APPENDICES

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APPENDIX A

THE FAIR RETURN STANDARD

The requirements for a fair return arise from legal precedents which are echoed in numerous regulatory decisions across North America.[1] Three standards for a fair return have arisen from the legal precedents for establishing a fair return, the capital attraction, financial integrity and comparable returns, or comparable investment, standard. The principal Court cases in Canada and the U.S. establishing the standards include *Northwestern Utilities Ltd.* v. *Edmonton (City)*, [1929] S.C.R. 186; *Bluefield Water Works & Improvement Co. v. Public Service Commission of West Virginia, 262 U.S. 679, 692 (1923)*; and, *Federal Power Commission v. Hope Natural Gas Company (320 U.S. 591 (1944))*.

In *Northwestern*, Mr. Justice Lamont stated

> The duty of the Board was to fix fair and reasonable rates; rates which, under the circumstances, would be fair to the consumer on the one hand, and which, on the other hand, would secure to the company a fair return for the capital invested. By a fair return is meant that the company will be allowed as large a return on the capital invested in its enterprise (which will be net to the company) as it would receive if it were investing the same amount in other securities possessing an attractiveness, stability and certainty equal to that of the company's enterprise.

[1] The three requirements were summarized by the National Energy Board (RH-2-2004, Phase II) as follows:

> "The Board is of the view that the fair return standard can be articulated by having reference to three particular requirements. Specifically, a fair or reasonable return on capital should:
> - be comparable to the return available from the application of the invested capital to other enterprises of like risk (the comparable investment standard);
> - enable the financial integrity of the regulated enterprise to be maintained (the financial integrity standard); and
> - permit incremental capital to be attracted to the enterprise on reasonable terms and conditions (the capital attraction standard)."

The three requirements were reiterated in the *Reasons for Decision*, *Trans Québec and Maritimes Pipelines Inc., RH-1-2008, March 2009* (pages 6-7).

In *Bluefield*, the criteria for a fair return were described as follows:

> A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties; but it has no constitutional right to profits such as are realized or anticipated in highly profitable enterprises or speculative ventures. The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties.

In *Hope*, Justice Douglas stated,

> By that standard the return on equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital.

In summary, a fair return gives a regulated utility the opportunity to:

1. earn a return on investment commensurate with that of comparable risk enterprises;
2. maintain its financial integrity; and,
3. attract capital on reasonable terms.

The legal precedents make it clear that the three requirements are separate and distinct. Moreover, none of the three requirements is given priority over the others. The fair return standard is met only if all three requirements are satisfied. In other words, the fair return standard is only satisfied if the utility can attract capital on reasonable terms and conditions, its financial integrity can be maintained ***and*** the return allowed is comparable to the returns of enterprises of similar risk.

The fact that the allowed return is applied to an original cost rate base is key to distinguishing between the capital attraction/financial integrity standards and the comparable returns standards.

The base to which the return is applied determines the dollar earnings stream to the utility, which, in turn, generates the return to the shareholder (dividends plus capital appreciation). In the early years of rate of return regulation in North America, there was considerable debate over how to measure the investment base. The controversy arose from the objective that the price for a public utility service should allow a fair return on the fair value of the capital invested in the business. The debate focused on what constituted fair value: Was it historic cost, reproduction cost, or market value? Ultimately, *Hope* opted for the "reasonableness of the end result" rather than the specification of a particular method of rate base determination. The use of a historic cost rate base became the norm because it provided an objective, measurable point of departure to which the return would be applied. There is no prescription, however, that the historic cost rate base itself constitutes the "fair value" of the investment.

Nevertheless, regulators' application of a capital market-derived "cost of attracting capital" to a historic rate base in principle will result in the market value of the investment trending toward the historic cost based on the erroneous assumption that this equates to "fair value". The "fair value equals original cost" result arises from the way "cost" has typically been interpreted and applied in determining other cost elements in the regulation of North American utilities. For most utilities, rates are set on the basis of book costs; that concept has been applied to the cost of debt and depreciation expense, as well as to all operating and maintenance expenses.

For economists, the theoretically appropriate definition of cost is marginal or incremental cost. For regulated utilities historic costs have been substituted for marginal or incremental costs for two reasons: first, as a practical matter, long-run incremental costs are difficult to measure; second, for the capital intensive utility industries, pricing on the basis of short-run marginal costs would not cover total costs incurred.

The determination of the return on common equity for regulated companies has traditionally been a "hybrid" concept. The cost of equity is a forward-looking measure of the equity investors' required return. It is, therefore, an incremental cost concept. The required equity return is not, however, applied to a similarly determined rate base (that is, current cost). It is applied to an original cost rate base. When there is a significant difference between the historic original cost rate base and the corresponding current cost of the investment, application of a current cost of attracting capital to an original cost rate base produces an earnings stream that is significantly lower than that which is implied by the application of that same cost rate to market value. The divergence between the earnings stream implied by the application of the return to book value rather than market value is magnified as a result of the long lives of utility assets.

The current cost of attracting capital is measured by reference to market values. The discounted cash flow test, for example, measures the return that investors require on the market value of the equity. For a utility regulated on the basis of original cost book value, the current cost of attracting equity capital is only equivalent to the return investors require on book value when the market value of the common stock is equal to its book value. As the market value of the equity of regulated utilities increases above its book value, the application of a market-value derived cost of equity to the book value of that equity increasingly understates investors' return requirements (in dollar terms).

Some would argue that the market value of utility shares should be equal to book value. However, economic principles do not support that conclusion. A basic economic principle establishes the expected relationship between market value and replacement cost which provides support for market prices in excess of original cost book value. That economic principle holds that, in the longer-run, in the aggregate for an industry, market value should equal replacement cost of the assets. The principle is based on the notion that, if the market value of firms exceeds the replacement cost of the productive capacity, there is an incentive to establish new firms. The existence of additional firms would lower prices of goods and services, lower profits and thus reduce market values of all the firms in the industry. In the opposite circumstance, there is an incentive to disinvest, i.e., to not replace depreciated assets. The disappearance of firms would push up prices of goods and services; raise the profits of the remaining firms, thereby raising the market values of the remaining firms. In equilibrium, market value should equal replacement cost. In the presence of inflation, even at moderate levels, absent significant technological advances, replacement cost should exceed the original cost book value of assets. Consequently, the market value of utility shares should be expected to exceed their book value.

Therefore, when the allowed return on original cost book value is set, a market-derived cost of attracting capital must be converted to a fair and reasonable return on book equity. The conversion of a market-derived cost of capital to a fair return on book value ensures that the stream of dollar earnings on book value equates to the investors' dollar return requirements on market value.

APPENDIX B

DISCOUNTED CASH FLOW TEST

1. Conceptual Underpinnings

The discounted cash flow (DCF) approach proceeds from the proposition that the price of a common stock is the present value of the future expected cash flows to the investor, discounted at a rate that reflects the risk of those cash flows. If the price of the security is known (can be observed), and if the expected stream of cash flows can be estimated, it is possible to approximate the investor's required return, which is the rate that equates the price of the stock to the discounted value of future cash flows.

The DCF model is a positive model; that is, it deals with "what is" as opposed to "what should be". The DCF test allows the analyst to directly estimate the utility cost of equity, in contrast to the Capital Asset Pricing Model (CAPM), a cost of equity model which has been favoured by Canadian regulators in recent years.[2] The DCF model is widely used; it is the principal model utilized by U.S. regulators.

2. DCF Models

There are multiple versions of the discounted cash flow model available to estimate the investor's required return. An analyst can employ a constant growth model or a multiple period model to estimate the cost of equity. The constant growth and three-stage versions of the model are discussed below. To estimate the DCF cost of equity, I utilized both a constant growth and a three-stage model.

[2] The CAPM is discussed in detail in Appendix C.

a. Constant Growth Model

The constant growth model rests on the assumption that investors expect cash flows to grow at a constant rate throughout the life of the stock. The assumption that investors expect a stock to grow at a constant rate over the long-term is most applicable to stocks in mature industries. Growth rates in these industries will vary from year to year and over the business cycle, but will tend to deviate around a long-term expected value.

The constant growth model is expressed as follows:

$$\text{Cost of Equity } (\mathbf{k}) = \frac{\mathbf{D_1}}{\mathbf{P_o}} + \mathbf{g},$$

where,

$\mathbf{D_1}$	=	next expected dividend[3]
$\mathbf{P_o}$	=	current price
$\mathbf{g}$	=	constant growth rate

This model, as set forth above, reflects a simplification of reality. First, it is based on the notion that investors expect all cash flows to be derived through dividends. Second, the underlying premise is that dividends, earnings, and price all grow at the same rate. However, it is likely that, in the near-term, investors expect growth in dividends to be lower than growth in earnings.

The model can be adapted to account for the potential disparity between earnings and dividend growth by recognizing that all investor returns must ultimately come from earnings. Hence, focusing on investor expectations of earnings growth will encompass all of the sources of investor returns (e.g., dividends and retained earnings).

[3] Alternatively expressed as $D_o (1 + g)$, where D_o is the most recently paid dividend.

b. Three-Stage Model

My application of the three-stage model is based on the premise that investors expect the growth rate for the utilities to be equal to the company-specific growth rates for the near-term (Stage 1), to migrate to the expected long-run rate of growth in the economy (GDP Growth) (Stage 2) and to equal expected long-term GDP growth in the long term (Stage 3).

Using the three-stage DCF model, the DCF cost of equity is estimated as the internal rate of return that causes the price of the stock to equal the present value of all future cash flows to the investor where the cash flows are defined as follows:

The cash flow per share in Year 1 is equal to:
Last Paid Annualized Dividend x (1 + Stage 1 Growth)

For Years 2 through 5, cash flow is defined as:
Cash Flow $_{t-1}$ x (1 + Stage 1 Growth)

For Years 6 through 10, cash flow is defined as:
Cash Flow $_{t-1}$ x (1 + Stage 2 Growth)

Cash flows from Year 11 onward are estimated as:
Cash Flow $_{t-1}$ x (1 + GDP Growth)

3. Growth Component of the DCF Models

The growth component of the DCF models is an estimate of what investors expect over the longer-term. For a regulated utility, whose growth prospects are tied to allowed returns, the estimate of growth expectations is subject to circularity because the analyst is, in some measure, attempting to project what returns the regulator will allow, and the extent to which the utilities will exceed or fall short of those returns. To mitigate that circularity, it is important to rely on a sample of proxies, rather than the subject company. (When the subject company does not have traded shares, a sample of proxies is required.) Further, to the extent feasible, one should rely on estimates of longer-term growth readily available to investors, rather than superimpose on the analysis one's own view of what growth should be.

a. Constant Growth Model Growth Rates

In the application of the constant growth model, I have relied on two estimates of earnings growth: a consensus of investment analysts' earnings forecasts and an estimate of the sustainable growth rate. The consensus forecasts are obtained from I/B/E/S, a leading provider of earnings expectations data. I/B/E/S compiles data from forecasts made by investment analysts for thousands of publicly traded companies.[4] The I/B/E/S consensus earnings growth rate forecasts utilized for each company are intended to represent the expected annual increase in operating earnings over the next business cycle. In general, these forecasts refer to a period of between three and five years. The I/B/E/S consensus data are reflective of the analyst community's views and, therefore, are a reasonable proxy of (unobservable) investor growth expectations

As an alternative to the consensus of investment analysts' earnings forecasts, I estimated DCF costs of equity for the sample based on sustainable growth rates derived from *Value Line* forecasts of returns on equity, earnings retention rates and earnings growth from external financing.

Sustainable growth, or earnings retention growth, is premised on the notion that future dividend growth depends on both internal and external financing. Internal growth is achieved by the firm retaining a portion of its earnings in order to produce earnings and dividends in the future. External growth measures the long-run expected stock financing undertaken by the utility and the percentage of funds from that investment that are expected to accrue to existing investors. The internal growth rate is estimated as the

[4] I/B/E/S collects data from over 7,000 analysts at over 1,000 institutions worldwide covering companies in more than 60 countries.

fraction of earnings (B) expected to be retained multiplied by expected return on equity (R). The external financing portion of the sustainable growth rate is estimated as the forecast growth in the number of shares of common stock outstanding (S) multiplied by the equity accretion rate (V) which is the fraction of sales of new equity investment expected to accrue to existing stockholders. The V term is calculated as 1-Book Value/Market Price per share. The sustainable growth rate is then calculated as the sum of BR and SV. The external growth component recognizes that investors may expect future growth to be achieved not only through the retention of earnings but also through the issuance of additional equity capital which is invested in projects that are accretive to earnings.

b. Expected Long-Term Growth in the Economy (Stage 3 Growth)

The use of forecast GDP growth in a multi-stage model as the proxy for the rate of growth to which companies will migrate over the longer term is a widely utilized approach. For example, the Merrill Lynch discounted cash flow model for valuation utilizes nominal GDP growth as a proxy for long-term growth expectations. The Federal Energy Regulatory Commission relies on GDP growth to estimate expected long-term nominal GDP growth for conventional corporations in its standard DCF models for gas and oil pipelines.

The use of forecast long-term growth in the economy as the proxy for long-term growth in the DCF model recognizes that, while all industries go through various stages in their life cycle, mature industries are those whose growth parallels that of the overall economy. Utilities are considered to be the quintessential mature industry.

c. Reliability of Forecasts

The reliability of the analysts' earnings growth forecasts as a measure of investor expectations has been questioned by some Canadian regulators. The issue of reliability arises because of the documented optimism of analysts' forecasts historically. However, as long as investors have believed the forecasts, and have priced the securities accordingly, the resulting DCF costs of equity are an unbiased estimate of investors' expected returns. That proposition can be tested indirectly. For the sample of U.S. distribution utilities used in the DCF test, the average expected long-term growth rate, as estimated using analysts' forecasts, for the entire 1995-2009 period of analysis was 4.8%. That growth rate is lower than the expected long-term nominal growth in the economy as a whole has been over the same period.[5] An expected growth rate that is close to that of the economy as a whole would not be out-of-line with the level of growth investors could reasonably expect for the relatively mature utility industries over the longer-term.

4. Selection of Proxy Benchmark Utilities

In applying both the constant growth and three-stage DCF model, the test was applied to a sample of U.S. distribution utilities that are intended to serve as a proxy for a benchmark Canadian distribution utility. The reasons for choosing U.S. companies generally and gas and electric utilities specifically as a proxy for a benchmark Canadian distribution utility are as follows:

First, there are only six publicly-traded Canadian utilities with conventional corporate structures and with a long-term stock trading history. The nature of the operations of these companies has in several instances changed materially over time. Second, there are insufficient forward-looking estimates of long-term growth rates for these companies that would permit the creation of a consistent series of DCF costs of equity and corresponding risk premiums. A consensus estimate of growth expectations is critical to the application of the discounted cash flow model and to the ability to estimate the relationship between the cost of equity and interest rates.

[5] The average expected long-term nominal rate of growth in the U.S. economy, based on consensus forecasts (Blue Chip *Economic Indicators*, March editions, 1995-2009), has been 5.2% over the same period covered by the DCF-based equity risk premium test, discussed in Appendix D.

Third, U.S. regulated companies are reasonable proxies for estimating the cost of equity for a benchmark Canadian gas distribution utility. The operating (or business) environments are similar, the regulatory model in the U.S. is similar to the Canadian model, Canadian and U.S. capital markets are significantly integrated and the cost of capital environment, as indicated by relatively similar levels of interest rates, is comparable.

The sample of low risk U.S. distribution utilities selected was comprised of all gas and electric distribution utilities satisfying the following criteria:

Gas Distribution Utility Criteria:

a. Classified by *Value Line* as a gas distributor;

b. Greater than 80% of assets in gas operations;

c. Consistent history of I/B/E/S analysts' forecasts;

d. Standard & Poor's and Moody's debt ratings of BBB+/Baa1 or higher;

e. Paid dividends in 2009.

Electric Distribution Utility Criteria:

a. Classified by *Value Line* as an electric utility;

b. Has more than 80% of its assets in electric or gas distribution operations, less than 5% of its total assets devoted to electricity generation and is not a pure electric transmission utility;

c. Consistent history of I/B/E/S analysts' forecasts;

d. Standard & Poor's and Moody's debt ratings of BBB+/Baa1 or higher;

e. Paid dividends in 2009.

The nine utilities[6] meeting the criteria are in the same business risk category as the typical Canadian utility[7] and are rated no lower than BBB+/Baa1 by both Standard & Poor's and

[6] The same sample of nine utilities is used in the application of the DCF-Based Risk Premium Test as discussed in Appendix D.

Moody's. (Schedule 7) The average debt ratings of the sample are A (S&P) and A3 (Moody's), similar to those of the universe of Canadian utilities with rated debt (Schedule 3). The median *Value Line* Safety rank of the U.S. distribution utility sample is 1; the Safety ranks of both of the two Canadian regulated companies covered by *Value Line* (TransCanada Corp. and Enbridge Inc.) are higher, at 2.[8] To the extent that the business risks of the U.S. distribution utilities are viewed as higher than the typical Canadian distribution utility, the U.S. utilities have higher common equity ratios (lower financial risk). The average common equity ratio of the sample of U.S. distribution utilities (based on the average of the last four quarters ending December 2009) was approximately 49% (Schedule 7), compared to a typical common equity ratio for Canadian gas distribution utilities of approximately 40% (Schedule 4).

5. Application of the DCF Models

a. Constant Growth Model

The constant growth DCF model was applied to the sample of U.S. low risk gas and electric distribution utilities using the following inputs to calculate the dividend yield:

(1) the average of the monthly high and low prices for the period January 1 to May 25, 2010 as P_o.

(2) the annualized dividend paid over the period January 1 to May 25, 2010.

The two estimates of long-term growth, the consensus of investment analysts' long-term earnings growth forecasts compiled by I/B/E/S and estimates of sustainable growth, were used in applying the constant growth model. For the model based on investment

[7] All of the utilities in the proxy sample of U.S. utilities have an "Excellent" business profile, as do the majority of Canadian utilities whose debt is rated by S&P.

[8] The Safety rank represents Value Line's assessment of the relative total risk of the stocks. The ranks range from "1" to "5", with stocks ranked "1" and "2" most suitable for conservative investors. The most important influences on the Safety rank are the company's financial strength, as measured by balance sheet and financial ratios, and the stability of its price over the past five years.

analysts' earnings forecasts, the average January to May 2010 I/B/E/S consensus (mean) earnings growth forecasts were used to estimate "g" in the growth component for each utility and to adjust the current dividend yield to the expected dividend yield.

Table B-1 below summarizes the results of the application of the constant growth model.

Table B-1

Growth Forecast	DCF Cost of Equity	
	Mean	**Median**
I/B/E/S Analysts' Forecasts	9.9%	9.7%
Sustainable Growth (*Value Line*)	9.9%	9.2%

Source: Schedules 8 and 9.

The results of the two constant growth models summarized in Table B-1 above indicate a cost of equity of approximately 9.7% based on both means and medians.

b. Three-Stage Model

The three-stage model relies on the I/B/E/S consensus of analysts' earnings forecasts for the first five years (Stage 1), the average of the I/B/E/S and the forecast long-term growth in the economy for the next five years (Stage 2) and the long-term growth in the economy thereafter (Stage 3). The long-run (2011-2020) expected nominal rate of growth in GDP is 5.0% based on the consensus of economists' forecasts (published twice annually) found in Blue Chip *Economic Indicators*, March 10, 2010.

The three-stage DCF model estimates of the cost of equity for the benchmark low risk U.S. distribution utility sample (Schedule 10) are as follows:

Mean	9.5%
Median	9.5%

c. Results of the Constant Growth and Three-Stage Models

The results of the two models indicate a required "bare-bones" return on equity of approximately 9.5% (three-stage model) to 9.7% (constant growth model).

APPENDIX C

RISK-ADJUSTED EQUITY MARKET RISK PREMIUM TEST

1. Conceptual Underpinnings of the Risk-Adjusted Equity Market Risk Premium Test

The risk-adjusted equity market risk premium approach to estimating the required equity risk premium for a benchmark distribution utility entails (1) estimating the equity risk premium for the equity market as a whole; (2) estimating the relative risk adjustment; and (3) applying the relative risk adjustment to the equity market risk premium, to arrive at the required equity risk premium for a benchmark distribution utility. The cost of equity is thus estimated as:

$$\text{Risk-Free Rate} + \left\{ \text{Relative Risk Adjustment} \times \text{Market Risk Premium} \right\}$$

The risk-adjusted equity market risk premium test is a variant of the Capital Asset Pricing Model (CAPM).

2. The Capital Asset Pricing Model

The CAPM is a theoretical, formal model of the equity risk premium test which posits that the investor requires a return on a security equal to:

$$\mathbf{R_F \quad + \quad \beta(R_M - R_F),}$$

Where:

$\mathbf{R_F}$ = risk-free rate

$\boldsymbol{\beta}$ = covariability of the security with the market (M)

$\mathbf{R_M}$ = return on the market.

The model is based on restrictive assumptions, including:

a. Perfect, or efficient, markets exist where,

(1) each investor assumes he has no effect on security prices;

(2) there are no taxes or transaction costs;

(3) all assets are publicly traded and perfectly divisible;

(4) there are no constraints on short-sales; and,

(5) the same risk-free rate applies to both borrowing and lending.

b. Investors are identical with respect to their holding period, their expectations and the fact that all choices are made on the basis of risk and return

The CAPM relies on the premise that an investor requires compensation for non-diversifiable risks only. Non-diversifiable risks are those risks that are related to overall market factors (e.g., interest rate changes, economic growth). Company-specific risks, according to the CAPM, can be diversified away by investing in a portfolio of securities whose expected returns are not perfectly correlated. Therefore, a shareholder requires no compensation to bear company-specific risks.

In the CAPM, non-diversifiable risk is captured in the beta. Theoretically, the beta is a forward looking estimate of the contribution of a particular stock to the overall risk of a portfolio. Beta measures the volatility of a particular stock or portfolio of stocks, relative to the volatility of the market. Specifically, the beta is equal to:

$$\frac{\text{Covariance}\ (R_E, R_M)}{\text{Variance}\ (R_M)}$$

The variance of the market return is intended to capture the uncertainty related to economic events as they impact the market as a whole. The covariance between the return on a particular stock and that of the market reflects how responsive the required return on an individual security is to changes in events that also change the required return on the market. In practice, the beta is a calculation of the historical correlation between the overall equity market returns, as proxied in Canada by the returns on S&P/TSX Composite, and the returns on individual stocks or portfolios of stocks.

The CAPM is a normative model, that is, it estimates the equity return that an investor **should** require under the restrictive assumptions outlined above, based on the systematic risk of the stock relative to the overall equity market.

3. Risk-Free Rate

a. The theoretical CAPM assumes that the risk-free rate is uncorrelated with the return on the market. In other words, the assumption is that there is no relationship between the risk-free rate and the equity market return (i.e., the risk-free rate has a zero beta). However, the application of the model frequently assumes that the return on the market is highly correlated with the risk-free rate, that is, that the equity market return and the risk-free rate move in the same direction.

b. The theoretical CAPM calls for using a risk-free rate, whereas the typical application of the model in the regulatory context employs a long-term government bond yield as a proxy for the risk-free rate. Long-term government bond yields may reflect various factors that render them problematic as an estimate of the "true" risk-free rate, including:

(1) Long-term government bond yields are not risk-free; they are subject to interest rate risk. The size of the equity market risk premium at a given point in time depends in part on how risky long-term government bond yields are relative to the overall equity market. The need to capture and measure changes in the risk of the so-called risk-free security introduces a further complication in the application of the CAPM, particularly as the changes impact the measurement of the equity market risk premium.

(2) The yield on long-term government bonds reflects the impact of monetary and fiscal policy; e.g., the potential existence of a scarcity premium. The Canadian federal government was in a surplus position for eleven years (from 1997/1998 to 2008/2009), which reduced its financing requirements.[9] However, the demand for long-term government securities by institutions (e.g., pension funds) that match assets and liabilities has not declined. The pension funds, key purchasers of long-term government bonds, are typically buy and hold investors which means that the government bonds in their portfolios do not trade. Thus, there is the potential not only for a scarcity premium in prices due to the demand for long-term government bonds, but also potential illiquidity in the market.

(3) Yields on long-term government bonds may reflect shifting degrees of investors' risk aversion; e.g., "flight to quality". An increase in the equity risk premium arising from a reduction in bond yields due to a "flight to quality" is not likely to be captured in the typical application of the CAPM which focuses on a long-term average market risk premium. Particularly in periods of capital market upheaval, e.g., the "Asian contagion" in the fall of 1998, during the technology sector sell-off beginning in mid-2000, the post 9/11 period, and in the wake of the subprime mortgage crisis commencing in late 2007, investors have shifted to the safe haven of government securities, pushing down government bond yields and increasing the required equity risk premium. The typical application of the CAPM captures the lower government bond yields, but not the increase in the equity risk premium.

(4) The radical change in Canada's fiscal performance over the past decade has contributed to a steady decline in long-term government bond yields and a corresponding increase in total returns achieved by investors in long-term government securities. As a result, the achieved equity market risk premiums in Canada have been squeezed by the performance of the government bond market. The low prevailing and forecast long-term Government of Canada bond yields

[9] The Federal government is anticipating budget deficits for fiscal years 2009/10 to 2014/15.

relative to both the historic yields and total returns on those securities indicate that the historic yields and returns on long-term Government of Canada bonds overstate the forward looking risk-free rate.

4. The Market Risk Premium

a. Introduction

An investor in common equity assumes greater risk than an investor in bonds and, as a result, requires a premium above bond yields in compensation for assuming that additional risk. The market risk premium is the equity risk premium for the equity market as a whole. As used within the context of a forward-looking equity risk premium test, it is estimated as the difference between the expected equity return on the market and the risk-free rate. However, the expected (or required) equity return on the market is unobservable and must be estimated. The estimation of the expected equity market risk premium starts with an analysis of historical market returns and risk premiums. The historical market risk premium can be calculated by subtracting a long-term average of the return on a riskless asset, typically a long-term government bond, from the long-term average stock market return. The estimation of the expected market risk premium from achieved market risk premiums is premised on the notion that investors' return expectations and requirements are linked to their past experience.

b. Use of Arithmetic Averages of Historic Returns to Estimate the Expected Equity Market Risk Premium

When historic risk premiums are used as a basis for estimating the expected equity market risk premium, arithmetic averages, not geometric (compound) averages, should be used. The geometric average, which is appropriate for use in describing historic portfolio performance, represents the achieved return as if it had been a constant average annual return. Using the arithmetic average of all past returns recognizes the probability distribution of future outcomes based on past variations in annual returns. Expressed simply, the arithmetic average captures the unpredictability of future returns based on the volatility of past returns; the geometric average masks the historic volatility by smoothing over annual differences.

(1). Rationale for the Use of Arithmetic Averages

In Robert F. Bruner, Kenneth M. Eades, Robert S. Harris, and Robert C. Higgins, "Best Practices in Estimating the Cost of Capital: Survey and Synthesis", *Financial Practice and Education*, Spring/Summer 1998, pp. 13-28, the authors found that 71% of the texts and tradebooks in their survey supported use of an arithmetic mean for estimation of the cost of equity. One such textbook, Richard A. Brealey, Stewart C. Myers and Franklin Allen, *Principles of Corporate Finance,* Boston: Irwin/McGraw Hill, 2006 (p. 151), states, "Moral: If the cost of capital is estimated from historical returns or risk premiums, use arithmetic averages, not compound annual rates of return."

The appropriateness of using arithmetic averages, as opposed to geometric averages, for estimation of the cost of equity is succinctly explained in Ibbotson Associates; *Stocks, Bonds, Bills and Inflation*, *1998 Yearbook*, pp. 157-159:

> The expected equity risk premium should always be calculated using the arithmetic mean. The arithmetic mean is the rate of return which when compounded over multiple periods, gives the mean of the probability distribution of ending wealth values . . . in the investment markets, where returns are described by a probability distribution, the arithmetic mean is the measure that accounts for uncertainty, and is the appropriate one for estimating discount rates and the cost of capital.

Triumph of the Optimists: 101 Years of Global Investment Returns by Elroy Dimson, Paul Marsh and Mike Staunton, Princeton: Princeton University Press, 2002 (p. 182), stated, The arithmetic mean of a sequence of different returns is always larger than the geometric mean. To see this, consider equally likely returns of +25 and –20 percent. Their arithmetic mean is 2½ percent, since (25 – 20)/2 = 2½. Their geometric mean is zero, since (1 + 25/100) x (1 – 20/100) – 1 = 0. But which mean is the right one for discounting risky expected future cash flows? For forward-looking decisions, the arithmetic mean is the appropriate measure.

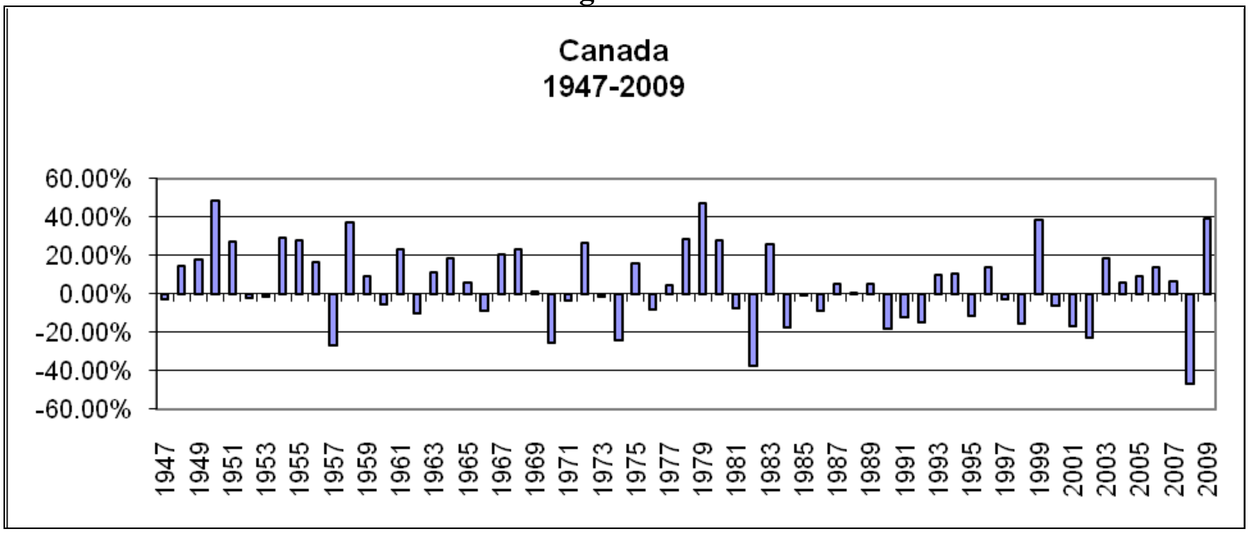
To verify that the arithmetic mean is the correct choice, we can use the 2½ percent required return to value the investment we just described. A $1 stake would offer equal probabilities of receiving back $1.25 or $0.80. To value this, we discount the cash flows at the arithmetic mean rate of 2½ percent. The present values are respectively $1.25/1.025 = $1.22 and $0.80/1.025 = $0.78, each with equal probability, so the value is $1.22 x ½ + $0.80 x ½ = $1.00. If there were a sequence of equally likely returns of +25 and –20 percent, the geometric mean return will eventually converge on zero. The 2½ percent forward-looking arithmetic mean is required to compensate for the year-to-year volatility of returns.

(2) Randomness of Annual Equity Market Risk Premiums

The use of arithmetic averages is premised on the unpredictability of future risk premiums. The following figures illustrate the uncertainty in the future risk premiums by reference to the historic annual risk premiums. The figures for both Canada and the U.S. suggest that each year's actual risk premium has been random, that is, not serially correlated with the preceding year's risk premium.[10]

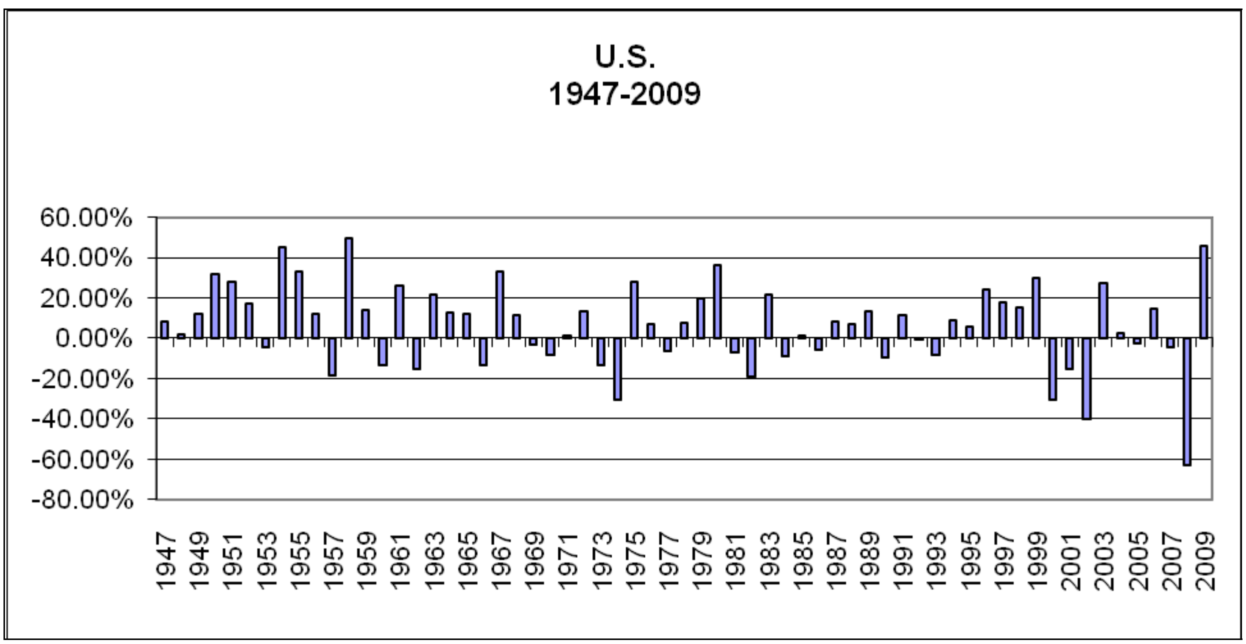
[10] A test for serial correlation between the year-to-year equity risk premiums shows that the serial correlation between the current year's risk premium and that of the prior year for the period 1947-2009 is -0.02 for Canada and -0.11 for the U.S. If the current year's risk premium were predictable based on the prior year's risk premium, the serial correlation would be close to positive or negative 1.0.

Figure C-1



Source: Canadian Institute of Actuaries, *Report on Canadian Economic Statistics, 1924-2006*; Ibbotson, *Canadian Risk Premia Over Time 2008*, *TSX Review* and Bank of Canada

Figure C-2



Source: Ibbotson Associates, *Stocks, Bonds, Bills & Inflation, 2010 Yearbook*

c. Income Bond Returns versus Total Bond Returns

The application of the CAPM requires the estimation of the market return in relation to the risk-free rate. While government bonds are considered default-free, they are not risk-free; they are subject to interest rate risk. The total bond returns experienced include capital gains and losses resulting from changes in interest rates over time. The bond income return, in contrast, reflects only the bond coupon payment portion of the total bond return; it represents the riskless component of the bond return. In principle, using the bond income return more accurately measures the historic equity risk premium above a true risk-free rate.

d. Globalization and Relevance of U.S. Equity Market Experience

The historic Canadian equity and government bond returns each incorporate various factors that call into question whether they would be a realistic representation of expected risk premiums (e.g., capital held captive in Canada as a matter of policy, lack of equity market liquidity and diversity, and the higher risk of the Government of Canada bond market historically, which has since dissipated). The U.S. equity market has historically been the principal alternative for Canadian investors to domestic equity investments. Therefore, analysis of historic risk premiums should not be limited to the Canadian experience, but should also take into account the U.S. equity market as a relevant benchmark for estimating the equity risk premium from the perspective of Canadian investors.

(1). The Canadian Equity Market Experience

Several factors inherent in the Canadian equity market make historic Canadian equity returns problematic in estimating the forward-looking expected equity market return. First and foremost, the Canadian equity market has been, and continues to be dominated by a relatively small number of sectors; the returns do not reflect those of a fully diversified portfolio.

Historically, the Canadian equity market composite has been dominated by resource-based stocks. At the end of 1980, no less than 46% of the market value of the TSX Composite Index (previously the TSE 300), was resource-based stocks.[11] The next largest sector, financial services, at less than 15% of the total market value of the composite, was a distant second. With the rise of the technology-based sectors and the increasing market presence of financial services, at the end of 2000, resource-based stocks had dropped to less than 20% of the total market value of the TSX Composite Index. By comparison, as indicated in Table C-1 below, the technology-based and financial service sectors accounted for over half of the market value of the index.

Table C-1

	1980	**2000**
Information Technology	0.9%	24.1%
Telecommunication Services	4.8%	6.5%
Financial Services	13.5%	24.1%
Total	19.2%	54.7%

Source: *TSE Review*, December 1980 and December 2000.

With the technology sector bust in 2000-2001, and the run-up in commodity prices commencing in 2004, the resource-based sectors reclaimed dominance. At the end of 2007, the energy and materials (largely mining) sectors accounted for close to 45% of the total market value of the composite. Including the financial services sector, three sectors accounted for close to 75% of the total market value of the composite. Despite the sharp decline in commodity prices in 2008-2009

[11] As measured by the oil and gas, gold and precious minerals, metals/minerals, and pulp and paper products sectors. Excludes "the conglomerates sector", which also contained stocks with significant commodity exposure.

and the fall-out of the sub-prime mortgage crisis, the same three sectors continued to represent just over three-quarters of the value of the S&P/TSX Composite Index at the end of 2009.

By comparison, the U.S. market has been significantly more diversified among industry sectors. A comparison of market weights in Canada and the U.S. of the major sectors at December 2009 demonstrates the difference.

Table C-2

Sector	S&P/TSX Canada	S&P 500 U.S.
Consumer Discretionary	4.3%	9.0%
Consumer Staples	2.8%	11.7%
Energy	27.6%	11.2%
Financials	30.5%	15.4%
Health Care	0.5%	13.4%
Industrials	5.6%	9.9%
Information Technology	3.5%	19.0%
Materials	19.4%	3.4%
Telecommunication Services	4.3%	3.1%
Utilities	1.7%	3.8%

Source: *TSX Review,* December 2009 and Standardandpoors.com.

Even within the remaining areas of the Canadian market (the approximately 25% accounted for by the non-resource and non-financial sectors); there are various sectors of the economy that are relatively underrepresented, e.g., pharmaceuticals, health care and retailing.

Further, the performance of the Canadian equity market as the "market portfolio" has been, at different periods of time, unduly influenced by a small number of companies. In mid-2000, before the debacle in Nortel Networks' stock value, Nortel shares alone accounted for almost 35% of the total market value of the TSX Composite Index as compared to the largest stock in the S&P 500 at that time (General Electric) which accounted for only 4% of total market value. In 2007, two stocks, Potash Corporation and Research in Motion, were responsible for approximately half of the gain in the S&P/TSX Composite Index. The undue influence of a small number of stocks requires caution in drawing conclusions from the history of the Composite regarding the forward-looking market risk premium.

Criticism of the former TSE 300 Index cited the lack of liquidity as well as questioned the quality and size of the stocks which comprised the index. In a speech in early 2002, Joseph Oliver, President and CEO of the Investment Dealers Association of Canada stated,

> Over the last 25 years, the TSE 300 has steadily declined as a relevant benchmark index. Part of the problem relates to the illiquidity of the smaller component companies and part to the departure of larger companies that were merged or acquired. Over the last two years, 120 Canadian companies have been deleted from the TSE 300.
>
> When a company disappears from a US index due to a merger or acquisition, that doesn't affect the U.S. market's liquidity. An ample supply of large cap, liquid U.S. companies can take its place. In Canada, when a company merges or is acquired by another company, it leaves the index and is replaced by a smaller, less liquid Canadian company. We have seen this over the last two years, -- notably in the energy sector. Over the next few years, we are likely to see it in financial services, where further consolidation is inevitable. Over time, Canada's senior index has become less diversified, with more smaller component companies. As a result, as many as 75 of the TSE 300 will not qualify for inclusion in the new S&P/TSE Composite Index.

Standard & Poor's and the TSX addressed some of these concerns when they overhauled the TSE 300 in May 2002, creating the S&P/TSX Composite Index. The overhaul of the index, which included more stringent criteria for inclusion, did not require that a specific number of companies be included in the index. As a result, only 275 companies were initially included instead of the previous 300.

At December 31, 2009 there were 211 companies in the S&P/TSX Composite Index, including 44 income trusts.

The addition of income trusts in 2005 represented a significant change in the make-up of the Composite Index. From the beginning of the decade to their peak in late 2006, the market value of income trusts grew rapidly, from a market capitalization of approximately $20 billion, to more than $200 billion. At the end of September 2006, prior to the announced change in tax treatment for income trusts, they accounted for over 11.5% of the total market value of the S&P/TSX Composite. At the end of 2009, income trusts continued to be a significant component of the S&P/TSX, accounting for approximately 21% of the issues and 7% of the value of the index.

Despite the change to the income tax treatment of income trusts announced in October 2006, income trusts significantly outperformed "conventional" equities during the period for which income trust market data are readily available. The annual compound total return for the S&P/TSX Capped Income Trust Index over the 1998-2009 period averaged 13.1%, compared to 6.9% for the S&P/TSX Composite Index. The exclusion of income trust returns from the S&P/TSX Composite Index prior to 2005 means that the measured equity returns using the Composite Index understate the actual equity market returns achieved by Canadian investors.

A further complication with respect to equating historic Canadian returns with the returns that investors required arises from the existence of restrictions on the foreign content of assets held in pension plans and tax deferred savings plans such as Registered Retirement Savings Plans (RRSPs) for approximately five decades (1957-2005). The restrictions on the ability of Canadians to invest globally negatively impacted their achieved returns. In 1957, when tax deferred savings plans were first established, no more than 10% of the income in pension plans or

RRSPs could come from foreign sources. The Foreign Property Rule was instated in 1971 and limited foreign content to 10% of the book value of assets in the funds. The limit was raised to 20% in 2% increments between 1990 and 1994.

In 1999, the Investment Funds Institute of Canada (IFIC) estimated that raising the cap to 20% had increased annual returns by 1% and that a 30% limit would increase returns a further 0.5%.[12] The limit was raised to 30% in 5% increments between 2000 and 2001. In 2002, the Pension Investment Association of Canada (PIAC) and the Association of Canadian Pension Management (ACPM) published a report entitled *The Foreign Property Rule: A Cost-Benefit Analysis*,[13] which supported the removal of the cap.[14] At that time, the *Globe and Mail* reported that the removal of the foreign content cap was expected to "have the broadest long-term impact of any personal finance measure in the budget. Global stock markets, accessible to any investor through global equity mutual funds, have historically made higher returns than the Canadian market, which only accounts for just over 2 per cent of the world's stock market value."[15] The Foreign Property Rule (FPR) was finally eliminated in 2005. From this perspective, historic Canadian equity returns therefore are likely to understate investor return requirements.

Investor reaction to the increasingly less restrictive FPR supports that conclusion. Equity investment outside of Canada grew rapidly as the barriers to foreign investment (in terms of transactions and information costs as well as the foreign investment cap) declined. Foreign stock purchases by Canadians increased almost ten-fold between 1995 and 2007. Purchases of foreign stocks in 1995

[12] Tom Hockin, President and CEO IFIC, *Paving the Way for Change to RRSP Foreign Content Rules*, January 31, 2000.
[13] David Burgess and Joel Fried, *The Foreign Property Rule: A Cost-Benefit Analysis*, The University of Western Ontario, November 2002.
[14] The IFIC's report *Year 2002 in Review* stated,

> During the period of 1991-1998, the percentage of sales in equity mutual funds that were comprised of non-domestic equities has hovered around the 41-58% range. This has significantly increased in 1999 and onwards. While performance in the markets is the major factor affecting such an increase, these figures can also be attributed to increases in foreign content limits in registered retirement savings plans as well as increased interest and availability of foreign clone funds.

[15] Rob Carrick, *Finance: Your Bottom Line*, Globeandmail.com, February 23, 2005.

were $83 billion; in 2007, they were $915 billion. Although purchases have declined from their 2007 peaks, in 2009 they were still over $500 billion. At the end of 2009Q3, although the total percentage of foreign assets in trusteed pension funds was less than 30%, the percentage of foreign equity to total equity was close to 50%.[16, 17]

(2) Relevance of U.S. Experience

The U.S. equity market has historically been the principal alternative for Canadian investors to domestic equity investments. At the end of 2008, approximately 47% of Canadian portfolio investment in foreign equities was in the U.S.[18] In 2009, approximately 70% of Canadian investor purchases of foreign stocks were U.S. stocks. The diversified nature of the U.S. equity market and the close relationship between the Canadian and U.S. capital markets and economies warrant giving weight to U.S. historical equity risk premiums in the estimation of the required equity risk premium for a benchmark Canadian distribution utility.

The relevance of the U.S. experience to the estimation of the risk premium from a Canadian perspective increased as the relationship between Canadian and U.S. interest rates changed. Historically, much of the difference between the achieved risk premiums in Canada and the U.S. arises from higher interest rates in Canada. With the vastly improved economic fundamentals in Canada (e.g., lower inflation, balanced budgets), the risk of investing in Canadian government bonds (relative to equities) has declined. Consequently, the differential between Canadian and U.S. government bond yields and returns that existed historically fell. Over the

[16] Based on market value. Statistics Canada, Table 280-0003.
[17] Pension funds are increasingly investing in infrastructure assets outside of Canada. For example, in early 2009 a consortium of investors including the British Columbia Investment Management Corporation, the Alberta Investment Management Corporation and the Canada Pension Plan Investment Board completed the acquisition of Puget Energy, an electric and gas utility serving northern Washington State. The most recent allowed returns for Puget Sound Energy (both electric and gas) were 10.1% on a 46% common equity ratio, adopted in April 2010.
[18] Statistics Canada, *Canada's International Investment Position – Fourth Quarter 2009.* The U.S. portion of Canadian direct investment abroad at the end of 2008 was 49%.

period 1926-1997, the difference between long-term government bond yields in Canada and the U.S. averaged close to 100 basis points. From 1998 to 2009, the difference was approximately -9 basis points. With similar government bond yields in the two countries for more than a decade, the U.S. historic equity market risk premium is a relevant benchmark for the estimation of the forward-looking equity market risk premium for Canadian investors.

e. Future vs. Historic Returns and Risk Premiums

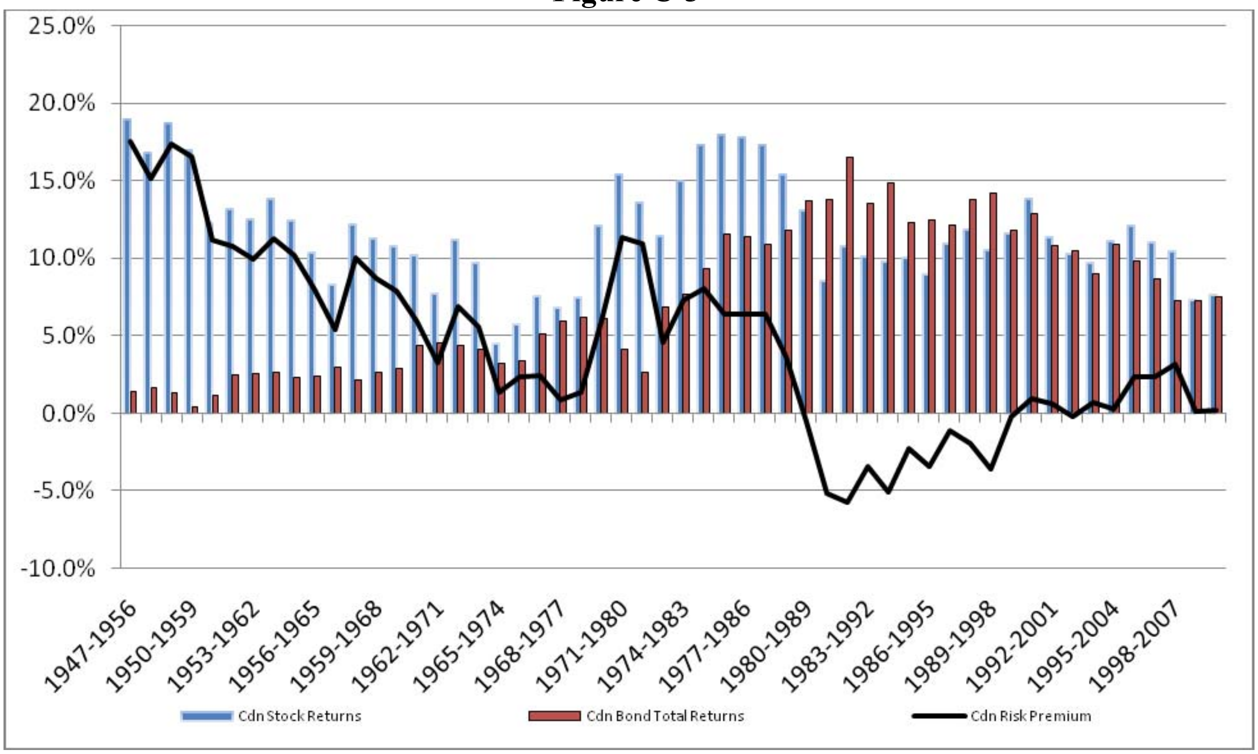
The point of departure for my estimate of the expected/required equity market risk premium was made by reference to an analysis of historic (experienced) market risk premiums. Basing calculations of achieved risk premiums on the longest periods available reflects the notion that it is necessary to reflect as broad a range of event types as possible to avoid overweighting periods that represent “unusual” circumstances. On the other hand, the objective of the analysis is to assess investor expectations in the current economic and capital market environment. Consequently, my point of departure was post-World War II returns and market risk premiums, a period more closely aligned with what today’s investors are likely to anticipate over the longer-term[19], supplemented with achieved returns and risk premiums over longer periods.

[19] Key structural economic changes have occurred since the end of World War II, including:
1. The globalization of the North American economies, which has been facilitated by the reduction in trade barriers of which GATT (1947) was a key driver;
2. Demographic changes, specifically suburbanization and the rise of the middle class, which have impacted on the patterns of consumption;
3. Transition from a resource-oriented/manufacturing economy to a service-oriented economy;
4. Technological change, particularly in the areas of telecommunications and computerization, which have facilitated both market globalization and rising productivity.

(1) Trends in Post World War II Canadian Equity and Government Bond Returns

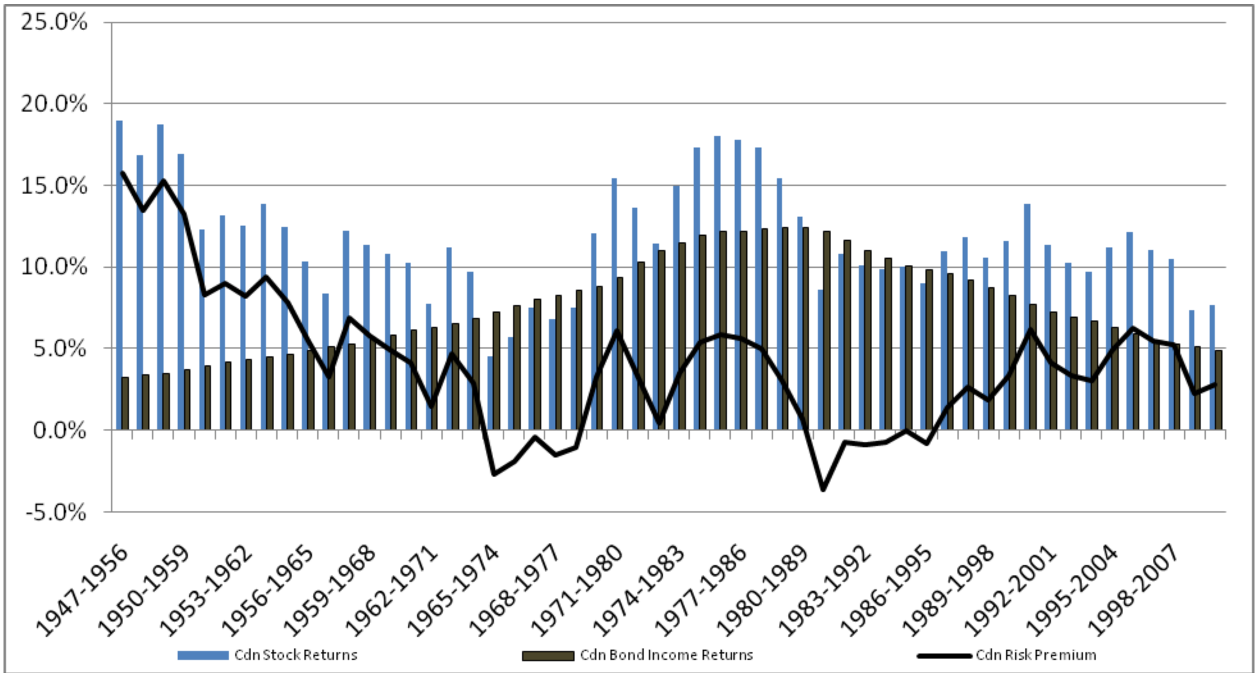
Figures C-3 and C-4 compare historic Canadian stock returns, long-term government bond total and income[20] returns and equity risk premiums, over rolling 10-year periods ending 1956-2009.

Figure C-3



[20] The income return reflects only the bond coupon portion of the total bond return. The other components are the reinvestment return and the capital gain or loss. The bond coupon payment represents the riskless portion of the bond total return.

Figure C-4



Source for Figures C-3 and C-4: Schedule 15.

The rolling ten-year averages in both Figures C-3 and C-4 do not reveal any significant upward or downward trend over time in equity returns during the post World War II period. On average, equity market returns in Canada were 12.0% from 1947-2009. By comparison, government bond returns (both Total and Income returns) exhibited an increase throughout much of the period, before beginning to decline in the early to mid-1990s. The pattern in the bond returns results from:

- ♦ rising bond yields in the 1950s through the mid-1980s, which produced capital losses on bonds and low bond total return;

- ♦ high bond income and income returns in the 1980s, reflecting the high rates of inflation; and,

- ♦ high bond total returns in the 1990s and first half of the 2000s, reflecting the decline in long-term government bond yields, resulting in capital gains and total returns well in excess of the yields.[21]

The resulting average income and total return on long-term government bonds in Canada has been approximately 7.0% during the post-World War II period (1947-2009), well in excess of the long-term Canada bond yields which are forecast to prevail going forward.

Given the absence of any significant upward or downward trend in the historic equity market returns, a reasonable expected value of the future equity market return, based solely on the post-World War II Canadian equity market returns, is approximately 12.0%. Based on a forecast long-term Canada bond yield of 5.0%, and an expected equity market return over the long-term of 12.0%, the indicated equity market risk premium is approximately 7.0% (12.0%-5.0%).

(2) Comparison of Longer-Period Returns to Post-World War II Returns

A comparison of the longer-term equity market returns in Canada and the U.S. to the post-World War II returns demonstrates that the average nominal returns for the equity markets have not changed materially between the two periods. Over the long-term, on average, the equity market return in both countries has been in the approximate range of 11.5%-12.0%, compared to the post World War II average returns of approximately 12.0-12.5%.

Table C-3

	Canada		**U.S.**	
	1924-2009	1947-2009	1926-2009	1947-2009
Equity Market Returns	11.6%	12.0%	11.8%	12.4%

Source: Schedule 14.

[21] The bond yield is, in fact, an estimate of the expected return.

(3) Trends in Price/Earnings Ratios

Several studies of historic and equity risk premiums conclude that the equity returns generated historically are unsustainable, since they were achieved through an increase in price/earnings ratios that cannot be perpetuated.

With respect to the U.S. equity market, the preponderance of the increase in price/earnings ratios occurred during the 1990s. The P/E ratio[22] of the S&P 500 averaged 13.25 times from 1936-1988, with no discernible upward trend.[23] From 11.7 times in 1988, the P/E ratio gradually rose, peaking at over 46 times in late 2001. At the height of the equity market (1998 to mid-2000), frequently described as a "speculative bubble", investors believed the only risk they faced was not being in the equity market. In mid-2000, the bubble burst, as the U.S. economy began to lose steam. The events of September 11, 2001, the threat of war, the loss of credibility on Wall Street, accounting misrepresentations and outright fraud, led to a loss of confidence in the market and a sense of pessimism about the equity market. These events led to a heightened appreciation of the inherent risk of investing in the equity market, all of which translated into a "bearish" outlook for the U.S. equity market and sent retail investors to the sidelines.[24] By mid-2006, the P/E ratio had fallen from its 2001 peak of 46 times to 17 times; at the end of 2009, with the sell-off in the market which commenced in mid-2007, it was 20 times (based on estimated 2009 operating earnings), compared to the long-term (1936-2009) average of approximately 16 times.

To assess whether the upward trend in P/E ratios from the late 1980s to their 2001 peak resulted in higher achieved returns than would be sustainable on a forward-looking basis, I analyzed the equity returns of the S&P 500 achieved between

[22] Price to trailing earnings.
[23] The average from 1947-1988 was 13 times.
[24] Weakness in the equity markets was partly responsible (along with low interest rates) for the burgeoning income trust market in Canada.

1936 (the first year for which P/E ratios are readily available) and 1988, that is, prior to the observed upward trend in P/E ratios. The analysis indicates that the achieved arithmetic average equity return for the S&P 500 was 12.3% from 1936-1988. The corresponding average return from 1936-2009 was 11.9%. Hence, despite the increase in P/E ratios experienced during the 1990s, the average equity market returns were actually lower over the entire 1936-2009 period than over the 1936-1988 period. The results are similar for the post-World War II period. The average returns from 1947-1988, at 13.1%, are higher than the average of 12.4% over the entire 1947-2009 period. Stated differently, the increase in P/E ratios during the 1990s has not resulted in a higher and unsustainable level of equity market returns. Consequently, based on history, an expected value for the U.S. equity market return equal to the historic level of approximately 12.0% is not unreasonable.

A review of equity returns in Canada indicates similar results. The 1936-1988 arithmetic average return for the Canadian equity market was 11.8%, higher than the average 1936-2009 return of 11.4%. Similarly, the 1947-1988 return of 12.9% is higher than the 1947-2009 return of 12.0%. There is no indication that rising P/E ratios during the bull market of the 1990s have resulted in average returns that are unsustainable going forward.

(4) Impact of Inflation on Equity Market Returns

Theoretically, the expected return on equity should be equal to the sum of the real risk-free cost of capital, the expected rate of inflation and an equity risk premium. Thus, the question arises whether the forward-looking equity nominal (inclusive of inflation expectations) market return should differ from the historic nominal returns due to differences in the historic versus expected rates of inflation. On average, historically, the actual rate of consumer price (CPI) inflation in both Canada and the U.S. has been higher than the expected rate of inflation. The arithmetic average CPI rate of inflation from 1926-2009 in Canada was 3.1%; the corresponding rate of inflation in the U.S. was also 3.1%. The most recent consensus long-term (2010-2020) forecast of CPI inflation for Canada is 2.0%; for the U.S., it is 2.2%.[25] The lower forecast rate of inflation compared to the historic rate of inflation might suggest that expected nominal equity returns would be lower than they have been historically.

However an analysis of nominal equity returns, rates of inflation and real returns on equity shows that real equity returns have generally been higher when inflation was lower. Table C-4 below summarizes the nominal and real rates of equity market returns historically at different levels of CPI inflation.

Table C-4

Inflation Range	Canadian Nominal Equity Return	Canadian Average Rate of Inflation	Canadian Real Equity Return	U.S. Nominal Equity Return	U.S. Average Rate of Inflation	U.S. Real Equity Return
Less than 1%	15.9%	-1.3%	17.8%	13.0%	-2.0%	15.2%
1-3%	12.3%	1.9%	9.9%	18.2%	2.0%	15.9%
3-5%	4.8%	4.1%	0.6%	6.0%	3.7%	2.2%
Over 5%	12.5%	9.2%	3.4%	7.0%	8.2%	-1.1%
Avg. 1926-2009	11.4%	3.1%	8.2%	11.8%	3.1%	8.6%

The observed negative relationship between the real equity return and the rate of inflation does not support a reduction to the historic nominal equity rates of return for expected lower inflation.

[25] Consensus Economics, *Consensus Forecasts*, April 2010. Consensus Economics surveys 14 Canadian financial and economic forecasts on a monthly basis for their estimates of a range of variables including interest rates, growth, inflation and exchange rates.

(5) Trends in Government Bond Returns and Expected Risk Premium

The analysis of stock and bond returns in Canada and the U.S. during the post World War II period reveals no upward or downward trend in market equity returns. Nevertheless, the achieved risk premiums have declined. The arithmetic average achieved risk premium in Canada (in relation to bond total returns) from 1947-1988 was 7.7%; in the U.S., it was 8.4%. By comparison, the corresponding 1947-2009 achieved risk premiums (in relation to the total returns on bonds) were 5.2% and 6.2% for Canada and the U.S. respectively. An analysis of the data shows that high bond returns have been the principal reason for the decline in experienced risk premiums, not a downward trend in equity returns. The average bond total return (income plus capital appreciation) in Canada from 1989-2009 was 10.0%.

Over the entire 1947-2009 period, the average return on long-term Canada bonds, both total and income returns, was approximately 7.0%. With long-term Canada bond yields currently at historically low levels (approximately 4.1% at the end of December 2009), and more likely to increase rather than decrease further, the 1947-2009 average bond returns of approximately 7.0% overstate the forward-looking expected bond return indicated by current and forecast 30-year Canada bond yields. A reasonable expected value of the long-term Canada bond return for the purpose of estimating the forward-looking equity market risk premium is the forecast of long-term Canada bond yields, rather than the historic average bond returns. The forecast of the risk-free rate as proxied by the 30-year Government of Canada bond yield is 5.0%.

f. Equity Market Risk Premium

Given the absence of any material upward or downward trend in the nominal historic equity market returns during the post World War II period, the longer-term equity market returns, the P/E ratio analysis, and the observed negative relationship between real returns and inflation, a reasonable expected value of the future equity market return is a range of 11.5%-12.0%[26], based on Canadian equity market returns and supported by U.S. equity market returns. The expected return on long-term Canada bonds is proxied by the forecast 30-year Canada bond yield of 5.0%. The resulting expected equity market risk premium is approximately 6.75%.[27] Based on the analysis of the historic returns and risk premiums in Canada, supported by U.S. returns, with consideration given to trends in the equity and government bond markets in both countries, a reasonable estimate of the expected value of the equity market risk premium at the forecast long-term Government of Canada bond yield of 5.0% is approximately 6.75%.

5. Relative Risk Adjustment

a. Total Market Risk

The market risk premium result needs to be adjusted to recognize the relative risk of a benchmark distribution utility. My analysis of the relative risk adjustment starts with the recognition that (1) investors are not perfectly diversified and (2) they do look at the risks of individual investments and expect compensation for assuming company-specific or investment-specific risk. It also recognizes that, while investors can diversify their portfolios, the stand-alone utility to which the allowed return is applied cannot. Thus, a risk measurement that reflects those considerations is relevant for estimating the

[26] As of the end of April 2010, the average dividend yield on the S&P/TSX was 2.5%. The expected long-term growth rate for the index based on available analysts' forecasts for the companies in the Composite, was 12.1%, indicating an expected return (based on a constant growth discounted cash flow approach) of approximately 14.9%.
[27] Estimated as the mid-point of the range of 11.5%-12.0% (11.75%) minus the forecast long term Canada bond yield of 5.0%.

benchmark distribution utility equity risk premium. These considerations support focusing on total market risk, as well as on beta. The latter is intended to measure solely non-diversifiable risk. The drawbacks of beta as the sole measure of risk, as well as the absence of an observable relationship between "raw" betas[28] and the achieved market returns on equity in the Canadian market, provide further support for reliance on other measures of risk to estimate the required equity return (see Section 5.b.ii below).

The standard deviation of market returns is the principal measurement of total market risk. To estimate the relative total risk of a benchmark distribution utility, I used the S&P/TSX Utilities Index as a proxy. I calculated the standard deviations of monthly total market returns for each of the 10 major Sectors of the S&P/TSX Index, including the Utilities Index, over five-year periods ending 1997 through 2009 (Schedule 16).

To translate the standard deviation of market returns into a relative risk adjustment, utility standard deviations must be related to those of the overall market. The relative market volatility of Canadian utility stocks was measured by comparing the standard deviations of the Utilities Index to the simple mean and median of the standard deviations of the 10 Sectors. Schedule 16 shows the ratios of the standard deviations of the Utilities Index to those of the 10 S&P/TSX Sectors. The ratio of the standard deviation of the Utilities Index to the mean and median standard deviations of the 10 major Sector Indices suggests a relative risk adjustment for a Canadian utility in the range of 0.55-0.85, with a central tendency of approximately 0.65-0.70.

[28] The "raw" beta refers to the simple regression between the monthly percentage changes in the price of a utility or utility index and the corresponding percentage change in the price of the equity market index (the S&P/TSX Composite).

b. Beta

(1) Impediments to Beta

Impediments to reliance on beta as the sole relative risk measure, as the CAPM indicates, include:

(a) The assumption that all risk for which investors require compensation can be captured and expressed in a single risk variable;

(b) The only risk for which investors expect compensation is non-diversifiable equity market risk; no other risk is considered (and priced) by investors;

(c) The assumption that the observed calculated betas (which are simply a calculation of how closely a stock's or portfolio's price changes have mirrored those of the overall equity market) are a good measure of the relative return requirement; and,

(d) Use of beta as the relative risk adjustment allows for the conclusion that the cost of equity capital for a firm can be lower than the risk-free rate, since stocks that have moved counter to the rest of the equity market could be expected to have betas that are negative. Gold stocks, for example, which are regarded as a quintessential counter-cyclical investment, could reasonably be expected to exhibit negative betas. In that case, the CAPM would posit that the cost of equity capital for a gold mining firm would be less than the risk-free rate, despite the fact that, on a total risk basis, the company's stock could be very volatile.

The body of evidence on CAPM leads to the conclusion that, while betas do measure relative volatility, the proportionate relationship between beta and return posited by the CAPM has not been established. A summary of various studies, published in a guide for practitioners, concluded,

> Empirical tests of the CAPM have, in retrospect, produced results that are often at odds with the theory itself. Much of the failure to find empirical support for the CAPM is due to our lack of ex ante, expectational data. This, combined with our inability to observe or properly measure the return on the true, complete, market portfolio, has contributed to the body of conflicting evidence about the validity of the CAPM. It is also possible that the CAPM does not describe investors' behavior in the marketplace.
>
> Theoretically and empirically, one of the most troubling problems for academics and money managers has been that the CAPM's single source of risk is the market. They believe that the market is not the only factor that is important in determining the return an asset is expected to earn. (Diana R. Harrington, *Modern Portfolio Theory, The Capital Asset Pricing Model & Arbitrage Pricing Theory: A User's Guide*, Second Edition, Prentice-Hall, Inc., 1987, page 188.)

Fama and French stated in "The CAPM: Theory and Evidence", *Journal of Economic Perspectives*, Volume 18, Number 3 (Summer 2004), pp. 25-26:

> The attraction of the CAPM is that it offers powerful and intuitively pleasing predictions about how to measure risk and the relation between expected return and risk. Unfortunately, the empirical record of the model is poor – poor enough to invalidate the way it is used in applications. The CAPM's empirical problems may reflect theoretical failings, the result of many simplifying assumptions. But they may also be caused by difficulties in implementing valid tests of the model. For example, the CAPM says that the risk of a stock should be measured relative to a comprehensive 'market portfolio' that in principle can include not just traded financial assets, but also consumer durables, real estate and human capital. Even if we take a narrow view of the model and limit its purview to traded financial assets, is it legitimate to limit further the market portfolio to U.S. common stocks (a typical choice), or should the market be expanded to include bonds, and other financial assets, perhaps around the

> world? In the end, we argue that whether the model's problems reflect weaknesses in the theory or in its empirical implementation, the failure of the CAPM in empirical tests implies that most applications of the model are invalid.

Fama and French have developed an alternative model which incorporates two additional explanatory factors in an attempt to overcome the problems inherent in the single variable CAPM.[29]

To quote Burton Malkiel in *A Random Walk Down Wall Street*, New York: W. W. Norton & Co., 2003:

> Beta, the risk measure from the capital-asset pricing model, looks nice on the surface. It is a simple, easy-to-understand measure of market sensitivity. Alas, beta also has its warts. The actual relationship between beta and rate of return has not corresponded to the relationship predicted in theory during long periods of the twentieth century. Moreover, betas for individual stocks are not stable from period to period, and they are very sensitive to the particular market proxy against which they are measured.
>
> I have argued here that no single measure is likely to capture adequately the variety of systematic risk influences on individual stocks and portfolios. Returns are probably sensitive to general market swings, to changes in interest and inflation rates, to changes in national income, and, undoubtedly, to other economic factors such as exchange rates. And if the best single risk estimate were to be chosen, the traditional beta measure is unlikely to be everyone's first choice. The mystical perfect risk measure is still beyond our grasp. (page 240)

One of the key developers of the Arbitrage Pricing Model, Dr. Stephen Ross, has stated,

> Beta is not very useful for determining the expected return on a stock, and it actually has nothing to say about the CAPM. For many years, we have been under the illusion that the CAPM is the same as finding that beta and expected returns are related to each

[29] The additional factors are size and book to market.

other. That is true as a theoretical and philosophical tautology, but pragmatically, they are miles apart.[30]

(2) Relationship between Beta and Return in the Canadian Equity Market

To test the actual relationship between beta and return in a Canadian context, the betas (using monthly total return data) were calculated for various periods for each of the 15 major sub-indices of the "old" TSE 300 as were the corresponding actual geometric average total returns. Simple regressions of the betas on the achieved market returns were then conducted to determine if there was indeed the expected positive relationship. The regressions covered (a) 1956-2003, the longest period for which data for the TSE 300 and its sub-index components are available; (b) 1956-1997, which eliminates the major effects of the "technology bubble", and (c) all potential non-overlapping 10-year periods from 2003 backwards.

The analysis showed the following:

Table C-5

Returns Measured Over:	Coefficient on Beta	R^2
1956-2003	-.088	47%
1956-1997	-.082	44%
1964-1973	-.020	1%
1974-1983	-.008	1%
1984-1993	-.056	11%
1994-2003	-.053	9%

Source: Schedule 18, page 1 of 2.

The analysis suggests that, over the longer term, the relationship between beta and return has been negative, rather than the positive relationship posited by the CAPM. For example, as indicated in Table C-5 above, for the period 1956-2003,

[30] Dr. Stephen A. Ross, "Is Beta Useful?" *The CAPM Controversy: Policy and Strategy Implications for Investment Management*, AIMR, 1993.

the R^2 of 47% means that the betas explained 47% of the variation in returns among the key sectors of the TSE 300 index. However, since the coefficient on the beta was negative, this means that the higher beta companies actually earned lower returns than the low beta companies.

A series of regressions was also performed on the 10 major sectors of the S&P/TSX Composite. These regressions covered (a) 1988-2009, the longest period for which data for the new Composite and its sector components were available; (b) 1988-1997,[31] and (c) the 10-year period ending 2009.

That analysis showed the following:

Table C-6

Returns Measured Over:	Coefficient on Beta	R^2
1988-2009	-.034	15%
1988-1997	-.017	1%
2000-2009	-.126	40%

Source: Schedule 18, page 2 of 2.

These analyses indicate that, historically, the relationship between beta and return in the Canadian equity market has been the reverse (higher beta = lower return) than the posited relationship. The results strongly suggest that, at a minimum, adjusted betas, rather than "raw" betas, should be relied upon in the application of the CAPM. Adjusting betas toward the equity market mean beta of 1.0 takes account of the empirically observed tendency of stocks with "raw" betas below 1.0 to achieve returns higher than implied by the theoretical single variable CAPM and vice versa.

[31] The use of this sub-period was intended to ensure elimination of the impacts of any anomalous market behavior during the technology "bubble and bust", which occurred mainly from 1999 through mid-2002.

(3) Historic Raw Betas

Since beta is the risk measure that underpins the application of the CAPM, I also took account of utility betas to estimate the relative risk adjustment. Schedule 19 summarizes the "raw"[32] betas I calculated using monthly changes in price for individual publicly-traded Canadian regulated pipeline, gas distribution and electric utility companies, the TSE Gas/Electric Index, and the S&P/TSX Utilities Sector using monthly price data calculated over five-year periods ending 1993 through 2009.[33]

As Schedule 19 indicates, there was a significant decline in the calculated "raw" five-year betas of the individual regulated Canadian companies between 1993-1998 and 1999-2005 (from approximately 0.50-0.60 to 0.0 and slightly negative). Following an increase in 2007 to 0.50, the "raw" betas for the individual regulated Canadian company betas again declined in 2008 to approximately 0.25 and remained at that level in 2009.

The observed levels and pattern of the calculated "raw" utility betas in 1999-2009 can be traced to four factors: (1) the technology sector bubble and subsequent bust; (2) the dominance in the TSE 300 of two firms during the early part of the "bubble and bust" period, Nortel Networks and BCE; (3) the financial crisis and the accompanying plunge in the equity markets; and (4) the greater sensitivity of utility stock prices than the equity market composite to rising and falling interest rates (e.g., during the equity market "bubble" of 1999 and early 2000 and during

[32] The term "raw" means that the beta is simply the result of a single variable ordinary least squares regression.
[33] The S&P/TSX Utilities Sector was created in 2002 (with historic data calculated from year-end 1987), when the TSE 300 was revamped to create the S&P/TSX Composite. The Utilities Sector was essentially an amalgamation of the former TSE 300 Gas/Electric and Pipeline sub-indices. In May 2004, the pipelines were moved to the Energy Sector.

the first half of 2006).[34] Over the longer-term (1970-2009), the "raw" beta of the Utilities Index using total returns has been approximately 0.50, as indicated in Table C-7 below.

(4) Canadian Regulated Company Returns and "Raw" Betas

The equity betas of traded regulated Canadian company shares and of the utility index explain a relatively small percentage of the actual achieved market returns over time. A regression of the monthly returns on the TSX Utilities Index against the returns on the TSX Composite, for example, over the period 1970-2009[35] shows the following:

Table C-7

$$\text{Monthly TSX Utilities Index Return} = 0.0055 + 0.49 \left\{ \text{Monthly TSE Composite Return} \right\}$$

t-statistic	=		14.6
R^2	=	31%	

The relationship quantified in the above equation suggests a long-term utility beta of 0.49, or approximately 0.50. However, the R^2, which measures how much of the variability in utility stock prices is explained by volatility in the equity market as a whole, is only 31%. That means 69% of the monthly volatility in share prices remains unexplained.

Since utility shares are interest sensitive, the regression was expanded to capture the impact of movements in long-term Canada bond prices on utility returns. The

[34] Schedule 17 shows that utilities were not the only companies whose betas were negatively impacted by the technology sector bubble and subsequent market decline. To illustrate, the 60-month beta ending 1997 of the Consumer Staples Sector was 0.62; the corresponding betas ending 2003 and 2004 were -0.08 and -0.07 respectively. In contrast, over the same periods, the beta of the Information Technology Sector rose from 1.57 to 2.87.

[35] The Monthly TSX Utilities Index Returns are comprised of the monthly returns on the TSE Gas & Electric Index for period January 1970 to April 2003 and the monthly returns on the S&P/TSX Utilities Index for the period May 2003 to December 2009.

addition of monthly long-term Canada bond returns to the analysis indicates the following:

Table C-8

Monthly TSX Utilities Index Return	=	0.00198 + .41	{ Monthly TSE Composite Return }	+ .52	{ Monthly Long Canada Bond Return }
t-statistics	=	13.0		9.1	
R^2	=	41%			

When government bond returns are added as a further explanatory variable, somewhat more of the observed volatility in utility stock prices is explained (41% versus 31%). The second regression equation suggests that utility shares have had approximately 40% of the volatility of the equity market and over 50% of the volatility of the bond market, the latter consistent with utility common stocks' interest sensitivity. Nevertheless, the equation still leaves more than half of the utility shares' volatility unexplained. To provide some perspective, the average actual annual return for the index from 1970-2009 was 12.25%. Of this average annual return, approximately 2.5 percentage points was explained neither by volatility in the equity market nor the long-term government bond market.[36]

Using an expected annual equity market return of 11.5%, the low end of the 11.5%-12.0% range developed above, an annual long-term Canada bond return equal to the forecast longer-term 30-year Canada yield of 5.0%, and an annual "unexplained" utility return component equal to that achieved in the past (approximately 2.5 percentage points on average annually), the indicated utility return going forward is 9.8%.[37] If, instead, the "unexplained" return component is assumed to be equal to the same proportion of the total utility return as was the

[36] The unexplained component of the achieved return is represented by the intercept in the equation. The intercept of 0.00198 (or .198%) is a monthly return, which when annualized, equals approximately 2.5%.
[37] 9.8% = 2.5% + (0.41*11.5%) + (0.52*5.0%).

case historically (approximately 20%[38]), the expected utility return is 9.1%.[39] When the average of the two utility returns (9.5%) is expressed as an equity risk premium above the forecast long-term Canada bond yield of 5.0%, the indicated relative risk adjustment is approximately 0.70.[40]

(5) Use of Adjusted Betas

From the calculated "raw" betas, the inference can readily be made that regulated companies are less risky than the equity market composite, which by construction has a beta of 1.0. The more difficult task is determining how the "raw" beta translates into a relative risk adjustment that captures utility investors' return requirements. In order to arrive at a reasonable relative risk adjustment, the normative ("what should happen") CAPM needs to be integrated with what has been empirically observed ("what does or has happened"). Empirical studies have shown that stocks with low betas (less than the equity market beta of 1.0) have achieved returns higher than predicted by the single variable (i.e., equity beta) CAPM. Conversely, stocks with betas higher than the equity market beta of 1.0 have achieved lower returns than the model predicts.

The use of betas that are adjusted toward the equity market beta of 1.0, rather than the calculated "raw" betas, takes account of the observed tendency of low (high) beta stocks to achieve higher (lower) returns than predicted by the simple CAPM. Adjusted betas are a standard means of estimating betas, and are widely disseminated to investors by investment research firms, including Bloomberg, *Value Line* and Merrill Lynch. All three of these firms use a similar methodology to adjust "raw" betas toward the equity market beta of 1.0. Their methodologies

38 2.5%/12.25% =20%.

39 9.1% = ((0.41*11.5%) + (0.52*5.0%))/(1-20%).

40 $\frac{9.5\% - 5.0\%}{11.5\% - 5.0\%}$ =0.70

give approximately 2/3 weight to the calculated "raw" beta and 1/3 weight to the equity market beta of 1.0.

The following table compares the reported Bloomberg betas (calculated using three years of weekly prices) ending May 2010 for the five major Canadian utilities to calculated "raw" weekly betas for the same three-year period. The Bloomberg betas suggest that the relative risk adjustment based solely on the most recent Canadian regulated company betas would be approximately 0.62. The application of the same adjustment formula used by Bloomberg to the long-term calculated "raw" beta of approximately 0.50 for the TSX Utilities Index shown in Table C-7 above results in a relative risk adjustment of 0.67.[41]

Table C-9

Company	"Raw" Beta	Bloomberg Beta
Canadian Utilities	0.39	0.59
Emera	0.39	0.60
Enbridge Inc.	0.51	0.63
Fortis	0.48	0.66
TransCanada	0.45	0.62
Average	**0.44**	**0.62**

Source: Schedule 19 and Bloomberg.com.

A comparison of the reported *Value Line* betas[42] to the "raw" calculated betas for the sample of low risk U.S. distribution utilities relied upon in the application of the discounted cash flow (DCF) and DCF-based risk premium test shows a similar relationship. While the "raw" calculated weekly betas for the five-year period ending April 2010 averaged approximately 0.55[43], the 1st Quarter 2010 betas

[41] Adjusted beta = 0.67 x "Raw" Beta + 0.33 x Market Beta of 1.0.
[42] *Value Line* uses a five-year horizon and a weekly price change interval.
[43] The calculations of the sample betas are sensitive to the period over which the betas are calculated, the price interval chosen to estimate the betas (e.g., weekly versus monthly) and the market index selected (e.g., S&P 500 versus the NYSE Index). The betas calculated using monthly data are systematically lower than the betas calculated using weekly data for the low risk U.S. distribution utility sample.

reported by the widely disseminated *Value Line* averaged approximately 0.65 for the sample (Schedule 7).

c. Relative Risk Adjustment

A summary of the relative risk measures for Canadian utilities based on the analyses above is set out in the table below:

Table C-10

Relative Risk Indicator	Relative Risk Factor
Total Market Risk (Standard Deviations)	0.65-0.70
Relative Historic Returns and Betas	0.70
Recent Adjusted Beta	0.62
Long-term Adjusted Beta	0.67

These results support a relative risk adjustment in the approximate range of 0.65-0.70 (mid-point of 0.675).

6. Benchmark Distribution Utility Risk Premium and Cost of Equity

I previously estimated the equity market risk premium at a forecast long Canada yield of 5.0% at approximately 6.75%. At an equity market risk premium of 6.75% and a relative risk adjustment of 0.65-0.70, the indicated equity risk premium is in the range of approximately 4.4%-4.7%. The corresponding cost of equity based on the risk-adjusted equity market risk premium test at a forecast long-term Canada bond yield of 5.0% is approximately 9.55%, before any adjustment for financing flexibility.

APPENDIX D

DCF-BASED EQUITY RISK PREMIUM TEST

1. Introduction

The DCF-based equity risk premium is a forward-looking test which uses the discounted cash flow model and long-term government bond yields to estimate expected utility returns and risk premiums over time. The utility equity risk premium is measured as the difference between the DCF cost of equity and the yield on long-term government bond yields. The advantage of the DCF-based equity risk premium test is that it allows for testing of the relationship between the utility cost of equity (or the utility equity risk premium) and interest rates.

2. Sample of Low Risk Benchmark U.S. Distribution Utilities

The same sample of benchmark utilities was used to perform the DCF-based equity risk premium tests as for the DCF test. The selection criteria for the low risk gas and electric distribution utilities are described in Appendix B.

3. Construction of the DCF-Based Equity Risk Premium Test

The constant growth DCF model was used to construct a monthly series of expected utility returns for each of the nine utilities in the sample from 1995-2009.[44] The monthly DCF cost for each utility was estimated as the sum of the utilities' I/B/E/S mean earnings growth forecast (published monthly) **(g)** and the corresponding expected monthly dividend yield **(DY_e)**. The dividend yield **(DY)** was calculated as the most recent quarterly dividend paid, annualized, divided by the monthly closing price. The expected dividend yield was then calculated by adjusting the monthly dividend yield for the I/B/E/S mean earnings growth forecast

[44] The analysis comprises the full period over which automatic adjustment formulas for setting allowed ROEs were (and in some cases continue to be) in effect in Canada. The period for the analysis was chosen in part to test the validity of the relationship between interest rates and the equity risk premium on which the formulas have been based.

(DY_e=DY*(1+g)). The individual utilities' monthly DCF estimates **(DY_e + g)** were then averaged to produce a time series of monthly DCF estimates **(DCFs)** for the sample. The monthly equity risk premium **(ERP)** for the sample was calculated by subtracting the corresponding 30-year Treasury yield **(TY)** from the average DCF cost of equity **(ERPs=DCFs–TY)** (Schedule 20). The monthly sample average ERPs were used to estimate the regression equations found on Schedule 20.

4. Estimation of the Cost of Equity Based on the DCF-Based Equity Risk Premium Test

For the sample of U.S. distribution utilities, the DCF-based risk premium test indicates an average risk premium over the full 1995-2009 period of 4.3%; the corresponding average long-term government bond yield was 5.4%, approximately 40 basis points higher than the forecast long-term Canada bond yield of 5.0% (Schedule 20, page 1). From 1999-2009,[45] the average risk premium was 4.6% with a corresponding average long-term government bond yield of 5.0% (Schedule 20, page 1).

For the entire 1995-2009 period, the data demonstrate that there has been an inverse relationship between the long-term government bond yield and utility equity risk premiums. A simple regression analysis between the monthly 30-year Treasury bond yields and the corresponding equity risk premiums indicates that, over the full period, the equity risk premium rose by 55 basis points when the long-term government bond yield fell by 100 basis points and, conversely, the equity risk premium fell by 55 basis points when the long-term government bond yield rose by 100 basis points (Schedule 20, page 2). Expressed in terms of cost of equity, the cost of equity rose (fell) by 45 basis points for every one percentage point increase (decrease) in the long-term government bond yield. For the shorter period (1999-2009), the equity risk premium increased (decreased) by 47 basis points for every one percentage point decrease (increase) in the long-

[45] EGNB's ROE of 13%, approved by the Board in 2000, was based on capital market conditions prevailing at the time the franchise was granted in 1999.

term government bond yield (Schedule 20, page 3). In other words, the utility equity risk premium is higher at lower levels of interest rates than it is at higher levels of interest rates.

Based on this relationship, over the longer period, at a forecast 30-year government bond yield of 5.0%, the indicated equity risk premium is approximately 4.6%. The indicated cost of equity would be 9.6%. Based on the 1999-2009 regression, the estimated equity risk premium is also 4.6% and the cost of equity at a long-term Canada bond yield of 5.0% is 9.6% (Schedule 20, page 3). However, this analysis reflects only the relationship between the cost of equity and government bond yields to the exclusion of other factors which impact on the cost of equity.

To capture the impact of other factors, I incorporated corporate bond yield spreads into the analysis. The magnitude of the spread between corporate bond yields and government bond yields is frequently used as a proxy for changes in investors' perception of risk.[46] I estimated the relationship among utility equity risk premiums[47] and the spreads between long-term utility[48] and government bond yields in conjunction with the change in the yield on long-term government bond yields. To estimate this relationship, I performed a second regression analysis using the same two time periods, 1995-2009 and 1999-2009 (Schedule 20, pages 2 and 3). The analysis indicated for both periods that, while there has been an inverse relationship between the utility risk premium and the level of government bond yields, there has been a positive relationship between the utility risk premium and the spread between utility bond yields and government bond yields. The utility risk premium is higher when government bond yields are lower and vice versa and higher when the utility/government bond yield spread is higher and vice versa.

Specifically, the 1995-2009 analysis showed that the utility equity risk premium increased or decreased by approximately 35 basis points when the government bond yield decreased or increased by 100 basis points and increased or decreased by approximately nine basis points for every 10 basis point increase or decrease in the utility/government bond yield spread (Schedule 20, page 2). By comparison, the 1999-2009 analysis showed an increase (decrease) in the utility

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46 Or, alternatively, risk aversion i.e., willingness to take risks.
47 Measured, as in the prior analysis, as the DCF cost of equity minus the long-term government bond yield.
48 Based on Moody's long-term A-rated U.S. utility bond index.

risk premium of approximately 50 basis points for every one percentage point decrease (increase) in the government bond yield and an increase (decrease) of 10 basis points in the utility risk premium for every 10 basis point increase (decrease) in the utility/government bond yield spread (Schedule 20, page 3).[49]

At the end of April 2010, the spread between long-term Canadian A rated utility bonds and 30-year Government of Canada bond yields was approximately 145 basis points. At a forecast long Canada yield of 5.0% and a utility/government bond yield spread of 145 basis points, based on both the 1995-2009 and 1999-2009 periods, the two variable DCF-based equity risk premium model indicates an equity risk premium of approximately 4.4%. The corresponding cost of equity before any adjustment for financing flexibility is approximately 9.4% (Schedule 20, pages 2 and 3).

Based on both the single and two variable DCF-based equity risk premium approaches over both periods at a forecast long-term Government of Canada bond yield of 5.0%, the indicated equity risk premium is approximately 4.5%. The average cost of equity based on both the single and two variable DCF-based equity risk premium approaches over both periods is approximately 9.5%.

[49] Expressed in terms of cost of equity, rather than risk premiums, for both periods, the analyses that include both the long-term government bond and the utility/government bond yield spread suggest that the cost of equity has increased or decreased by approximately 50-65 basis points for every one percentage point increase or decrease in the government bond yield and has also increased or decreased by approximately 10 basis points for every 10 basis point increase or decrease in utility/government bond yield spreads.

APPENDIX E

FINANCING FLEXIBILITY ADJUSTMENT

An adjustment to the equity risk premium and discounted cash flow test results for financing flexibility is required because the measurement of the return requirement based on market data results in a "bare-bones" cost. It is "bare-bones" in the sense that, theoretically, if this return is applied to (and earned on) the book equity of the rate base (assuming the expected return corresponds to the approved return), the market value of the utility would be kept close to book value.

The financing flexibility allowance is an integral part of the cost of capital as well as a required element of the concept of a fair return. The allowance is intended to cover three distinct aspects: (1) flotation costs, comprising financing and market pressure costs arising at the time of the sale of new equity; (2) a margin, or cushion, for unanticipated capital market conditions; and (3) a recognition of the "fairness" principle.

The financing flexibility allowance recognizes that return regulation remains, fundamentally, a surrogate for competition. Competitive unregulated companies of reasonably similar risk to utilities have consistently been able to maintain the real value of their assets significantly in excess of book value, consistent with the proposition that, under competition, market value will tend to equal the replacement cost, not the book value, of assets. In the absence of an adjustment for financial flexibility, the application of a "bare-bones" cost of equity to the book value of equity, if earned, in theory, limits the market value of equity to its book value. The fairness principle recognizes the ability of competitive firms to maintain the real value of their assets in excess of book value and thus would not preclude utilities from achieving a degree of financial integrity that would be anticipated under competition. The market/book ratio of the S&P/TSX

Composite averaged 2.2 times from 1995-2009; the corresponding average market/book ratio of the S&P 500 was 3.2 times.[50]

Utility return regulation should not seek to target the market/book ratios achieved by such unregulated companies, but, at the same time, it should not preclude utilities from achieving a level of financial integrity that gives some recognition to the longer run tendency for the market value of unregulated companies to equate to the replacement cost of their productive capacity. This is warranted not only on grounds of fairness, but also on economic grounds, to avoid misallocation of capital resources. To ignore these principles in determining an appropriate financing flexibility allowance is to ignore the basic premise of regulation. The adjustment for financing flexibility recognizes that the market return derived from the equity risk premium test needs to be translated into a return that is fair and reasonable when applied to book value. The concept of a financing flexibility or flotation cost allowance has been accepted by most Canadian regulators.

This premise was recognized by the Independent Assessment Team (IAT), retained by the Alberta Department of Resource Development to determine the cost parameters for the Power Purchase Arrangement (PPAs) for existing regulated generating plants, concluded in its 1999 report, regarding flotation costs,

> This is sometimes associated with flotation costs but is more properly regarded as providing a financial cushion which is particularly applicable given the use of historic cost book values in traditional rate of return regulation in Canada. No such adjustment has ever been made in UK utility regulation cases which tend to use market values or current cost values.[51]

The Report of the IAT was accepted by the Alberta Energy and Utilities Board in Decision U99113 (December 1999).

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[50] The market to book ratio of the S&P 500 includes the Utilities. The market to book ratio of the S&P Industrials alone has been higher.

[51] *Independent Assessment Team Power Purchase Arrangement Report*, July 1999, page XLV, footnote 99.

At a minimum, the financing flexibility allowance should be adequate to allow a utility to maintain its market value, notionally, at a slight premium to book value, i.e., in the range of 1.05-1.10. At this level, a utility will be able to recover actual financing costs, as well as be in a position to raise new equity (under most market conditions) without impairing its financial integrity. A financing flexibility allowance adequate to maintain a market/book in the range of 1.05-1.10 is approximately 50 basis points.[52]

Further, the financing flexibility allowance should also recognize that both the equity risk premium and DCF cost of equity estimates are derived from market values of equity capital. The cost of capital, as determined in the capital markets, is derived from market value capital structures. The cost of equity has been estimated using samples of proxy companies with a lower level of financial risk, as reflected in their market value capital structures, than the financial risk reflected in the corresponding book value capital structure. Regulatory convention applies the allowed equity return to a book value capital structure. When the market value equity ratios of the proxy utilities are well in excess of their book value common equity ratios, the failure to recognize the higher level of financial risk in the book value capital structure relative to the financial risk of the proxy samples of utilities, as recognized by equity investors, results in an underestimation of the cost of equity. The cost of capital reflects the market value of the firms' capital, both debt and equity. The market value capital structures may be quite different from the book value capital structures. When the market value common equity ratio is higher (lower) than

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[52] The financing flexibility allowance is estimated using the following formula developed from the discounted cash flow formula:

$$\text{Return on Book Equity} = \frac{\text{Market/Book Ratio x "bare-bones" Cost of Equity}}{1 + [\text{retention rate (M/B} - 1.0)]}$$

For a market/book ratio of 1.075 (mid-point of 1.05 and 1.10), assuming a retention rate of 35% and a cost of equity of 10.0%, the indicated ROE is:

$$\text{ROE} = \frac{1.075 \times 10.0\%}{1 + [.35\,(1.075 - 1.0)]}$$

$$\text{ROE} = 10.5\%$$

The difference of 50 basis points between the ROE and the "bare-bones" cost of equity is the financing flexibility allowance.

the book value common equity ratio, the market is attributing less (more) financial risk to the firm than is "on the books" as measured by the book value capital structure. Higher financial risk leads to a higher cost of common equity, all other things equal.

To put this concept in common sense terms, assume that I purchased my home 10 years ago for $100,000 and took out a mortgage for the full amount. My home is currently worth $250,000 and my mortgage is now $85,000. If I were applying for a loan, the bank would consider my net worth (equity) to be $165,000 (market value of $250,000 less the $85,000 unpaid mortgage), not the "book value" of the equity in my home of $15,000, which reflects the original purchase price less the unpaid mortgage loan amount. It is the market value of my home that determines my financial risk to the bank, not the original purchase price. The same principle applies when the cost of common equity is estimated. The book value of the common equity shares is not the relevant measure of financial risk to equity investors; it is their market value, that is, the value at which the shares could be sold.

The cost of equity has been estimated using samples of comparable proxy companies with a lower level of financial risk, as reflected in their market value capital structures, than the financial risk reflected in the book value capital structure. Regulatory convention applies the allowed equity return to a book value capital structure. When the market value equity ratios of the proxy utilities are well in excess of their book value common equity ratios, the failure to recognize the higher level of financial risk in the book value capital structure relative to the financial risk of the proxy samples of utilities, as recognized by equity investors, results in an underestimation of the cost of equity.

Two approaches can be used to quantify the range of the impact of a change in financial risk on the cost of equity. The first approach is based on the theory that the overall cost of capital does not change materially over a relatively broad range of capital structures. The second approach is based on the theoretical model which assumes that the overall cost of capital declines as the debt ratio rises due to the income tax shield on interest expense.[53]

Schedules 24 and 25 provide the formulas and inputs for estimating the change in the cost of equity under each of the two approaches. Full recognition of the difference in financial risk between the market value capital structures of the publicly-traded Canadian utilities and the low risk U.S. distribution utilities and the typical book value capital structure of Canadian regulated utilities and the U.S. distribution utilities (40% and 49% equity respectively; see Schedules 4 and 7) results in an increase in the cost of equity of no less than 115 basis points.

Based on both the minimum financing flexibility allowance and the financial risk adjustment, a reasonable estimate of the adjustment to the "bare bones" cost of equity for financing flexibility that is warranted is the mid-point of a range of approximately 50 to 100 basis points (mid-point of 75 basis points).

[53] The second approach does not account for any of the factors that offset the corporate income tax advantage of debt, including the costs of bankruptcy/loss of financing flexibility, the impact of personal income taxes on the attractiveness of issuing debt, or the flow-through of the benefits of interest expense deductibility to ratepayers. Thus, the results of applying the second approach will over-estimate the impact of leverage on the overall cost of capital and understate the impact of increasing financial leverage on the cost of equity.

APPENDIX F

QUALIFICATIONS OF KATHLEEN C. McSHANE

Kathleen McShane is President and senior consultant with Foster Associates, Inc., where she has been employed since 1981. She holds an M.B.A. degree in Finance from the University of Florida, and M.A. and B.A. degrees from the University of Rhode Island. She has been a CFA charterholder since 1989.

Ms. McShane worked for the University of Florida and its Public Utility Research Center, functioning as a research and teaching assistant, before joining Foster Associates. She taught both undergraduate and graduate classes in financial management and assisted in the preparation of a financial management textbook.

At Foster Associates, Ms. McShane has worked in the areas of financial analysis, energy economics and cost allocation. Ms. McShane has presented testimony in more than 200 proceedings on rate of return and capital structure before federal, state, provincial and territorial regulatory boards, on behalf of U.S. and Canadian gas distributors and pipelines, electric utilities and telephone companies. These testimonies include the assessment of the impact of business risk factors (e.g., competition, rate design, contractual arrangements) on capital structure and equity return requirements. She has also testified on various ratemaking issues, including deferral accounts, rate stabilization mechanisms, excess earnings accounts, cash working capital, and rate base issues. Ms. McShane has provided consulting services for numerous U.S. and Canadian companies on financial and regulatory issues, including financing, dividend policy, corporate structure, cost of capital, automatic adjustments for return on equity, form of regulation (including performance-based regulation), unbundling, corporate separations, stand-alone cost of debt, regulatory climate, income tax allowance for partnerships, change in fiscal year end, treatment of inter-corporate financial transactions, and the impact of weather normalization on risk.

Ms. McShane was principal author of a study on the applicability of alternative incentive regulation proposals to Canadian gas pipelines. She was instrumental in the design and preparation of a study of the profitability of 25 major U.S. gas pipelines, in which she developed estimates of rate base, capital structure, profit margins, unit costs of providing services, and various measures of return on investment. Other studies performed by Ms. McShane include a comparison of municipal and privately owned gas utilities, an analysis of the appropriate capitalization and financing for a new gas pipeline, risk/return analyses of proposed water and gas distribution companies and an independent power project, pros and cons of performance-based regulation, and a study on pricing of a competitive product for the U.S. Postal Service. She has also conducted seminars on cost of capital and related regulatory issues for public utilities, with focus on the Canadian regulatory arena.

PUBLICATIONS, PAPERS AND PRESENTATIONS

- *Utility Cost of Capital: Canada vs. U.S.,* presented at the CAMPUT Conference, May 2003.
- *The Effects of Unbundling on a Utility's Risk Profile and Rate of Return*, (co-authored with Owen Edmondson, Vice President of ATCO Electric), presented at the Unbundling Rates Conference, New Orleans, Louisiana sponsored by Infocast, January 2000.
- *Atlanta Gas Light's Unbundling Proposal: More Unbundling Required?* presented at the 24th Annual Rate Symposium, Kansas City, Missouri, sponsored by several commissions and universities, April 1998.
- *Incentive Regulation: An Alternative to Assessing LDC Performance*, (co-authored with Dr. William G. Foster), presented at the Natural Gas Conference, Chicago, Illinois sponsored by the Center for Regulatory Studies, May 1993.
- *Alternative Regulatory Incentive Mechanisms*, (co-authored with Stephen F. Sherwin), prepared for the National Energy Board, Incentive Regulation Workshop, October 1992.

EXPERT TESTIMONY/OPINIONS
ON
RATE OF RETURN AND CAPITAL STRUCTURE

Client	Date
Alberta Natural Gas	1994
AltaGas Utilities	2000
Ameren (Central Illinois Public Service)	2000, 2002, 2005, 2007 (2 cases), 2009 (2 cases)
Ameren (Central Illinois Light Company)	2005, 2007 (2 cases), 2009 (2 cases)
Ameren (Illinois Power)	2004, 2005, 2007 (2 cases), 2009 (2 cases)
Ameren (Union Electric)	2000 (2 cases), 2002 (2 cases), 2003, 2006 (2 cases)
ATCO Electric	1989, 1991, 1993, 1995, 1998, 1999, 2000, 2003
ATCO Gas	2000, 2003, 2007
ATCO Pipelines	2000, 2003, 2007
ATCO Utilities	2008
Bell Canada	1987, 1993
Benchmark Utility Cost of Equity (British Columbia)	1999
Canadian Western Natural Gas	1989, 1996, 1998, 1999
Centra Gas B.C.	1992, 1995, 1996, 2002
Centra Gas Ontario	1990, 1991, 1993, 1994, 1995
Direct Energy Regulated Services	2005
Dow Pool A Joint Venture	1992
Edmonton Water/EPCOR Water Services	1994, 2000, 2006, 2008
Electricity Distributors Association	2009
Enbridge Gas Distribution	1988, 1989, 1991-1997, 2001, 2002
Enbridge Gas New Brunswick	2000
Enbridge Pipelines (Line 9)	2007, 2009
Enbridge Pipelines (Southern Lights)	2007

FortisBC	1995, 1999, 2001, 2004
Gas Company of Hawaii	2000, 2008
Gaz Metropolitain	1988
Gazifère	1993, 1994, 1995, 1996, 1997, 1998, 2010
Generic Cost of Capital, Alberta (ATCO and AltaGas Utilities)	2003
Heritage Gas	2004, 2008
Hydro One	1999, 2001, 2006 (2 cases)
Insurance Bureau of Canada (Newfoundland)	2004
Laclede Gas Company	1998, 1999, 2001, 2002, 2005
Laclede Pipeline	2006
Mackenzie Valley Pipeline	2005
Maritime Electric	2010
Maritimes NRG (Nova Scotia) and (New Brunswick)	1999
MidAmerican Energy Company	2009
Multi-Pipeline Cost of Capital Hearing (National Energy Board)	1994
Natural Resource Gas	1994, 1997, 2006, 2010
New Brunswick Power Distribution	2005
Newfoundland & Labrador Hydro	2001, 2003
Newfoundland Power	1998, 2002, 2007, 2009
Newfoundland Telephone	1992
Northland Utilities	2008 (2 cases)
Northwestel, Inc.	2000, 2006
Northwestern Utilities	1987, 1990
Northwest Territories Power Corp.	1990, 1992, 1993, 1995, 2001, 2006
Nova Scotia Power Inc.	2001, 2002, 2005, 2008
Ontario Power Generation	2007
Ozark Gas Transmission	2000
Pacific Northern Gas	1990, 1991, 1994, 1997, 1999, 2001, 2005, 2009
Plateau Pipe Line Ltd.	2007
Platte Pipeline Co.	2002

St. Lawrence Gas	1997, 2002
Southern Union Gas	1990, 1991, 1993
Stentor	1997
Tecumseh Gas Storage	1989, 1990
Telus Québec	2001
Terasen Gas	1992, 1994, 2005, 2009
Terasen Gas (Whistler)	2008
TransCanada PipeLines	1988, 1989, 1991 (2 cases), 1992, 1993
TransGas and SaskEnergy LDC	1995
Trans Québec & Maritimes Pipeline	1987
Union Gas	1988, 1989, 1990, 1992, 1994, 1996, 1998, 2001
Westcoast Energy	1989, 1990, 1992 (2 cases), 1993, 2005
Yukon Electrical Company	1991, 1993, 2008
Yukon Energy	1991, 1993

EXPERT TESTIMONY/OPINIONS
ON
OTHER ISSUES

Client	Issue	Date
Nova Scotia Power	Calculation of ROE	2009
New Brunswick Power Distribution	Interest Coverage/Capital Structure	2007
Heritage Gas	Revenue Deficiency Account	2006
Hydro Québec	Cash Working Capital	2005
Nova Scotia Power	Cash Working Capital	2005
Ontario Electricity Distributors	Stand-Alone Income Taxes	2005
Caisse Centrale de Réassurance	Collateral Damages	2004
Hydro Québec	Cost of Debt	2004
Enbridge Gas New Brunswick	AFUDC	2004
Heritage Gas	Deferral Accounts	2004
ATCO Electric	Carrying Costs on Deferral Account	2001
Newfoundland & Labrador Hydro	Rate Base, Cash Working Capital	2001
Gazifère Inc.	Cash Working Capital	2000
Maritime Electric	Rate Subsidies	2000
Enbridge Gas Distribution	Principles of Cost Allocation	1998
Enbridge Gas Distribution	Unbundling/Regulatory Compact	1998
Maritime Electric	Form of Regulation	1995
Northwest Territories Power	Rate Stabilization Fund	1995
Canadian Western Natural Gas	Cash Working Capital/ Compounding Effect	1989
Gaz Metro/ Province of Québec	Cost Allocation/ Incremental vs. Rolled-In Tolling	1984