Actuarial Bias Enables DB Plan Equity Investments

Jeremy Gold

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Outline

- Finance says DB plans -- no equities
- Opacity favors equity holdings
- Transparent accounting model
- Transparent model --> biased model
- Opaque accounting
- Transparent accounting
- ERISA
- Summary

Finance says DB plans -- no equities

- Sharpe (1976) weak funding + equities + flat PBGC premium => s/h value
- Black (1980) fixed income investment + corporate leverage => after-tax s/h value
- Tepper (1981) fixed income + s/h portfolio adjustment => after-tax s/h value

Finance says DB plans -- no equities

- Harrison & Sharpe (1983) PBGC Put + Tepper-Black => all-equity or all-fixed
- Post-1983 statutory changes => all-fixed
- All of above assume transparency

Opacity favors equity holdings

- Actuaries use expected returns
- Actuaries spread deviations from expected
- Thus, equity => “instant” earnings
- Finance view requires s/h to see thru this
- If s/h & analysts see thru, managers stop
- Evidence that they do not see thru: accounting, NationsBank, technology

Transparent accounting model

- Based on Treynor financial subsidiary model
- Operating expense of pensions:

$$X^{f}_{B,t} = SC_t$$

- Financial subsidiary accounting:

$$X^{f}_{P,t} = \left(L_{P,t} + P_t - SC_t - L_{P,t-1}\right) - \left(A_{P,t} + P_t - C_t - A_{P,t-1}\right)$$

Transparent model morphs into biased model

- Define:

r = short rate (e.g., year bill)

$\tilde{r}$ = stochastic liability return

$\bar{r}$ = expected liability return (e.g., settlement rate)

α = fraction of assets in equity

$\tilde{q}$ = stochastic equity return

$\tilde{e} = \alpha\tilde{q} + (1-\alpha)r$ = stochastic asset return

$\bar{e}$ = expected asset return

Transparent model morphs into biased model

$$X^{f}_{P,t} = \left(L_{P,t} + P_t - SC_t - L_{P,t-1}\right) - \left(A_{P,t} + P_t - C_t - A_{P,t-1}\right)$$

$$= \tilde{r} L_{P,t-1} - \tilde{e} A_{P,t-1}$$

$$\triangleq r L_{P,t-1} - r A_{P,t-1} = -r E_{P,t-1}$$

$$\neq X^{a}_{P,t}$$

$\triangleq$ over equals sign means risk-adjusted (financial) equality.

Transparent model morphs into biased model

$$X^{a}_{P,t} = \bar{r} L_{P,t-1} - \bar{e} A_{P,t-1}$$

$$\hat{=} \bar{r} L_{P,t-1} + AMT_{t} - \bar{e} A_{P,t-1}$$

$$\hat{=} \bar{r} L_{P,t-1} + AMT_{t} - \bar{e} MRV_{P,t-1}$$

$$= iPBO_{t-1} + AMT_{t} - jMRV_{t-1}$$

Transparent model morphs into biased model

- Consolidating the operating company and the financial subsidiary, we get FAS 87 expense:

$$X_t^a = iPBO_{t-1} + SC_t + AMT_t - jMRV_{t-1}$$

- And we can identify the bias:

$$\text{bias} = \Delta X_t = X_t^a - X_t^f = (\bar{r} - r)L_{P,t-1} - (\bar{e} - r)A_{P,t-1}$$

Transparent model morphs into biased model

- An overstatement of:

$$(\bar{r} - r)L_{P,t-1}$$

  which we ignore because it is easily hedged by dollar-duration matching.

- And an understatement (the equity enabling bias):

$$-(\bar{e} - r)A_{P,t-1}$$

Implications of opaque accounting

- The annual equity-enabled earnings bias:

$$(\bar{e} - r)A_{P,t-1} = \alpha(\bar{q} - r)A_{P,t-1}$$

may be restated at its perpetuity value:

$$\alpha\left(\frac{\bar{q} - r}{r}\right)A_{P,t-1} = \alpha\left(\frac{\bar{q}}{r} - 1\right)A_{P,t-1}$$

Implications of opaque accounting

- We restate these values as the marginal values of a $1 shift from bonds to equity:

$$(\bar{q} - r)$$

$$\left(\frac{\bar{q}}{r} - 1\right)$$

Implications of opaque accounting

- Suppose q = 12%, r = 6% and a 35% annual corporate tax rate. Then $1 shift equity appears to add $.65 to shareholder value

- Alternatively, suppose P/E = 20:1. Then $1 shift implies apparent shareholder value of (.12-.06)(20)(.65) = $.78.

Transparent accounting implications

- After accounting for taxes, the value of $1 of plan surplus is $1 as it should be for any marketable pool of assets and liabilities.
- The Tepper-Black (Session 98 tomorrow) argument has traction with shareholders, analysts and the financial press.
- Managers have to modify their behavior
- No more DB equity allocations.

ERISA

- Funding algebra is no better than accounting.
- Primary societal purpose of ERISA assets is collateral for promises.
- Some argue that funding reduces benefit costs but, absent tax incentives, this is not true.
- For a given level of assets, fixed income provides better collateral for fixed promises.
- Amazingly, ERISA encourages lower funding when assets include equities.

Summary

My argument follows this sequence :

- Contrary to theory, assets are in equities
- FAS 87 rewards sponsors for equity in plan
- Bias is detectable but undetected
- Opacity might cause equity allocations:
  - Managers believe analysts follow earnings
  - Analysts can, but do not, unwind the bias
- Transparent accounting contraindicates equity => opacity enables equity