MEMBER’S PAPER

Selection of Valuation Interest Rates for Funding Valuations of Pension Plans – Traditional Pension Plan Approach versus Financial Economics Approach

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ABSTRACT
This paper analyzes the relative merits of the Traditional Actuarial Approach and the Financial Economics Approach to selection of valuation interest rates for funding valuations of pension plans. It describes the two approaches, compares them, raises a number of questions about them and considers the usefulness of each from the respective perspectives of several different stakeholders. The author concludes that, for funding valuations, the traditional approach continues to be appropriate for most plans, and that for many plans there is value in adding optional supplemental calculations based on the financial economics approach. He also calls for the actuarial profession to develop improved methodologies and standards for development of valuation interest rates using the traditional approach.

RÉSUMÉ
1. INTRODUCTION

The purpose of this paper is to assist in an informed discussion of an issue of considerable importance in pension funding.

Over the last few years, there has been a growing call by some actuaries\(^1\) for the use of the “financial economics”\(^2\) approach to establishing valuation interest rates, rather than the “traditional” approach, for actuarial valuations of pension plans. This paper analyzes the relative merits of these two approaches for purposes of funding valuations.

This is an issue that affects only the choice of the valuation interest rate, and is independent of other current important issues in pension valuation such as:

- Funding standards and policies,
- The appropriateness of the forecast valuation method and the standards that should apply to it,
- The use of “best estimates” and separate provisions for adverse deviations, and
- The use of stochastic rather than deterministic mathematical models.

Because of the importance of the valuation interest rate under almost all funding standards and actuarial methods, this paper deals with the topic of the valuation interest rate in isolation from the other topics, and focuses on the two approaches noted above.

Some of the issues raised in this paper may have application to valuations for purposes other than funding, such as financial reporting by the plan sponsor or computation of commuted values, and such extensions of the analysis would be useful to pursue. Such possible extensions are referred to, but not studied, in this paper, and no conclusions or recommendations concerning such extensions are made here.

This paper is written from a Canadian perspective, but the issues it addresses have application outside Canada as well.

The author hopes the paper will generate a number of written discussions, on both sides of the issue, including both practical and theoretical points of view and possible elaboration of either or both of the approaches, that will be published alongside this paper, and which will further assist the appropriate resolution of the issue.

2. THE TWO APPROACHES

The two approaches to establishing the valuation interest rate are as follows.
2.1 The Traditional Approach

The traditional pension plan approach discounts the liability cash flows using as a valuation interest rate a conservative estimate of the expected rate of return on plan assets, based on the plan’s long-term asset mix targets. The estimate includes an estimate of the equity risk premium on the portion of the target portfolio expected to be invested in equities. The result of the calculation is a conservative estimate of the value of the liability cash flows; there is usually no attempt to produce a unique, precise value.

In theory, this approach requires the selection of a series of select and ultimate assumed rates of future investment return, and involves a separate determination of the best estimate rates and a margin for adverse deviations. The choice of best estimate select rates is influenced by current market interest rates and stock valuations and by expectations of change in both over the select period. The choice of best estimate ultimate rates is usually strongly influenced by the expectation of reversion to a long-term mean.

This approach allows for cash flow projections, both deterministic and stochastic, that can (by using best estimates) centre on expected mean future values, as well as for discounting those future cash flows to obtain estimated present values.

It is useful to follow the discipline of developing separate best estimate select and ultimate rates and a separate margin for adverse deviations to ensure consistency of approach from one valuation to the next, as the target margin will seldom vary (it is driven by plan-distinct policy), the ultimate rates will vary seldom and by small amounts (as the long-term means will vary seldom and by little), and the select rates will usually vary from year to year (driven to a large extent by current financial markets). The rates will also vary when there is a change in the long-term asset mix targets of the plan. This discipline leads to regular measurement and review of adequacy of the margin.

For example, using

- rates at December 31, 2002 (when real rates of return were above the very long term – such as 100 year – averages, and stock valuations relative to bond yields and stock volatility measures appeared to many observers - including the US Federal Reserve Valuation Model - to be below, the norm) as a starting point for the select rates, and
- very long-term averages as a guide to the ultimate rates, one might select a best estimate real rate of return of 5.25% for the first 15 years and 4.25% for years after 15, and a best estimate nominal rate of return of 7.5% for the first 15 years and 6.5% for years after 15, somewhat as follows:
Table 1
Derivation of Select and Ultimate Best Estimate Valuation Interest Rates
Example as at December 31, 2002 under the Traditional Actuarial Approach

<table>
<thead>
<tr>
<th></th>
<th>1st 15 Years</th>
<th>Beyond 15 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected real yields on long Canada bonds</td>
<td>3.3%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Net adjustments for diversified bond portfolio (netting the effects of lower credits and shorter durations)</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Adjustment for expected capital gains (losses) on bonds</td>
<td>0.2%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Expected real return on bonds</td>
<td>3.5%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Expected equity risk premium over long Canada yields</td>
<td>3.7%</td>
<td>3.5%</td>
</tr>
<tr>
<td>Expected real return on a 50/50 portfolio</td>
<td>5.25%</td>
<td>4.25%</td>
</tr>
<tr>
<td>Expected inflation rate</td>
<td>2.25%</td>
<td>2.25%</td>
</tr>
<tr>
<td>Expected nominal return on 50/50 portfolio</td>
<td>7.5%</td>
<td>6.5%</td>
</tr>
</tbody>
</table>

If the margin for adverse deviations in the valuation interest rate were selected to be 1% per annum, the gross valuation interest rate (before netting off expected investment expenses) would be a real rate of return of 4.25% for the first 15 years and 3.25% for years after 15, and a nominal rate of return of 6.5% for the first 15 years and 5.5% for years after 15.

In practice, a single aggregate rate (i.e., a single rate over all years, being a liability-weighted average of the select and ultimate rates) usually substitutes for the series of select and ultimate rates. At one time, this simplified the calculations considerably. With the use of high-speed computers, the computational advantage of using an aggregate rate has been materially diminished, yet the aggregate rate is still in common use.

Moreover, in current practice a conservative net rate is often established directly, without following the mechanics of determining a best estimate and an explicit margin.

When aggregate rates are used, they are not always changed at each successive valuation as select and ultimate assumptions are (i.e., they are not changed with shorter-term changes in economic conditions). The most common cause of a change in an aggregate rate is a significant change in long-term interest rates. Thus, short-term changes in economic conditions often add to or subtract from the margin in the valuation interest rate.

The best estimate figures in Table 1 might lead to the use of a liability-weighted aggregate best estimate real rate of return of, for example, 4.85% and a corresponding aggregate best estimate nominal rate of return of 7.10% for a valuation as at December 31, 2002.

If the margin for adverse deviations in the valuation interest rate were selected to be 1% per annum, the gross aggregate valuation interest rate (before netting off expected investment expenses) would be 3.85% real and 6.10% nominal.
The traditional approach is frequently used to conservatively calculate contribution rates that are expected to remain relatively steady over a long period of time, while varying somewhat over the shorter term, and with a bias (of conservatism) to somewhat overstate those contribution rates.

The valuation interest rate under the traditional approach is usually used in combination with a market-related actuarial value of assets. The valuation interest rate is intended to be consistent with that asset valuation so that both sides of the actuarial balance sheet are determined consistently.

The focus of the traditional approach is entirely at the fund level. Accumulation of risk for shareholders and members, outside of the fund, is not considered in this approach.

There are a number of variations of the traditional approach. For example, one could use:

- an estimate of the expected rate of return on the fixed income portion of the plan assets, and not take into account the expected equity premium rate, leaving that to be recognized in future years as the premiums are actually realized (i.e., treating that as a margin for adverse deviations),
- a conservative estimate of the rate of return on a notional portfolio or notional asset mix that differs from the plan’s target asset mix,
- for a plan with benefits indexed by “excess interest” above a pre-established floor rate of return, one would use the floor rate as the valuation interest rate for discounting those benefits.

We will not consider these variations further in this paper.

In the absence of specific professional standards of practice to narrow the variations of practice and to constrain the range of best estimates and margins, there can be a wide range of practice, and this sometimes leads to criticism of the traditional actuarial approach.

In concise summary, the traditional valuation interest rate

- is based on expected future returns,
- is determined by a blend of current market rates, expectations of short- to mid-term market conditions and reversion to the long-term mean,
- anticipates an equity risk premium,
- contains a policy-driven margin against adverse deviations from all sources,
- is driven by a desire to more or less level out contribution rates over the long term at least as much as by a desire to report accurate liabilities at each point of time,
- is consistent with the underlying anticipated rates of return inherent in the actuarial value of the plan’s assets, and
- contains no discount for the probability of non-payment of the benefits.

Most current pension plans were developed, and the current benefit levels have been established, based on cost estimates and measurements of liabilities using valuation interest rates derived using some variation of the traditional approach.
2.2 The Financial Economics Approach

The description that follows draws heavily on an important paper, Exley, Mehta and Smith (1997). Anyone interested in a full development of the financial economics approach and its theoretical underpinnings should read that paper and the accompanying discussions.

The financial economics approach starts from the assertion that pension plan liabilities are obligations that have properties similar to other financial obligations such as bonds and other corporate or institutional debt. It further asserts that bonds with a current market value of $1 have the same value as equities with a current market value of $1 even though the equities may have a significantly higher expected future (i.e., *ex post*) value than the bonds, and that the equity risk premium therefore has an *ex ante* value of zero. It therefore asserts that the equity *risk* has a present value that is negative, and that exactly offsets the present value of the expected future equity premium.

Under this approach, the equity risk premium is not anticipated in the valuation interest rate. It will be recognized in the asset values used in future valuations as and when it is realized in the market.

Two key concepts are *hedging*, or reducing risk of loss on a transaction by a similar transaction on the other side of the risk, and *arbitrage*, or the Law of One Price.

This approach bases the valuation interest rate on a reference (or hedge) portfolio that approximates the liability cash flows of the pension plan in amount, timing (i.e., hedges the liabilities at each point in time) and probability of payment, and discounts the entire liability cash flow at the internal rate of return of the reference portfolio. That reference portfolio is usually comprised mostly of debt instruments, and may include real rate of return bonds as well as fixed interest bonds. To hedge all along the time axis, it is necessary that the portfolio have the correct *term structure*.

This approach to establishing the value of pension liabilities is thus consistent with the values the capital markets place on other future cash flows. It also provides a relatively mechanical procedure for determining the valuation interest rate, with no significant judgment by the actuary of the plan sponsor. There is a sense that the market is always in equilibrium and, while perhaps not always right, it represents the views of the marginal players in the market, who are the best able make the necessary fine judgments of value. Moreover, the rest of the world makes decisions based on market values, and problems of arbitrage will arise if other values are used. By using market values, our own subjective views do not come into play.

Where the plan is fully-funded and is invested in the reference portfolio, the assets can be expected to closely match the accrued liabilities over time, and the only further funding required will be the normal actuarial cost (i.e., contributions for current service). The normal actuarial cost will vary over time as interest rates rise and fall and as the shape of the yield curve changes.
This approach views the pension plan as an integral part of the employer’s operations (i.e., it views the company and the pension plan as a single entity). This view is rationalized primarily by a sense that the employer, and not the plan member, bears the investment risk in a defined benefit pension plan. This view allows the employer to look at the plan through its shareholders’ eyes.

From this viewpoint, shareholders have three broadly equivalent ways to gain a level of equity exposure. These are:

- through their personal portfolios,
- through the direct holdings of the company, and
- through the company’s pension fund.

Viewed in this way, if a company takes on less risk through its pension plan, it can afford to generate greater returns for its shareholders by taking on more risk in its operations, and can spend more management time on managing its operations and less on managing its pension fund. This argument leads in the direction of the matching of pension assets and liabilities, which in turn reduces the volatility of corporate earnings, increases a company’s ability to raise debt and enhances shareholder value.

Also from this viewpoint, the application of any investment gains above the valuation interest rate to increase benefits for members is a “leakage” of the shareholders earned reward for taking risk or an “expropriation” of wealth from shareholders to plan members.

A feature of financial economics is continuous marking-to-market. In the case of pension plan valuations this rule is relaxed and the marking-to-market takes place at each valuation, and that may be once a year or even once every three years. There is no place for “smoothing” of asset values in financial economics.

There are practical difficulties in developing the precise term structure of the reference portfolio, and so approximations are necessary. In practice, one might represent the term structure by, say, three rates representing respectively, short-, medium- and long-term rates. One of the more difficult and most contentious approximations is that of the interest rate applicable more than 30 years after the valuation date, since there are few, if any, bonds available in the market with terms longer than 30 years.

Some practitioners would use the rate on long-term (say, 10 to 30 year) bonds to approximate the rate that might be paid on longer-term (30 to 80 year) bonds, if they existed. For example, The Canadian Institute of Actuaries’ Task Force on Transfer Values recommended the use of two approximations for selecting the interest rate, including allowance for investment expenses and for credit risk (for computation of transfer values), one for non-indexed benefits and one for indexed benefits⁴. The recommended approximations for non-indexed benefits (to be used with projected mortality rates) were:
First 10 years \[ i_{1,10} = i_7 + 0.25\% \]
Next 20 years \[ i_{11,30} = i_L + 0.5\%(i_L - i_7) + 0.25\% \]
Thereafter \[ i_{ult} = i_{11,30} (\text{subject to a minimum of 4.5\% and a maximum of 8.5\%}) \]

Where
\[ i_7 \] is the annualized yield on 7-year Canada bonds (CANSIM series 14070), and
\[ i_L \] is the annualized yield on long Canada bonds (CANSIM series 14072).

The recommended approximations for indexed benefits were:
First 10 years \[ r_{1,10} = r_7 + 0.25\% \]
Next 20 years \[ r_{11,30} = r_L + 0.5\%(r_L - r_7) + 0.25\% \]
Thereafter \[ r_{ult} = r_{11,30} (\text{subject to a minimum of 2.25\% and a maximum of 4.25\%}) \]

Where
\[ r_7 \] is the theoretical annualized yield on 7-year Canada real return bonds, approximated as \[ r_7 = \frac{i_7}{i_L} \], and
\[ r_L \] is the annualized yield on long Canada real return bonds (CANSIM series 14081).

As at December 31, 2002, \( i_7 \) is 4.52\%, \( i_L \) is 5.49\% and \( r_L \) is 3.36\% (all annualized). Using these data with the foregoing approximations minus the allowance for investment expenses, and adding, for our example, a risk of non-payment of benefits equivalent to an interest rate adjustment of 0.50\% per annum, we obtain as at December 31, 2002 gross (i.e., before investment expenses) valuation interest rates of:

Table 2
Valuation Interest Rates at December 31, 2002
Example Under the Financial Economics Approach

<table>
<thead>
<tr>
<th></th>
<th>Non-indexed Benefits</th>
<th>Indexed Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>First 10 years</td>
<td>5.02%</td>
<td>3.26%</td>
</tr>
<tr>
<td>Next 20 years</td>
<td>6.48%</td>
<td>4.16%</td>
</tr>
<tr>
<td>Thereafter</td>
<td>6.48%</td>
<td>4.16%</td>
</tr>
</tbody>
</table>

Another difficult approximation is the estimate of the risk of non-payment of benefits. This requires an estimate of
- the likelihood and timing of plan termination,
- the likelihood and size of unfunded benefits upon plan termination, and
- the likelihood that the contributors will be unable to make additional contributions to cover that shortfall upon or after plan termination (for example, employer insolvency).

Some plan sponsors issue bonds and are rated by bond rating services. That helps assess the likelihood of insolvency. For some other plan sponsors there is no independent rating available and no published market interest rate to refer to. Even where a plan sponsor issues bonds and is rated by a bond rating service, that plan sponsor does not have just a single credit risk. The credit risk for a particular debt depends on the seniority of the debt in relation to all other debts of the plan sponsor. The obligation to fund unfunded pension liabilities on plan wind-up will not rank equal in seniority to the secured debt of the plan sponsor. All three likelihoods are very difficult, if not impossible, to quantify.

The financial economics approach uses the reference portfolio to attempt to match and properly value the liability. That portfolio is not a recommended asset mix policy. The asset mix policy may be any rational asset mix policy. Under the financial economics approach, however, the liabilities are measured without regard to the expected return on
the actual assets in the pension fund portfolio, regardless of how risky or safe those assets may be. Thus, the same reference portfolio is used, and the same valuation interest rate results, regardless of whether the liabilities are funded and of how the funds are invested.

The valuation interest rate under the financial economics approach is used in combination with the market value of the plan’s assets. That valuation of the assets discounts the future returns on equities at higher rates than it discounts the future returns on bonds (i.e., at rates considerably higher than the rates used to discount the liabilities).

The valuation interest rate under this approach contains no margins for the possibility of market error either short term or long term.

In concise summary, the financial economics valuation interest rate
- is based entirely on current market rates,
- anticipates no future equity risk premium (it will recognize such premiums only in the future, as and when the premiums are actually realized),
- contains no explicit margin against adverse deviations from any economic sources,
- is driven by a desire to report accurate liabilities at each point of time more than by a desire to more or less level out contribution rates over the long term,
- is consistent with the interest rates on the reference portfolio but not with the underlying rates of return inherent in the plan’s assets, and
- contains a discount for the probability of non-payment of the benefits.

3. THE DIFFERENCE BETWEEN THE TWO APPROACHES

The difference between the valuation interest rates under the two approaches under study will vary over time due to
- the size of the equity risk premium and the margins used in the traditional approach,
- the size of the credit risk adjustment used in the financial economics approach,
- the differences in the market’s and the actuary’s estimates of future interest rates, inflation rates and equity risk premium, and
- the differences in approach to such estimates (the generally instantaneous and lumpy approach of the market vs. the generally longer term and smoother approach of the actuary),
- and to changes over time in each of these.

Of course further differences will be introduced if the actuary following the traditional approach uses only an ultimate rate or uses an aggregate (blend of select and ultimate) rate approximated other than by taking a liability-weighted average of the select and ultimate rates, and may be introduced depending on what approximations to the reference portfolio rates are used with the financial economics approach. In comparing the two methods, we will assume that the actuary uses select and ultimate rates for both approaches and determines the rates rigorously, so that we will focus on the fundamental differences in the approaches and not the differences introduced by approximations or
lack of rigour. The issue of approximations and degree of rigour in determining the valuation interest rate under either approach may well be a useful topic for another paper and/or for development of detailed standards. It is likely that most stakeholders noted below would prefer more detailed standards.

Like any other material change in methodology or assumptions, a change from the traditional actuarial approach to the financial economics approach would create a material “shock to the system” and would create a material shift in the balance between the benefits and cost estimates (a modest “shock wave”). The impact of the “shock wave” would be felt for longer than the period of amortization of the “shock”. If the cost estimates rise, the amortization payments increase, and then there will be a subsequent amortization of a higher surplus or of a lower unfunded liability in subsequent periods due to the higher funding in the initial amortization period, and vice versa.

3.1 Current Quantitative Example of the Differences

As of December 31, 2002, for non-indexed pension plans, using the above data and with a 1% per annum margin on the valuation interest rate under the traditional approach, the respective rates under the two approaches (task force approximations using financial economics versus my example of traditional valuation interest rates) and the differences between them would be:

<table>
<thead>
<tr>
<th>Years</th>
<th>Financial Economics</th>
<th>Traditional</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>5.02%</td>
<td>6.5%</td>
<td>(1.48%)</td>
</tr>
<tr>
<td>11-15</td>
<td>6.48%</td>
<td>6.5%</td>
<td>(0.02%)</td>
</tr>
<tr>
<td>Thereafter</td>
<td>6.48%</td>
<td>5.5%</td>
<td>0.98%</td>
</tr>
</tbody>
</table>

As of December 31, 2002, for indexed pension plans, using the above data and with a 1% per annum margin on the valuation interest rate under the traditional approach, the respective rates under the two approaches and the differences between them (financial economics approach minus traditional approach) would be:

<table>
<thead>
<tr>
<th>Years</th>
<th>Financial Economics</th>
<th>Traditional</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>3.26%</td>
<td>4.25%</td>
<td>(0.99%)</td>
</tr>
<tr>
<td>11-15</td>
<td>4.16%</td>
<td>4.25%</td>
<td>(0.09%)</td>
</tr>
<tr>
<td>Thereafter</td>
<td>4.16%</td>
<td>3.25%</td>
<td>0.91%</td>
</tr>
</tbody>
</table>
The differences arise for indexed pension plans entirely from the differences in assumed real rate of return and for non-indexed pension plans from the differences in both assumed real rate of return and assumed inflation rate, including the approximation to the term structure of both rates in the task force approximations. For example, for non-indexed pension plans, in the first 10 years there is a 0.99% lower assumed real rate of return (3.26% vs. 4.25%) and a 0.49% lower assumed inflation rate (1.76% vs. 2.25%), if the inflation rate under the financial economics approach is taken as the difference between nominal rate of interest $i_n$ and the real rate $r_n$. Of course, this is an oversimplification since that difference includes amounts related to both the inflation rate and the term structure of interest rates in the formulas for $i_n$ and $r_n$, including the assumption that the term structure of future interest rates has the same shape as the term structure of future inflation rates. On this oversimplified basis, the assumed differences in all three periods are as follows:

<table>
<thead>
<tr>
<th>Years</th>
<th>Real Rate of Return (Fin Econ – Traditional)</th>
<th>Inflation Rate</th>
<th>Sum of Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>(0.99)%</td>
<td>(0.49)%</td>
<td>(1.48%)</td>
</tr>
<tr>
<td>11-15</td>
<td>(0.09)%</td>
<td>0.07%</td>
<td>(0.02%)</td>
</tr>
<tr>
<td>Thereafter</td>
<td>0.91%</td>
<td>0.07%</td>
<td>0.98%</td>
</tr>
</tbody>
</table>

The differences in assumed real rate of return represent a combination of the differences in portfolio composition (including the equity risk premium in the traditional approach), in outlook (the capital market’s versus mine), the presence of the margin of 1% in the rate under the example of the traditional approach and the presence of a 50 basis point adjustment in the example of the financial economics approach.

The oversimplified differences in assumed inflation rate are interesting. They indicate that the market appears to anticipate a lower inflation rate in the first 10 years than I do, but we seem to agree for years after that. It is my impression that the 2.25% inflation rate I have used is below the average of the rates currently used by most actuaries in Canada.

### 3.2 Non-quantitative Analysis of the Differences

The key philosophic differences between the two approaches are:

- The financial economics approach accepts the rates in the current financial markets, without adjustment; the traditional approach uses a blend of current market rates and valuations, current expectations and long-term reversion to the mean.
- The financial economics approach values the equity risk premium at zero; the traditional approach places a positive value on the equity risk premium.
- The financial economics approach contains no explicit margins other than for non-payment of benefits; the traditional approach applies a policy-driven margin against all adverse deviations.
• The liabilities under the financial economics approach are valued consistent with a reference portfolio comprised mostly of debt instruments and not consistent with the plan assets; the liabilities under the traditional approach are valued more consistently with the actuarial value of plan assets, and
• The financial economics approach is driven to a large degree by the desire for accurate reporting of liabilities at each point of time, and in a manner consistent with the capital markets at each such point of time; the traditional approach is often driven to a large degree by a recognition that the capital markets are highly variable in the short term but less variable over a longer time horizon, and by the desire to smooth contribution rates over time.

The argument between level contribution rates and precise determination of liabilities at each point in time has a number of parallels where related philosophical issues have appeared in past actuarial discussions and in actuarial literature. Examples are the arguments between:

• Smoothness and goodness of fit in mortality table construction,
• Leveling of pension costs and precise measurement of actuarial liabilities in accounting for pension costs, and
• Use of going concern valuations as opposed to solvency valuations (or the use of both).

There is no absolute correct answer to these questions; both sides have merit from one or more particular perspectives, but not from all perspectives.

There are important differences in focus as between the two approaches. The focus of the financial economics approach appears to be on plan sponsor reporting of pension liabilities and costs on a basis consistent with valuations of debt obligations in capital markets, and with particular emphasis on precise measurement of accrued liabilities. It is widely felt that this allows for improved management of total corporate risk by the plan sponsor. The focus of the traditional approach, on the other hand, is often on reporting a conservative estimate of pension liabilities and costs, and with particular emphasis on achieving a smooth pattern of funding costs over time. The degree of conservatism is usually selected based on a consideration of the interests of both the plan members and the plan sponsor, and is often determined with a measure of subjectivity.

The value of the likely payment determined under the financial economics approach will be more or less conservative than the liability for that payment estimated on the traditional approach, depending on the size of equity premium assumed and the size of the margin in the traditional approach, and on the target equity weight in the asset mix. The traditional approach has the potential to develop margins that are scientifically tied to the downside risks of both unacceptable contribution increases and non-payment of benefits, but more research and development would be useful to improve the standard of practice in this respect.

The consistency between the valuation of assets and the valuation of liabilities has always been an important goal. The traditional approach achieves consistency between the assets and the liabilities of the plan, at least in principle, through the use of approximately the same discount rates for both assets and liabilities. The financial economics approach
achieves consistency with the notional portfolio but not with the actual portfolio or with the asset mix policy of the plan.

The financial economics approach hedges the liabilities all along the time axis while the traditional actuarial approach hedges the liabilities partially and crudely through the margins, and often mainly at the longer end of the time axis, and exposes the liabilities to significant risk (asset/liability mismatch) in the shorter timeframes. The financial economics approach tends to lead to lower volatility of contributions over time, but higher contributions initially, than the traditional approach.

In the financial economics approach, the equity risk premium is zero. In the traditional actuarial approach, the equity risk premium does have a material positive value, usually greater than the margin against adverse deviations, and therefore can lower cost or provide more benefits at an earlier date, but capturing that premium exposes the fund to greater risk of adverse deviations (more often and of greater magnitude) along the way to the long term.

The financial economics approach appears to blend a plan wind-up perspective in with its primarily going concern perspective, in the sense that the default of pension payments that it discounts can occur while the plan is ongoing or upon wind-up, and tends to occur most often upon plan wind-up. The traditional approach requires two valuations (a going-concern and a wind-up valuation) to look at both perspectives, and includes no discount for the possibility of non-payment.

The financial economics approach values the benefit payments (discounted for default). The traditional approach values the benefit payments (not discounted for default). The excess (or shortfall) of assets over the plan liabilities is reported in both cases as the measure of surplus (or unfunded liability), although the liabilities being valued differ in this respect as between the two approaches.

It is perhaps worth noting that it would be quite possible mathematically to build into the otherwise traditional actuarial model a discount for the probability for non-payment of benefits (through either a discount applied directly to the benefits or an adjustment to the valuation interest rate). That would have an impact (occasionally quite large) on some wind-up valuations and a small impact on many going-concern valuations. The practical difficulty in this would be in developing a reasonable assessment of the probability and extent of such non-payments, particularly in going-concern valuations. That may prove to be impossible in the majority of cases. Such a discount may be relevant for a plan wind-up valuation but not for a going concern valuation.

More appropriately, when applying the financial economics approach to a funding valuation, I suspect one would ignore the discount for non-payment of benefits. Funding to less than 100% of the promised benefit would not be acceptable to plan members or regulators, nor to most shareholders, even if capital markets apply such a discount when assessing the market value of the plan sponsor’s securities.

Because, in principle, one can discount for the risk of non-payment of benefits under either approach, and because of the likelihood that such a discount would not be
acceptable for funding purposes, I will not consider this as a difference between the two approaches for the purposes of the further analysis in this paper. I note, however, that ignoring the probability of non-payment can be viewed as an element of conservatism in relation to corporate financial reporting while it is an essential element in relation to funding if the funding target is to finance 100% of the promised benefits.

It is common under both methods to use the term liability to characterize the estimated value of future obligations accrued, to date, in respect of current plan members and beneficiaries, even though there is an important difference in how the valuation interest rate is determined under the two methods, and accordingly an important difference in how the liabilities should be interpreted.

4. NINE IMPORTANT QUESTIONS

This analysis raises the following nine important questions:
- Does the equity risk premium really have a value of zero?
- Should the expected equity risk premium be ignored?
- How important is the time horizon?
- What benefits are really being funded?
- Should we have results reported on both approaches?
- Should the financial markets be trusted to estimate interest rates far into the future?
- Is it more important to develop precise estimates of accrued liabilities at each point of time or to develop reasonably level contributions over time?
- Should the valuation interest rate be totally detached from the plan assets and the asset mix targets?
- Under the traditional approach, is the current range of practices acceptable or should more discipline and rigour be required in its application?

Some of these questions have clear answers; others do not. Some answers depend on the perspective from which the question is viewed. Yet it provides useful insights to review these questions and to consider possible answers.

4.1 Does the equity risk premium really have a value of zero?

If the expected return on a bond and a stock were equal, one would expect to pay less for the more volatile and riskier stock than for the less volatile and less risky bond. It is the anticipation of the equity risk premium that allows the riskier stock to attain the same market value as the less risky bond.

In theory, the market is viewed as valuing both debt securities and stocks by discounting all of the expected future cash flows, including the risk premium on the stocks. It then places a higher discount for risk on stocks than on bonds. This discount includes elements for the risk of default, the risk of misestimating future returns and the volatility of the returns. It appears that the market applies discounts for misestimation and for volatility of returns even though the probability of returns higher than estimated may balance out the
probability of returns lower than estimated (i.e., even though the *mathematical expectation* of the returns would be reflected by not discounting for these effects – that is, where there is a 50% probability that the equity risk premium will turn out to be even higher than the estimate).

Interestingly, even the market expects to receive a future risk premium on stocks. However, the market is viewed as discounting the equity risk premium (*ex ante*) until the premium is received, so that the premium is treated as a reward (*ex post*) for having accepted the risk and volatility of returns. Thus, the market is considered to place a positive expected value on the risk premium and a negative value of equal magnitude for its risk and volatility, resulting in a current net market value of zero for the future risk premium.

*In practice*, the market sets prices by finding the price at which the buyer and the seller transact. That price fluctuates widely from time to time, sometimes even when the fundamental economics do not change much. While such a price always reflects the *instantaneous trading* values of the premiums and risks at the point in time, it is unlikely that such a price will accurately portray the *ex post* values that will actually be realized. There is a fairly high probability that the market at most points in time will turn out to be wrong over both the long term and over many shorter-term periods.

The traditional approach handles the equity risk premium and its associated risks differently. In a deterministic valuation, the actuary places a positive value on the expected risk premium and ignores the risk and volatility (both upwards and downwards). Of course, in a stochastic valuation, both (a) the expected equity risk premium and (b) the upward and downward risks of default and volatility (but not the risk of misestimating the mean) are considered explicitly and separately. In both types of valuation, the risk of misestimating the mean can, of course, be assessed to some degree by sensitivity tests.

The market discounts the long-term equity risk premium because in the short term a down market can wipe out the premium, and the market views each security as being available for trading at the next instant of time. The traditional actuarial approach takes a longer view of the time horizon. It considers that the portfolio, with periodic substitutions of specific securities, will be in existence for a very long period of time and will, with a high probability, earn a material equity risk premium over the long term, even though the market goes through ups and downs in its journey to the long term. The market takes a shorter-term view and the traditional actuarial approach takes a longer-term view.

Over the long term, the equity risk premium is expected to be positive, and a plan investing in equities is therefore expected to *cost less or provide more benefits* over the long term than a comparable plan invested only in bonds. Thus, this issue is not just of academic interest.

My conclusion on this question is that the equity risk premium is zero in the instantaneous trading timeframe of the capital markets but it has a positive value in the longer-term timeframe in which pension plans have traditionally operated. This leads to the question of whether it makes more sense to fund a pension plan, and to assess the
progress of its funding, from a very short-term viewpoint or from a longer-term perspective.

4.2 Should the expected equity risk premium be ignored?

The capital markets are solely concerned with instantaneous trading and establishing a fair price at each instant. All market valuations are concerned with the realizable value at a point of time. They are not concerned with consistency of funding rates over long periods of time or, apart from its effect on the value of the plan sponsor’s shares, with matching of projected assets and projected liabilities of the plan over many years into the future.

For a funding valuation of a pension plan, should a pure financial economics approach be followed? Is the principal purpose of a funding valuation to report precise cost and liability figures in a plan sponsor’s financial statements in a manner consistent with financial economics and the instantaneous trading philosophy? Or is it to develop a rational funding pattern that will be relatively smooth over time and a reasonable measurement of the degree to which the assets on hand cover the accrued liabilities. The former leads to ignoring the premium and the latter to including it (offset to some degree by the margin against adverse deviations).

My conclusion on this question is that it depends on the real purpose of the valuation, and this in turn depends on your perspective. I comment more on perspectives below.

4.3 How important is the time horizon?

The longer the measurement period, the more certain one can be of realizing an equity risk premium. This phenomenon is sometimes described as time diversification and is contrasted with portfolio diversification. Over the long term, both are important.

I believe it was John Maynard Keynes who first said that in the long term we will all be dead. He of course was drawing to our attention that in most human endeavours, including economics, the short term really does matter.

There is no doubt that the short term does matter in pension finance. On the other hand, pension plans are designed specifically for the long term, and the long term matters for pension plans more than it does for most financial activities. Under the going concern principle, the benefits are payable for 60 to 90 years into the future for current members and for generations beyond that for future generations of members. Pension plans are, therefore, better placed than most economic entities to apply very long-term thinking in their planning and operations.

Funding based solely on a short-term outlook (with no allowance for the equity risk premium) will tend to favour the later generations of contributors over the current contributors, as the equity risk premiums are realized over time (or the later generation of members and beneficiaries over the current one if returns above the valuation interest rate are used to improve future benefits). For a plan with a significant investment in equities and no future benefit improvements, such funding will start out at the higher level
appropriate for bonds and will fluctuate up and down. Over time it will tend to decrease until it fluctuates around the lower level compatible with the returns from the portfolio with significant equities.

A pension plan operates in both the short term and the long term. It is important to pay attention to both. In this way, one can manage the respective intergenerational interests and appropriately balance the interests of lowering long-term funding costs of contributors and improving the likelihood of future benefit improvements, on the one hand, and of protecting the members from too high short-term downward fluctuations in funded ratio and the contributors from too high fluctuations in funding costs.

4.4 What benefits are really being funded?

While all defined benefit plans set out a precise benefit or benefit formula, most provide that in the event of plan termination, something less than the full benefit may be paid. Some plans promise a form of indexing of benefits after retirement, and sometimes before retirement too. Others provide ad hoc indexing from time to time, often influenced directly or indirectly by the investment performance of the fund. Most plans are improved over time and, again, this is often influenced by the investment performance of the fund. It is unusual for a pure defined benefit plan’s benefits to be reduced.

The financial economics approach appears to apply to precisely defined benefits for the current members and beneficiaries. It does not appear to consider future generations of members and beneficiaries, or the possibility of future benefit improvements. Like the traditional approach, it could consider future ad hoc indexing or other future benefit improvements, but on a speculative basis that would break some from its basic disciplines.

Negotiated cost defined benefit plans are a little different. A level of benefits is promised (based on funding estimates) but that promise is not intended to be final. Over time, benefits are intended to be adjusted (mostly upwards, hopefully) as funding permits or requires. The entire equity risk premium is applied to finance benefits, not reduce costs. Equity between generations of members and beneficiaries is an important planning principle when designing and modifying benefits. Applying the financial economics approach would appear to be more difficult in this environment. There is a natural tension between (a) guaranteeing the current benefits for the current members, by investing in the reference portfolio and (b) creating a strong probability of providing a larger level of benefits for all generations of members by investing part of the assets in equities.

Some plans actually promise a lower level of benefits but target and fund for a higher level of benefits, leaving the funding of the difference as a funding margin.

No doubt there are many further variations.

It is not clear to me what financial economics would do where the intended benefits are not precise.
Clearly, also, there are significant differences between (a) insured annuities, under which an insurer guarantees benefits and (b) non-insured pension plans, which do not guarantee benefits, and range from trying to assure payment of precise benefits to trying to provide the largest reasonable levels of pension over the long term.

It is worth noting that in 1960, there was a thriving group annuity business in Canada. It diminished during the 1960s and 1970s, and is non-existent today. A principal reason for its demise was the expectation of higher returns from diversified portfolios that included equities and did not guarantee precise benefits. It is hard to envision a return to a totally guaranteed approach for pension provision.

4.5 Should we have results reported on both approaches?

The dichotomy between the going concern and wind-up perspectives leads to conflicting views on whether the focus should be on market values of assets and liabilities and on “instantaneous trading” or on level long-term costs, on reasonable long-term values of assets and liabilities, and on matching of expected future income and disbursements over the long term. That dichotomy of perspectives has been visible in pension actuarial circles for some time, and has led to the requirement to perform both a going concern (i.e., “funding”) valuation and a solvency valuation, and to fund in Canada based on a combination of the two.

The financial economics approach gives a new and distinct boost to the “instantaneous trading” perspective for funding valuations. But the question still lingers: should the focus in such valuations be on instantaneous trading or on the longer-term perspective? For a going concern pension plan, instantaneous trading will not actually take place; it is just a matter of valuation.

It may be that both determinations are useful. If so, is it reasonable to perform both sets of calculations? Pension legislation already requires a going concern and a solvency valuation for funding purposes and accounting standards call for an accounting valuation for accounting purposes.

My conclusion to this question is that I believe the financial economics principles apply more to the accounting valuation than to the funding valuation, because they relate to the risk management of the plan sponsor and the capital market’s need for information about the plan sponsor, not the pension plan. The information about the pension plan reported in the plan sponsors financial statements is included to identify the costs and risks the plan sponsor incurs with regard to the pension plan, not to present information on the plan per se. I feel the financial economics principles should be considered more in relation to accounting valuations than to funding valuations. If they are applied to the accounting valuation and not to the funding valuation, the number of separate calculations made and reported may not escalate.

It may also be useful to report the difference between the results on the two approaches as a measure of the shorter-term mismatch risk being taken on in the operation of the plan.
4.6 Should the financial markets be trusted to estimate interest rates far into the future?

In theory at least, it is possible to match the cash flows or the durations of the benefit payments of a pension plan with the cash flows or durations of a bond or a series of bonds. This provides the basis in financial economics for using the market value of that bond and the market yields of that bond in the pension plan valuation. In practice, it is possible to use market interest rates for bonds of suitable terms or durations to the extent that such bonds exist in the marketplace.

To the extent that the market does not have bonds of suitable terms (i.e., for terms over 30 years), the market does not provide a direct estimate of the market yields for those terms. Some actuaries have suggested the substitution in such cases of the yields on bonds with terms between, say, 10 and 30 years.

This splits the question into two: “are bonds with terms over 30 years available?” and “if not, how can one approximate the yields that would be available on such bonds?”

Those rates (had they existed) and the approximations that have been suggested by the Canadian Institute of Actuaries’ Task Force on Transfer Values (substituting bonds with shorter terms) would have produced some strange and dangerous results in the past. Long Canada nominal yields have varied over the last 66 years from a low of about 2.6% (1947) to a high of about 15% (1981). For this reason, the task force recommended the use of lower and upper bounds on ultimate nominal rates of 4.5% and 8.5% and on ultimate real rates of 2.25 and 4.25% for years beyond 30 years in the future. This certainly reduces the most extreme problems with the substitution method, but does not solve the entire problem, as these are wide bounds, the market has not been a good predictor of long-term rates at many points in the past, the substitution of rates on terms from 11 to 30 years for rates on terms over 30 years is, at best, a crude approximation, and there is no evidence that the bond market at any point in time is a good predictor of interest rates 10 to 30 years into the future, let alone 30 to 70 years into the future.

Any approximations to yields on corporate bonds will be, of course, even rougher than approximations to yields on government bonds due to greater volatility of rates and less availability of data.

Some actuaries would prefer to assume a reversion to the long-term mean real rate of return on long bonds. Simply applying the mean rate of long-term Canada bonds over the 101 years from 1900 through 2000 without adjustment, one would come up with a real rate of 1.8% (1.2% from 1900 through 1949, 2.5% from 1950 through 2000). If one is skeptical about the prospects of a long-term reduction in public and private levels of long-term debt, he or she may wish to adjust the historical figure upwards on this account (as I did in the illustration of the traditional method in Section 2, above).

Some actuaries and others have noted that the mean on bonds has not been mean-reverting. This may be due, at least in part, to the inflation bubble of 1971 through 1982, which was unprecedented in the two previous centuries, and may have been precipitated by the final change from the gold standard to a managed money supply in
August, 1971, the market’s inability to anticipate the inflation bubble that ensued, and central banks’ initial difficulties in managing inflation in the absence of the gold standard. Even with that problem, there is some merit in looking further at the long-term means (see, for example, Bernstein\textsuperscript{11}), perhaps with some adjustment for outliers such as 1971-82, rather than just abandoning this and adopting an alternative such as the substitution method with wide bounds described above.

My conclusion on this question is that one should place full reliance on the current market for the interest rates on current debt securities and progressively less reliance on the current market, and progressively more reliance on reversion to the mean, the farther out in the future one is discounting. I prefer not to rely on the market at all to provide the estimates of future interest rates beyond 30 years. I prefer to rely on the long-term mean, with some discounting of the data from 1971 through 1982. Moreover, until better analysis and data are available, I think the use of an ultimate real interest rate on long Canada bonds higher than 3% is unwise.

Some observers feel that it is not reasonable for actuaries to claim they know better than the market. In the absence of a clear demonstration that the market can provide reasonable estimates of very long-term future rates, I believe we have no choice but to use long-term data and professional judgment in our selection of ultimate valuation interest rates many years in the future. That judgment might, for example, include the selection of the appropriate long-term mean and any adjustments to that mean to remove “outlying” or otherwise unreasonable data.

4.7 Is it more important to develop precise market estimates of accrued liabilities at each point of time or to develop reasonably level contributions over time?

This is, to a large degree, the old “smoothness versus goodness of fit” issue that so often confronts actuaries. The answer to this may differ from one perspective to another.

The capital markets and stockholders of the plan sponsor may prefer that accounting for pension costs use precise estimates of accrued liabilities incorporating an estimate of the probability of non-payment of the pensions. That may not be the best reporting for the plan member, the trustees and the regulators, all of whom want the full pension to be funded (not discounted for non-payment), and most or all of whom may want more data on the best estimate position of the plan and on the adequacy of the margin for adverse deviations. It may not even be sufficient for the corporate treasurer who wants to estimate the cash flows (and perhaps the likely volatility in the cash flows) as realistically as possible, and based on the actual portfolio and asset mix targets.

I believe there is also a difference in the viewpoints of traders, who are always interested in instantaneous trading (and therefore current market prices), and long-term investors, who may be more interested in the expected pension costs over time (including some allowance for the future equity risk premium) without some of the “noise” inherent in short-term market fluctuations.

My conclusion on this question is that the precise market estimate at each point of time may be the most important focus for the plan sponsor’s accounting and financial
reporting, but, for funding, the focus on reasonably level long-term contributions will be more important for many pension plans than the focus on those point-in-time market estimates of liabilities; and for regulation of funding, the focus on the reasonableness of the best estimates and the margins of conservatism on both the liabilities and the contribution rates will be more important than the market estimate of liabilities.

4.8 Should the valuation interest rate be totally detached from the plan assets and the asset mix targets?

Again, this may make sense to the capital markets and to stockholders of the plan sponsors, but may not provide the best information to the other parties at interest. Moreover, this will have little or no interest to the trustees or members of multi-employer plans.

4.9 Under the traditional approach, is the current range of practices acceptable or should more discipline and rigour be required in its application?

Although there is still much room for differences in the approximations that could be used, the financial economics approach would likely produce a narrower range of practice than is current with the traditional approach. That, to many observers, is strength of the financial economics approach.

It is likely that most of the stakeholders noted below would prefer to see a narrowing of the range of practice under the traditional method, through more discipline and transparency in the development of the valuation interest rate. That may include some or all of:

- Selection of best estimate select and ultimate rates,
- Application of discipline and rigour in the selection of those rates,
- If aggregate rates are used, disciplined calculation of those rates from the select and ultimate rates,
- Policy driven margins against adverse deviations from the best estimates,
- Periodic assessment of the adequacy of those margins,
- Formal approval of that policy by the plan sponsor or Trustees as the case may be,
- Calculation of the impacts of any changes in each of those elements, or in the long-term asset mix targets, from one valuation to the next, and
- Full disclosure of all of the above in the actuarial valuation report.

I think it would be very useful for the Canadian Institute of Actuaries to tighten its standards of practice regarding selection of the valuation interest rate, along these lines.
5. DIFFERENT STAKEHOLDER PERSPECTIVES

There are a number of perspectives from which to consider the choice of approach to establishing the valuation interest rate. Here we will consider five:

- The law,
- The sponsors (employer and union) of a defined benefit pension plan,
- The trustees of a negotiated cost pension plan,
- The plan member and beneficiary, and
- The actuarial profession.

5.1 The Law

At present, in the various jurisdictions in Canada, the law generally requires that the actuarial assumptions be appropriate and in accordance with accepted actuarial practice. That means the assumptions are established in conformance with the standards of practice of the Canadian Institute of Actuaries (“the CIA”) or, if not in conformance with those standards, would attract a consensus among the actuarial profession as being acceptable actuarial practice\textsuperscript{12}.

At present, the standards of practice stipulate that “the appropriate model assumption for a matter is the best estimate assumption of that matter, modified, if appropriate, to make provision for adverse deviations, and taking account of …, in the case of assumptions on economic matters for calculation of liabilities in a balance sheet, the assets which support those liabilities at the calculation date and the expected policy for asset-liability management after that date.”\textsuperscript{13}. This means that the CIA standards of practice currently clearly approve the use of the traditional method. This does not mean that the financial economics approach is not a reasonable and acceptable approach, but it is a newer approach and it has not yet been shown to be accepted by consensus among the actuarial profession. Thus, its use may not currently be accepted actuarial practice and thus may not currently meet the letter of the law.

Even if it were to become accepted by consensus among the actuarial profession, it might take a few years before that change in accepted actuarial practice were accepted under the laws of all of the jurisdictions in Canada, as the law in some jurisdictions refers to the CIA standards of practice as they stood at a specific time.

The law does not currently distinguish much between plans by the degree of financial risk borne by the employer, the employees and the pensioners and beneficiaries respectively or even by whether the plan is a unilateral employer sponsored defined benefit plan, collectively bargained defined benefit plan or negotiated cost plan. Perhaps more consideration should be given to this. Presumably, if accepted actuarial practice were to distinguish by degree of risk borne or between these types of plans the law would also distinguish between them by virtue of its reliance on accepted actuarial practice, at least initially. However, such a change in actuarial practice might also prompt a review of the law by our legislatures.
5.2 The Sponsors (Employer and Union) of a Defined Benefit Pension Plan

The employer, like the capital markets, has a direct and substantial interest in the use of the financial economics approach. This approach aligns the risk management of the pension plan (measured by reference to financial economics) with the risk management of the rest of the employer’s operations (also measured by reference to financial economics). It makes it easier for the employer to choose whether to use its entire risk budget in making risky operating investments, risky pension investments or some of both, since both sets of risks are measured on the same scale. Most employers will also want to satisfy the reporting needs of the capital markets (in particular, the traders), and this approach does that.

The Union has an interest in obtaining both the highest benefits and a high level of security of those benefits. This should lead to a strong focus on finding a suitable balance between these two goals in the margin against adverse deviations. The Union will also have a strong interest in maintaining a balance between, on the one hand, amount of and security of benefits for current plan members and, on the other, intergenerational equity as between past, current and future plan members. The union would not normally wish the pension plan risk profile to be determined by the employer’s (or the capital market’s) preference as between the plan sponsor’s operational and pension plan risks.

5.3 The Trustees of a Negotiated Cost Pension Plan

The trustees of a negotiated cost pension plan will normally want to balance the application of assets to current margins and to current and future benefits. They will not want the pension plan risk profile to be determined by the employer’s preference as between operational and pension plan risks.

5.4 The Members and Beneficiaries of a Pension Plan

The active members of the plan will have an interest in both margins of security and levels of benefit, and will be in a position to take a very long-term view. Pensioners and other beneficiaries now receiving payments will normally take a shorter-term view and will normally place more emphasis on security of benefit than on level of future benefits. It is unlikely that either group will want the pension plan risk profile to be determined by the employer’s preference as between operational and pension plan risks.

5.5 The Actuarial Profession

The actuarial profession will wish to be relevant to, and of service to, its various publics, including all of the parties noted above. Thus, it may wish to debate this issue at some length and develop a suitable resolution to the debate. Once the debate is resolved in principle, the profession may wish to consider developing standards that provide more guidance than at present for calculation and reporting based on that suitable resolution.
6. POSSIBLE RESOLUTION OF DIFFERENCES

The actuarial profession could attempt to resolve this issue by deciding that accepted actuarial practice should include, alternatively:

- only the traditional approach;
- only the financial economics approach;
- only the financial economics approach for defined benefit pension plans and only the traditional approach for negotiated cost plans;
- only the financial economics approach for defined benefit plans where only the employer contribution varies with the financial experience of the plan;
- the traditional approach for all plans for the main valuation of the plan, with supplemental calculations on the financial economics approach for all defined benefit plans (for purposes of the employers management of total corporate risk and for corporate financial reporting to shareholders and the capital markets);
- the traditional approach for all plans for the main valuation of the plan, with supplemental calculations on the financial economics approach for those defined benefit plans where the employer wishes to have those results (for purposes of the employers management of total corporate risk and for corporate financial reporting).

It would be useful for the profession to consult with the various stakeholders noted above before trying to resolve the issue.

My own view based on all of the foregoing analysis is that the financial economics approach has not yet made the traditional approach obsolete. The financial economics approach has particular relevance to funding where, inter alia:

- the benefits are pure defined benefit, precise, and will not be ad hoc indexed or changed;
- future new members are not a concern;
- the plan is funded solely by employer contributions;
- the plan sponsor has little or no tolerance for variations in contribution rates in the shorter term; and
- the plan sponsor can afford the higher pension costs or else has alternative sources to obtain the risk premium (i.e., through risky operations) and uses those sources and/or the shareholders of the plan sponsor have alternative funds to place in risky investments and do that.

To the degree that the circumstances of the plan vary from that extreme set of conditions, the applicability of the financial economics approach declines.

In cases where

- there is an opportunity for higher benefits over the long term if the fund is invested partly in equities,
- the cost and the contribution risk is shared by members and the employer,
- the plan sponsor has some tolerance for volatility of contribution rates,
- the plan sponsor has no alternative sources to obtain the risk premium or does not use them, or
• the shareholders of the plan sponsor do not have alternative funds to place in risky investments or do not so invest those funds, there is still good reason to use the traditional approach.

In my view, switching the method used to select the valuation interest rate for funding valuations from the traditional approach to the financial economics approach is not warranted for most plans today. On the other hand, there are useful lessons to be learned from the financial economics approach and there are useful purposes to be served by calculations based on the financial economics approach. My preference under the circumstances is the sixth alternative (i.e., traditional approach for all plans, with the option of having supplemental calculations on the financial economics approach).

This, however, tells only part of the story. I think the actuarial profession should develop improved methodologies and standards for the development of valuation interest rates based on the traditional approach. This should include more disciplined and rigorous best estimates of those rates, distinct margins for adverse deviations (to protect against both short-term and long-term risks, and recognizing the tolerance most contributors have for some volatility of contributions), meaningful measures of adequacy of those margins and improved disclosure of these matters.

Moreover, it may be time for lawmakers to legislate clear and rational minimum margins for funding. For this, it will be helpful if the actuarial profession can develop meaningful measures of adequacy of margins, and the cost implications of varying levels of margins, and assist the lawmakers in making appropriate decisions.

7. POSSIBLE ROLE OF THE CANADIAN INSTITUTE OF ACTUARIES

Because the law says that the funding and solvency calculations must be in accordance with accepted actuarial practice, and because it is in accordance with the Institute’s Guiding Principles to do so, it seems logical for the actuarial profession take an active role in studying and resolving this issue, and to do so with extensive consultation with all of the stakeholders.


2 I am using the term “financial economics” approach, as did Bader and Gold. The Canadian Institute of Actuaries Task Force on Transfer Values used the term “market-based” for this approach

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