Accounting/Actuarial Bias Enables Equity Investment by Defined Benefit Pension Plans

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Abstract

Although pension finance theory says most defined benefit pension plans sponsored by publicly traded corporations should invest entirely in fixed income, 60% of assets are invested in equities. The existing theory makes a strong – but often unstated – assumption of transparency, implying that investors view the pension plan as a financial subsidiary of the operating parent and value it as a <u>market portfolio</u>. I explain the equity choice made by managers as a reaction to how investors perceive the opaque standard pension accounting model. Investors view the plan in operating terms and value it based on <u>reported earnings</u>.

Defined benefit pension plans' earnings (expenses) are computed using actuarial methods and economic assumptions that anticipate expected equity returns and strongly dampen the volatility of actual equity returns. Thus, corporations whose plans invest in equities overstate the financial value of their earnings and understate the volatility of such earnings.

Under the transparent model, managers who invest in equities may be confronted by arbitrage arguments that show equity investment injures shareholders. Under the opaque model, these arbitrage arguments are not available and managers who invest in equities enjoy premium returns to risk while those who invest in fixed income instruments are punished by higher costs without visible risk reduction.

1   Introduction

Defined benefit (DB) pension accounting rules in many nations, stemming from actuarial roots, anticipate equity risk premia before the risks are weathered. Thus reallocating pension assets from debt to equity immediately increases reported earnings of the plan sponsor. This accounting result encourages equity investments despite arguments made by financial economists to the effect that swapping debt for equity within tax-sheltered pension plans generally destroys shareholder value.

Funded DB plans in North America and Western Europe typically invest 60% or more of their assets in equities. Are plan managers destroying shareholder value or are the arguments of financial economists missing something? My answer is that both are true. This paper reconciles the behavior of managers and the analysis of financial economists. I focus on actuarially-based accounting rules and the asset allocation of tax-sheltered pension plans. For the most part, this

paper ignores the parallel actuarial processes that govern pension funding (cash flow from the sponsor to the plan) rules.

The dissonance between financial economic theory and managerial practice is not a small matter. In the U.S., for example, the $2 trillion of pension equity investments represents about 1/4 of the U.S. equity market capitalization. Nor is it a transient issue. The equity percentage has been stable for the past 30 years even as changes in funding and tax laws have strengthened the pension finance arguments for fixed income.

Pension finance theory has always embedded a strong, but often unstated, transparency assumption. Financial economists have generally modeled DB plans as transparent financial subsidiaries of the sponsoring corporations, assuming that corporate managers, financial analysts and shareholders will see the plan this way and act accordingly.

1.1 Remaining Sections

The remainder of Section 1 contrasts the financial and actuarial views with respect to the measurement and recognition of pension costs. In Section 2 we further develop the financial versus actuarial issue and its impact on investors. We include a *thought experiment* which shows how anticipating and smoothing risky returns biases analyst valuations. The model of Section 3 values the pension plan subsidiary as a marketed portfolio of assets and liabilities. We show how this may be reformulated to produce the standard accounting pension expense equation. The reformulation is shown to introduce measurement bias. Section 4 begins with a description of transparent accounting and then develops support for my opacity thesis which asserts that the capital markets neither penetrate the actuarial veil nor correct managers who invest their pension plans in equity. Section 5 looks at counterarguments, some of which weaken the opaque model and lead to a translucent middle ground. Section 6 discusses empirical tests of the opacity thesis conducted by Coronado and Sharpe (2003). Section 7 addresses how mispricing based on the opaque model can persist. Section 8 concludes.

1.2   Background

There is a stark and important difference between the <u>actuarial</u> and the <u>financial</u> pricing principles as applied to defined benefit pension plans sponsored by publicly traded corporations. The actuarial principles, embodied in several documents[1]:

- use the <u>expected return on plan assets</u> to calculate plan costs (thereby anticipating returns to risk before the risk is borne), and

- spread deviations from the expectation over several years.

The financial principles, based on <u>pricing by arbitrage</u>, determine the discount rate on the liabilities by reference to publicly traded <u>hedging assets</u> (Bader and Gold, 2003, Principle 4). These hedging assets closely match the liability cash flows with respect to maturities and creditworthiness and have similar correlations with the market portfolio (beta). For the (not so) special case where the liabilities are independent of the market portfolio and are collateralized (well-funded), liabilities may be discounted using the term structure of nearly riskless interest rates.

Prior to the 1960's, the great majority of pension plans were "insured" by which I mean that life insurance companies took premiums from pension plan sponsors and promised deferred annuities to plan participants. Trowbridge (1952) summarized the actuarial methods that could be used by insurance companies and others to provide sufficient funds to meet the annuity obligations. The applicability of these methods to non-insurance entities allowed plan sponsors to elect to self-insure rather than buy their annuities. Plan sponsors who chose this route established pension trusts to act as repositories for the plan assets and to pay beneficiaries, employed independent actuaries to perform periodic valuations of the plans, and hired money managers to see to the investment of the plan assets. Such plans are called "trusteed" instead of insured.

1.21   Financial View

The trusteed plan has been interpreted by financial economists as a transparent financial subsidiary of the sponsoring corporation (Treynor, as Bagehot, 1972). Consistent with this perspective, Treynor proposed the "augmented balance sheet" as a model of the plan sponsor

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[1]   E.g., ASOP 27, CICA 3461, FAS 87, FRS 17, IAS 19, IRC Section 412(c)3B, Trowbridge & Farr (1976), Chapter 10.

consolidated with its pension subsidiary. Subsequent pension finance research has generally relied on this model.

Sharpe (1976) observes that the establishment, by ERISA[2], of the Pension Benefit Guarantee Corporation (PBGC, the U.S. federal guarantor of qualified DB plans) creates a put option for DB plans which may be exercised (with restrictions)[3] to the advantage of the plan and the corporation when plan liabilities exceed plan assets. This put value may be maximized by minimizing contributions to the plan and by investing in equities.

Black (1980) and Tepper (1981) focus on the differences among tax rules applied to the plan, the corporation and its shareholders. In the hands of taxpayers, returns on debt are more highly taxed than are equity returns. This distinction does not apply to returns on assets held by tax-sheltered pension plans. Tepper and Black conclude that tax benefits are maximized by maximizing tax-deductible contributions and by investing in fixed income.

Harrison and Sharpe (1983) demonstrate that the apparent tension between the PBGC put and the tax theories will lead to corner solutions (all-equity or all-fixed) depending on the pertinent variables in each corporation.

During the period 1985 through 1990, the U.S. Congress passed a number of laws[4] that reduced the importance of the PBGC put option[5] for the vast majority of employers and instituted a confiscatory excise tax on the reversion of excess plan assets (overfunding) upon plan termination. The reversion excise tax may be characterized as a call option held by the federal government against plans that accumulate assets substantially in excess of liabilities. The diminished role of the PBGC put and the existence of the "excise tax call" means that most major defined benefit plans today should be, per Harrison and Sharpe, invested entirely in fixed income.

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[2]   P.L. 93-406, Employee Retirement Income Security Act of 1974. Federal pension law in U.S.

[3]   Ippolito and Boyce (1999) state that the PBGC, from its inception, required coincident sponsor bankruptcy. The Pension Protection Act (contained in P.L. 100-203, the Omnibus Budget Reconciliation Act of 1987) amended ERISA to make this position statutorily clear.

[4]   Including: the Single Employer Pension Plan Amendments Act (SEPPAA, contained in P.L. 99-272, The Consolidated Omnibus Budget Reconciliation Act of 1985), the Tax Reform Act of 1986, the Omnibus Budget Reconciliation Act of 1987 and the Omnibus Budget Reconciliation of 1990.

[5]   By requiring accelerated funding and higher PBGC premiums for poorly funded plans, by removing the 30% net worth cap on employer liability, and by the imposition of excise tax penalties for failure to meet minimum funding standards. Amir & Benartzi (1999) state that the value of the put option has been substantially reduced and is now of second-order nature.

Bulow and Scholes (1983) and Bodie (1991) observe that employees may hold implicit call options on well funded plans. These call options, just like the excise tax, should discourage equity investment by defined benefit plans.

By 1983, transparent financial analysis of defined benefit pension plans had demonstrated that the inclusion of equities among plan assets was costly to shareholders for the majority of U.S., U.K. and Canadian corporate pension plans. Nonetheless, most corporate plans have continued to allocate substantial fractions of their assets to equities.

Friedman (1983) and Bodie et al (1987) conducted empirical studies to assess the degree to which actual pension fund management is integrated with corporate financial management (e.g., the theories identified above) in contrast to a null hypothesis (plan decisions are independent of the corporate financial status of the plan sponsor). They find that corporate financial objectives do influence pension asset-liability management but not necessarily in the fashion theorized.

1.22   Actuarial views

Sponsors who, in the 1950's, insured their pension plans often bought group deferred annuities. The premiums paid each year were deducted from corporate income. Then,[6] even more than now, U.S. insurers invested in high quality fixed income assets, and interest rates were generally stable. Thus costs were inherently smooth from year to year for stable employee populations and insurers managed the process to reduce what little natural volatility there was.

When U.S. sponsors switched to trusteed plans, they treated the money contributed to the trust just as they had earlier treated the premiums paid to the insurance company; they deducted it from operating income each year. Actuaries who advised the plan sponsors employed actuarial cost methods that were designed to emphasize smooth year-to-year progressions of plan contributions. As the percentage of the plan assets invested in equities grew from 17% in 1952 to 55% in 1970[7], actuaries strengthened their smoothing techniques (Dreher, 1960, Jackson and Hamilton, 1968).

The general identity of cash contributions and reported expense remained the norm until the Financial Accounting Standards Board (FASB)[8] adopted Statement of Financial Accounting

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[6]   ACLI Life Insurance Fact Book (1998), Table 6.9.

[7]   Ibid., Table 2.18.

[8]   The U.S. accounting standards setter. In Canada, standards are set by the Canadian Institute of Chartered Accountants (CICA). U.K. standards are set by the Accounting Standards Board (ASB). The

Standards No. 87 (SFAS 87) in December, 1985, and required its application to plan years beginning after December 15, 1986.[9] SFAS 87 broke the tight bond between plan contributions and expense and significantly tightened the rules with respect to the selection of actuarial assumptions. Despite these improvements, SFAS 87 formalized and endorsed a systemic financial bias embedded in all U.S. pension actuarial methods. This bias derives from the *anticipation of expected equity returns* and the *smoothing of equity return volatility*.

1.23   Financial versus Actuarial

In financial terms, SFAS 87 overstates reported earnings because it reduces current expense by the expected return on risky assets in advance of the risk. SFAS 87 also smoothes earnings by amortizing deviations between expected and actual returns over forward periods. In effect, corporate income statements include equity returns delivered, apparently, without risk.

If accounting for pension plans followed the financial economics model, the asset allocation ideas of the pension finance theorists would find a ready audience. With a transparent accounting base, financial writers in the popular media would be able to understand and to explain the issues that would then cause rational investors to discredit equity investment by pension plans.

The overstatement of corporate earnings associated with pension plan equity investments provides an incentive for managers to invest in equities. It is likely, however, that the incentive does not have a direct role; nor are managers necessarily aware of the earnings bias. Rather it is the case that the bias: 1) reinforces managers' beliefs about the benefits of equities for the long run, and 2) defeats (through opacity) the rational objections that would cause capital markets to correct the managers' behavior (and beliefs). Thus it may be said that the bias does not cause the equity investments, rather it enables them. This theory of bias, opacity and enablement explains observed practitioner behavior. It remains true to the idea that corporate and pension financial management are integrated, but removes the tacit assumption of transparency made by earlier financial theorists.

International Accounting Standards Board (IASB) promulgates international standards. Local standards are expected to converge internationally during this decade.

[9]   Canada adopted CICA 3460 effective for 1987, and added CICA 3461 in 2000. The ASB of the U.K. replaced Statement of Standard Accounting Practice 24 (SSAP24) with Financial Reporting Standard 17 (FRS 17) which they promulgated in 2000 to be in effect in 2003. The IASB's predecessor, the International Accounting Standards Committee, introduced International Accounting Standard 19 (IAS 19) in 1999.

Corporate financial managers are highly motivated to report good earnings. The earnings management literature (e.g., Healy and Wahlen, 1999) shows that persistent earnings are valued highly by investors and this is an incentive for managers to use their discretion in pursuit of smoothness. It is evident that SFAS 87 which overstates and smoothes earnings derived from pension plan equity investments will, if not penetrated by analysts, upwardly bias valuations by investors.

2 Opaque Model Encourages Mispricing

2.1 Accounting: pension earnings versus net tangible value

An observation of accounting is that, in theory, the balance sheet and the income statement are redundant since each implies the other (Barth, Beaver and Landsman, 1993). This redundancy implies that analysts should be able to deduce the value of a business by review of either the earnings or the balance sheet. Given the limitations of theory, however, we are not surprised to learn that analysts attempt to value businesses through careful review of both presentations.

For operating companies, this use of both presentations adds to analyst understanding in part because neither is presented in market value terms. For financial entities, the tangible market value (assets less liabilities each at market value) may be arrived at relatively easily. Babbel (1999) explains why franchise and option effects imply that the market value of the enterprise should exceed its tangible value. For the special case where the financial entity is a defined benefit pension plan sponsored by an operating company, the positive franchise and option effects are properly attributed to the parent, while negative option effects, such as the excise tax call, may be hedged to a near-zero value.

Thus, according to financial economists, analysts should give great weight to the disclosed asset and liability values and very little weight to pension expense. Bader (2002) explains that, in a transparent environment, the worth of a corporation is the value of its operating business adjusted to include non-operating financial assets and liabilities such as the net tangible value of the pension plan. In calculating the value of the operating business, the only pertinent pension component would be the expense attributable to newly earned benefits. If corporate managers believed that the analysts would analyze their businesses in this fashion, we would expect them to behave as predicted by pension finance theory. Accordingly, except for that minority of cases

characterized by Harrison and Sharpe (1983), managers would invest entirely in fixed income assets (to maximize the potential tax arbitrage gain for shareholders) and would closely match the duration to the plan liabilities in order to minimize the value of embedded negative options.

All of this suggests strongly that the pension plan subsidiary is not viewed in the above fashion by analysts or else that the managers do not know that the analysts are using tangible market value. The managers must believe that analysts are giving substantial weight to the income effects of the pension plan. Section 6 discusses recent empirical work indicating that analysts do so.

In this paper I call the hypothesized behavior of the analysts the "opaque" view because they seem not to see and appreciate the tangible market value. The term "contagious opacity" may be used to describe the potential behavior of the analyst who says to herself "I see that the appropriate value is the plan surplus (deficit), but my job is to deduce the value that the consensus will assign. I believe that the consensus valuation will be based on pension expense."

2.2 A thought experiment – the "value" of opacity

Suppose we establish a transparent box and place some publicly traded assets into it. We market shares in the box. Not surprisingly, in an efficient setting, these shares sell at the net asset value of the assets in the box. Of course this is an open-end mutual fund and transparent accounting neither adds nor subtracts value from the assets in the box.

Next, suppose that the box is opaque. Periodically the box pays out its audited **total return**. Because the assets inside the box constitute a marketed portfolio, with some assumptions about information efficiency we can conclude that box shares will also sell for their net asset value <u>even though the market cannot see</u> what is in the box. Perfectly accurate and pertinent accounting is a sufficient replacement for transparency.

Next, suppose that the box invests in the S&P 500 index portfolio, can borrow without limits at the risk-free rate[10], and pays out each period the **expected return** on the S&P 500. In order to maintain one unit of S&P exposure, the box borrows (lends) the excess (shortfall) of the paid out expected return relative to the actual return. The unconditional expected net borrowing/lending

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[10]   In order to rule out arbitrage opportunities, structures such as this are excluded from modern asset pricing theory. In other words, extrapolation from this example leads to impossible perpetual money machines.

position of the box is zero for any future date. Because the box is opaque, the market observes only the payout.

Assuming that the S&P expected return is unvarying, the payout is a constant stream. Under these assumptions, the market can be expected to value the ownership of the payout stream as a riskless perpetuity:

Defining:

$r =$ short-term risk-free rate of return

$\overline{q} =$ expected return on equities $> r$

The market value of a unit of S&P in the box is equal to $\overline{q}/\overline{q} = 1$ and the value of the payout stream is $\overline{q}/r > 1$. In effect, opacity combined with unlimited zero-expected-value borrowing adds value.

To apply this experiment to the real world, we have to make a case for analysts who focus on earnings instead of tangible market values and for managers who respond to analysts. The accounting literature (see Section 4) shows that accounting can fool enough of the people some of the time. We must also explain why those analysts who do see through the accounting cannot establish profitable arbitrage strategies (Section 7).

The dissonance between theory and practice calls for an explanation not provided by the transparent financial models. Other than for their transparency, however, the models' arbitrage-based arguments are compelling. Whether lack of transparency is sufficient to explain the divide between theory and practice is an empirical matter (Section 6).

2.3   How pensions compare/contrast with the thought experiment

The purpose of the thought experiment is to highlight the intuition for the more detailed analysis developed in Section 3. The complete opacity attributed to the black box above exaggerates the pension plan case. The audited financial statements (with footnotes) provide the market values of the pension assets and an approximation to the market values of the liabilities deemed to have accrued to date.

Additionally, the rates of liability discount and the expected return on assets are disclosed so that it is possible for investors to make their own adjustments. Amir and Benartzi (1998) find a weak positive connection between the expected return on assets and the actual asset allocation. They indicate that enforcement would make the relationship stronger and result in a fair presentation. Neither they nor the other relevant accounting literature question the systematic bias implied by the use of an expected return that includes an equity risk premium.

The black box does not allow for additions to assets and future payouts. Pension plans typically award new benefits and pay out old benefits each year and often receive new contributions from the plan sponsor. The model below takes account of these matters.

Pension plan demographics affect the real world as well. In our model below we assume that these are perfectly predictable. In this regard, we follow the precedents of the existing pension finance literature. Further in this tradition, we assume that the plan liabilities are bond-like and may be modeled as such.

3 Pension Subsidiary Models

We contrast the financial (transparent) model of defined benefit pension plans and the actuarial (opaque) model. The opaque model, which manufactures instant earnings when plans invest in equities, encourages managers to invest in "equities for the long run." Bodie (1995) argues that such reasoning is fallacious. The transparent model, which makes it clear that shareholder value is increased by fixed income investments, would discourage equity investment by managers.

3.1 Assumptions

The models are based on the following assumptions: i) the plan holds, as assets, a portfolio of marketed securities; ii) plan liabilities are fixed cash flows without demographic uncertainty; and iii) well-funded plans sponsored by solid companies in a regulated environment are not likely to default; thus we may discount their pension promises at rates that are close to risk free.[11]

We analyze strong forms of transparency and opacity, recognizing that reality lies somewhere in the middle. Transparency is taken to imply that the market values of pension plans accurately

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[11] Gold (1989) discusses cases where this assumption is not supportable.

reflect the market values of assets and liabilities. Opacity is defined as the condition under which the market values of pension plans are derived entirely from reported expenses (income).

3.2   Definitions

Viewing a pension plan as a financial subsidiary (annuity company) of an operating company, let:

A_t = plan assets at time t .

L_t = plan liabilities.

E_t = plan surplus (deficit) $= A_t - L_t$

so that E_t is the transparent value of the subsidiary (tangible market value).

For the capital markets, let:

r = the one-period near riskless return.

$\bar{r}$ = the near riskless periodic rate of return on the liabilities over their term (internal rate of return).

$\tilde{r}$ = the one-period stochastic total return on the liabilities.

$\tilde{q}$ = the one-period stochastic rate of return on equity investment.

$\bar{q}$ = the expected rate of return on equity investment.

α = the fraction of assets invested in indexed equities, balance at the short term rate.

$\tilde{e} = \alpha \tilde{q} + (1 - \alpha)r$ = one-period stochastic rate of return on an α – weighted portfolio.

$\bar{e} = \alpha \bar{q} + (1 - \alpha)r$ = expected periodic rate of return on an α – weighted portfolio.

AAV_t = actuarial asset value (market related) which is often a trailing average of market values; a smoothed version of A_t

C_t = cash contribution from the operating company to the plan at end of period.

$B_{i,t}$ = benefit for participant i attributed to service up to time t

$PVDA_{i,t}$ = present value at time t of a deferred annuity on behalf of participant i

$SC_t = \sum_i (B_{i,t} - B_{i,t-1})PVDA_{i,t}$ = service cost = new liability attributable to the period $[t-1, t]$

P_t = pension benefits paid to participants at end of period

AMT_t = the one-period amortization of historic deviations between actual and assumed plan experience designed to drive E_t to zero over time

3.3 Structure

Financial economists follow Treynor's (1972) *augmented balance sheet* which depicts the trusteed pension plan as a transparent financial subsidiary of the corporate sponsor. Thus, shareholders own the assets and owe the liabilities of the pension plan (annuity subsidiary). Equivalently, shareholders own the operating business and own or owe the plan surplus or deficit. This articulates the financial truth that, in an ongoing firm, deficits must be made up by shareholders while surpluses may be used to reduce future contributions. Statutes (e.g., ERISA in the U.S.) hold that the pension trust owns the assets but this does not contradict the limited sense of ownership expressed by the augmented balance sheet.

We look at the relationship between the operating and annuity companies and ask which is responsible for what elements of pension plan operations and costs? As the employees accrue pension benefits, the operating company "buys" the benefits (market value SC_t) from the annuity company which bears the responsibility for payment. Periodically, the operating company pays cash contributions (C_t) to the annuity subsidiary in accordance with statutory funding rules. The value $C_t - SC_t$ constitutes an infusion (drainage if negative) of capital into the annuity company by the operating company.

The U.S., Canadian, U.K. and International Standards all use the projected unit credit (PUC) actuarial approach to attribute the accrual of benefits by individual employees to accounting periods. This means that benefits purchased in the current period are based on salaries expected to be earned in the future. An alternative traditional unit credit (TUC) approach that does not anticipate future salary increases would be more in keeping with the modern finance view of pensions. Because this paper treats the definition of the liabilities as arbitrary (or at least exogenous), the PUC/TUC distinction is moot. The annuity company is understood to be responsible for a given set of liabilities no matter how determined.[12]

3.4 Costs – financial model

Under the financial model, the consolidated marked-to-market cost of the plan is:

$$(L_t + P_t - L_{t-1}) - (A_t + P_t - C_t - A_{t-1}) \tag{1}$$

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[12] For a discussion of the accounting for estimated future salary increases, see Bodie (1990) and Gold (2003).

Note that benefits paid to participants (P_t) are redundant because assets and liabilities are simultaneously and equally reduced. As shown, a portion of the asset change (C_t) is attributable to cash contributions made by the operating company to the annuity company. Similarly, part of the liability change (SC_t) flows the same way. Thus the annuity company portion of the pension cost is:

$$X_t = (L_t + P_t - SC_t - L_{t-1}) - (A_t + P_t - C_t - A_{t-1}) \tag{2}$$

The change in assets not explained by assets contributed and assets paid out must be the investment return on the initial assets:

$$A_t + P_t - C_t - A_{t-1} = \tilde{e}A_{t-1} \tag{3}$$

and similarly for liabilities:

$$L_t + P_t - SC_t - L_{t-1} = \tilde{r}L_{t-1} \tag{4}$$

We restate the annuity company loss (gain), i.e., its share of consolidated plan expense:

$$X_t = \tilde{r}L_{t-1} - \tilde{e}A_{t-1} \tag{5}$$

3.5   Costs — actuarial/accounting model

We want to show how the actuarial/accounting model differs from the financial model with attention paid to: 1) anticipation of returns to risk, and 2) smoothing which obscures the risk. In a sense these are two sides of the same coin and, assuming opacity, either side can appear to add value that does not exist in the transparent financial model. We will present the case wherein the value arises from the anticipation of returns to risk and where smoothing provides the mechanism necessary to facilitate the anticipation.

The value that appears to be induced by the opaque model arises in the context of a market with diversified investors with an equity risk premium attributable to the bearing of systemic (non-diversifiable) risk. This implies that fluctuations (zero-mean) in the expense (income) streams of the financial subsidiary that are orthogonal (zero-beta) to the market portfolio neither create nor

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destroy value ex-ante. Elements in the expense (income) stream that do correlate with the market portfolio need to be discounted on a risk-adjusted basis in order to measure present value.

With this in mind, we will rework the transparent cost equation by piecemeal substitution (identifying where the opaque model seems to add value ex-ante) until we arrive at the opaque model of pension expense that is incorporated in the common accounting standards.

Assuming diversified investors and an equity risk premium strictly attributable to systemic risk implies that the hedged equivalent of all stochastic income variables is $\mathbf{r}$. Thus the ex-ante market value of $\mathbf{X_t}$ is unchanged when we write (5) as: [13]

$$\mathbf{X_t} \mathbin{\hat=} \mathbf{rL_{t-1}} - \mathbf{rA_{t-1}} = -\mathbf{rE_{t-1}} \tag{6}$$

which may be understood to mean that the risk-adjusted expense (income) of the pension subsidiary is identical to the short rate applied to the plan deficit (surplus) regardless of the asset allocation or liability duration as long as the assets and liabilities are defined in complete markets.

We reformulate (5) for the subsidiary expense using <u>expected</u> rather than risk-adjusted return:

$$\mathbf{Y_t} = \mathbf{\bar{r}L_{t-1}} - \mathbf{\overline{e}A_{t-1}} \tag{7}$$

where the new designation, $\mathbf{Y_t}$, indicates an actuarial rather than a financial value. This new expense is the pith of the opaque model. Below, we make some zero-mean zero-beta adjustments. These adjustments obscure the process and allow it to achieve an accounting balance but no financial value is added or subtracted from this point onward.

We note that the changes in the market values of $\mathbf{L_t}$ and $\mathbf{A_t}$ over the period $\mathbf{[t-1,t]}$ are always reconciled by the annuity company transparent expense, $\mathbf{X_t}$, but that this is not the case when the expense is defined by $\mathbf{Y_t}$. These deviations are expected to average out to zero over time but, just to make sure that the accounting trues up over a defendable time frame (e.g., fifteen years), we (acting now as accountants) will identify the differences between the ex-post values of $\mathbf{X_t}$ and $\mathbf{Y_t}$

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[13]   (6) is the hedged equivalent of (5). All members of a hedged equivalence set have the same ex-ante value. For the remainder of this section we adopt the symbol $\hat=$ to indicate this equivalence.

that have accumulated over prior periods. Further, since the annuity company serves only the pension process, the accounting must also drive $\mathbf{E_t}$[14] to zero over time.

The corrections to the forward accounting expense necessary to true up prior deviations and to eliminate the plan deficit (surplus) take the form of amortizations ($\mathbf{AMT_t}$) of these amounts over n subsequent periods.[15] This assures an asymptotic accounting balance at a horizon that is regularly extended.[16] Thus:

$$\mathbf{Y}_t \triangleq \overline{\mathbf{r}}\mathbf{L_{t-1}} + \mathbf{AMT_t} - \overline{\mathbf{e}}\mathbf{A_{t-1}} \qquad (8)$$

where $\mathbf{AMT_t} = 0$ under FRS 17.[17]

This representation produces a time series for $\mathbf{Y_t}$ with reduced volatility in comparison to the $\mathbf{X_t}$ time series and with ultimately equal accounting value.

The unit credit actuarial methodology that underlies the accounting standards had been designed to provide a budgeting process for contribution flows from the operating to the annuity company. Smooth cash flows were a high priority of this design. During the development of SFAS 87, many actuaries argued that (7) was too volatile (e.g., Buck Consultants, 1985). The historical actuarial approach smoothed the asset value (substituting $\mathbf{AAV_{t-1}}$ for $\mathbf{A_{t-1}}$) before applying a rate of return. Thus the formula was adjusted to smooth it further:[18]

$$\mathbf{Y}_t \triangleq \overline{\mathbf{r}}\mathbf{L_{P,t-1}} + \mathbf{AMT_t} - \overline{\mathbf{e}}\mathbf{AAV_{t-1}} \qquad (9)$$

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[14]   Adjusted for balance sheet accruals.

[15]   n is a number defined as a weighted average of values each of which is usually in the range of [5,15] years. The average amortization period depends on the plan's historical path.

[16]   The value of n is adjusted each year to reflect emerging deviations. Thus, for an ongoing plan, n does not systematically shrink and the smoothing process is perpetuated. Upon plan termination, n disappears so that all the accumulated deviations are accounted for at once.

[17]   Under FRS 17, $\mathbf{X_t} - \mathbf{Y_t}$ is immediately recognized in the Statement of Total Recognized Gains and Losses (STRGL). Thus $\mathbf{X_t}$ enters the balance sheet but only $\mathbf{Y_t}$ appears in the income statement.

[18]   Similarly under CICA 3461, but FRS 17 and IAS 19 require $\mathbf{A_{t-1}}$.

The differences between AAV_{t-1} and $A_{P,t-1}$ are also accumulated and their amortization becomes part of AMT_t.[19] Finally, we bring SC_t back into the equation to reflect operating/annuity company consolidation:

$$rL_{P,t-1} + SC_t + AMT_t - \overline{e}AAV_{t-1} \qquad (10)$$

which is the reported expense under the various standards.

3.6   Costs – actuarial/accounting bias

We now consider the difference between Y_t and X_t to see whether these may be described as zero-mean zero-beta and thus without financial bias. The difference is:

$$\Delta = Y_t - X_t = (\overline{r} - r)L_{t-1} - (\overline{e} - r)A_{t-1} \qquad (11)$$

Since none of the terms are stochastic in their relation to the market portfolio in the period $[t-1, t]$, the difference may be described as zero-beta. But the difference is not zero-mean. The accounting equation overstates the financial value of the expense to the extent that $(\overline{r} - r)L_t > 0$ and understates to the extent that $(\overline{e} - r)A_t > 0$. The overstatement represents the difference that one usually expects to find between the internal rate of return on a liability-matching portfolio of bonds and the short rate. For the most part this overcharge is an accounting artifact that cannot be directly altered by the plan sponsor – because the rate r is given by the market and the use of the rate $\overline{r}$ is defined in the accounting standards. It can, however, be neutralized on the asset side of the equation by adding liability-matching bonds to the assets of the plan while borrowing their cost (various ways of implementing this hedge are discussed by Gold and Peskin, 1988).

The understatement of the plan expense equal to $(\overline{e} - r)A_t$ is generally under the direct control of the plan sponsor in two ways: first, by using accounting discretion with respect to selecting $\overline{e}$ as discussed by Amir and Benartzi (1998); second by choosing the equity exposure percentage α.

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[19]   Additionally, under SFAS 87, IAS 19 and CICA 3461, a corridor equal to 10% of the larger of AAV_{t-1} and L_{t-1} is defined such that $AMT_{t-1} \equiv 0$ unless the absolute value of the accumulated deviations is greater than the corridor amount. The purpose of the corridor is further to smooth expense by allowing relatively small amortizations of opposite sign to cancel out before recognition.

The first represents a misapplication or lax enforcement of the accounting standards. The second is more significant because it represents a conceptual error in the financial framework that underlies the standards.

The accounting community has been moving towards a "fair value" approach that is likely, in the long run, to undo the standards bias. The FASB issued Statement of Accounting Concepts 7 in February 2000 showing how fair value may be employed to shift the accounting paradigm from valuation by history to valuation by arbitrage. Section 4 expands on these developments.

3.7   Value of the cost bias

After hedging the overstatement of the expense due to liabilities[20], the understated expense remains:

$$(\overline{e} - r)A_{t-1} = \alpha(\overline{q} - r)A_{t-1}$$

In perpetuity, the value of this bias equals:

$$\alpha(\frac{\overline{q} - r}{r})A_{t-1} = \alpha(\frac{\overline{q}}{r} - 1)A_{t-1}$$

The partial derivatives with respect to α of the annual and perpetuity values are, respectively:

$$(\overline{q} - r)A_{t-1}$$

$$(\frac{\overline{q}}{r} - 1)A_{t-1}$$

If, for example, we take $\overline{q} = 8\%, r = 3\%$, then a \$1 shift of pension plan assets from cash to equity results in an earnings bias with a potential (fully opaque) perpetuity value of \$1.67 (pre-tax). After corporate tax at an assumed 35% rate, market capitalization may be increased by \$1.08 for each dollar shifted. Alternatively, if we assume an after-tax price/earnings ratio of 20:1, market capitalization is inflated by \$.65 **[\$1(8% − 3%)20(1 − 35%)]** for each \$1 shifted.

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[20]   The liability hedge corrects the accounting bias, adds to earnings and reduces plan asset-liability risk. A corresponding asset hedge would eliminate equity investment and end the conflict between theory and practice that is the heart of this paper.

4 Supporting Considerations

In this section I briefly outline a transparent accounting method. We then review some of the explanations that practitioners offer for their investments in equities. We argue that these explanations are not sufficiently rebuked under opaque accounting but that we may reasonably believe that managers would alter their behavior if transparent accounting were the norm.

We then look at the earnings management literature and learn that earnings are value-relevant for investors, that investors are often misled by managers who use accounting discretion to smooth and otherwise dress up earnings, and that accounting research is silent on the systemic bias in pension accounting.

Lastly we look the recent activity of accounting standards setters and see progress towards the application of fair value (transparent) accounting to financial instruments. If adopted, and applied to defined benefit pension plans, we might well expect the financial press to follow the arguments of pension finance theory. This in turn would lead to persuasive arguments against pension plan equity investments that could inform analysts, investors, financial planners and consultants.

4.1 Transparent accounting

Transparent accounting for a pension plan would follow the approach shown in equation (1). The service cost, which is the fair value of benefits attributed to the current accounting period, would be reported on the operating company's books as an employee compensation expense. Because, in a traditional defined benefit plan, it is a long duration discount variable, it will be volatile with respect to interest rate changes. It will generally amount to a single-digit percentage of compensation and in the face of significant changes in long-term interest rates it might go up or down by as much as two percent of compensation from year to year. If the corporation sponsored a cash balance plan and if the benefit attributed to the period for any employee equaled that year's compensation credit – i.e., if a TUC approach to pension liabilities were employed, an approach particularly appropriate in the cash balance case – there would be no interest rate sensitivity.

Equation (5) represents the change in tangible market value for the pension subsidiary or annuity company. Except when the probability of bankruptcy or asset reversion is not trivial, the market value of the company should, after accounting for deferred taxes, reflect this change without a price-earnings multiplier. In order to facilitate this valuation, the market value of assets and

liabilities should be presented in a pension balance sheet. The change in the tangible market value (annuity company net income) should not be reported as "operating" profit and loss, but should flow into shareholders' equity as suggested by Knutson (1999) and as prescribed in FRS 17.

Presented with pension plan information in this fashion, analysts and investors would likely reach many of the same conclusions as do the financial researchers discussed in Section 1.

4.2   Practictioners' tales

The opacity theory offered in this paper is a theory of enablement not of causation. What this means is that, absent opacity, the transparent financial theories would in all likelihood prevail over the common practices of the day. In this subsection we sketch the rationales that have been commonly offered by corporate financial officers with pension plan responsibilities as well as by the actuaries and consultants who advise them.

What do pension plan managers tell themselves and their associates and constituents they are doing? Many would explain that they are maximizing long-term expected returns while tolerating acceptable levels of risk. When they invoke the long-term nature of the process, they are really making several possible arguments:

- *In the long run equities are not as risky as they appear to be in the short run.* This view is a proxy for a strong mean-reverting model or a shortfall model or for similar ideas that inhabit the actuarial (and popular) psyche.[21] This view ignores arbitrage based arguments and generally supports perpetual money machines that may usually be reduced to "borrow and invest in equities". The common actuarial version holds that liabilities financed by equity assets cost less than those where the pension assets are invested in debt.

- *Even though equities are risky in the short run, the actuarial process is self-correcting and does not get far off course when market setbacks occur. The short-term effects on plan assets are troubling but the impact is deferred and we usually catch up sooner or later.* This is a combination of the long-term argument above and a reliance on the enabling actuarial technology. This combination can be no stronger than the long-term argument alone. The

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[21]   Burrows (1999) says: "Any market downswing experienced in one generation will be offset by an upswing in later generations." Mr. Burrows has headed the Actuarial Standards Board and its project that led to Actuarial Standard of Practice 27 (ASOP 27). ASOP 27 continues and formalizes the decades old actuarial practice of using the expected rate of return on plan assets to discount liabilities.

"pension crisis" (Fabozzi and Ryan, 2003), also described as "the perfect storm" (AAA, 2003), challenges the robustness of the actuarial process in the face of prolonged economic recession.

- *Our real risk is underperforming our competitors and facing higher effective labor costs because we have not earned the equity premium. We can better tolerate the equity risk than we can the competitive risk.* If this were true and the enabling camouflage were not in place, then it could easily be countered by the Black argument: if your shareholders cannot figure out how to adjust your exposure to the equity market versus that of your competitors (i.e., they do not follow Tepper), then take the equity risk on your taxable balance sheet. In this instance it should be clear that such an exposure will not be camouflaged.

- *We take our fiduciary responsibility seriously. We understand that the pension scheme serves many stakeholders and prudent application of portfolio selection theory tells us to diversify across asset classes as well as across individual securities.* This scheme-centric view misrepresents the interests of plan participants and shareholders and misinterprets fiduciary responsibility in most venues. It is clear that a liability-matching bond portfolio meets fiduciary responsibilities.

- *We do stochastic studies of our assets and liabilities* (McGill et al, 1996 ,page 574)*. These studies show us how assets, liabilities, expenses and various other measurement and control variables are likely to evolve over various time periods from five to thirty years. When we look at the results it is clear that equity exposure in the long run presents virtually no risk and that over shorter periods, we can live with the risks associated with our level of equity investment.* As earlier, this is a combination of the long-term argument and a reliance on the enabling actuarial technology. It ignores the persistence (and growth over time) of risk articulated by Bodie (1995).

- *Our pension plan is a profit center. We raise capital by promising benefits that an insurance company could provide. By running our own insurance company and investing in equities, we profit.* In a world where the annuity market is competitive, shareholders of an operating business earn no special rewards for adding an annuity business to the product mix. The inclusion of equity merely adds a valueless swap to the mix (Bader, 2001).

4.3 Transparency rebuts practicioners

Consider the senior manager who asks the company's auditors and actuaries what would happen to reported earnings if the plan were to reduce its policy[22] exposure to equities. In accordance with existing standards, the manager would be told that the immediate effect would be a decrease in current earnings followed by lower expected earnings thereafter. When investor and analyst reactions to earnings are factored in, most managers are likely to continue the long term equity position of the plan even if they elect to reduce it tactically.

Next tell the senior manager that, although equity returns are generally higher than those on fixed income, some of the rewards are likely to be shared by employees or tax-collectors. But the reported earnings will continue to be higher with equities and only very good equity returns will result in sharing with these other parties. The manager is still likely to conclude that this is a good arrangement.

Now explain the Tepper[23] arbitrage argument to the manager. With lower equity exposure in the pension plan, taxable shareholders will be able to hold more equity in their personal portfolios and this is more tax-effective for them. The perceptive manager may ask whether the shareholder will be able to earn higher after-tax returns on a portfolio with identical volatility, because if that is true it seems to be a pretty good idea. Under today's accounting rules, however, the probable answer to that question is "no" because the volatility of the pension portfolio is being smoothed and the company stock is not trading as it would under the transparency assumption.

Now reconsider all three of the previous paragraphs in a world where the accounting procedure is transparent. The pension plan expense is based entirely on the new benefits accumulated by employees during the accounting period and the company maintains a tax-sheltered mutual fund whose asset and liability values are reported independently at market. Now the worldwide financial press writes articles analyzing the company and the pension plan separately; press analysts write articles explaining that investors should consider tax effects and volatility.

With such clean accounting, the articles would be easily written and understood. Now the senior manager will be told that earnings subject to a price-earnings multiple will not be affected when

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[22] The expected long-term return on assets under SFAS 87 depends on the policy asset allocation which is determined infrequently. Interim (non-policy) allocations may vary due to market forces and tactical decisions.

[23] Unlike the Black version which has structural impediments and requires capitalization changes by the corporation, the Tepper arbitrage depends only on shareholder perception and revaluation.

the equity exposure is changed. The manager, a shareholder as well, will understand that the pension plan is just one of the mutual funds s/he owns and that it is special because it is tax-favored. Additionally, explain the employee call (for benefit improvements) and the excise tax call and how their effects are accentuated by equity exposure and the manager should shortly conclude that equities are a poor pension investment choice.

4.4   Accounting literature

Formal accounting literature is silent with respect to the bias discussed herein. The literature is not silent with respect to pension plans, nor with respect to accounting, nor with respect to bias.[24] One article (Craig, 1999) aptly observes that "Noise tends to cancel out, bias does not." But he then tells us that "Noise is a statistical term referring to effects of random errors, which have a cumulative expected value of zero. Bias does not have an expected value of zero … " This view is representative of the accounting literature in general. The earnings management literature diligently pursues evidence of accruals that are intentionally away from the mean.

Let us be clear as to exactly what the nature of my bias claim is. I contend that the substitution of $\overline{\mathbf{e}}$ for $\widetilde{\mathbf{e}}$ is financially biased. The earnings management literature is presumptive with respect to the view that the deliberate misestimate of $\overline{\mathbf{e}}$ is biased (e.g., Amir and Benartzi, 1998) but that a correct estimate of $\overline{\mathbf{e}}$ precludes bias.

Accounting rules credit $\overline{\mathbf{e}}$ as the expected return on assets in each accounting period and, except for FRS 17, defer (for amortization, i.e., forward averaging) the difference:

$$\widetilde{\mathbf{e}} - \overline{\mathbf{e}}$$

If this difference were orthogonal to the market portfolio, we could invoke the Law of Large Numbers and agree that, on average, its value is indistinguishable from zero. But, from a finance perspective, we know that this is not the case. Actuarial and accounting theory, to date, appear to be insensitive to the difference. The entire pension accounting literature appears to take the

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[24]   A search of ABI/Inform reveals 19435 articles with "pension" in the title or abstract, 43494 with the word "accounting" and 1077 with both. There are 5041 articles with "bias" in the title or abstract. There are 0 articles at the intersection of these terms. There are 49 with "pension" and "bias" but they refer to biases in the awarding of pensions not in the accounting. There are 206 with accounting and bias but these are focused primarily on earnings management.

actuarial view to the effect that there is not an economically important difference between the long-term average and the path that gets one there.

In an article written for actuaries interested in investment, Wendt (1999) explains an article by Bodie (1995) on the persistence of equity risk. Wendt shows that actuarial principles break down when the Law of Large Numbers is inapplicable or misapplied. No amount of forward averaging, and only excessively strong assumptions of mean-reversion, can remove the financial bias that derives from the use of actuarial principles that average equity performance over time. Bodie and Wendt each use the price of insuring against equity underperformance as the arena to demonstrate the inappropriateness of trying to wring more than is possible from time diversification. The financial economics literature in this regard is traced by Bodie to Samuelson's (1963) simple but subtle paper.

How does this defense of the validity of the financial bias inherent in accounting standards support my claim with respect to the behavior of the equity analyst? In one sense the implications are clear. <u>If the accounting and actuarial literature have missed the bias, why should we expect the analysts to unearth it?</u>

Interestingly, this is too facile a leap. In fact, some analysts have an appreciation for the difficulty that is not directly reflected in the earnings management literature. Stone, Joy and Thomas (1995) report a survey of Chartered Financial Analysts (CFA) who strongly support an accounting that is very close to what I have herein described as transparent. 21% of 350 random CFA designated analysts responded to the survey. A majority of the respondents favored an accounting system that would place the ABO and the fair value of plan assets on the balance sheet and for an income equation that is much the equivalent of our equation (1). By 2002 (McConnell and Palacky), representing the prevailing view of the Association for Investment Management and Research (the AIMR, which awards the CFA designation to financial analysts), wrote to Sir David Tweedie (head of the IASB) to recommend pension accounting based on market values with no smoothing and immediate recognition of gains, losses and newly award benefits (past service as well as current) separately itemizing components of periodic and non-periodic costs. In short they asked that IAS 19 be immediately improved to the FRS 17 level.

2003 has seen analysts specializing in corporate accounting at major brokerage houses offer their readers insights into the limitations of the opaque model, often adding their transparent interpretation of the reported figures. The most recent offering (Cooper, Bianco, 2003), based in

part on the earlier draft of this paper, go on to suggest that DB plans should (and, when the transparent accounting becomes more widely available, will) reallocate assets from equities to debt in order to increase shareholder value.

So, if the analysts are keen on this issue, is the opacity claim without merit? That too might be too facile a leap. As pointed out by Exley (2002), as much as FRS 17 improves on IAS 19, FAS 87 and CICA 3461, it falls short in two ways: i) FRS 17 pension expense recognizes the expected return on risky assets and ii) it uses PUC instead TUC thus anticipating pay increases in the pension liability even though future pay increases are never included in accounting liabilities.

4.5 Earnings-management literature shows investors act on reported earnings

The earnings management literature makes it clear that accounting earnings are an important part of the valuation performed by financial analysts and investors. In the language of the literature, earnings are "value-relevant." The literature also indicates that corporate managers believe that they can use accounting discretion to mislead their audiences over the short run.

We are not interested in earnings management per se since it may be defined (Healy and Wahlen, 1999) as manager use of "judgment in financial reporting and in structuring transactions to alter financial reports to either mislead …" We are interested to learn that such efforts succeed, or that managers believe them to succeed, because investors place great emphasis on reported earnings. The authors note that "investors appear to view earnings as more informative than cash flow data."

Other researchers echo this last point often noting, however, that large abnormal accruals (accruals are defined as the algebraic excess of net income over cash flows) are often followed by inferior subsequent results and that negative abnormal accruals predict future positive results. This suggests investors follow earnings and are surprised when successful earnings management (over- or under-accrual) leads to reversals.

For our purposes we take two lessons from the earnings management literature. First, that investors and analysts make valuations that are highly dependent on reported earnings and, second, they are frequently unable to penetrate to the underlying economic realities.

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We also note that the literature that addresses pension accounting makes no observations with respect to the systematic bias issue that we have raised here. This might indicate that all of the researchers are so aware of the bias implications of the smoothing process that they see no need to opine upon it. But Amir and Benartzi (1998) address the relationship between equity allocation and the expected long-term return on assets (i.e., α and $\overline{e} - r = \alpha(\overline{q} - r)$) without asking whether the use of any risk premium is appropriate. From the perspective of their paper, the issue is the difference between $\overline{e} - r$ and $\alpha(\overline{q} - r)$ rather than the systemic difference between $\overline{e}$ and r or the financially equivalent difference between $\overline{e}$ and $\widetilde{e}$.

Barth, Beaver, Hand and Landsman (1999) and Barth, Cram and Nelson (1999) find that earnings (cash flow from operations plus accruals) is a better indicator of future earnings, cash flows and dividends than are cash flows alone. In other words accruals are value-relevant. But the sign of the coefficients on accruals are found to be negative while the signs on cash flows are consistently positive.

Chambers (1999) asks:

> "… whether investors misallocate invested capital away from firms that practice income-decreasing opportunistic earnings management and towards firms that practice income-increasing earnings management.

> "Accounting earnings are an important source of value-relevant information useful to investors' decisions about the composition of their investment portfolios."

Chambers concludes:

> "Using a broad sample of NYSE, ASE and NASDAQ firms, I find significant positive abnormal returns from a hedge portfolio formed using an earnings-management trading rule. … I demonstrate that these abnormal trading returns are most likely not the result of uncontrolled differential risk, but rather caused by market mis-pricing."

4.6 The standard setting process – moving slowly towards transparency

SFAS 87 was developed during the 1980's out of the Projected Unit Credit (PUC) Actuarial Cost Method (ACM), one of several ACM's used by actuaries. Each of the ACM's had been designed to control a cash contribution budgeting process with almost no concern for accounting

implications. The powerful smoothing techniques embedded in the ACM's made them natural favorites among statement preparers for use in accounting as well.

CICA 3640 was developed contemporaneously with SFAS 87 and differs primarily in nomenclature. CICA 3461 is an update. IAS 19 adopted in 1998 and effective in 1999 is very similar to SFAS 87 and CICA 3461. FSR 17, originally expected to become fully effective after June 22, 2003, has been deferred to 2005.

SFAS 87 contains discussions about the process leading up to its adoption. Paragraph 116 tells of the debate with respect to the location (basic financial statements or footnotes) of the pension information. This amounts to a distinction between recognition and disclosure. The Board concluded:

> "116. … Further, although the "equal usefulness" argument may be valid for some sophisticated users, the Board does not believe it holds for all or even most other users. Finally, if the argument were valid, the consequences of recognition would not be different from those of not recognizing but disclosing the same information; **it is obvious from their arguments that many who assert that disclosure would be equally useful believe that recognition would have different consequences."** [emphasis added]

Note that, even after this observation, pension expense is recognized under SFAS 87 but pension assets and liabilities are merely disclosed in the footnotes.[25]

The lesson that we may take from this is that the presentation of information can be as or more important than its content. The fashion of today is to value companies more by multiples of earnings than by pension assets and liabilities that do not even make it out of the footnote and onto the balance sheet. Is it not reasonable to conclude that managers believe that their investors will be pleased by large equity exposure (α) and high expected returns ($\bar{e}$)?

In paragraphs 120 and 121, we learn that the Board acquiesced to understatement of the volatility inherent in the transparent accounting model:

> "120. The Board understands that measuring investments at fair value could introduce volatility into the financial statements as a result of short-term changes in fair values.[26] Some respondents described that volatility as meaningless or

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[25] When the plan assets fall below the ABO (the TUC-based Accumulated Benefit Obligation), the difference is promoted to the liability side of the corporate balance sheet.

[26] This is consistent with the observation that accounting rules applicable to an operating company are at odds with a transparent view of a financial subsidiary.

even misleading, particularly in view of the long-run nature of the pension commitment and the fact that pension investments are often held for long periods, thus providing opportunity for some gains or losses to reverse.[27] …

"121. The Board concluded that the difference between the actual return on assets and the expected return on assets[28] could be recognized in net periodic pension cost on a delayed basis. … That conclusion was based on (a) the probability that at least some gains would be offset by subsequent losses and vice versa and (b) respondents' arguments that immediate recognition would produce **unacceptable volatility** and would be inconsistent with the present accounting model." [emphasis added]

Note the phrase "the present accounting model." This is the model based on historic cost. An international effort is underway to supplant this accounting concept with the "fair value" concept discussed below.

Volatility and delayed recognition of gains and losses are further discussed beginning at paragraph 173. In paragraph 178, we learn that:

"178. The Exposure Draft [preceding the final version of SFAS] would have required use of the discount rate and the fair value of assets [i.e., $\bar{r}A_{t-1}$ instead of $\bar{e}AAV_{t-1}$] as the basis for calculating the return-on-assets component of net periodic pension cost. Many respondents argued that the return-on-assets component so determined would create unacceptable volatility even if gains and losses were never amortized. The Board considered several approaches that would have further reduced volatility and concluded that the approach required by this Statement represents the best pragmatic solution."

Note that the basis in the Exposure Draft is very close to unbiased. The net bias after considering both assets and liabilities is $(\bar{r} - r)E_{t-1}$ which is very small in comparison to the bias in the final Statement.

Note the resistance expressed to acknowledgement of the volatility inherent in equity investments. It is clear that many of respondents (most of whom were likely to be aligned with the preparers rather than the users of financial statements) perceived equity as a favored long-term investment (ignoring all arbitrage based indifference arguments) and volatility as an enemy. By prevailing, the respondents immunized themselves and their constituents against the theories of the financial economists.

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[27]   This argument is similar to that made by Burrows (1999) and at odds with Samuelson (1963).

[28] $\tilde{e} - \bar{e}$

Next we consider FASB's contribution to the worldwide effort to implement fair value. In February 2000, FASB issued *Statement of Financial Accounting Concepts (SFAC) 7 – Using Cash Flow Information and Present Value in Accounting Measurements.* On December 14, 1999, FASB issued *Preliminary Views on Major Issues Related to Reporting Financial Instruments and Certain Related Assets and Liabilities at Fair Value.* Preliminary Views are a precursor to an Exposure Draft which in turn precedes an SFAS.

SFAC 7 tells us that fair value is the objective for measuring the present value of future cash flows. Fair value is the market value where available and a reasoned estimate thereof when it is not. Paragraph 25 directly rebuts the approach adopted by U.S. actuaries in ASOP 27:

> "25. While the expectations of an entity's management are often useful and informative, the marketplace is the final arbiter of asset and liability values. Fair value represents a price and, as such, provides an unambiguous objective for the development of the cash flows and interest rates used in present value measurement. In contrast, the alternative measurements all accept an element of arbitrariness in the selection of an interest rate. For example, **some might argue that an asset-earning rate is appropriate for cost-accumulation measurement of liabilities.**
>
> "… an entity must pay the market's price when it acquires an asset or settles a liability in a current transaction, regardless of its intentions or expectations. For measurements at initial recognition or fresh-start measurements, fair value provides the most complete and representationally faithful measurement of the economic characteristics of an asset or a liability." [emphasis added].

But SFAC 7 does not tell us where and when fair value measurement is required. Paragraph 13:

> "13. The Board also decided that this Statement will not specify when fresh-start measurements are appropriate. Accountants frequently face situations in which a change in an asset or liability can be recognized by either a fresh-start measurement or an adjustment to the existing amortization convention. The events and circumstances that prompt a fresh-start measurement vary from one situation to the next, and information about estimated future cash flows is sometimes part of the remeasurement determination. The Board expects to decide whether a particular situation requires a fresh-start measurement or some other accounting response on a project-by-project basis."

The Preliminary Views are a specific application of SFAC 7 to a class of assets and liabilities that either are or bear a close relationship to financial instruments. If the Preliminary Views were to be adopted, assets and liabilities that have financial instrument properties would be carried at fair value. A fresh-start value would be measured with each financial statement and would not bear an

amortizable relationship to any previous instances of the item in question. Additionally, the changes in fair value from one period to the next would be reported immediately in net income (paragraph 8c).

Because most assets and liabilities already enter the books of account at fair value when their recognition stems from a transaction, the challenging issue for the FASB is the fresh-start remeasurement for financial instruments. Interestingly, the pension and other post-retirement benefits are already subject to annual remeasurement. But, according to paragraphs 37 and 41 of the Preliminary Views, they will be excepted:

> "37. Certain financial instruments are excluded from the scope of this Preliminary Views, including: …
>
> "e. Employers' and plans' obligations for pension benefits …
>
> "41. Employers' and plans' obligations for pension benefits … are excluded for practical reasons. Some of these obligations can be especially complex, and accounting literature already requires periodic remeasurement of those obligations (albeit not at fair value)."

Since February 2000, the movement in the fair value direction has been diffused into various other projects and FASB has not followed up on the Preliminary Views that would tell us how to apply fair value to financial instruments. Fair value for financial instruments is also on the agenda of the IASB. Both of the organizations are balancing this accounting paradigm shift against their, possibly more pressing, need to converge financial reporting standards around the world.

During 2003, the FASB has paid some attention to disclosure required in financial statements in regard to pensions and other employee benefits. The have reinstated the disclosure of the TUC liability (the Accumulated Benefit Obligation or ABO). The Board has also directed that TUC be used instead of the PUC model to determine the cost of certain cash balance plans.

5   Counterarguments

The opaque model argues that managers enjoy expected equity returns without the attendant risk because investors and analysts do not see through the reported earnings. In this section we review three challenges to this assertion: 1) managers do not take full advantage of the opportunity to front load equity returns, 2) analysts have the means to see through the accounting, and 3) the accounting does not entirely obscure equity risk.

5.1 SFAS 87 expected returns on assets do not fully adjust for equity premia

Amir and Benartzi (1998) find that the relationship between equity allocation and expected return on plan assets is weak. They analyze the extreme deciles and deduce that the implied equity risk premium is only 67 bp. In other words, the slope of $\overline{e}$ as a function of α is only .67% despite typical empirical estimates of $(\overline{q} - r)$ in the range of 5% to 6%. This finding indicates that the earnings advantage that derives from using the expected return on equities is not being taken immediately. Managers who invest in equity and conservatively estimate $\overline{e}$ expect **AMT** to have a negative (favorable) rather than zero mean. Amir and Benartzi also report that the expected return was not frequently updated from 1988 through 1994.

To the extent that hypothesized managerial behavior depends exactly on the reported year-to-year earnings, these empirical results represent a challenge. But much of the story depends on the smoothing opportunities and much depends on longer term expected pension plan costs. Pension fund managers are fond of saying that they are long-term investors who hold equity because it substantially reduces the costs of their employee benefit plans over time. They invest confidently and substantially in equity knowing that short term fluctuations will be smoothed away by the actuarial/accounting process and that, if equity returns are indeed superior, the pension costs over the next several years will be reduced and corporate earnings will rise.

Thus managers look to the actual returns on equities over time (some positive part of which drips through the amortization process when the expected return is consciously conservative) as beneficial while they ignore the financial risks from which they are generally shielded. To some degree, the understatement of expected return premia noted by Amir and Benartzi is a mechanism for acknowledging that personal risk tolerance is not symmetric. By upwardly biasing the amortization of lagging returns, managers mitigate their risk associated with falling markets as distinct from the shareholders' risk associated with equity volatility. It appears that managers did avoid the early impact of the 2000-2003 equity bear market but, in 2003, critical commentary has increased in frequency and intensity (e.g., Fabozzi and Ryan, 2003).

5.2 SFAS 87 disclosures are sufficient to approximate transparent expense

The values of A_t and L_t are available in the financial footnotes and these are sufficient to allow analysts to make close approximations to the transparent accounting. Although these and other data useful for analyst decomposition of the pension subsidiary were not readily available prior to the adoption of SFAS 87, their subsequent availability has not led to changes in asset allocation consistent with the transparent financial pension theories.

The issue remains the inconsistency between the reported expense and the available market values. Until this is resolved (by transparent accounting), the theories of pension finance will not be allowed to inform the marketplace.

6   Empirical Implications

The empirical question of interest raised by the arguments presented herein is not "are pension plan asset allocations consistent with financial theory?" We know the answer to that is "no." The empirical question to be asked is "do investors use the transparent model or do they respond to earnings presentations?" A related, but not identical, question is "do managers behave as though they believe that investors follow reported earnings?" While we may not directly address the second question, empirical tests can answer the first question and we may infer that, if investors do respond to earnings, managers will believe that they do. If investors see through to the transparent result, managers would be well-advised to learn this and exit the equity mutual fund business.

Further, if shareholders' views are transparent, managers should support changes to the accounting rules that will reinforce transparency and permit shareholders to understand manager strategies that take advantage of tax rules and embedded options. If, instead, shareholders follow a translucent model, managers may benefit from continued equity investment and resistance to accounting change.

An earlier version of this paper (Gold, 2000) has been tested empirically by Coronado and Sharpe (2003):

> "This study assesses the extent to which equity investors were fooled by pension accounting. First, we test whether stock prices reflected the fair market value of

sponsoring firms' net pension assets reported in footnotes to the 10-K or, instead, some capitalization rate on the pension cost accruals embedded in the income statement. The results strongly favor the latter view. Additional tests indicate that the market does not value a firm's 'pension earnings' differently from its 'core earnings', suggesting that pension earnings are often overvalued."

7   Persistent Mispricing

How can this mispricing have persisted until now?

If the "true" value of the pension subsidiary, consistent with the transparent model, equals its after-tax assets less liabilities, then any other market value indicates mispricing. This mispricing arises from a consensus based on reported earnings. The consensus says that a portfolio of publicly traded equities in a pension plan is worth more than the same portfolio held elsewhere (even after accounting for taxes). Such a consensus mispricing should present an arbitrage opportunity for the investor who knows the "true" value. A few knowledgeable investors should profit and their actions should eliminate the arbitrage opportunity. Thus the mispricing should not persist.

We suppose that the mispricing exists and we propose to profit from the arbitrage opportunity. We recall that the opportunity comes primarily from the difference between $\overline{\mathbf{e}}\mathbf{AAV}$ and $\mathbf{rA}$. In order to profit, we need to establish an arbitrage portfolio which:

- Is neutral with respect to valuation factors other than pension plan assets, i.e., $\mathbf{w'F} = \overline{\mathbf{0}}$ where $\mathbf{w}$ is a vector of portfolio weights and $\mathbf{F}$ is a factor matrix including all valuation factors other than pension plan assets.

- Is neutral with respect to plan assets, i.e., $\mathbf{w'A} = \overline{\mathbf{0}}$, where $\mathbf{A}$ is a matrix of plan assets by type and by firm.

- Minimizes the value of $\mathbf{w'V}$ where $\mathbf{V}$ is a firm by firm vector equal to $\mathbf{rA} - \overline{\mathbf{e}}\mathbf{AAV}$. Note that we are minimizing a negative value.

Now we wait until the "true" value prevails in the market. One way in which the values must true up is plan termination. Upon termination, $\mathbf{rA} - \overline{\mathbf{e}}\mathbf{AAV}$ increases to a value of zero. For firms that we are long, this will cause us a loss; for firms we are short, this will profit us. Because we have

minimized $\mathbf{w'V}$, we stand to gain more than we lose. But only when all the plans terminate and $\mathbf{w'V}$ increases to a zero value can we be assured of our arbitrage profit.

We might profit upon a change in regime. If and when the FASB adopts a transparent pension accounting model, $\mathbf{rA} - \overline{\mathbf{e}}\mathbf{AAV}$ will effectively rise to a zero value for all firms at the same time. While this might happen fairly soon and while it may represent a genuine opportunity to profit from the existing bias, it does not answer the question that opened this section.

As long as the present regime prevails, we would-be-arbitrageurs may face an endless and expensive wait. Consider what happens if the accounting system remains unchanged while the size of pension portfolios increases relative to the size of the plan sponsors. We can expect that $\mathbf{A}$ and $\mathbf{AAV}$ will increase and $\mathbf{rA} - \overline{\mathbf{e}}\mathbf{AAV}$ will become more negative and we will be losers. Our hoped-for future gains will then be larger but we may be unable to sustain our portfolio. This is comparable to the value investor who buys undervalued stocks only to discover that they can become more undervalued before they recover. The stocks may recover, but the investor may not. It is also similar to shorting a rational bubble. The hoped-for-gains when the bubble bursts may grow while the short investor goes bankrupt.

The rational bubble analogy is quite apt. The one-period expected return to a buyer during a bubble equals the cash flow received plus the end of period investment value. If the bubble persists, the buyer is rewarded in accordance with his expectations. An investor who shorts will lose what the buyer gains and unless the date of the bubble bursting is known in advance, the losses can overwhelm any investor with finite capital.

In the pension case, as in the rational bubble, the would-be-arbitrageur cannot force the correction to occur on a schedule that assures the success of the arbitrage.

An informative contrast may be struck between the potentially endless mispricing that derives from accounting that is systemically biased and the temporary mispricing that may be generated by deliberate earnings management. Chambers (1999) builds portfolios based on earnings management and generates abnormal risk-adjusted gains. This occurs because accounting is a self-correcting process and the deliberate misrepresentation of one period is generally corrected over a short forward period.

But, one might ask, is not the pension accounting also self-correcting? Does not the amortization of gains and losses provide the necessary self-correction? Interestingly, it does not. What the

amortization does is to true up the difference between the actual and expected returns of the past. It does not limit the self-perpetuating bias about the future. As long as the pension plan and the accounting regime persist, there is a perpetuation of the forward bias created by the anticipation of equity returns without the appropriate charge for risks not yet borne.

8   Conclusions

I have made the following sequence of arguments:

- In contrast to modern financial theory, pension assets are substantially invested in equities.

- The standard accounting formulation for pension expense includes a financial bias likely to lead to systematic overvaluation of corporations whose pension plans invest in equities.

- This bias, though not undetectable, seems to have gone undetected in the pertinent accounting literature. And even as standards writers move to remove the bias, it does not appear that the removal is prompted by awareness of the bias.

- The opacity that enfolds the bias <u>may</u> have a <u>causative</u> role in the determination of pension asset allocation as corporate financial officers enjoy the benefit of the equity premium while avoiding much of the concomitant risk.

  - For the bias itself to induce equity investment, managers must believe that financial analysts and investors find reported earnings to be value-relevant. The accounting literature finds that earnings in general and pension earnings are value-relevant.

  - Nonetheless, financial reports including footnotes provide sufficient information for analysts to unwind the bias by reference to the disclosed pension asset and liability values at fair value. While there is evidence that some analysts are capable of unwinding the bias, there is little reason to believe that the consensus analyst does so.

- The opacity is <u>very likely</u> to have an <u>enabling</u> role in the allocation of pension assets to equities. A variety of perceived advantages to equity investment can be refuted in a transparent accounting environment. Notably, the significant tax disadvantages of equity investing would be exposable in a persuasive fashion. Because the accounting is not

transparent and because the bias is neither well-publicized nor well-understood, these exposures and corrections do not occur.

The key hypothesis, that investors rely on (opaque) accounting presentations of pension expense rather than upon (transparent) fair values for assets and liabilities, has been empirically tested and appears to have been confirmed.

I propose transparent pension accounting. I believe that such an approach will pave the way for the lessons of the prior theoretical research to be made manifest to investors. Accounting for expense that directly reflects the difference in end-of-year market values of assets and liabilities is necessary to support the financial story telling that will make the financial theory digestible by investors and analysts. Consider, many financial planners are able to tell their constituent investors to adjust their taxable and tax-sheltered portfolio allocations to achieve net tax benefits consistent with their general risk-return balance. When the corporate story is as easily told, I predict that the theories of the financial economists will be realized.

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