key conclusions:
 - Pensions appear to be viewed as significant by the market
 - Reported fund liabilities linked to company profitability by management's discount rate choice.
 - Profitability and the proportion of pension assets invested in fixed securities have positive associations with funding level.

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Data

- UK listed companies have had to report pension liabilities on FRS17 basis since late 2001
- Collected roughly 150 data items for FTSE350 on corporate finance from FRS17 disclosures
- Matched data to other data on market returns/option price data, betas, etc.
- Some of this data also available for Japan, Europe, US

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Accounting Dates

- Roughly 48% of FTSE350 (168 companies) use Dec. 31 as end of year, 17% (60 companies) use 31 March, 8% (29 companies) use 30 September, remainder use a variety of dates
- Define a panel with three waves:
 - 2001 Wave = Accounting dates between 30 June 2001 and 29 June 2002
 - 2002 Wave = Accounting dates between 30 June 2002 and 29 June 2003
 - 2003 Wave = Accounting dates between 30 June 2002 and 1 January 2004

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Are Assumptions Reasonable?

- Yes, broadly so.
- Regressions of assumptions on risk fundamentals reveal no anomalies or correlations of a significant nature.

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Proposition 1

- Look at how pension variables relate to volatility and beta
- Summary of results:
 - Pension variables do matter
 - But not necessarily as one would expect...
 - Liabilities matter more than deficits
 - Pension coefficients different than debt coefficients

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Proposition 1

- Try to explain beta with pension variables in 2002
- Observations 253
- Exclude zero liability companies and investment trusts

	Coefficient	T-statistics
Pension leverage	0.619	(3.48)**

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Proposition 1

- Try to explain beta with pension variables in 2002
- Observations 253
- Exclude zero liability companies and investment trusts

	Coefficient	T-statistics
BS exposure	0.119	(3.12)**
Pension leverage	0.070	(0.28)

Proposition 1

- Try to explain volatility with pension variables in 2002

	Coefficient	T-statistics
Pension leverage	.2398891	(5.54)**

Proposition 1

- Try to explain volatility with pension variables in 2002

	Coefficient	T-statistics
BS exposure	.0277246	(3.00)**
Pension leverage	.1113416	(1.84)

Proposition 1

- How about leverage?
- On its own it has an effect but not with pension variables

Effect on beta	Coefficient	T-statistics
BS exposure	.1140731	(2.98)**
Pension leverage	.0487195	(0.20)
Ordinary leverage	.0261252	(0.90)

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Proposition 1

- How about with other controls?
- Same qualitative results

Effect on beta (including controls for maturity, leverage and equity allocation of pension plan)	Coefficient	T-statistics
BS exposure	.1127027	(2.84)
Pension leverage	.0462398	(0.18)

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Proposition 1

- How about looking at lags?
- Worse: 2002 (N=238)

Explaining 2003 volatility		T-statistic
Pension BS exposure	.0481317	2.45
Pension leverage	-.0394235	-0.29

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Proposition 1

- How about looking at a panel?
- Random/fixed effect regressions
- Same basic pattern:
 - Pension liabilities relative to market cap matters much more than pensions as debt

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- How about looking at a panel?
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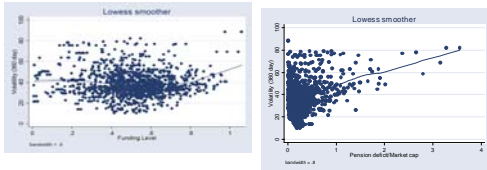
Proposition 1

- How about implied volatility?
- Same basic results (at least in 2002)

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Proposition 1

- How about other countries (Japan)



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Proposition 1: Summary

- Market appears to take into account pensions
- ... but do participants seem to look at it as debt???

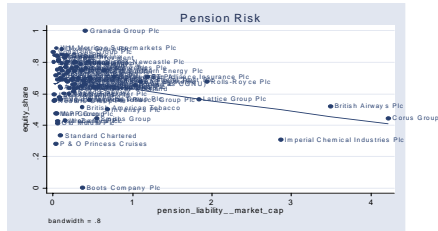
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Proposition 2

- Proposition 2: Healthy companies should invest in bonds
- ... or are asset allocation of pension funds determined by corporate fundamentals?

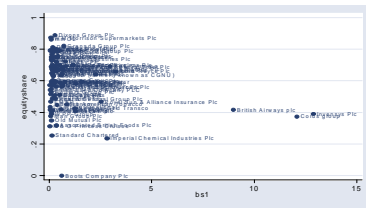
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Pension Liabilities/Market Cap (2001)



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Pension Liabilities/Market Cap (2002)



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Proposition 2

- Possible fundamentals to consider
 - Market/book ratio
 - Price/earnings ratio
 - Maturity of the scheme
 - Credit rating

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Do A rated companies hold less equity in their pension plans?

Sample all S&P rated companies in 2002

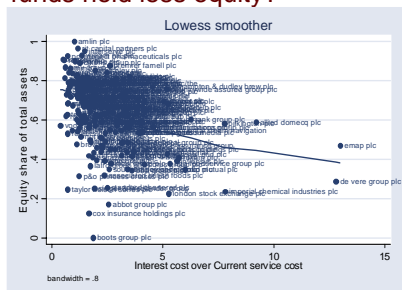
A rated companies no more or less likely to hold equity

Equity share of total assets	
arated	0.004
	(0.11)
ftse100	0.007
	(0.16)
Constant	0.595
	(17.56)**
Observations	94
R-squared	0.00
Absolute value of t statistics in parentheses	
* significant at 5%; ** significant at 1%	

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[illegible]

Do companies with more mature pension funds hold less equity?



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How about directional movements?

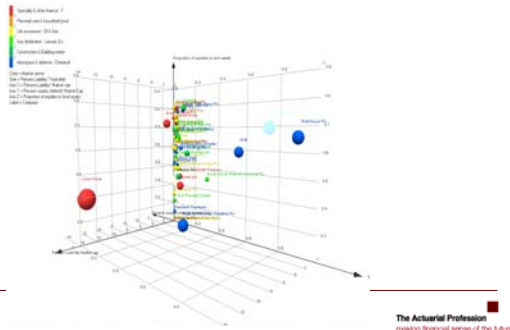
Not much of statistical significance...
however, pension leverage
coefficient lends some support to
Proposition 2

Change in equity share	Coefficient	T statistic
Lagged Pension exposure	.0009908	0.11
Lagged Pension leverage	.0740915	1.60
ftse100	-.0010068	-0.10
Constant	-.0444145	-5.60

N=314

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Proposition 2



Proposition 2

- Proposition 2: Asset allocation of pension plan determined by fundamentals
- Does not work well in practice....

Proposition 3

- Healthy companies should be closer to full funding

Proposition 3

- A rated companies in 2003: 5.7% greater funding
- A rated companies in 2003: 6.4% greater funding (lower for FTSE100)
- Direction of change is also positive for top rated companies

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Does the theory work in practice?

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