BEFORE THE
ALBERTA UTILITIES COMMISSION

WRITTEN EVIDENCE
OF
BENTE VILLADSEN

FOR
ALTAGAS UTILITIES INC
ENMAX POWER CORPORATION
FORTISALBERTA INC
THE ATCO UTILITIES

2016 Generic Cost of Capital

Proceeding ID No. 20622

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I. INTRODUCTION AND SUMMARY

Q1. Please state your name and address.

A1. My name is Bente Villadsen and my business address is The Brattle Group, 44 Brattle Street, Cambridge, MA 02138, USA.

Q2. What have you been asked to do in this proceeding?

A2. I have been asked by AltaGas Utilities Inc. (AUI), ENMAX Power Corporation (ENMAX), FortisAlberta Inc. (FortisAlberta), and The ATCO Utilities (ATCO) (jointly "Utilities") to estimate the cost of equity and capital structure that the Utilities should be allowed for the period 2016-17. I have also been asked to discuss whether the 2% equity adder for non-taxpaying entities has merit, whether the credit metrics relied upon by the Alberta Utilities Commission (AUC or Commission) in the past remain valid, and whether the completion of large capital projects for the transmission utilities affect the capital structure of these utilities.

Q3. Please summarize your qualifications.

A3. I am a principal of The Brattle Group and have more than 15 years of experience working with regulated utilities on cost of capital and related matters. My practice focuses on cost of capital, regulatory finance and accounting issues. I have testified or filed expert reports on cost of capital and related issues in Alaska, Arizona, California, New Mexico, Oregon as well as before Bonneville Power Administration and the Surface Transportation Board. I have provided white papers to the British Columbia Utilities Commission and the Canadian Transportation Agency as well as before European and Australian regulators on cost of capital.[1] I have testified or filed testimony on regulatory

[1] In Europe, I have written white papers for the Netherlands Competition Authority (NMa) and the Netherlands Independent Post and Telecommunications Authority (OPTA) and provided an expert report on behalf of Telecom Italia to Communications Regulatory Authority of Italy. In Australia, I have provided expert reports to the Australian Energy Regulator (AER) and the Economic Regulation Authority of Western Australia on behalf of the Australian Pipeline Industry Association and before the Queensland Competition Authority on behalf of Aurizon Network (a railroad).

accounting issues before the FERC, the Michigan PSC as well as in international and U.S. arbitrations. I also advise utilities on regulatory matters as well as risk management. I hold a Ph.D. from Yale University and a BS/MS from University of Aarhus, Denmark. Appendix A contains more information on my professional qualifications.

Q4. What topics do you address in your evidence?

A4. The Commission in its final issues list stated that the 2016 GCOC will establish approved ROE and capital structures for 2016 and 2017. Consistent with that finding, I estimate and recommend a generic cost of equity (ROE) and recommend capital structures for 2016 and 2017. Further, the Commission asked:[2]

a) How should the Commission consider the relationship between return on equity and capital structure with respect to overall return?

b) Assessment of the impacts, if any, of the completion of the large capital projects for the transmission utilities on the capital structure of the affected utilities.

c) Should the Commission continue to use the observed credit metric ratios it currently relies on in its capital structure analyses? Should other credit metrics also be considered?

d) Can forecast data be used to calculate expected credit metric ratios? If so, how?

e) Is an adder for tax-free or municipally owned utilities still warranted, and if so, how much should the adder be?

I address these in my evidence below, but note that b) is best addressed as a general discussion of credit metrics and capital structures because the impact of a build-out will show up in credit measures.

Q5. Please summarize your evidence.

A5. I rely on estimates from a Canadian Utility sample, a U.S. Gas Distribution sample, and a U.S. Electric sample as benchmarks for my recommended ROE. I derive my recommended benchmark capital structure from an analysis of credit ratios and a review

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2 Alberta Utilities Commission, "2016 Generic Cost of Capital Proceeding 20622: Final issues list and request for information regarding the roundtable discussion," September 10, 2015.

of commonly allowed equity ratios. Based on my analyses, my range of estimates is very wide but concentrated in the range of slightly below 9% to slightly above 11%. I find that a reasonable range to consider is 9.5% to 10.5% ROE for the Utilities.

I agree with the Utilities witness Mr. Robert A. Buttke's[3] analysis of the economy and find, as he does, that a high degree of economic uncertainty and market volatility are impacting investors. As market volatility and the spread between utility and government bond yields have both increased and are higher than they were during the 2013 GCOC proceeding, I find that the allowed ROE should be in the upper half of the range noted above.

I recommend that the benchmark deemed equity ratio be moved to 40%, which will provide credit ratios consistent with the midpoint of DBRS's benchmarks and meet Moody's / Standard & Poor's benchmarks for regulated utilities rated in the "A" range. This will also ensure that the Utilities have an equity ratio that is on par with that of other utilities. Having determined the benchmark equity percentage, I find that financial markets are more volatile than in the recent past, implying that an equity ratio that is closer to the middle rather than the low end of the benchmark range used by credit rating agencies is important to ensure flexibility. If Alberta Utilities can barely sustain an A range credit rating, the Utilities' access to debt capital could be threatened by potential adverse circumstances.

I concur with Dr. Carpenter and Mr. Buttke's view that Alberta-specific risks may not be reflected in my comparable samples and also with Mr. Buttke expresses the view that market volatility is high with 2016 being a challenging year. While I concur with the presence of Albert-specific risks, I do not rely on this risk for my ROE recommendation. Instead, I consider Mr. Buttke's view that market volatility is high and 2016 is a challenging year along with my own study of the required MERP in Canada to recommend that the Utilities be placed in the upper half of the range for an ROE of 10.0

[3] Written Evidence of Robert Buttke for AltaGas Utilities Inc., ENMAX Power Corporation, FortisAlberta Inc., and The ATCO Utilities (Buttke Evidence).

to 10.5%. A reasonable point estimate would be the midpoint, 10.25% for 2016 and 2017.

In consideration of my recommendation that the benchmark deemed equity ratio be moved to 40%, I recommend that the Commission increase the equity by 2% for all the Utilities. Similarly, I recommend the Commission retain the 2% equity adder for non-taxpaying entities. The 2% equity adder for non-taxpaying entities is in fact below the level required to restore these utilities' Earnings before Interest and Taxes (EBIT) interest coverage ratio to a level comparable to that of taxable entities.

In addition, I find that

- Because investors compare risk and return across industries and jurisdictions, it is important that the ROE and equity ratio that are granted to the Utilities are comparable to what is available in other industries or jurisdictions. Because equity investors ultimately are concerned about the dollar return that they receive, the allowed ROE and deemed capital structure cannot be considered separately, but must jointly ensure that the Utilities earn a fair return **and** maintain an A range rating.
- Targeted credit metrics should be near the mid-range of the credit rating benchmark to allow for flexibility to ensure that the Utilities can remain in the A range in light of the risks discussed by Dr. Carpenter and Mr. Buttke.
- Forecast data can be used to consider credit metrics, but a careful analysis needs to be done that considers all relevant factors and not just macro-economic developments.

Q6. How have you structured your direct evidence?

A6. In Section II, I explain my approach to cost of capital estimation including my reliance on samples and methods; Section III discusses how capital market conditions impact the current cost of equity; Section IV explains the procedures I used to estimate the cost of equity based on selected samples and presents my results; Section V provides a capital structure analysis; Section VI discusses the merits of an adder to the equity percentage of non-taxpaying entities; finally, Section VII provides my ultimate recommendation on ROE and capital structure taking into account the prior sections as well as the business risk discussion of Dr. Paul R. Carpenter and the capital markets discussion of Mr. Robert A. Buttke.

II. APPROACH TO ESTIMATING THE COST OF CAPITAL

A. PRELIMINARY COMMENTS

Q7. How do you approach the estimation of the cost of capital for the Utilities?

A7. The Commission in its final issues list confirmed that the 2016 GCOC will establish approved ROE and capital structures for the years 2016 and 2017. Consistent with that finding, I estimate and recommend a generic cost of equity (ROE) and recommend capital structures for 2016 and 2017.

Colleagues at The Brattle Group have in the past recommended that the National Energy Board rely on the After-Tax Weighted-Average Cost of Capital (ATWACC) to determine the return that TransCanada PipeLines Limited should be allowed to earn on its regulated assets.[4] The ATWACC is simply one of several methodologies that can be used to translate a cost of equity that is measured for a group of comparable companies to a cost of equity for a company with a different capital structure. There are several other measures that similarly translate the differences in financial risk between capital structures. For example, the so-called Hamada adjustment which focuses on translating the levered beta that is measured by the Capital Asset Pricing Model (CAPM) for a sample into an unlevered (all-equity) beta and then relevers the beta to match the leverage of the target company.

Because there has been substantial controversy over the applicability of the ATWACC methodology, I present my results both with and without the application of this methodology. I address the Commission's question on how it should consider the relationship between return on equity and capital structure with respect to overall return

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[4] See the Evidence of A. Lawrence Kolbe and Michael J. Vilbert and decisions in proceedings leading to RH-003-2011 and RH-1-2008. The evidence of Michal J. Vilbert in the Commission's 2009 Generic Cost of Capital Proceeding leading to Decision 2009-216 used the ATWACC to derive the Cost of Equity at a specific capital structure, but did not recommend its use for ratemaking purposes.

in Section V below. The Commission in its 2013 GCOC Decision confirmed its previous decision that "[a]rguments that a market return should be applied to a market value based rate base, rather than a book value rate base, are circular since the market value is clearly dependent on the awarded return."[5] Consistent with this ruling and with my own standard practice, I recommend an ROE to be applied to a book value rate base and capital structure. When adjusting the results of my market derived cost of equity to account for financial risk, I simply consider the impact of different levels of financial leverage on the required return on equity. To reiterate, I present my results both with and without such adjustments.

The 2013 GCOC Decision also continued the Commission's historical precedent of allowing a 50 basis point adder to compensate for flotation cost.[6] Consequently, I present my results including 50 basis point flotation cost allowance.

Q8. What are the guiding principles for utility returns?

A8. The Canadian Supreme Court (as well as the U.S. Supreme Court) has made clear that a "fair return" is one that is comparable to what investors would receive if investing in alternative securities with the same risk characteristics. As noted in the Northwestern Utilities case:

> 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.[7] [emphasis added]

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5 Alberta Utilities Commission, "2013 Generic Cost of Capital, Decision 2191-D01-2015," March 23, 2015 (2013 GCOC Decision), ¶141.

6 *Ibid.*, ¶144.

7 Northwestern Utilities Limited v. City of Edmonton, (1929) S.C.R. 186 (Northwestern). A similar sentiment is reflected in the U.S. Supreme Court decisions of Bluefield Water Works CO. v. Public Service Commission, 262 U.S. 679 (1923) and Federal Power Com'n v. Hope Natural Gas Co., 320 U.S. 591 (1944).

Q9. How do you follow these principles in your conducting your analysis and making your recommendations?

A9. In making its decision, the court did not distinguish between sources of stability or uncertainty. Thus, I find it is of primary importance to consider all risks that impact the cost of capital when determining the allowed return as well as to consider a range of comparable entities.

Because market-based estimation methods such as the Capital Asset Pricing Model and the Discounted Cash Flow model require information on stock prices, only entities that are publicly traded (on, for example, the Toronto Stock Exchange) can be used to derive such estimates. Therefore, the group of comparable companies that can be used for market-based estimation methods is limited in size. Because they must be publicly traded and meet data reliability requirements, the companies eligible to be included in my samples are generally not perfect analogs of the Utilities. Put differently, there are very few "pure play" distribution utilities operating in Canadian regulatory jurisdictions whose stock is exchange traded. In light of this substantial constraint, I select my sample companies from a broader group of publicly-traded companies that are substantially involved in regulated utility operations and have comparable characteristics relative to the Utilities.

Specifically, my selection of comparable samples considers a set of Canadian companies with utility operations to assess Canadian conditions, a sample of U.S.-based natural gas distribution entities, which are close to being pure-play in the distribution sector of utilities, and a broader set of electric utilities, which ensures that I have sufficient data available to make market-based recommendations.

I further note that the court did not specify any specific methodology for determining a fair return and because each methodology has its advantages and disadvantages, I strongly suggest that more than one method be used in the estimation process. This sentiment is echoed by well-known academics such as Stewart C. Myers, Robert C. Merton Professor of Finance of MIT, who has so concisely and eloquently stated:

> Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, only a fool throws away useful information.[8]

Other scholars agree. For example, professors Berk and DeMarzo of Stanford and Harvard Universities, respectively, in their corporate finance textbook comment on the use of the CAPM, DCF and other models by practitioners as follows:

> It is not difficult to see why there is so little consensus in practice about which technique to use. All the techniques we covered are imprecise. Financial economics has not yet reached the point where we can provide a theory of expected returns that gives a precise estimate of the cost of capital. Consider, too, that all techniques are not equally simple to implement. Because the tradeoff between simplicity and precision varies across sectors, practitioners apply the techniques that best suit their particular circumstances.[9]

The reliance on multiple methods is also consistent with the Commission's most recent order on cost of capital, where the Commission stated that it

> agree[d] with the view of Ms. McShane and the Alberta Utilities that the benchmark generic ROE should be established on the results of multiple tests, as "each of the tests has its own strengths and weaknesses" and "no single test can pinpoint the fair return."[10] [footnotes omitted]

The view that multiple tests are preferable is also consistent with the approach taken by other provincial regulators in Canada.[11]

B. APPROACH TO ESTIMATING THE UTILITIES' ROE

Q10. How did you estimate the cost of equity for the Utilities?

A10. To assess the cost of capital for the Alberta Utilities, I start by selecting three samples of regulated utilities: a Canadian Utility sample, a U.S. Electric sample, and a U.S. Gas

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8 Stewart C. Myers, "On the Use of Modern Portfolio Theory in Public Utility Rate Cases: Comment," *Financial Management*, Autumn 1978, p. 67.

9 Jonathan Berk and Peter DeMarzo, *Corporate Finance: The Core*, 3rd edition, 2013, (Berk & DeMarzo 2014) p. 466.

10 2013 GCOC Decision, ¶271.

11 See, for example, British Columbia Utilities Commission, "Generic Cost of Capital Proceeding (Stage 1) Decision," Decided May 10, 2013 (BCUC 2013 Decision), p. 80; Ontario Energy Board, EB-2009-0084, "Report of the Board on the Cost of Capital for Ontario's Regulated Utilities," December 11, 2009, p. 36.

Distribution sample. The Canadian Utility sample provides insights into the risk and return of Canadian-based utilities; the U.S. Gas Distribution sample provides insights into the risk and returns associated with distribution activities; and the U.S. Electric sample is a more generic sample—albeit one predominantly focused on provision of regulated electric utility services—which has many more companies available for consideration. I look to results from several financial models to assess the cost of equity and also summarize recently allowed returns to arrive at my recommendation.

Sample companies are ideally selected to be very comparable to the target company, but there are only a limited number of publicly traded companies with significant utility operations in Canadian jurisdictions, and even those companies are somewhat diversified in terms of geography and lines of business. Therefore, as explained above, I consider the estimates from the three samples in light of the characteristics that make each one comparable to the Utilities.

For each company in my samples, I then estimate the cost of equity using standard methods including two versions of the Capital Asset Pricing Model (CAPM), two versions of the Discounted Cash Flow (DCF) model, and a version of the risk premium model. To ensure that I obtain both company-specific and industry-wide measures, I include CAPM results for individual companies as well as portfolio based results, where estimates of the systematic risk (beta) are based on the market-value weights of the individual utilities.

Finally, I look at the allowed returns granted by other Canadian and U.S. regulators relative to those allowed for the Utilities. While I recognize that the Commission has in the past been reluctant to consider such evidence,[12] I respectfully submit that it provides relevant information that complements estimates from market-based models and provides

[12] Alberta Utilities Commission, "2011 Generic Cost of Capital, Decision 2011-474," December 8, 2011 (2011 GCOC Decision), ¶¶100-103.

context for those estimates.[13] The data is available to investors, who can use it to inform their investment decisions. Additionally, as discussed in Sections IV.E and IV.F below, I have analyzed the allowed ROE data in a manner that I believe addresses the Commission's stated concerns. I therefore find that the information is relevant for the assessment of the fair return for the Utilities. I consider it when forming my recommendation, and urge the Commission to do the same as an input to its decision.

To arrive at my final ROE recommendation, I consider (i) the range of estimates I have derived, (ii) the current economic outlook, (iii) the financial risk differences, and (iv) the business risks of the Utilities relative to that of the benchmark samples. The evaluation draws on the evidence of Dr. Paul R. Carpenter and the evidence of Mr. Robert Buttke.

1. Cost of Capital and Risk

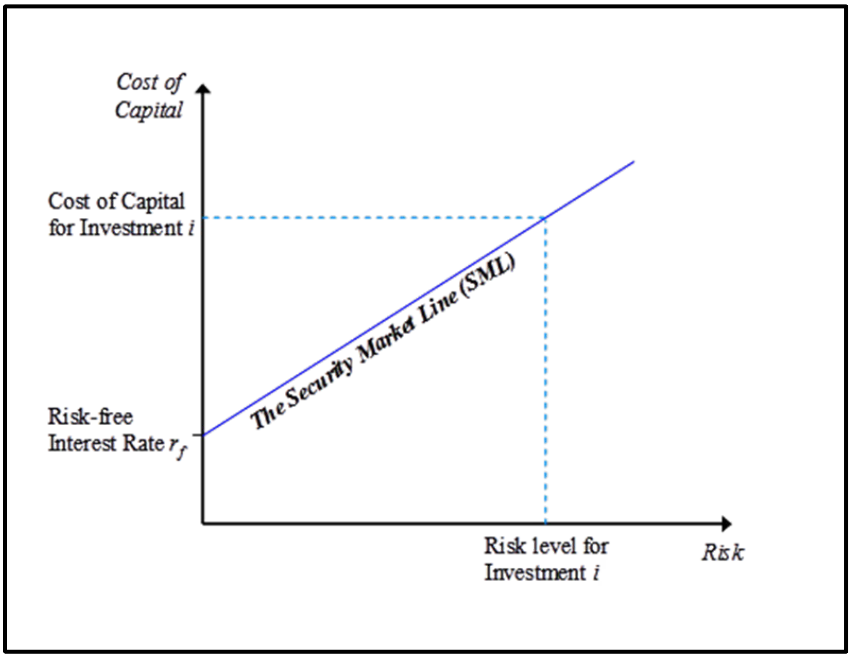
Q11. How is the "cost of capital" defined?

A11. The cost of capital is defined as the expected rate of return in capital markets on alternative investments of equivalent risk. The cost of capital is a type of opportunity cost: it represents the rate of return that investors could expect to earn elsewhere without bearing more risk. "Expected" is used in the statistical sense: the mean of the distribution of possible outcomes. The terms "expect" and "expected," as in the definition of the cost of capital itself, refer to the probability-weighted average over all possible outcomes.

The definition of the cost of capital recognizes a tradeoff between risk and return that can be represented by the "security market risk-return line" or "Security Market Line" for short. This line is depicted in Figure 1 below. The higher the risk, the higher the cost of capital required.

[13] Unlike the market-based estimates that can only be derived for companies with exchange traded stock, data on allowed returns pertains directly to pure play regulated utilities—which commonly have operations and regulatory environments that (notwithstanding any Alberta specific regulatory or operating issues) make them more directly comparable to the Alberta Utilities.

Figure 1: The Security Market Line



Q12. Why is the cost of capital relevant in rate regulation?

A12. The "cost of capital" is the return that investors expect to earn on investments of comparable risk.[14] As noted above, this is consistent with the Canadian Supreme Court's decision in Northwestern Utilities and also with the U.S. Supreme Court's decisions in Bluefield Water Works and Hope Natural Gas,[15] which concluded that

1. the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks[16]

2. The return should be reasonably sufficient to assure confidence in the financial soundness of the utility; and

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[14] See also Stewart C. Myers, "The Application of Finance Theory to Public Utility Rate Cases," *The Bell Journal of Economics & Management Science* 3:58-97 (1972).

[15] *Bluefield Water Works & Improvement Co. v. Public Service Commission of West Virginia*, 262 U.S. 679 (1923) (Bluefield), and *Federal Power Com'n v. Hope Natural Gas Co.*, 320 U.S. 591 (1944) (Hope).

[16] Hope.

3. 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. [17]

In the 2009 GCOC Decision, the Commission commented substantially on the fair return standard and looked to the Canadian Supreme Court decision of Northwestern Utilities v. City of Edmonton along with the U.S. Supreme Court decisions of Bluefield Water Works and Hope Natural Gas and concluded that

> the determination of a fair return on equity for Alberta utilities requires the assessment of three criteria: return on comparable investments, ability to attract capital and maintenance of financial integrity. [18]

Q13. What does this mean from an economic perspective?

A13. While the first of the three criteria goes to the importance of equity investors earning a return that is comparable to that available elsewhere on comparable risk investments, the second and especially the third criteria have implications for the need for regulated companies to maintain healthy finances; including a solid credit rating and credit metrics.

From an economic perspective, rate levels that give investors a fair opportunity to earn the cost of capital are the lowest levels that compensate investors for the risks they bear. A utility's ability to attract capital and maintain its financial integrity requires that the combined equity return and equity ratio be such that not only is the expected return commensurate with that of other enterprises, but it also meets the expectations of credit market participants.

More important for customers, however, are the broader economic consequences of providing an inadequate return to the company's investors. In the short run, deviations from the expected rate of return on the rate base from the cost of capital may seemingly create a "zero-sum game"—investors gain if customers are overcharged, and customers

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[17] Bluefield.

[18] Alberta Utilities Commission, "2009 Generic Cost of Capital, Decision 2009-216," November 12, 2009 (2009 GCOC Decision), ¶110.

gain if investors are shortchanged. In the longer term, inadequate returns are likely to cost customers—and society generally—far more than may be saved in the short run. Inadequate returns lead to inadequate investment, whether for maintenance or for new plant and equipment. Without access to investor capital, the company may be forced to forgo opportunities to maintain, upgrade, and expand its systems and facilities in ways that decrease long run costs. Indeed, the cost to consumers of an undercapitalized industry can be far greater than any short-run gains from shortfalls in the cost of capital. This is especially true in capital-intensive industries (such as the electric and gas utility industry), which feature systems that take a long time to decay. Such long-lived infrastructure assets cannot be repaired or replaced overnight, because of the time necessary to plan and construct the facilities. Thus, it is in customers' interest not only to make sure the expected return of the investors does not exceed the cost of capital, but also that the expected return does not fall short of the cost of capital.

2. The Impact of Risk on the Cost of Capital

Q14. Please summarize how you consider risk when estimating the cost of capital.

A14. First, I select my three benchmark samples. Second, as the cost of equity depends on the leverage of the company to which it is applied, I consider the difference in leverage between the data from which I estimate the cost of equity and a benchmark equity percentage. To determine where in the estimated range the ROE reasonably falls, I consider the business risk of the Utilities relative to the samples and also the capital markets evidence.

Q15. Why is capital structure important for the determination of the cost of equity?

A15. As shown by Hamada (1979),[19] shareholders in a company with more debt face more equity risk and the return on equity needs to increase. There are several manners in which the impact of financial risk can be taken into account. One way to take the phenomena into account is to determine the after-tax weighted-average cost of capital for

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[19] Robert S. Hamada, "Portfolio Analysis, Market Equilibrium and Corporate Finance," *The Journal of Finance* 24: 13-31 (March 1969).

the entities and let that figure be constant between the estimate obtained for the sample and the entity to which it is applied. This assumes that the after-tax weighted-average cost of capital is constant for a range that spans the capital structures used to estimate the cost of equity and the regulatory capital structure. A second approach was developed by Professor Hamada, who unlevered the beta estimates in the CAPM to obtain a so-called all-equity or assets beta and then relevered the beta to determine the beta associated with the target regulatory capital structure. This requires an estimate of the systematic risk associated with debt (i.e., the debt beta), which is usually quite small. See Appendix B, Section IV for further technical details related to methods to account for financial risk when estimating the cost of capital.

Q16. Are there Alberta-specific risk factors?

A16. Yes, as discussed in the evidence of Dr. Carpenter, the regulatory framework in Alberta is similar to that of other Canadian provincial regulators and U.S. regulators on many dimensions but differs in one important aspect. The AUC's Utility Asset Disposition (UAD) and related court decisions have created greater uncertainty about the risk of recovering capital invested in utility assets than exists in U.S. or other Canadian jurisdictions.[20] The written evidence of Mr. Buttke summarizes the views of credit and equity analysts regarding the impact of the UAD on utilities in Alberta and finds that while some credit rating agencies have taken a "wait and see" approach, the credit rating agencies have all noted the current and future AUC proceedings and the UAD court case as key data points. Mr. Buttke also observes that markets have reacted by raising the relative cost of funding for the utilities in question.[21]

Q17. How does capital market evidence impact your evidence?

A17. The return that investors require to provide equity capital depends not only on the relative risk of the investment being considered but also on the return generally available in the market for investments with comparable risk. Therefore, it is essential to consider

[20] Carpenter Evidence Section V.

[21] Buttke Evidence, Sections I and III.

prevailing conditions and trends in financial markets when determining inputs to the models used to estimate the cost of equity and when evaluating the reasonableness of the estimates.

III. IMPACT OF THE ECONOMY AND MARKETS ON THE COST OF EQUITY

Q18. What do you cover in this section?

A18. This section focuses on how recent changes in capital markets conditions and ongoing volatility in equity and debt markets impact the cost of equity and its estimation. Specifically, this section addresses (i) how ongoing monetary policy has driven interest rates to historic lows, so that current government bond yields underestimate the cost of risk-free debt, (ii) how market volatility may have impacted the premium that investors require to hold equity rather than debt, and (iii) the interaction of Canadian, U.S. and world markets, indicating that investors consider the risk-return tradeoff across jurisdictions.

A. INTEREST RATES

Q19. What are the relevant developments regarding interest rates?

A19. As discussed in the written evidence of Mr. Robert Buttke and shown in Figure 2 below, interest rates have until recently been declining, and since April 2015 have been increasing and are expected to increase further.[22] It is also clear that the spread between A range utility and long-term government bond yields have started to widen again after a period during which the yield spread declined.

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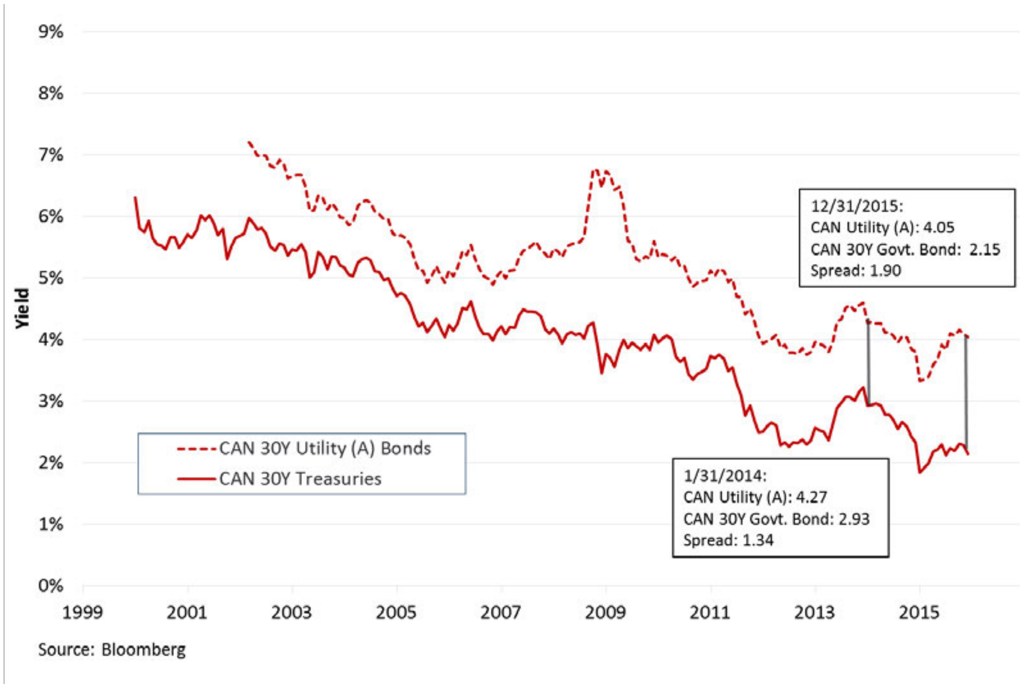
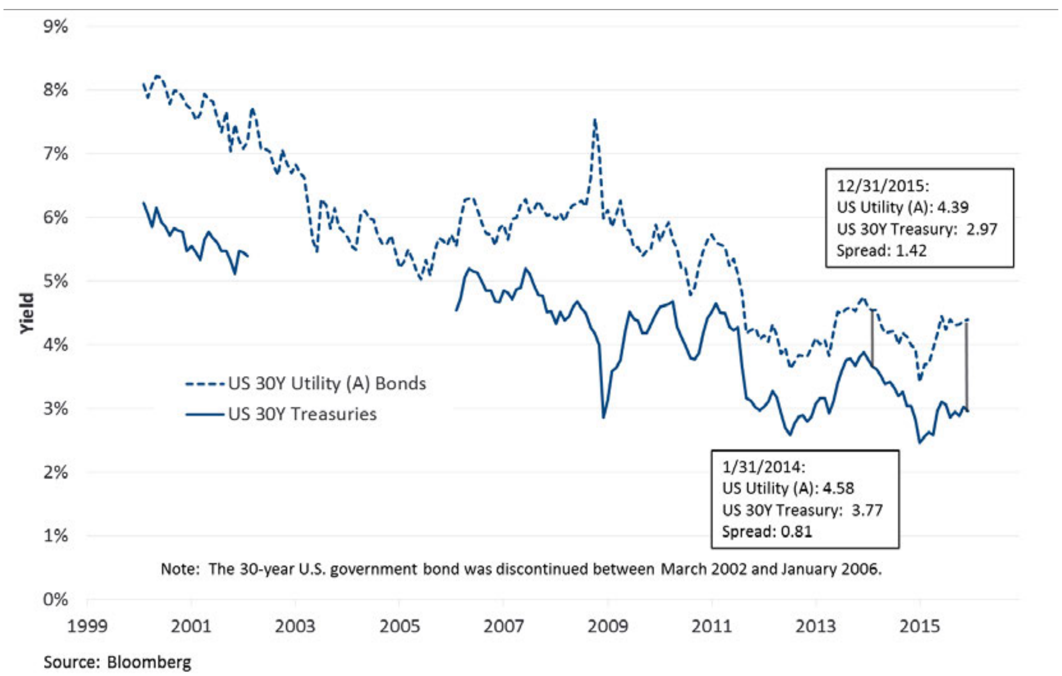
[22] Consensus Forecasts, December 2015, Blue Chip Economic Indicators, October 10, 2015, and RBC Economics, "Financial Market Forecasts," January 8, 2016 all forecast increasing interest rates in Canada and the U.S.

Figure 2: Canadian and U.S. Government Bond Yields 2000–2015
Panel A—Canadian Bonds



Panel B—U.S. Bonds



Q20. How do these developments impact the cost of equity estimation?

A20. There are several ways in which the current interest rate environment affects cost of equity estimation. First and most directly, the Capital Asset Pricing Model (CAPM) takes as one of its inputs a measure of the risk-free rate (see Figure 1). I (like most analysts) use the yield on a Government of Canada bond as a proxy for the risk-free rate. The estimated cost of equity using the CAPM increases (decreases) by 1% when the government bond rate increases (decreases) by 1%. Therefore, to the extent that the government bond rate is driven by monetary policy rather than market factors, so is the CAPM estimate. Importantly, if the government bond rate is downward (upward) biased, then the CAPM estimate will be downward (upward) biased. When that is the case, it is necessary to normalize the relied upon government bond rate, so that the resulting CAPM estimate reflect a non-biased government bond rate.

Second and as a further indication of a potential bias, if the spread between the yield on utility (or corporate) bonds and government bonds (the "yield spread") widens, it indicates that the premium that investors require for holding securities other than government bonds has increased. Thus, there is evidence that the market equity risk premium has increased. A higher than normal yield spread is one indication of the higher risk premiums currently prevailing in capital markets. Investors consider a risk-return tradeoff (like the one displayed in Figure 1 above) and select investments based upon the desired level of risk. Higher yield spreads reflect the fact that the return on corporate debt is higher relative to government bond yields than is normally the case, even for regulated utilities. Because equity is more risky than debt, this means that spread between the cost of equity and government bond yields must also be higher; i.e., the premium required to hold equity (the Market Equity Risk Premium or MERP) rather than government bonds has increased. If this fact is not recognized, then the traditional cost of capital estimation models will underestimate the cost of capital prevailing in the capital markets.

Third, in times of economic uncertainty (such as the present) investors seek to reduce their exposure to market risk. This precipitates a so-called "flight to safety," wherein demand for low-risk government bonds rises at the expense of demand for stocks. If yields on bonds are extraordinarily low, however, any investor seeking a higher expected return must choose alternative investments such as stocks, real estate, or gold or collectibles. Of course, all of these investments are riskier than government bonds, and investors demand a risk premium (perhaps an especially high one in times of economic uncertainty) for investing in them. But short of accepting meager returns, investors simply have few alternatives to returning to the stock market. Utility stocks may have experienced the "flight to safety" phenomenon to a larger degree than other stock because they traditionally have paid a non-trivial portion of their earnings as dividends. Therefore, investors who have sought income from their investments and found government bonds too unattractive may have accepted a higher risk and invested in utility stock with the goal of receiving periodic dividend payments.

Q21. What particular developments have occurred during 2015?

A21. While the Bank of Canada has lowered its overnight rate twice during 2015,[23] Bank of Canada governor Poloz acknowledged that

> [a]s U.S. monetary policy continues to normalize, longer-term interest rates in the United States will naturally rise as the term premium decompresses. Canada's financial markets are closely linked with U.S. markets, and, historically, higher longer-term interest rates there have meant higher longer-term rates here.[24]

Similarly, the yield on U.S. utility bonds has increased substantially more during 2015 than has the yield on treasury bonds. Both utility bond yields and government bond yields are expected to increase over the next several years and I note that, for example, Consensus Forecasts' forecast for the 10-year Canadian government bond yield 12 months forward and further out is expected to increase, so that the 10-year government bond yield is expected to reach 3.5% over the next couple of years.[25] This is an important observation because the ROE that is being determined in this case is expected

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[23] Bank of Canada, Key Interest Rate Lookup at http://www.bankofcanada.ca/rates/interest-rates/key-interest-rates/.

[24] Remarks by Stephen S. Poloz, "Life After Liftoff: Divergence and U.S. Monetary Policy Normalization," January 7, 2016.

[25] Consensus Forecasts, October 2015, p. 28.

to be in effect through 2017. Thus, the fact that yields are forecasted to continue to increase for the next several years means that contemporaneous yields and even 12-month ahead yields are likely to under estimate the yield for the period. In addition, the artificial suppression of the government bond yield means that the direct reliance on current yields is likely to lead to an under estimation of the cost of equity. Compared to the time period studied during the 2013 GCOC proceeding, the Consensus Forecasts' estimate for the 10-year Canadian Government bond yield has declined, but the spread between A rated utility bonds and government bonds has increased.[26] The increased yield spread suggests the cost of equity has increased over its prior level, so that the decline in Consensus Forecasts' 10-year government bond yield is not a reliable indication of the trend in the cost of equity.

Q22. How does the current spread between utility and government bond yields compare to the historical spread?

A22. The spread between the yields on 30-year A rated utility bonds and the 30-year government bond was 190 basis points on average in December 2015, whereas the spread prior to the financial crisis (from 2002 through 2007) was 99 basis points, meaning the spread has increased by 91 basis points. Thus, the spread is elevated by just under a full percentage point relative to its average historical level.[27] This phenomenon is illustrated in Figure 3 below.

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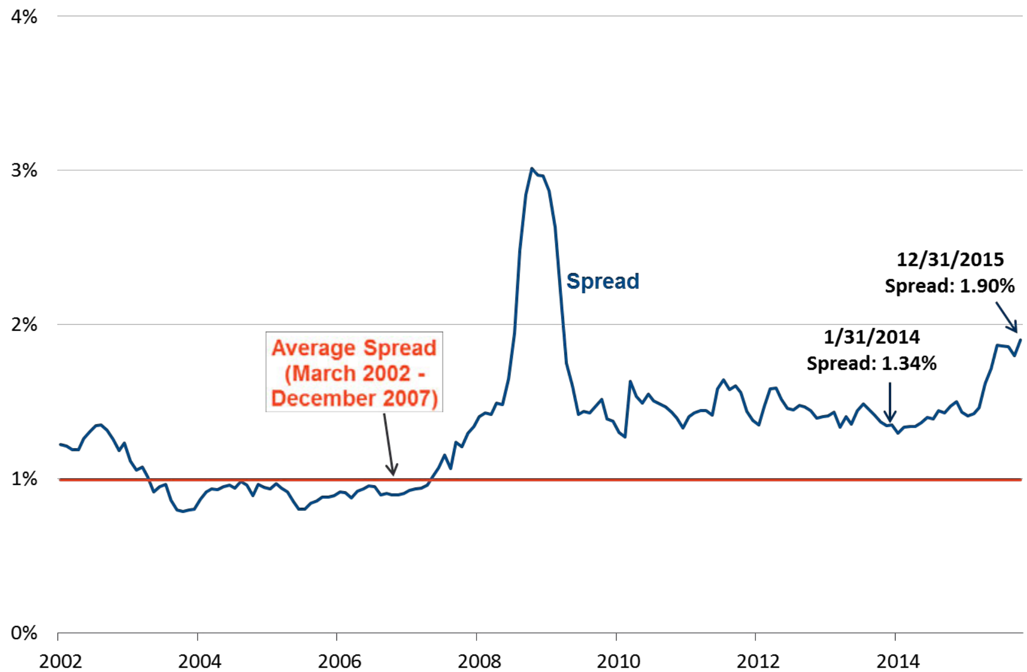
[26] According to the 2013 GCOC Decision, p. 15, the Consensus Forecasts' 10-year bond yield at the time evidence was filed in the 2013 GCOC was about 3.1%. Bloomberg data indicates that the spread between 30-year A rated utility and 30-year Government of Canada bonds was about 134 basis points in January 2014, so this spread has increased by more than 50 basis points as of year-end 2015.

[27] See Workpaper 1 for details.

Figure 3: Spread between Canadian A-Rated Utility and 30-Year Government Bond Yields



Source: Bloomberg.

One possible explanation of the current elevated level of the yield spread is that current and near-term expected levels of government bond yields are artificially depressed due to global monetary policy.[28] I emphasize that both the Canadian and the U.S. government bond yields are expected to increase substantially over the next several years. For example, Royal Bank of Canada forecasts that the interest on 30-year government bonds between Q4, 2015 and Q4, 2016 will increase by 69 basis points in Canada and by 53 basis point in the U.S. Further, between Q4, 2016 and Q4, 2017, the bank forecasts the 30-year government bond rate will increase by an additional 80 basis points (for a total increase of 149 basis points) in Canada and by an additional 70 basis points (for a total of 123 basis points) in the U.S.[29]

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[28] If investors' believe the yield on government bonds will soon elevate, they may demand higher yields on corporate debt relative to the prevailing government bond yields, thus widening the yield spread.

[29] RBC Economics, "Financial Market Forecasts," January 8, 2016 (http://www.rbc.com/economics/economic-reports/pdf/financial-markets/rates.pdf). As a check on the reasonableness of RBC's expectations, I note that the forecast for the 10-year Canadian bond is consistent with that of Consensus Forecasts to mid-2016 and its expectations for the 10-year U.S. bond is consistent with that of Blue Chip Economic Indicators, October 10, 2015.

In addition to the increase in the yield spread, which focuses on the difference between utility and government bond yields, I observe that Mr. Buttke presents evidence that the coupon and yield on preferred securities relative to government bonds increased over the last two years. As does the increase in the spread between utility and government bonds, this evidence strongly indicates an increase in the return required by investors to hold securities other than government bonds.[30]

Q23. What are the implications of an elevated yield spread?

A23. The increase in the yield spread indicates that (i) the current long-term government bond yields are depressed relative to their normal levels and / or (ii) investors are demanding a premium higher than historical premium to hold securities that are not risk free. The latter is an indication that the market equity risk premium may be elevated relative to its historical level. Regardless of the interpretation, the consequence is that if cost of equity is estimated using the current risk-free rate and a market equity risk premium based on historical data, then it will be downward biased. Hence, it is necessary to "normalize" the risk-free rate, take into account the current (rather than historical) market equity risk premium, or a combination of these two interpretations.[31]

B. MARKET VOLATILITY

Q24. Why is it important to consider the stock market's volatility?

A24. Academic research has found that investors expect a higher risk premium during more volatile periods. The higher the risk premium, the higher the required return on equity. For example, French, Schwert, and Stambaugh (1987) found a positive relationship between the expected market equity risk premium (MERP) and volatility:

> We find evidence that the expected market risk premium (the expected return on a stock portfolio minus the Treasury bill yield) is positively related to the predictable volatility of stock returns. There is also evidence that unexpected stock returns are negatively related to the unexpected change in the volatility

[30] Buttke Evidence, Section II.

[31] I note that if a combination interpretation is used, it becomes important to make sure that the overall (total) "normalization" takes into account the elevated yield spread once and only once.

> of stock returns. This negative relation provides indirect evidence of a positive relation between expected risk premiums and volatility.[32]

One implication of this finding is that the MERP tends to increase when market volatility is high, even when investors' level of risk aversion remains unchanged.

A measure of the market's expectations for volatility is the S&P/TSX 60 VIX (VIXC), which measures the 30-day implied volatility of the S&P/TSX 60 index. In the U.S. the VIX measures the 30-day implied volatility of the S&P 500 index. These indices are also referenced as the "investor fear gauge."[33] While the long-term average for both the VIXC and VIX is about 20, the current level is elevated and stands at about 26 for both indices.[34] During the more recent period, the VIXC and VIX spiked in August at 33 and 40, respectively, which is a level we have not seen since October 2011 (See Figure 4 and underlying data included in Workpaper 2). The market volatility is thus higher today than the 2013 GCOC proceeding and the period leading up to that proceeding.

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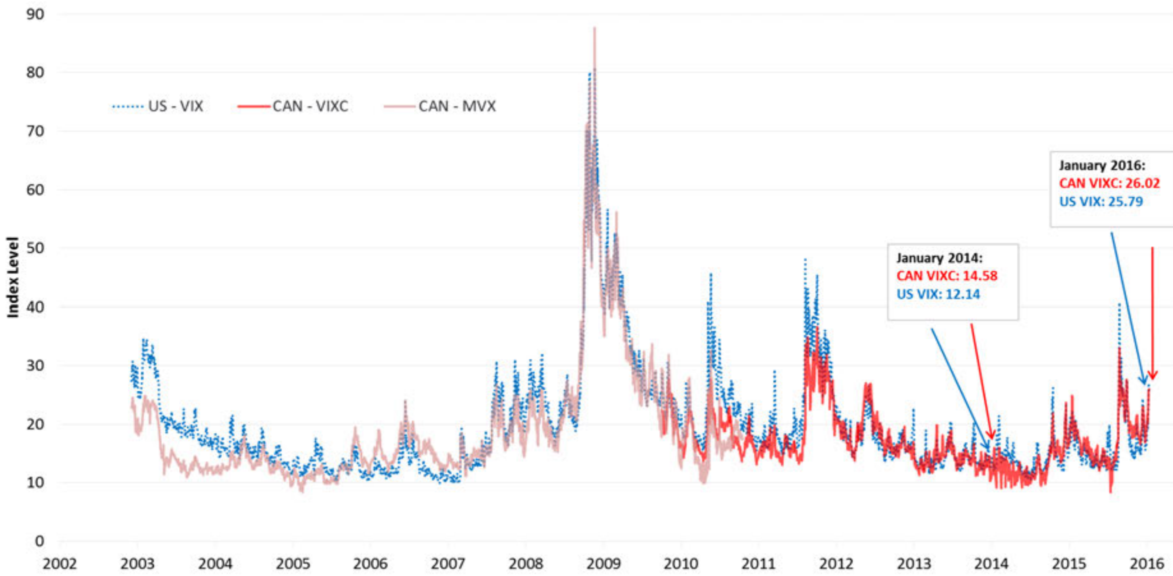
32 K. French, W. Schwert and R. Stambaugh (1987), "Expected Stock Returns and Volatility," *Journal of Financial Economics*, Vol. 19, p. 3.

33 Standard & Poor's Indices, "A VIX for Canada," October 14, 2010.

34 Bloomberg as of January 15, 2016. Note that the Canadian VIX until Dec. 2008 was the Montreal Exchange's MVX.

Figure 4: Canadian and US Volatility Index



Source: VIX and VIXC - from Bloomberg, MVX from Canadian Derivatives Exchange

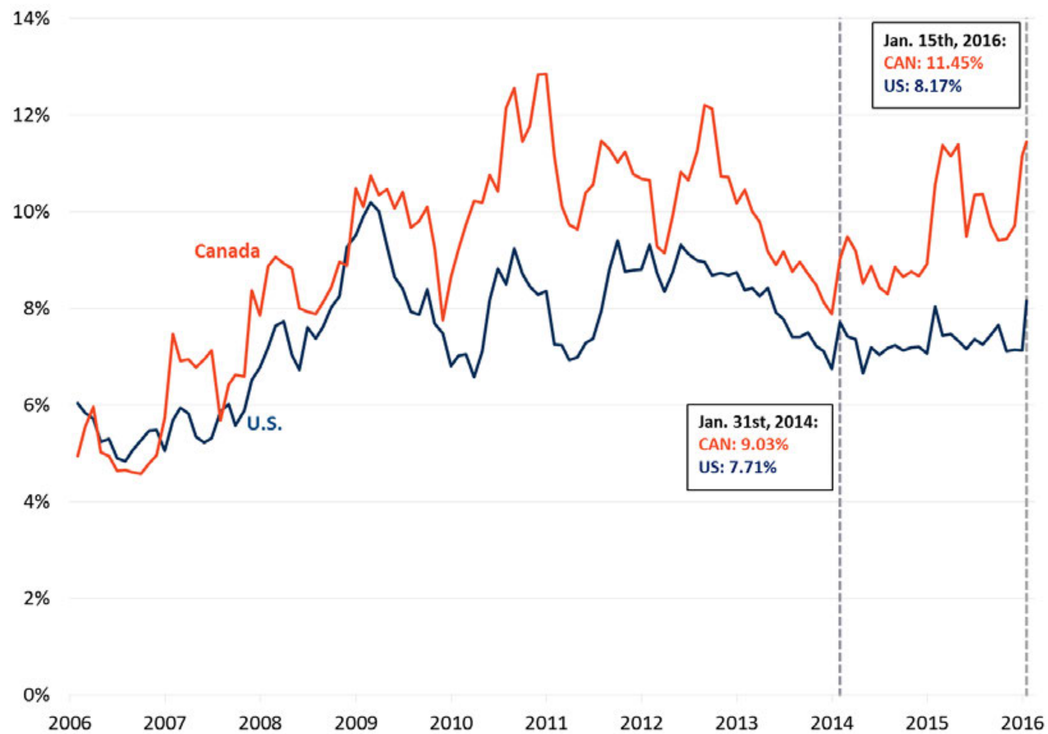
Q25. What do you mean by the term "risk aversion"?

A25. Risk aversion is the recognition that investors dislike risk, which means that for any given level of risk, investors must expect to earn an appropriate return to be induced to invest. An increase in risk aversion means that investors now require a higher return for that same level of risk.

Q26. Do you have any evidence that the return premium demanded by investors for taking risk is higher than it was prior to the crisis?

A26. Yes. Looking to forecasted MERPs, both academic research and financial data services such as Bloomberg have found an increase in the expected MERP compared to prior to the financial crisis. Not only did the expected MERP increase but it remains above the historical level. This is especially true for Canada, where Bloomberg's expected MERP has exceeded the U.S. MERP for most of the time since 2006 and consistently since 2007. Bloomberg measures the forecasted Canadian MERP at over 11% as of December and early January, which is an increase over the forecasted MERP Bloomberg reported in the fall of 2015. The same service measured the U.S. MERP at about 7.1% in November and December, but shows a U.S. MERP above 8% as of early January. The Bloomberg measure is over a 10-year government bond, so the forecasted MERP would be about 10¾% and 6½ to 7½ % over the 30-year government bond in Canada and the U.S., respectively.[35] Figure 5 below shows Bloomberg's forecasted MERP for Canada and the U.S. from 2006 to today.

Figure 5
Forecasted Canadian and U.S. Market equity risk premium
(Over 10-Year Government Bonds)



I note that Bloomberg's forecasted MERP for Canada has increased by about 200 basis points since January 2014, while the U.S. forecast has increased by about 50 basis points.

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[35] Estimates of the MERP over a 30-year bond is obtained by subtracting the maturity premium of the Canadian (U.S.) 30-year over the 10-year government bond from the figure reported by Bloomberg. This maturity premium is about 40 (55) basis points in Canada (the U.S). See Workpaper 1.

Q27. Is there recent academic support that the MERP has increased since the crisis?

A27. Yes. A recently updated analysis by Duarte and Rosa of the Federal Reserve of New York aggregates the results of many models of the required MERP in the U.S. and tracks them over time. This analysis finds a very high MERP in recent years.

The authors estimate the MERP that results from a range of models each year from 1960 through the present.[36] The authors then report the average as well as the first principal component of results.[37] The authors find that the models used to determine the risk premium are converging to provide more comparable estimates and that the average annual estimate of the MERP was at an all-time high in 2013. These estimates are reasonably consistent with those obtained from Bloomberg and the consistent elevation of the MERP over the historical figure indicates that the elevated level is persistent. Figure 6 below reproduces Duarte and Rosa's summary results.

Figure 6
Duarte and Rosa's Chart 3
One-Year Ahead MERP and Cross-Sectional Mean of Models

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[36] Fernando Duarte and Carlo Rosa, "The Equity Risk Premium: A Review of Models*," Federal Reserve Bank of New York*, December 2015 (Duarte & Rosa 2015).

[37] Duarte & Rosa emphasize the "first principal component" of the 20 models. This means that the authors used statistics to compute the weighted average combination of the models that captures the most variability among the 20 models over time.

Q28. Are there other reasons why capital markets may continue to exhibit high volatility?

A28. Yes, the first couple of weeks of 2016 have seen very large market declines across the globe (including in Canada) and trading on the Chinese market was halted. For example, the Toronto index, the S&P / TSX 60 has shown substantial volatility in early 2016 and was down by about 7% during the first two weeks of 2016. The development in the U.S. major index, the S&P 500 is similar. At the same time, market volatility is high as illustrated in Figure 4. Further, oil prices are currently very low by historic standards – with a substantial impact on oil producing countries and regions.[38] Finally, unrest in the Middle East (e.g., Syria and Saudi Arabia / Iran) plausibly has contributed to continued uncertainty and thereby an increase in the market equity risk premium that investors require.

Q29. What do you conclude from the discussion above?

A29. The increase in the spread between the yield on utility and government bonds indicates that the premium investors require to hold assets that are not risk-free has increased. Likewise, the recent trends in preferred equity yields confirm that the premium on assets other than government bonds has increased. Similarly, the forecasted MERP is high relative to its recent past and the volatility index is higher than any time since 2011. These observations are consistent with the observations in Mr. Buttke's evidence that economic uncertainty and market volatility are high. All of these factors point to a relatively high degree of market volatility and because the measures have increased relative to their level at the 2013 GCOC proceeding, indications are that investors' required premia to hold assets that are not risk-free have increased.

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[38] For a discussion of the impact on Canada, see Remarks by Stephen S. Poloz, "Life After Liftoff: Divergence and U.S. Monetary Policy Normalization," January 7, 2016.

C. CANADIAN VS U.S. MARKETS

Q30. Please summarize the relationship between the Canadian and U.S. capital markets.

A30. While the Canadian and U.S. market have experienced aspects of the financial crisis and its aftermath differently, there are many similarities. For example, as illustrated in Figure 2 and Figure 5 above, interest rates and the forecasted MERP in the two countries tend to move in the same direction. Similarly, the S&P/TSX and S&P 500 are highly correlated with a correlation coefficient of 0.78 since 2000,[39] and the volatilities of these indexes tend to track one another as shown in Figure 4. Importantly, the North American Free Trade Agreement (NAFTA) of 1994 eliminated many barriers to trade and investment across the U.S. and Canadian border, so that investors more freely can invest in whatever jurisdiction they choose.[40]

Q31. Do you have any evidence of the magnitude of investments from the U.S. into Canada or Canada into the U.S.?

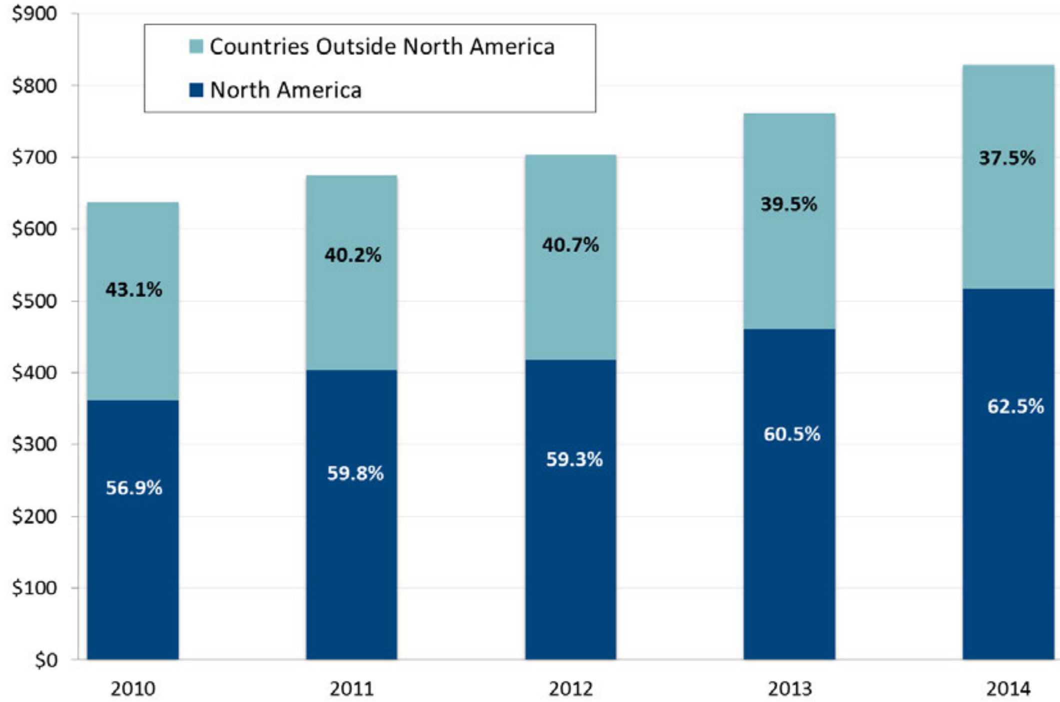
A31. Yes. Figure 7 summarizes Canada's international investment position by region. It is clear from Figure 7 (Panel A) that the majority of Canada's international direct investments abroad are into North America (primarily the U.S). I also note that the magnitude of the investment into North America has been increasing. Further, the majority of the international investments are into equity.[41] Figure 7 (Panel B) also shows the origins of foreign direct investments into Canada are split roughly 50/50 between North America and elsewhere.

39 Calculated from Bloomberg data.

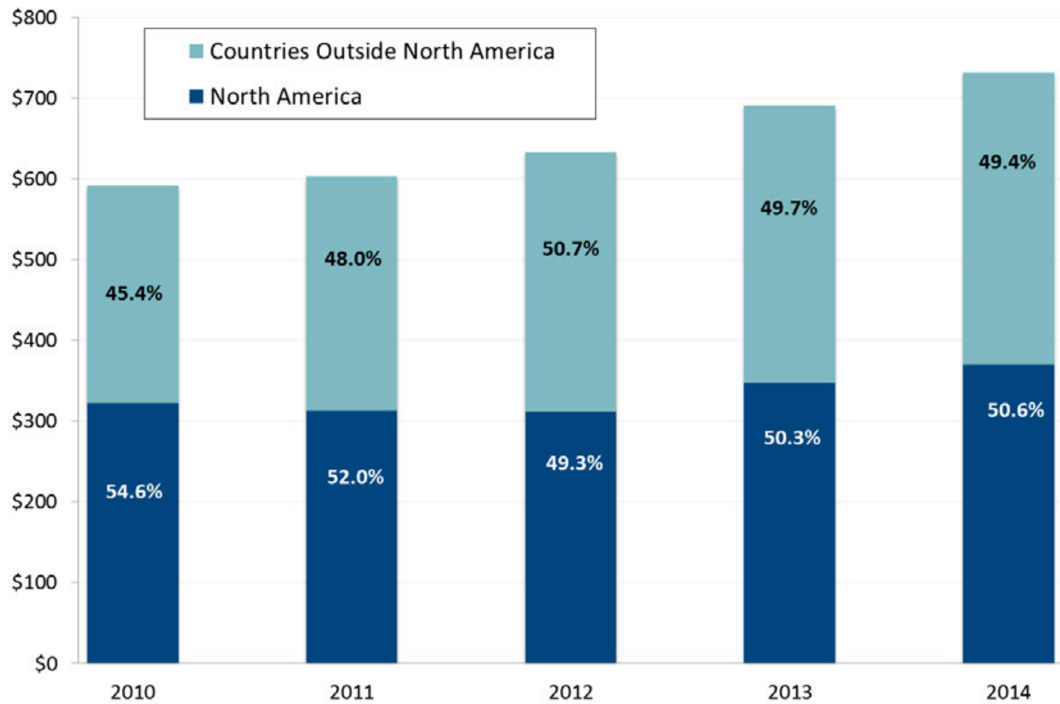
40 Some provisions came into effect over a period of time.

41 See CANSIM Table 376-0141: International Investment Position, Book Value. Available at: http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3760141&&pattern=&stByVal=1&p1=1&p2=-1&tabMode=dataTable&csid=. See also Workpaper 3.

Figure 7: Summary of Direct Investments: Canada
Panel A: Canadian Direct Investment Abroad ($CAD million)



Panel B: Foreign Direct Investment in Canada ($CAD million)



Q32. Do Canadian direct investments in U.S. equity pertain to utilities?

A32. Yes. Canadian pension funds as well as Canadian utilities have invested in U.S.-based regulated assets. For example, Canadian Pension Plan Investment Board holds approximately 28% of the equity in Puget Sound Energy in the state of Washington[42] and the British Columbia Investment Management Corporation is part of a group planning to acquire CLECO in the state of Louisiana.[43] Similarly, Fortis Inc. acquired Arizona-based UNS Energy in 2014 and CH Energy Group in 2013, while Emera Inc. plans on acquiring Florida-based TECO Inc.[44]

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[42] Washington State Utilities and Transportation Commission, Order 08 in Docket U-072375, p. 16. According to the same docket British Columbia Investment Management Corporation and Alberta Investment Management Corporation holds another 20% of equity (p. 16-17).

[43] CLECO Press Release, "Cleco and investor group enhance commitments to create additional value for customers and obtain approval of the Louisiana Public Service Commission," January 4. 2016.

[44] Bloomberg as of January 4, 2016.

Q33. Why is the relationship between Canadian and U.S. markets important for cost of equity estimation?

A33. Because of the interaction of financial markets and cross-border investments, there is a strong link between financial markets in Canada and the U.S. As a result (and as discussed in Mr. Buttke's evidence), investors consider not only Alberta or Canadian utilities but also comparable U.S. investments. Since investors clearly consider not only Canadian but also U.S. opportunities, it becomes important to include both Canadian and U.S. companies as comparables in the cost of equity study.

D. IMPACT ON ROE ESTIMATION

Q34. Please summarize how the economic developments discussed above have affected the return on equity and debt that investors require?

A34. Utilities rely on investors in capital markets to provide funding to support their capital expenditure program and efficient business operations, and investors consider the risk return tradeoff in choosing how to allocate their capital among different investment opportunities. It is therefore important to consider how investors view the current economic conditions; including the plausible development in the risk-free rate and the current MERP.

These investors have been dramatically affected by the credit crisis and ongoing market volatility, so there are reasons to believe that their risk aversion remains elevated relative to pre-crisis periods.

Likewise, the effects of the Bank of Canada and other federal banks' monetary policy have artificially lowered the risk-free rate. As a result, yield spreads on utility debt, including top-rated instruments, have remained elevated. The evidence presented above demonstrates that the equity risk premium is higher today than it was prior to the crisis for all risky investments. This is true even for investments of lower-than-average risk, such as the equity of regulated utilities.

Q35. Does your analysis consider the current economic conditions?

A35. Yes. In implementing the CAPM and risk premium models, I consider the downward biased risk-free rate as well as the elevated MERP. Specifically, I rely on two sets of inputs for the CAPM: I consider the elevated spread between utility and government bond yields and either (i) normalize the risk-free rate to reflect the currently downward bias of the yields and combine that with the historical MERP or (ii) rely on Consensus Forecasts' one-year out government bond yield forecast for the risk-free rate and combine that with a MERP that reflects the strong evidence that risk premiums are elevated relative to their long-term historical average. Because, as Mr. Buttke points out, the Bank of Canada has not engaged in formal Quantitative Easing as the U.S. Federal Reserve did, the majority of the increase in yield spread could be argued to be primarily a confirmation of an increase in the MERP.

To be conservative, I am consistent with the Commission's order in the 2013 GCOC and do not simultaneously normalize the risk-free rate and adjust the MERP, although both adjustments may have merit.

IV. ESTIMATING THE COST OF EQUITY FOR BENCHMARK SAMPLES

A. APPROACH

Q36. Please outline your approach for estimating the cost of equity for the Utilities.

A36. As described above in Section II.A, the standard for establishing a fair rate of return on equity requires that the regulated entity be allowed to earn a return equivalent to what an investor could expect to earn on an alternative investment of equivalent risk. Therefore, my approach to estimating the cost of equity for the Utilities focuses on measuring the expected returns required by investors to invest in companies that face business and financial risks comparable to those faced by the Utilities. Because the models I rely upon most heavily require market data, my consideration of comparable companies is restricted to those that have publicly traded stock.

To this end, I have selected three samples of publicly-traded companies with risk profiles that are comparable to those of the Utilities (albeit in various degrees and aspects): a sample of Canadian companies with substantial natural gas and electric distribution operations (Canadian Utility sample); a sample of U.S. based companies whose business is focused on the local distribution of natural gas (Gas LDC sample); and a sample of U.S. companies operating in the electric sector whose operations are primarily concerned with the provision of regulated electric utility service (Electric sample).

For each sample, I derive estimates of the representative cost of equity according to standard financial models including two versions of the Capital Asset Pricing Model (CAPM) and two versions of Discounted Cash Flow (DCF). I further report results based on one version of the so-called risk premium model, as well as summary analysis of allowed ROEs from other jurisdictions in Canada and the U.S. The latter two analyses are conducted using allowed returns on equity and associated allowed equity ratios rather than market data; the results of these analyses are used as a test on the reasonableness of my results.

As the cost of equity for the CAPM and DCF based models are derived from market data that reflect the capital that investors hold in the sample companies, I consider the impact of any difference between the financial risk inherent in the cost of equity estimates and the capital structure to which it is assigned using several methods to avoid any one method biasing the results. I emphasize that in all circumstances the cost of equity is applied to the book value rate base. Further, I present my results both before and after a financial risk adjustment in acknowledgement of the Commission's historical practice.

B. SAMPLE SELECTION

Q37. Why do you apply your cost of capital models to samples of comparable companies instead of estimating the cost of capital for the Utilities directly?

A37. It is a well-established point of finance theory (and practice) that the cost of capital depends on the *use*—not the source—of the invested capital. This means that if a diversified company has subsidiary parts engaged in distinct lines of business, the cost of capital for each part is specifically dependent on the risks inherent in its own line of business, not on the risks of the consolidated company as a whole.

Since the Utilities are subsidiaries of consolidated entities and do not themselves have publicly traded stock, it is not possible to directly estimate their cost of equity using the CAPM or DCF models. This is because these models rely on market information (such as stock prices, betas based on historical stock returns, and growth rate estimates) to estimate the expected returns required by equity investors.

Nor would it be appropriate to infer the appropriate cost of equity of the Utilities based solely on the measured cost of equity of the Utilities' publicly traded corporate parents, since those corporations also contain other lines of business with different levels and sources of risk. According to financial theory, the overall risk of a diversified company equals the market-value weighted average of the risks of its components, so cost of equity estimates derived for diversified publicly traded companies reflect a blend of risk-appropriate returns.

That is why I develop samples of publicly traded companies that are as analogous as possible to the Utilities in terms of business risk, and apply the models to those samples as proxies for the Utilities.

Q38. How do you identify sample companies of comparable business risk to the Utilities?

A38. The Utilities are primarily engaged in the regulated distribution and transmission of electricity and natural gas. As discussed by Dr. Carpenter, the specific business risk associated with these endeavors depends on many factors, including the specific characteristics of the service territory and regulatory environment in which the Utilities operate. It is obviously not possible to identify publicly traded sample companies that replicate every aspect of the Utilities' risk profile. However, ensuring that the sample companies have their business operations concentrated in similar lines of business and/or business environments is an appropriate starting point for selecting a proxy group of comparable risk to the target companies.

To this end I have selected three samples, each with different advantages when it comes to estimating the cost of capital for the Utilities.

Q39. Please describe the Canadian Utility Sample.

A39. The Canadian Utility Sample contains companies that have utility operations in Canadian regulatory jurisdictions and therefore provides insights into the risk and return of Canadian-based utilities. These companies' equity is publicly traded on the Toronto Stock Exchange, and data is available for estimation as well as long histories of paying periodic dividends to shareholders. They are in general diversified and have some business segments engaged in unregulated operations (such as merchant power generation) or regulated activities other than gas and electric distribution and transmission (such as common carrier oil pipelines). Several of these companies also have operations in the U.S., and other international jurisdictions as well as in Canada.

Q40. What are the characteristics of the Canadian Utility Sample?

A40. Figure 8 reports the sample companies' annual revenues for the trailing twelve months ended September 2015 and the percentage of their assets devoted to regulated activities. It also displays each company's Market Capitalization and the S&P Credit Rating in 2015, as well as its 3-year adjusted historical beta from Bloomberg and the consensus long-term (3- to 5-year) earnings growth rate estimate for the company from Thomson Reuters IBES.

Figure 8
Canadian Utility Sample Companies[45]

Company	DCF Subsample	CAPM Subsample	Annual Revenue (CAD million)	Regulated Assets	Market Cap. 2015 Q3 (CAD million)	Betas	S&P Credit Rating (2015)	Long Term Growth Est.
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Canadian Utilities Ltd		*	$3,328	80%	$9,477	0 86	A	2 6%
Fortis Inc	*	*	$6,712	93%	$10,172	0 67	A-	12 2%
Emera Inc	*	*	$2,884	77%	$6,239	0 72	BBB+	8 6%
TransCanada Corporation	*	*	$11,065	73%	$30,802	0 97	A-	5 0%
Enbridge Inc	*	*	$33,677	61%	$44,249	1 07	BBB+	12 1%
AltaGas Ltd			$2,271	37%	$4,923	1 20	BBB	14 5%
Average			$9,990	70%	$17,644	0 92		9 2%
Portfolio						0 97		

Sources and Notes:
[1]-[2]: Denotes companies used in the CAPM and DCF subsamples
[3]: Bloomberg as of January 5, 2016 Most recent four quarters
[4]: Cap IQ and company financial statements Includes regulated and unregulated assets outside of Canada See Table No BV-CAN-2
[5]: See Table No BV-CAN-3 Panels A through F
[6]: See Supporting Schedule # 1 to Table No BV-CAN-10
[7]: Standard & Poor's Research Insight as of 2015 Q3
[8]: See Table No BV-CAN-5

Q41. Why do you consider U.S. based samples in addition to the Canadian Utility Sample?

A41. The Canadian Utility sample is limited because it is composed of a relatively small number of companies whose business operations are diversified relative to the Utilities and engaged in higher proportions of unregulated activities. As discussed by Dr. Carpenter, U.S. and Canadian utility business and regulatory models are increasingly similar, and thus the business risk and regulatory environment are comparable. For example, Dr. Carpenter points out that many of the gas LDC have deferral accounts related to, for example, capital expenditures and revenue decoupling.[46] It has also become common for U.S. electric utilities to have a variety of deferral accounts.[47]

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45 I note that I do not include Hydro One because it has had publicly traded stock only since early November, 2015. See http://www.chumfm.com/news/2015/11/05/watch-shares-of-hydro-one-start-trading-on-the-tsx.

46 Carpenter Evidence, Section IV.

47 See, for example, Regulatory Research Associates, "Adjustment Clauses: A State-by-State Overview," October 2, 2015.

In addition, investors in Canada consider investment alternatives in both the U.S. and Canada, as described by Mr. Buttke, which makes the U.S.-based samples relevant investment alternatives to the Canadian utilities we are considering. As such, they would be expected to have similar returns given their levels of business and financial risk.

Q42. Why did you select separate U.S. Electric and Gas LDC samples?

A42. Both the U.S. Electric and Gas LDC samples have different advantages in estimating the cost of capital for the Utilities. The U.S. Electric sample is a large sample—which allows for greater statistical precision in the results. Additionally, the companies in the Electric sample have utility operations in a variety of jurisdictions, so they are broadly representative of utility regulation in the U.S. However, due to the majority of companies in the U.S. Electric sample being vertically integrated, it is not possible to isolate transmission and distribution from generation functions. Further, because some higher proportions of unregulated activities, I create a subsample that consists of companies that with at least 80% of their assets subject to regulation.

On the other hand, the Gas LDC sample is essentially a pure play local distribution group, which may be the closest analog to the business of Utilities. However, the sample is small due to fewer Gas LDCs in the U.S. and a large number of them being eliminated for not meeting various selection criteria.

In light of the relative advantages and limitations of these two groups of sample companies, I believe each one provides a useful point of comparison when estimating the cost of equity for the Utilities.

Q43. Will you please summarize how you selected the Electric and Gas LDC samples?

A43. For the Electric sample and the Gas LDC sample, I started with the universe of publicly traded utilities classified as electric utilities and natural gas distribution companies in *Value Line*. I then eliminated companies engaged in substantial merger and acquisition (M&A) activities over the past 5-years and companies with less than 50% of its assets subject to regulation. Further, I require that the companies have an investment grade credit rating, no recent dividend cuts, more than $300 million in revenues to ensure liquidity, and generally have data available for estimation.

Q44. Did you apply similar screening criteria to the Canadian Utility Sample?

A44. I did check the Canadian Utility sample companies for the same criteria. However, I did not eliminate any of the companies based on these criteria. This is because most of the companies in this group have recently engaged in substantial merger or acquisition activity, such that strictly following my standard elimination criteria would have left only three companies (Canadian Utilities Ltd., TransCanada, and Enbridge), which is an insufficient number from which to calculate meaningful estimates. Therefore, rather than foregoing any consideration of Canadian utility companies in my analysis, I elected to retain all six in the sample.

Q45. What are the characteristics of the Electric sample?

A45. The Electric sample comprises electric companies whose primary source of revenues and majority of assets are in the regulated portion of the U.S. electric industry. The final sample consists of the 27 electric utilities listed in Figure 9 below. These companies own regulated electric utility subsidiaries in many U.S. states, and some also provide electric transmission service regulated by the U.S. Federal Energy Regulatory Commission (FERC).[48] Therefore, the Electric sample is broadly representative of the regulated electric utility industry from a business risk perspective. However, unlike the Utilities, the companies in the Electric sample are generally not pure transmission and distribution utilities.[49] Many own regulated electric generation plants and some have unregulated wholesale power generation operations. Nevertheless, the Electric sample companies are dividend paying utility companies whose business risk is predominantly defined by the regulatory environments in which their utility subsidiaries operate. As discussed in detail

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[48] None of the included entities are primarily electric transmission entities.

[49] While there are some U.S. electric companies that do engage almost exclusively in regulated electric transmission (such as ITC Holdings Corp) or distribution (such as Eversource Energy), these companies were eliminated from my Electric sample because they have been involved in significant announced and/or completed merger and acquisition activity in the last few years.

by Dr. Carpenter, the regulation of natural gas and electric utilities in the U.S. increasingly resembles the regulatory model in Alberta with the possible exception of the UAD.[50] Therefore, the US Electric sample companies may have lower risk than the Utilities, so that the estimates at a comparable equity ratio are too low.

Figure 9 reports the sample companies' annual revenues for the trailing twelve months ended September 2015 and the percentage of their assets devoted to regulated electric operations according to Edison Electric Institute's (EEI) classifications of electric utilities as being either regulated (R), having greater than 80% regulated electric assets or mostly regulated (MR), having 50-80% regulated electric assets. It also displays each company's Market Capitalization and the S&P Credit Rating in 2015, as well as its 3-year adjusted historical beta from Bloomberg and the consensus long-term (3- to 5-year) earnings growth rate estimate for the company from Thomson Reuters IBES and *Value Line*.

[50] See Carpenter Evidence, Section IV.

Figure 9
U.S. Electric Utility Sample Companies

Company	CAPM Subsample	DCF Subsample	Annual Revenues (USD million)	Regulated Assets	Market Cap. 2015 Q3 (USD million)	Betas	S&P Credit Rating (2015)	Long Term Growth Est.
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
ALLETE	*	*	$1,397	R	$2,393	0 67	BBB+	4 2%
Alliant Energy	*	*	$3,318	R	$6,434	0 70	A-	5 6%
Amer Elec Power	*	*	$17,108	R	$27,037	0 67	BBB	4 4%
Ameren Corp	*	*	$6,160	R	$9,802	0 71	BBB+	7 1%
CenterPoint Energy			$7,967	M	$7,692	0 76	A-	1 6%
CMS Energy Corp	*	*	$6,705	R	$9,338	0 62	BBB+	6 3%
Consol Edison	*	*	$12,676	R	$18,927	0 55	A-	3 0%
Dominion Resources			$12,070	M	$41,040	0 68	A-	5 8%
DTE Energy	*	*	$10,928	R	$13,951	0 67	BBB+	5 1%
Edison Int'l	*	*	$12,297	R	$19,740	0 56	BBB+	0 3%
El Paso Electric	*	*	$800	R	$1,432	0 74	BBB	8 0%
Entergy Corp	*	*	$11,836	R	$11,376	0 66	BBB	-2 6%
G't Plains Energy	*	*	$2,492	R	$3,964	0 72	BBB+	6 2%
IDACORP Inc	*	*	$1,275	R	$3,087	0 77	BBB	3 1%
MGE Energy			$579	M	$1,396	0 71	AA-	6 4%
NextEra Energy			$18,080	M	$44,783	0 73	A-	7 0%
OGE Energy	*	*	$2,276	R	$5,399	0 76	A-	3 2%
Otter Tail Corp	*	*	$784	R	$972	0 84	BBB	7 4%
PG&E Corp	*	*	$16,974	R	$24,840	0 61	BBB	8 2%
Pinnacle West Capital	*	*	$3,487	R	$6,850	0 71	A-	4 8%
Portland General	*	*	$1,899	R	$3,155	0 72	BBB	4 6%
Public Serv Enterprise			$10,910	M	$20,317	0 68	BBB+	1 7%
SCANA Corp			$4,638	M	$7,565	0 65	BBB+	4 3%
Sempra Energy			$10,277	M	$22,956	0 79	BBB+	9 9%
Vectren Corp			$2,508	M	$3,324	0 80	A-	6 1%
Westar Energy	*	*	$2,510	R	$5,239	0 68	BBB+	4 7%
Xcel Energy Inc	*	*	$11,307	R	$17,219	0 59	A-	4 8%
Average			$7,158		$12,601	0 70		4 9%
Portfolio						0 67		

Sources and Notes:
[1]-[2]: Denotes companies used in the CAPM and DCF subsamples
[3]: Bloomberg as of January 5, 2016 Most recent four quarters
[4]: See Table No BV-ELEC-2 Key:
R - Regulated (More than 80% of assets regulated)
M - Mostly Regulated (50%-80% of assets regulated)
[5]: See Table No BV-ELEC-3 Panels A through AA
[6]: See Supporting Schedule # 1 to Table No BV-ELEC-10
[7]: S&P Credit Ratings from Research Insight as of 2015 Q3
[8]: See Table No BV-ELEC-5

Q46. What are the characteristics of the Gas LDC sample?

A46. The Gas LDC sample consists of six companies that have the majority of their revenue generating assets dedicated to the regulated distribution of natural gas in the U.S.

Figure 10 reports the sample companies' annual revenues for the trailing twelve months ended September 2015 and the percentage of their assets devoted to regulated activities.

It also displays each company's Market Capitalization and the S&P Credit Rating in 2015, as well as its 3-year adjusted historical beta from Bloomberg and the consensus long-term (3- to 5-year) earnings growth rate estimate for the company from Thomson Reuters IBES and *Value Line*.

Figure 10
U.S. Gas LDC Utility Sample Companies

Company	**Annual Revenues (USD million)**	**Regulated Assets**	**Market Cap. 2015 Q3 (USD million)**	**Betas**	**S&P Credit Rating (2015)**	**Long Term Growth Est**
	[1]	[2]	[3]	[4]	[5]	[6]
Atmos Energy	$4,142	99%	$5,680	0.71	A-	5.5%
New Jersey Resources	$2,734	68%	$2,409	0.77	A	5.1%
Northwest Nat. Gas	$733	91%	$1,212	0.66	A+	10.2%
South Jersey Inds.	$983	65%	$1,642	0.72	BBB+	9.1%
Southwest Gas	$2,406	83%	$2,625	0.72	BBB+	8.0%
WGL Holdings Inc.	$2,660	94%	$2,719	0.66	A+	5.2%
Average	$2,276		$2,715	0.71		7.2%
Portfolio				0.71		

Sources and Notes:
[1]: Bloomberg as of January 5, 2016. Most recent four quarters.
[2]: Company 10-Ks. See Table No. BV-GAS-2.
[3]: See Table No. BV-GAS-3 Panels A through F.
[4]: See Supporting Schedule # 1 to Table No. BV-GAS-10.
[5]: S&P Credit Ratings from Research Insight as of 2015 Q3.
[6]: See Table No. BV-GAS-5.

The average Gas LDC sample company devotes approximately 80% of its assets to regulated activities related to primarily the local distribution of natural gas.[51] Therefore, these sample companies are nearly pure-plays in the natural gas distribution industry.[52] Moreover, as discussed by Dr. Carpenter, the regulatory frameworks in the nine jurisdictions in which the Gas LDC sample companies operate are substantially similar to those prevailing in Alberta and other Canadian jurisdictions.[53] Therefore, I believe that

[51] While some of the companies in the Gas LDC sample own gas transmission assets, the majority of those assets are state and not FERC regulated, indicating they are not long-haul transmission lines.

[52] I note that these companies are primarily subject to state regulation.

[53] Carpenter Evidence, Table 1 and Section IV.

although they do not engage in electric distribution or transmission operations, the Gas LDC sample companies are among the most directly comparable to the Utilities in terms of business risk as they tend to be primarily distribution entities subject to state regulation.

Q47. Are there any risks specific to the Utilities that are not captured when measuring the cost of capital for samples of comparable companies?

A47. Yes. As discussed at length in the evidence of Dr. Carpenter and Mr. Buttke, recent developments in the Alberta regulatory environment—notably the Alberta Utilities Commission's Utilities Asset Disposition Decision (UAD Decision)—have introduced substantial uncertainty regarding the ability of the Utilities to recover their costs. To the extent that such uncertainty is particular to Alberta, and that the proxy companies contained in my samples are not substantially affected by similar regulatory provisions and associated uncertainty, the cost of capital estimates obtained for the samples will not fully reflect the business risk profiles of the Utilities.

Therefore, it is essential that the Commission take Alberta-specific risk factors into account when determining the appropriate risk-adjusted cost of equity and capital structure that the Utilities should be allowed. As discussed in Section VII below, I consider these factors when making my capital structure recommendations.

C. THE CAPM BASED COST OF EQUITY ESTIMATES

Q48. Please briefly explain the CAPM.

A48. The Capital Asset Pricing Model (CAPM) is a theoretical model stating that the collective investment decisions of investors in capital markets will result in equilibrium prices for all risky assets such that the returns investors expect to receive on their investments are commensurate with the risk of those assets relative to the market as a whole. The CAPM posits a risk-return relationship known as the Security Market Line (see Figure 1 in Section II), in which the required expected return on an asset is proportional to that asset's relative risk as measured by that asset's so-called "beta".

More precisely, the CAPM states that the cost of capital for an investment, S (e.g., a particular common stock), is given by the following equation:

$$\boldsymbol{r_s = r_f + \beta_s \times MERP} \tag{1}$$

where $\boldsymbol{r_S}$ is the cost of capital for investment S;

$\boldsymbol{r_f}$ is the risk-free interest rate;

$\boldsymbol{\beta_S}$ is the beta risk measure for the investment S; and

$\boldsymbol{MERP}$ is the market equity risk premium.

The CAPM is a "risk-positioning model" that relies on the empirical fact that investors price risky securities to offer a higher expected rate of return than safe securities. It says that an investment whose returns do not vary relative to market returns should receive the risk-free interest rate (that is the return on a zero-risk security, the y-axis intercept in Figure 1). Further, it says that the risk premium of a security over the risk-free rate equals the product of the beta of that security and the Market Equity Risk Premium: the risk premium on a value-weighted portfolio of all investments, which by definition has average risk.

1. Inputs to the CAPM

Q49. What inputs does your implementation of the CAPM require?

A49. As demonstrated by equation (1), estimating the cost of equity for a given company requires a measure of the risk-free rate of interest and the market equity risk premium (MERP), as well as a measurement of the stock's beta. There are many methodological choices and sources of data that inform the selection of these inputs. I discuss these issues, along with the finer points of finance theory underlying the CAPM, in Appendix B, Section B to my written evidence. In recognition that estimating the appropriate values of these inputs is inherently imprecise and requires judgment on the part of the analyst, I perform multiple CAPM calculations corresponding to distinct "scenarios" reflecting different values of the inputs. This allows me to derive a range of reasonable estimates for the cost of equity capital implied by each of my samples.

Q50. What values do you use for the risk-free rate of interest?

A50. I use the yield on a 30-year Canadian Government Bond as the risk-free asset for purposes of my analysis. Recognizing the fact that the cost of capital set in this proceeding will prevail for the Utilities over the next several years, I rely on a forecast of what Canadian Government bond yields will be at the end of 2016. Specifically, Consensus Forecasts® predicts that the yield on a 10-year Government Bond will be 2.2% at the end of this year.[54] I adjust this value upward by 40 basis points, which is my estimate of the representative maturity premium for the 30-year over the 10-year Government Bond.[55] This gives me a lower bound on the risk-free rate of 2.6%.

I also consider a scenario in which the appropriate risk-free rate of interest is 3.4%. Thus, I consider a scenario where 80 basis points reflect downward pressure on the government bond yield or an increase in the MERP.[56] It also reflects the fact that (as discussed above in Section III) economic forecasts are for government bond yields to increase over the next several years to about 3.5% by 2018.[57]

Q51. What values do you use for the market equity risk premium (MERP)?

A51. Like the cost of capital itself, the market equity risk premium is a forward-looking concept. It is by definition the premium above the risk-free interest rate that investors can *expect* to earn by investing in a value-weighted portfolio of all risky investments in the market. The premium is not directly observable, and must be inferred or forecasted based on known market information. One commonly used method for estimating the MERP is

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[54] Consensus Forecasts December 2015 survey.

[55] This maturity premium is estimated by comparing the average excess yield on 30-year versus 10-year Canadian Government Bonds over the period 1990 - 2015, using data from Bloomberg.

[56] As of year-end 2015, the spread between utility and government bond yields was elevated by about 91 basis points relative to the historical norm, so the application of only 80 basis points as an upward adjustment to the risk-free interest rate is conservative.

[57] Consensus Forecasts, October 2015, p. 28.

to measure the historical average premium of market returns over the income returns on government bonds over some long historical period. *Duff and Phelps* performs such a calculation of the Canadian MERP using data from several sources.[58] The average market equity risk premium from 1935 to the present is 5.7% with slightly shorter or longer periods resulting in slightly higher or lower MERPs.[59] I use this value of the MERP in one input scenario to my CAPM analyses.

However, investors may require a higher or lower risk premium, reflecting the investment alternatives and aggregate level of risk aversion at any given time. As explained in Section III, there is substantial evidence that investors' level of risk aversion remains elevated relative to the time before the global financial crisis and ensuing recession that commenced in 2008. In recognition of this evidence, together with forward-looking measurements of the expected market equity risk premium that are higher than the long-term historical average, I also perform CAPM calculations using 8% for the Canadian market equity risk premium. The 8% forecasted MERP is in between Bloomberg's forecasted Canadian and U.S. MERP.[60] I use a forecasted MERP between the Canadian forecast and the U.S. forecast because of the substantial interaction of the two markets.

Q52. What is the evidence that the current MERP is higher than its historical average?

A52. Academic articles that were written in the late 1990s or early 2000s often found that the U.S. MERP at the time was lower than the its historical average based on various forward-looking models, such as market-wide versions of the DCF model. A recent article by Duarte and Rosa of the Federal Reserve of New York summarizes many of these models and also estimates the MERP from the models each year from 1960 through

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58 See *Duff and Phelps International Cost of Capital Handbook, 2015,* pp. 3-9 for details.

59 See *Duff and Phelps International Cost of Capital Handbook*, 2015, Exhibit 1-9

60 Over a 30-year government bond, the Canadian MERP is 10.75% which is high relative higher than the forecasted U.S. MERP of 6.5% - 7.5%, so that 8% gives substantial weight to the lower U.S. MERP. (See Workpaper 1.)

the present.[61] The authors find that the models are converging to provide more consensus around the estimate and that the average annual estimate of the MERP is consistent with the academic literature and with forward-looking estimates such as Bloomberg's. Their analysis shows that the U.S. MERP was lower than its long-term historical average in the early 2000s, but is currently at an all-time high. Chart 3 from Duarte & Rosa 2015 was re-produced in Figure 6, which shows the average estimated MERP (over 30-day U.S. T-bills) for 20 models.

These findings are broadly consistent with the forward-looking MERP's calculated by Bloomberg and shown in Figure 5, which showed that the forward-looking MERP for Canada is particularly high at over 11 percent. Even after reducing this estimate to account for the maturity premium between 30-day U.S. Treasury bills used in their model and 30-year Government bonds, this suggests that a figure above 10% could be an appropriate input to the CAPM for the market equity risk premium over the long-term Canadian government bond rate. Because the forecasted U.S. MERP is lower, I rely on an estimate of 8% for the forecasted MERP. Thus, I conservatively rely on the historical average MERP of 5.7% and a forward-looking MERP of 8% in my CAPM analysis.[62]

Q53. What betas did you use for the companies in your sample?

A53. I used adjusted historical betas obtained from Bloomberg, using weekly returns over a three-year historical estimation period.[63] As acknowledged by the Commission "adjusted betas are widely disseminated to investors by investment research firms."[64] For the Canadian Utility Sample, I used the S&P/TSX as the measure of overall market returns,

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61 Fernando Duarte and Carlo Rosa, "The Equity Risk Premium: A Consensus of Models," *Federal Reserve Bank of New York*, December 2015 (Duarte & Rosa 2015).

62 I use 8% because it recognized that the forward-looking U.S. MERP is lower than the Canadian forward-looking MERP and also is justified by the elevation in the spread between A rated utility and government bond yields. See Appendix B, Section II for details.

63 Bloomberg reports betas using "Blume Adjustment" to improve predictive accuracy relative to the use of raw historical betas. Betas adjusted in this manner are also reported by *Value Line* and other investment services, are routinely relied upon in practical applications of the CAPM, including in many regulatory jurisdictions See Appendix B, section IV for more detail on the estimation of betas.

64 2013 GCOC Decision, pp. 27-28

but for the U.S. Electric and Gas LDC samples, I relied on the S&P 500 as the market proxy.

Additionally, I estimated a portfolio beta for each sample, reflecting the market risk of the each sample on an aggregate basis. For example, I took the market-value weighted average of the weekly returns to the stocks of the six Gas LDC companies and measured how this series of composite returns varied relative to the market over a 3-year period. The use of value-weighted portfolio betas is advantageous from a statistical standpoint, since idiosyncratic fluctuations in the returns on individual stocks may cancel each other out as part of the portfolio, leading to a more precise estimate of beta compared to betas measured for individual securities.

The portfolio betas for the three samples, along with the individual company betas and the simple average betas for each sample are reported above in Figure 8, Figure 9, and Figure 10.

Q54. How have the betas for your three samples compared over the recent past?

A54. For the majority of the last decade, portfolio betas for the U.S. Electric and Gas LDC samples have been higher than those for the Canadian Utility sample. This is shown in Figure 11 below, which plots rolling 3-year adjusted betas for my three samples estimated against their respective country stock market index over the last 10 years. However, within the last two years the Canadian adjusted sample betas have dramatically increased from about 0.60 to about .95 and surpassed the betas for the U.S. sample. The increase in the beta of Canadian utilities is not driven by an individual utility or the Canadian stock market index as the results are very similar if the calculation is performed against the U.S. stock market index.[65] The substantial increase in the Canadian MERP and utility betas indicates that the returns investors require to hold Canadian utility stock have increased.

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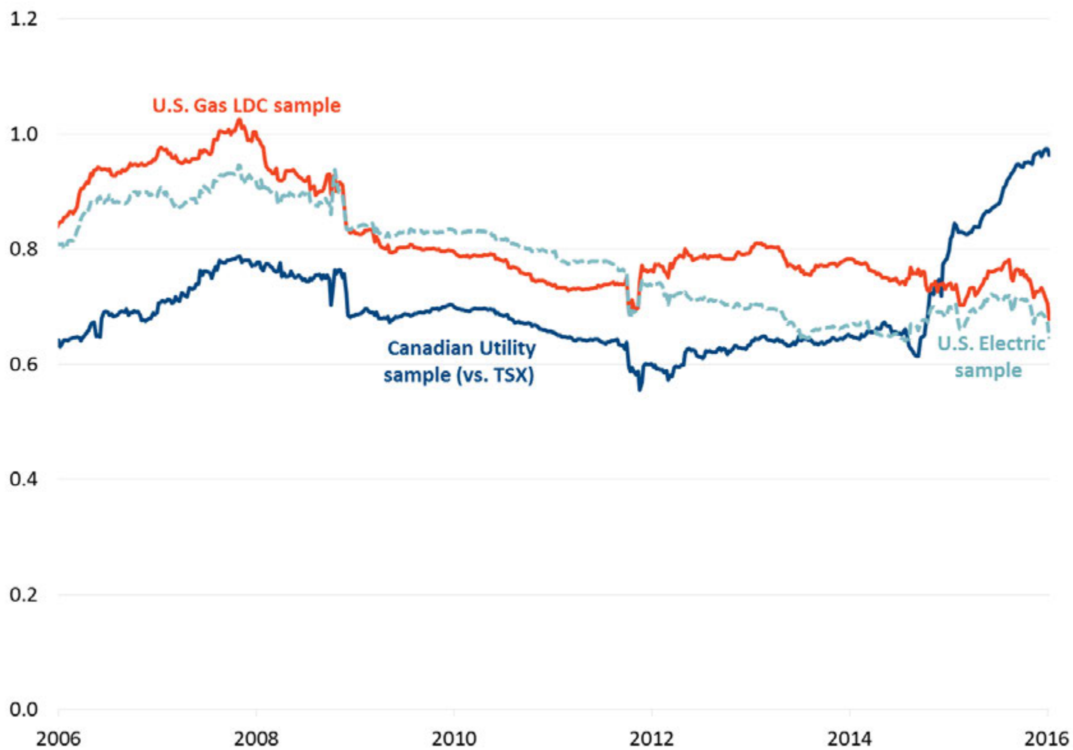
[65] See Appendix B, Section II for details on the method and Workpaper 4 for data.

Figure 11
Rolling 3-Year Adjusted Weekly Utility Sample Portfolio Betas



Sources and Notes: See Workpaper 4. Data from Bloomberg pulled as of January 12, 2016. U.S. utility industry betas are calculated using total returns gross dividends against the S&P 500 Index using risk free rate yields from the U.S. 3-month Treasury Bill. The Canadian utility industry betas as calculated against the SPTSX Index using 3-month Canadian bond index yields.

2. The Empirical CAPM

Q55. What other equity risk premium model do you use?

A55. Empirical research has long shown that the CAPM tends to overstate the actual sensitivity of the cost of capital to beta: low-beta stocks tend to have higher risk premiums than predicted by the CAPM and high-beta stocks tend to have lower risk premiums than predicted.[66] A number of variations on the original CAPM theory have been proposed to explain this finding, but the observation itself can also be used to estimate the cost of capital directly, using beta to measure relative risk by making a direct empirical adjustment to the CAPM.

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[66] See Figure A-4 in Appendix B for references to relevant academic articles.

The second variation on the CAPM that I employ makes use of these empirical findings. It estimates the cost of capital with the equation,

$$\boldsymbol{r_S = r_f + \alpha + \beta_S \times (MRP - \alpha)} \qquad (2)$$

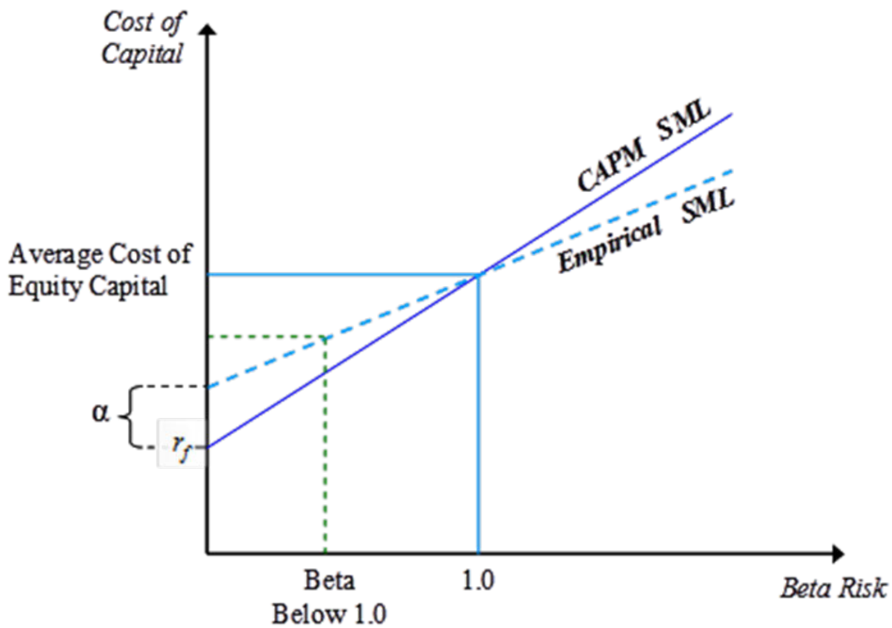
where $\boldsymbol{\alpha}$ is the "alpha" adjustment of the risk-return line, a constant, and the other symbols are defined as for the CAPM (see equation (2) above).

I label this model the Empirical Capital Asset Pricing Model, or "ECAPM." The alpha adjustment has the effect of increasing the intercept but reducing the slope of the Security Market Line in Figure 1, which results in a Security Market Line that more closely matches the results of empirical tests. In other words, the ECAPM produces more accurate predictions of eventual realized risk premiums than does the CAPM.

Q56. Why do you use the ECAPM?

A56. Academic research finds that the CAPM has not generally performed well as an empirical model. One of its short-comings is directly addressed by the ECAPM, which recognizes the consistent empirical observation that the CAPM underestimates the cost of capital for low beta stocks. In other words, the ECAPM is based on recognizing that the actual observed risk-return line is flatter and has a higher intercept than that predicted by the CAPM. The alpha parameter (α) in the ECAPM adjusts for this fact, which has been established by repeated empirical tests of the CAPM. Appendix B, Section II discusses the empirical findings that have tested the CAPM and also provides documentation for the magnitude of the adjustment, α.

Figure 12
The Empirical Security Market Line



3. Results from the CAPM Based Models

Q57. Please summarize the parameters of the scenarios and variations you considered in your CAPM and ECAPM analyses.

A57. The parameters for the two scenarios are displayed in Figure 13 below. The motivation for the scenarios is the empirical observation that the yield spread is higher than normal as is the forecasted MERP for Canada. The increased yield spread could reflect the increase in the MERP or downward pressure on the yield of government bonds due to a flight to quality or other factors. Therefore, I use the unadjusted forecast risk-free rate with a higher estimate of the MERP, and the unadjusted historical average MERP with the increased estimate of the risk-free interest rate as illustrated in Figure 13. Consistent with the Commission's concern in the 2013 GCOC Decision, I do not simultaneously normalize the risk-free rate and elevate the MERP. This is a conservative approach as it is plausible that both downward pressure on the risk-free rate and upward pressure on the MERP could simultaneously occur. Scenario 1 normalizes the risk-free rate and uses a historical MERP while Scenario 2 uses an unadjusted forecast of the risk-free rate and a forecasted MERP. Because I do not simultaneously normalize both the government bond rate and the MERP, my estimates are lower bounds.

Figure 13
Risk Positioning Scenario Parameters

	Scenario 1	Scenario 2
Risk-Free Interest Rate	3.41%	2.61%
Market Equity Risk Premium	5.70%	8.00%

Q58. Please explain the difference between the data relied upon to estimate the cost of equity and the regulatory rate base to which the cost of equity is applied.

A58. Both the CAPM and the DCF models rely on market data to estimate the cost of equity for the sample companies, so the results reflect the value of the capital that investors hold during the estimation period (market values). The allowed return on equity is applied to the rate base, which is determined using historical cost and hence reflect the book values of assets.

Q59. Why is this difference important to the estimation of the cost of equity?

A59. The strict application of a cost of equity that is estimated from market value and hence is based on market value capital structures to a book value capital structure leads to a mismatch between the two. To my knowledge there is no dispute that the rate base is and should be determined using book values. However, the Commission in its 2013 GCOC Decision cited its 2011 GCOC Decision that "[a]rguments that a market return should be applied to a market value based rate base, rather than a book value rate base, are circular since the market value is clearly dependent on the awarded return."[67] I therefore make clear that the rate base is measured using book values.

Taking differences in financial leverage into consideration does not change the value of the rate base, but it does consider the fact that the more debt a company has, the higher is

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[67] 2013 GCOC Decision, p. 30.

the financial risk associated with an equity investment.[68] To see this I construct a simple example below, where only the financial leverage of a company varies. I assume the return on equity is 10% at a 50% equity capital structure and determine the return on equity that would result in the same overall return if the percentage of equity in the capital structure were reduced to 40%.

Figure 14
Illustration of Impact of Financial Risk on Allowed ROE

	Company A (50% Equity)	Company B (40% Equity)
Rate Base	$1,000	$1,000
Equity	$500	$400
Debt	$500	$600
Cost of Debt (5%)	$25	$30
Return on Equity	$50	$45
Total Cost of Capital (7.5%)	**$75**	**$75**
ROE / Implied ROE	10%	11.25%

The table above illustrates how financial risk affects returns and also the allowed ROE: the overall return does not change, but the allowed ROE required to produce the same return goes up in recognition of the increased risk to equity investors caused by the higher degree of financial leverage.

The principle illustrated in Figure 14 is exemplary of the adjustments I perform to account for differences in financial risk when conducting estimates of the cost of equity applicable to the Utilities. However, I recognize that the Commission in past decisions has expressed a concern about the reliance on financial leverage adjustments, so I report my results both without and with the adjustments for financial leverage. Further, I perform these adjustments using several commonly used methods to avoid undue

[68] See Appendix B, Section IV for a description of common practice and underlying finance principles related to the impact of financial risk on the cost of equity.

influence from any one set of assumptions.[69] The details of these methods are included in Appendix B, Section IV.

Q60. Can you summarize the results from applying the CAPM-based methodologies?

A60. Yes. The results are presented in Figure 15, Figure 16, and Figure 17 below.[70] Consistent with Commission precedent, I have included a 50 basis point flotation cost allowance as an adder to all of my estimates. Note that I include estimates from the full Canadian Utility sample as well as from a subsample that excludes the estimate based on the highest beta. The results for the full Electric sample and the subsample (containing only companies designated by EEI as having greater than 80% of their assets devoted to regulated electric utility operations) are essentially the same and therefore I do not present the subsample results in Figure 17 (for details see Workpaper 8).

Figure 15
Canadian Utility Sample CAPM Results using Bloomberg Betas

	Scenario 1		Scenario 2	
	Without Leverage Adjustment [1]	With Leverage Adjustments [2]	Without Leverage Adjustment [3]	With Leverage Adjustments [4]
Average Method				
CAPM	9.1%	10.3% - 11.0%	10.4%	12.0% - 12.7%
ECAPM (α = 1.5%)	9.3%	10.1% - 11.1%	10.6%	11.8% - 12.8%
Average Method for CAPM Subsample				
CAPM	8.8%	9.7% - 10.3%	10.0%	11.2% - 11.8%
ECAPM (α = 1.5%)	9.0%	9.7% - 10.6%	10.2%	11.2% - 12.0%
Portfolio Method				
CAPM	9.5%	10.6% - 10.9%	10.9%	12.4% - 12.9%
ECAPM (α = 1.5%)	9.5%	10.3% - 10.6%	10.9%	12.2% - 12.6%

Sources and Notes:
Scenario 1: Long-Term Risk Free Rate of 3.41%, Long-Term Market Risk Premium of 5.70%.
Scenario 2: Long-Term Risk Free Rate of 2.61%, Long-Term Market Risk Premium of 8.00%.
Includes flotation costs of 0.5%.

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69 These methods include calculating the ROE implied by the overall cost of capital as illustrated in Figure 14, as well as two versions of the so-called Hamada Adjustment for levering and unlevering betas in the CAPM and ECAPM. See Appendix B, Section IV for further discussion and detail.

70 Tables and supporting schedules detailing my cost of capital calculations for the Canadian Utility sample, the Gas LDC sample, and the Electric sample are contained in Workpapers 6, 7, and 8, respectively.

Figure 16
U.S. Gas LDC Utility Sample CAPM Results using Bloomberg Betas

	Scenario 1		Scenario 2	
	Without Leverage Adjustment [1]	With Leverage Adjustments [2]	Without Leverage Adjustment [3]	With Leverage Adjustments [4]
Average Method				
CAPM	7.9%	9.8% - 10.7%	8.8%	11.4% - 12.0%
ECAPM (α = 1.5%)	8.4%	9.8% - 11.4%	9.2%	11.3% - 12.7%
Portfolio Method				
CAPM	7.9%	9.7% - 10.1%	8.8%	11.2% - 11.7%
ECAPM (α = 1.5%)	8.4%	9.6% - 9.9%	9.2%	11.2% - 11.6%

Sources and Notes:
Scenario 1: Long-Term Risk Free Rate of 3.41%, Long-Term Market Risk Premium of 5.70%.
Scenario 2: Long-Term Risk Free Rate of 2.61%, Long-Term Market Risk Premium of 8.00%.

Figure 17
U.S. Electric Utility Sample CAPM Results using Bloomberg Betas

	Scenario 1		Scenario 2	
	Without Leverage Adjustment [1]	With Leverage Adjustments [2]	Without Leverage Adjustment [3]	With Leverage Adjustments [4]
Average Method				
CAPM	7.9%	9.3% - 10.0%	8.7%	10.7% - 11.2%
ECAPM (α = 1.5%)	8.3%	9.4% - 10.6%	9.1%	10.8% - 11.8%
Portfolio Method				
CAPM	7.7%	9.1% - 9.5%	8.5%	10.4% - 10.9%
ECAPM (α = 1.5%)	8.2%	9.3% - 9.5%	9.0%	10.6% - 11.0%

Sources and Notes:
Scenario 1: Long-Term Risk Free Rate of 3.41%, Long-Term Market Risk Premium of 5.70%.
Scenario 2: Long-Term Risk Free Rate of 2.61%, Long-Term Market Risk Premium of 8.00%.
Includes flotation costs of 0.5%.

Q61. How do you interpret the results of your CAPM and ECAPM analyses?

A61. Looking at the three samples, the results indicate an ROE range of 9.1% to above 12%, when the financial risk in the estimation process is taken into account. However, the majority of the results are in the range of 9.5% to 11.5%, with the lower end of the range overlapping the range that reflects estimates without financial risk considerations. . Based on this evidence, I believe the CAPM / ECAPM results are most consistent with a cost of equity in the range of 9.5% to 10.5% as (i) all three samples have results in that range, (ii) the range is consistent with the high end of the estimates with no financial leverage consideration and the low end of the estimates that do adjust for financial leverage.[71] The lower estimates that result from not considering financial leverage are not meaningful in that they are derived using data of publicly traded entities whose equity ratios are much higher that what I recommend for the average risk utility. Therefore, the relevant CAPM estimates are those that consider financial risk.

D. THE DCF BASED ESTIMATES

1. Single- and Multi-Stage DCF Models

Q62. Can you describe the discounted cash flow approach to estimating the cost of equity?

A62. The DCF model attempts to estimate the cost of capital for a given company directly, rather than based on its risk relative to the market as the CAPM does. The DCF method simply assumes that the market price of a stock is equal to the present value of the dividends that its owners expect to receive. The method also assumes that this present value can be calculated by the standard formula for the present value of a cash flow—literally a stream of expected "cash flows" discounted at a risk-appropriate discount rate. When the cash flows are dividends, that discount rate is the cost of equity capital:

$$\boldsymbol{P_0} = \frac{\boldsymbol{D_1}}{\boldsymbol{1+r}} + \frac{\boldsymbol{D_2}}{\boldsymbol{(1+r)^2}} + \frac{\boldsymbol{D_3}}{\boldsymbol{(1+r)^3}} + \cdots + \frac{\boldsymbol{D_T}}{\boldsymbol{(1+r)^T}} \qquad (3)$$

where $\boldsymbol{P_0}$ is the current market price of the stock;

$\boldsymbol{D_t}$ is the dividend cash flow expected at the end of period $\boldsymbol{t}$;

$\boldsymbol{T}$ is the last period in which a dividend cash flow is to be received; and

$\boldsymbol{r}$ is the cost of equity capital

[71] While I believe financial risk is important, I note that the Canadian Utility sample supports the 9.5% to 10.5% range even without reliance on the estimates that consider the impact of financial risk.

Importantly, this formula implies that if the current market price and the pattern of expected dividends are known, it is possible to "solve for" the discount rate r that makes the equation true. In this sense, a DCF analysis can be used to estimate the cost of equity capital implied by the market price of a stock and market expectations for its future dividends.

Many DCF applications make the assumption the growth rate last forever, so the formula can be rearranged to estimate the cost of capital. Specifically, the implied DCF cost of equity can then be calculated using the well-known "DCF formula" for the cost of capital:

$$\boldsymbol{r = \frac{D_1}{P_0} + g = \frac{D_0}{P_0} \times (1 + g) + g} \tag{4}$$

where $\boldsymbol{D_0}$ is the current dividend, which investors expect to increase at rate $\boldsymbol{g}$ by the end of the next period, and over all subsequent periods into perpetuity.

Equation (4) says that if equation (3) holds, the cost of capital equals the expected dividend yield plus the (perpetual) expected future growth rate of dividends. I refer to this as the single-stage DCF model; it is also known as the Gordon Growth model, in honor of its originator Professor Myron J Gordon of the University of Toronto.

Q63. Are there other versions of the DCF model?

A63. Yes. There are many alternative versions, notably (i) multi-stage models, (ii) models that use cash flow rather than dividends, or versions that combine aspects of (i) and (ii).[72] One such alternative expands the Gordon Growth model to three stages. In the multistage model, earnings and dividends can grow at different rates, but must grow at the same rate in the final, constant growth rate period. [73]

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[72] The Surface Transportation Board uses a cash flow based model with three stages. See, for example, Surface Transportation Board Decision, "STB Ex Parte No. 664 (Sub-No. 1)," Decided January 23, 2009.

[73] See Appendix B, Section III for further discussion of the various versions of the DCF model, as well as the details of the specific versions I implement in this proceeding.

In my implementation of the multi-stage DCF, I assume that companies grow their dividend for 5-years at the forecasted company-specific rate of earnings growth, with that growth then tapering over the next 5-years toward the growth rate of the overall economy (i.e., the long-term GDP growth rate forecasted to be in effect 10 years or more into the future).

Q64. Are there advantages to the multistage DCF relative to the single-stage DCF?

A64. Potentially, the multi-stage DCF allows the near-term growth rate to differ from the long-term growth rate with the latter commonly being set at GDP growth, so that in the long-run the growth rate follows GDP growth.[74]

Q65. What are the relative strengths and weaknesses of the DCF versus CAPM based methodologies for estimating the cost of equity capital?

A65. Current market conditions affect all cost of capital estimation models to some degree, but the DCF model has at least one advantage over the CAPM-based models as it includes contemporaneous stock prices and forward-looking growth, whereas the CAPM relies on historical data to estimate systematic risk and (in some cases) the market risk premium.

2. DCF Inputs and Results

Q66. What growth rate information do you use?

A66. The first step in my DCF analysis (either constant growth or multi-stage formulations) is to examine a sample of investment analysts' forecasted earnings growth rates from for companies in my samples. For the single-stage DCF and for the first stage of the multi-stage DCF, I use investment analyst forecasts of company-specific growth rates sourced from *Value Line* and Thomson Reuters IBES.[75]

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[74] The multi-stage DCF model is therefore consistent with the Commission's 2013 GCOC Decision, which stated that it "will not accept the use of long-term or terminal growth rates that exceed estimates of the nominal long-term GDP growth rate in single-stage DCF model." (p. 40)

[75] Since *Value Line* does not cover Canadian companies, I used only the consensus mean EPS growth rate estimates from Thomson Reuters IBES for my Canadian Utility Sample.

For the long-term growth rate for the final, constant-growth stage of the multistage DCF estimates, I use the long-term Canadian GDP growth forecast of 4.25% from Towers Watson.[76] I use the most recent long-run U.S. GDP growth forecast of 4.3% from Blue Chip Economic Indicators for the U.S. Electric and Gas LDC samples.[77] Thus, the long-run (or terminal) growth rate in the multi-stage model is GDP growth.

Q67. What are the pros and cons of the input data?

A67. Both the Gordon Growth and single-stage DCF models require forecast growth rates that reflect investor expectations about the pattern of dividend growth for the companies over a sufficiently long horizon, but estimates are typically only available for 3-5 years. In the multi-stage version, I taper these growth rates toward a stable growth rate corresponding to a forecast of long-term GDP growth for all companies.[78]

One issue with the data is that it includes solely dividend payments as cash distributions to shareholders, while some companies also use share repurchases to distribute cash to shareholders. To the extent that companies in my samples use share repurchases, the DCF model using dividend yields will under estimate the cost of equity for these companies.

Q68. What are the DCF based cost of equity estimates for the samples?

A68. The results are presented in Figure 18, Figure 19, and Figure 20 below.[79] Consistent with the Commission's precedent, I have included 50 basis points for flotation costs in my estimates. As with the CAPM based estimates, I have presented both cost of equity estimates that adjust for financial risk and simple averages of the individual market-implied cost of equity estimates for the sample companies without adjustment for

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[76] Towers Watson, "Economic Expectations 2014, 33rd Annual Canadian Survey"

[77] Blue Chip Economic Indicators, October 2015.

[78] In the case of the Towers and Watson estimates of Canadian GDP growth, the horizon of the forecasts is 2019-2028; for the Blue Chip Economic Indicators projections of U.S. GDP growth, it is 2022-2026.

[79] Tables and supporting schedules detailing my cost of capital calculations for the Canadian Utility sample, the Gas LDC sample, and the Electric sample are contained in Workpapers 6, 7, and 8, respectively.

financial leverage. For the Canadian Utility sample, I also present the results from a subsample that excludes the results calculated from the highest and lowest growth rates.

Figure 18
Canadian Utility Sample DCF Results

	Without Leverage Adjustment	With Leverage Adjustments
Full Sample		
Simple	14.8%	17.1%
Multi-Stage	11.4%	13.2%
DCF Subsample		
Simple	14.7%	16.7%
Multi-Stage	11.0%	12.4%

Sources and Notes: Includes flotation costs of 0.5%.

Figure 19
U.S. Gas LDC Utility Sample DCF Results

	Without Leverage Adjustment	With Leverage Adjustments
Simple	11.3%	15.9%
Multi-Stage	9.1%	12.5%

Sources and Notes:: Includes flotation costs of 0.5%

Figure 20
U.S. Electric Utility Sample DCF Results

	Without Leverage Adjustment	With Leverage Adjustments
Full Sample		
Simple	9.8%	12.9%
Multi-Stage	8.9%	11.5%

Sources and Notes: Includes flotation costs of 0.5%.

Q69. How do you interpret the results of your DCF analyses?

A69. Focusing on the multi-stage results, which prevent the utilities from growing faster or slower than the overall economy in the long run, I find that the results indicate an ROE of 11.5% to 13.2% when I consider the impact of financial leverage. If I were to ignore the financial risk inherent in the estimates, my results indicate an ROE in the range of 8.9% to 11.4%. I note that ignoring the highest and lowest estimates and focusing on the sub-sample results in slightly lower ROE estimates than for the full Canadian Utility sample. The results for the full Electric sample and the associated "regulated" subsample (containing only companies designated by EEI as having greater than 80% of their assets devoted to regulated electric utility operations) are essentially the same and therefore I do not present the subsample results in Figure 20.[80] The overall results from the DCF estimates are higher than the CAPM estimates by a non-trivial amount.

E. RISK PREMIUM MODEL ESTIMATES

Q70. Do you estimate the cost of equity that results from an analysis of risk premiums implied by allowed ROEs in past utility rate cases?

A70. Yes. In this type of analysis, sometimes called the "risk premium model", the cost of equity capital for utilities is estimated based on the historical relationship between allowed ROEs in utility rate cases and the risk-free rate of interest at the time the ROEs were granted. These estimates add a "risk premium" implied by this relationship to the relevant (prevailing or forecast) risk-free interest rate:

$$Cost\ of\ Equity = r_f + Risk\ Premium$$

Q71. What is your response to the Commission's prior decisions not to consider allowed returns from other jurisdictions?

A71. As noted above, I respectfully recognize that in past decisions, the Commission has given "no weight to the returns awarded by other regulators" and noted that (i) the allowed

[80] See Workpaper 8 for details.

ROE may have occurred during a different interest environment and (ii) some of the presented ROEs were the result of settlements.[81] However, I respectfully submit that the data are observable by investors and therefore inform their investment decisions. The data also have the benefit of having been derived for fully regulated entities, which often are very comparable to the Utilities.

Additionally, in the context of my implementation of the risk premium model, (described below), my consideration of information on Allowed ROEs takes account of the fact that the returns were granted under varying economic circumstances as measured by the relationship of the allowed risk premium and the contemporaneous government bond yield. Also, because the data I use includes details about ROE's granted via settlements vs. fully-litigated rate cases, I am able to address the Commission's concern about negotiated settlements in my analysis presented below in Section IV.F.

Q72. How do you use rate case data to estimate the risk premiums for your analysis?

A72. Using quarterly data from Regulatory Research Associates from Q1 1990 to Q4 2015,[82] I compare the average allowed rate of return on equity granted by U.S. state regulatory agencies in gas and electric utility rate cases to the average 30-year Treasury bond yield that prevailed in each quarter. I calculate the allowed utility "risk premium" in each quarter as the difference between allowed returns and the Treasury bond yield, since this represents the compensation for risk allowed by regulators. Then I use ordinary least squares (OLS) regression to estimate the parameters of the linear equation:

$$Risk\ Premium = A_0 + A_1 \times (Treausury\ Bond\ Yield) \qquad (5)$$

I derive my estimates of A_0 and A_1 using standard statistical methods (OLS regression) and find that the regression has a high degree of explanatory power in a statistical sense ($R^2 = 0.82$) and the parameter estimates, $A_0 = 8.589\%$ and $A_1 = -0.5639$, are statistically significant. The negative slope coefficient reflects the empirical fact that

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[81] 2011 GCOC Decision, p. 20.

[82] SNL Financial as of 1/7/2016

regulators grant smaller risk premiums when risk-free interest rates (as measured by Treasury bond yields) are higher. This is consistent with past observations that the premium investors require to hold equity over government bonds increases as government bond yields decline. In the regression described above, the allowed ROE on average declined by 56 basis point when the government bond yield declined by 100 basis points. This relationship is illustrated graphically in Workpaper 5, which contains my risk premium analysis.

Q73. What result does your risk premium analysis estimate for the Utilities' cost of equity?

A73. To estimate a cost of equity, I apply my regression equation at the normalized risk-free interest of 3.4 percent.[83] The calculation is shown below and gives a cost of equity estimate of 10.1 percent:

$$\boldsymbol{Risk\ Premium} = 8.5894\% - 0.5639 \times 3.4\% = \mathbf{6.7}\%$$

$$\boldsymbol{Cost\ of\ Equity} = 3.4\% + 6.67\% = \mathbf{10.1}\%$$

I note that I did not include any flotation cost allowance as an adder to the 10.1% above because some utilities receive the flotation cost through the allowed ROE while others receive the flotation costs through a different mechanism. As a result, the 10.1% is likely to underestimate the cost of equity for the Utilities when flotation costs are considered.

Q74. Does the rate case data you used for this analysis include vertically integrated electric utilities?

A74. It does. However, I performed the same analysis on two subsets of the RRA data: one containing only rate cases of electric transmission and distribution companies, and another containing only rate cases for gas distribution companies. The resulting risk premium model cost of equity from those subsets is only slightly lower, at 9.7 percent and 9.9 percent, respectively. Keeping in mind that these results do not include flotation

[83] As discussed above, this represents the Consensus Forecasts estimate for the 10-year Canadian Government Bond yield at the end of 2016, adjusted upward by 40 basis points to account for the maturity premium between 10- and 30-yr Canadian government bonds and by a further 80 basis points to account for the elevated levels of utility yield spreads.

cost, they are likely to underestimate the cost of equity derived from the risk premium model.

Q75. Are these cost of equity estimates consistent with the deemed capital structures of the Utilities?

A75. No. The utility rate case data I used in my analysis generally reflects a substantially higher average ratio of common equity to total capital of 47 – 49% on a book value basis as compared to the 36 – 43% that the AUC has granted in the recent past.[84] (See Workpaper 9 for a summary of the average allowed equity percentage from the rate cases in my analysis.) Having a lower percentage of debt financing (i.e., lower financial leverage) decreases financial risk, thereby lowering the cost of equity. Therefore, my risk premium model results are conservatively low estimates of the cost of equity appropriate for the Utilities.

Q76. What conclusions do you draw from your risk premium analysis?

A76. Although risk premium models based on historical allowed returns are not underpinned by fundamental finance principles in the manner of the CAPM or DCF models, I believe they can provide useful benchmarks for evaluating appropriate rates of return. My risk premium model cost of equity estimates demonstrate that the results of my DCF and CAPM analyses are in line with the actions of utility regulators. Because the risk premium analysis as implemented takes into account the interest rate prevailing during the quarter the decision was issued, it addresses the Commission's concern that the allowed ROE occurred during a different interest environment.[85]

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[84] AUC Decision 2191-D01-2015, p. 100.

[85] 2011 GCOC Decision, p. 20.

F. OTHER EVIDENCE RELEVANT TO THE ALLOWED ROE

Q77. Do you have any other pertinent evidence regarding the cost of equity for the Utilities?

A77. Yes. For the reasons explained above, I believe that since investors compare returns across jurisdictions, it is important to recognize what return utilities have recently been granted in other jurisdictions. Figure 21 below summarizes the allowed ROE and capital structure for Canadian and U.S. utilities regulated by the province / state.[86] It is interesting to note that in 2014, allowed ROE's and deemed equity ratios were higher in fully litigated rate cases than in cases that reached negotiated settlements. The ability to distinguish between "settlements" and "fully litigated" cases addresses one of the Commission's concerns that some of the ROE decisions that have been presented in the past were settlements.

Figure 21: Allowed ROEs and Capital Structures in Canada and the U.S.

	2014		2015	
Service	Allowed ROE (%)	Common Equity Ratio (%)	Allowed ROE (%)	Common Equity Ratio (%)
U.S.				
Natural Gas	9.78	51.06	9.60	49.94
Electric	9.75	50.21	9.59	48.78
Electric T&D	9.50	49.26	9.23	47.18
All	9.77	50.60	9.59	49.24
All - Settled	9.65	49.50	9.86	49.70
All - Fully Litigated	10.02	51.27	9.56	48.89
Canada				
Natural Gas	9.32	40.40	9.31	40.23
Electric	8.81	40.40	8.80	40.27
All	9.12	40.40	9.09	40.25
All (excluding Alberta)	9.41	40.64	9.41	40.46

Sources:
For U.S. data: SNL Financial
For Canadian data: Concentric Energy Advisors Authorized Return on Equity for Canadian and U.S. Gas and Electric Utilities, Volume III.

[86] Sources: SNL Financial for the U.S. and Concentric Energy Advisors, "Authorized Return on Equity for Canadian and U.S. Gas and Electric Utilities," Volume III. See Workpaper 9.

Q78. Do you have any other evidence on the allowed ROE for electric transmission?

A78. Yes. The Federal Energy Regulatory Commission (FERC) recently allowed ROE of 10.57% (not including any incentive returns) for New England Transmission Owners[87] and the Administrative Law Judge hearing the case regarding the Midwest ISO owners' allowed ROE recommended an ROE of 10.32% (before any incentive additions).[88]

It is clear from the table above and the recent FERC decision/ALJ recommendation that allowed ROEs in both Canada and the U.S. have been substantially higher than the most recently allowed ROE in Alberta and the average capital structure includes an average of 40% to 50% equity. I note that the average ROEs in Canada (excluding crown corporations) have been about 9.4% and the deemed equity ratio averaged about 40%.[89] In summary, the return available to investors is higher both because of a higher ROE and because of a higher equity ratio. I also note that there is no apparent difference between the allowed ROE for "Settled" and "Fully Litigated" cases as the allowed ROE was higher by 37 basis points in 2015 and lower by 30 basis points in 2014.

Q79. Do you include evidence from surveys of pension fund managers or based on price-to-book ratios?

A79. I find such information problematic. First, pension fund returns information is usually based on surveys and it is difficult to assess exactly what is being measured. Surveys have to be evaluated carefully as it can be difficult to ensure (i) all respondents measure the same parameter (e.g., the required equity return on well-specified market or subset of the market) and (ii) the survey is representative. Second, as the Commission acknowledged in the 2009 GCOC Decision, it was "unable to derive any useful information about the price-to-book ratios of stand-alone utilities from the price-to-book

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87 FERC, "Opinion No. 531-A," October 16, 2014.

88 SNL "FERC law judge recommends lowering base ROE for MISO transmission owners," December 23, 2015.

89 See Figure 21 and Workpaper 9. Note also that the Ontario Energy Board's 2016 ROE parameter for electric distribution and transmission is 9.19% according to the OEB's October 15, 2015 letter "Cost of Capital Parameter Updates for 2016 Applications." Ontario electric distributors have a deemed equity ratio of 40%.

ratios of utility holding companies."[90] In that decision, the Commission also found that there may be business reasons for a specific purchase that is not well understood and henceforth, the Commission found it difficult to draw any conclusions from this evidence.[91] Put differently, the market-to-book ratio is influenced by many factors other than allowed ROEs. Finally, as Professors Brealey, Myers and Allen point out,

> Most of the tests of market efficiency are concerned with *relative* prices and focus on whether there are easy profits to be made. It is almost impossible to test whether stocks are *correctly valued* because no one can measure true value with any precision.[92]

This means that it is difficult to assess the absolute price of a stock and therefore the price-to-book value.

V. CAPITAL STRUCTURE ANALYSIS

A. BACKGROUND

Q80. Please summarize the Commission's recent approach to determining the capital structures for the Utilities.

A80. In the 2013 GCOC Decision,[93] the Commission confirmed its prior method of using credit metrics to assess the capital structure of Utilities. The Commission also affirmed that it intended for the credit metrics to be such that the utilities could achieve an A rating.[94] The Commission looked to three credit metrics and used a minimum benchmark for each. The Commission's metrics and minimum benchmarks are summarized below:

- Earnings before Interest and Taxes (EBIT) Coverage of at least 2.0 times.
- Funds from Operations (FFO) to Debt of 11.1% to 14.3%.
- Funds from Operations (FFO) Interest Coverage of at least 3.0 times.

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90 2011 GCOC Decision, p. 23.

91 *Ibid.*, pp. 23-24.

92 Richard A. Brealey, Stewart C. Myers, and Franklin Allen, "Principles of Corporate Finance," 11th Edition, 2014, p. 332.

93 2013 GCOC Decision, pp. 90-95.

94 2013 GCOC Decision, ¶420.

The Commission defines FFO as net income plus depreciation and the increase in future income taxes (and in the case of the FFO interest coverage metric, plus interest). Before discussing the pros and cons of this approach, I note that the Commission historically has used total debt rather than adjusted debt, while credit agencies commonly make adjustments to include leases (and other items) as debt-like for the purpose of determining credit ratios.[95] As a result, the observed debt to capital and FFO to debt ratios that credit rating agencies report will not be an apples-to-apples comparison with the Commission's ratios. The reported ratios cannot be used as a lower bound as a measure that includes total debt only would require a lower debt to capital and a higher FFO-to-debt ratio. It is important to recognize that credit rating agencies such as Moody's and Standard & Poor's focus on the FFO interest coverage and FFO to *adjusted* debt ratios.[96] For example, Moody's assigns 40% of its ratings weight to leverage and coverage of which 31% is FFO to Debt and another 31% is net debt to rate base (or net debt to fixed assets), while FFO interest coverage accounts for 25%. EBIT coverage is not mentioned. DBRS also reports benchmark debt to capitalization ratio. The ratios that are relied upon by the credit rating agencies and market participant are the most important ones and I consider it vital that the Utilities' capital structures are such that the credit ratios are expected to be near the middle of the range rather than the bottom.

Q81. Based on the approach described above, what capital structures did the AUC deem in the 2013 Generic Cost of Capital Proceeding?

A81. The Commission followed its prior practice of determining the equity ratio for an average risk utility, which it has historically deemed to be distribution companies. It allowed such companies an equity ratio of 38% prior to any company-specific adjustments.[97] Further, the Commission in its 2013 GCOC Decision awarded 36% equity to transmission entities. The Commission reaffirmed ATCO Pipeline's equity percentage as

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[95] 2013 GCOC Decision, p. 92; DBRS, "Industry Study: Canadian Utilities Q3 2014," January 2015, p. 72.

[96] Moody's, "Regulated Electric and Gas Networks," November 25, 2014. S&P, "Corporate Methodology: Ratios And Adjustments," November 19, 2013.

[97] 2013 GCOC Decision, pp. 93-94.

in between that of the distribution and transmission entities. The Commission also reaffirmed it considered AUI's smaller size and maintained the 4% equity premium over distribution entities. Finally, the Commission maintained its 2% equity adder for non-taxpaying entities (ENMAX, EPCOR and FortisAlberta).[98] These deemed equity ratios were a reduction of 1% for all utilities over what was allowed in the 2011 GCOC Decision except in the case of TransAlta. The company-specific ratios allowed in the 2013 GCOC Decision are summarized in Figure 22 below.

Figure 22: Recently Allowed Equity Ratios[99]

	Deemed Equity for 2013-15	Deemed Equity for 2011-12
ATCO Electric (transmission)	36	37
AltaLink	36	37
ENMAX (transmission)	36	37
EPCOR (transmission)	36	37
Red Deer	36	37
Lethbridge	36	37
TransAlta	36	36
ATCO Pipelines	37	38
ATCO Electric (distribution)	38	39
ENMAX (distribution)	40	41
EPCOR (distribution)	40	41
ATCO Gas	38	39
FortisAlberta	40	41
AUI	42	43

[98] 2013 GCOC Decision, p. 100.
[99] *Ibid.*

B. APPROACH

Q82. How do you propose to determine reasonable equity ratios for the Utilities?

A82. I agree with the Commission and Mr. Buttke that it is important to maintain ratings in the "A" range for the Utilities to ensure their access to capital. I also agree that credit ratios are one important measure of utilities' ability to raise capital, but in addition to considering the capital structures that satisfy the credit rating agencies requirements to obtain an A range rating, the overall return that is available to investors needs to be comparable to what investors can obtain in other investments of comparable risk. Thus, an equity ratio that results in a credit metric that meets the minimum standards for obtaining an A range rating is not sufficient – the equity ratio need also be such that investors on a risk-adjusted basis find that investments in Utilities are as attractive as other alternatives. Because the dollar return that accrues to investors is determined as a multiple of the equity ratio and the percentage return, both components are important and there is commonly a tradeoff.

Q83. How do you determine appropriate equity ratios?

A83. First, I look to the guidelines of credit rating agencies as indicative of the criteria that the Utilities must meet to be A range rated. Second, I consider the historical credit metrics of A range rated Canadian utilities and investment grade U.S. utilities. Third, I provide forecasted benchmarks using the reasonable parameters for needed inputs as well as the most recently allowed ROE and my recommended ROE for a range of capital structures. I use the information derived from this analysis to recommend a benchmark capital structure for the Utilities before any adjustment to non-taxpaying entities or for unique circumstances.

Q84. Please summarize the credit metrics used by the Commission and credit rating agencies.

A84. Figure 23 below summarizes the expectations for an A rating as used by the Commission and credit rating agencies. I note that the Commission originally determined its ratios primarily from looking to realized ratios for some Canadian utilities rather than looking to the credit rating agencies' benchmarks.

Figure 23: Summary of Credit Ratio Benchmarks[100]

	EBIT Coverage	FFO Coverage	FFO to Debt
Commission Minimum[101]	2.0	3.0	11.1 – 14.3%
DBRS Range[102]	1.8- 2.8	n/a	12.5 – 17.5%
Moody's Range[103]	n/a	4.0 – 5.5	18 – 26%
Standard & Poor's[104]	n/a	n/a	13 – 23%

Q85. Please comment on the ratios listed in Figure 23.

A85. From the table above, it is clear that the Commission's minimum levels are at or below what credit rating agencies use as benchmarks. Further, the comparison does not consider the typical level for an A range rated utility or whether the resulting return to investors is comparable to what they "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.[105]

[100] I have been unable to find comparable benchmarks from Fitch Ratings as that rating agency tends to look at slightly different ratios using the cash flow statement. However, Fitch Ratings median FFO to debt measure for A range rated utilities is about 29% using the FFO lease-adjusted leverage. Source: Fitch Ratings, "Rating U.S. Utilities, Power and Gas Companies, "March 11, 2014.

[101] 2013 GCOC Decision, p. 93.

[102] DBRS, "Rating Companies in the Regulated Electric, Natural Gas and Water utilities Industry," October 2014. DBRS provides a Cash Flow to Debt measure rather than FFO to Debt.

[103] Moody's, "Regulated Electric and Gas Networks," November 25, 2014. Moody's range uses the benchmarks for the regulated electric and gas networks. An alternative was to use Moody's guidelines for regulated electric and gas utilities as discussed in Moody's, "Ratings Methodology: Regulated Electric and Gas Utilities," December 23, 2013, p. 24, which indicates that an A range rating has Cash Flow From Operations to Interest coverage of 4.5 – 6 times and Cash Flow from Operations to Debt of 19 – 30%..

[104] Standard & Poor's, "How Regulatory Advantage Scores Can Affect Ratings on Regulated Utilities," April 23, 2015, p. 4 for FFO to Debt. The range uses S&P's "significant financial" risk profile. S&P has a lower metric that pertains only to utilities with a "strong regulatory advantage score." S&P notes that with a less strong advantage score the FFO-to-debt is in the range of 13-23 to warrant a profile that is consistent with an "A" range rating. Note that a "Strong" regulatory advantage is required to access the low volatility table and that S&P currently rates Alberta "Strong" albeit with a negative trend (S&P, "Assessing the Regulatory Advantage in Canada," April 21, 2015, pp. 9 and 13).

[105] Northwestern Utilities Limited v. City of Edmonton, (1929) S.C.R. 186 (Northwestern). A similar sentiment is reflected in the U.S. Supreme Court decisions of Bluefield Water Works CO. v. Public Service Commission, 262 U.S. 679 (1923) and Federal Power Com'n v. Hope Natural Gas Co., 320 U.S. 591 (1944).

Neither does it consider the equity ratios credit rating agencies use as benchmarks. For example, DBRS uses 10 factors when considering the regulatory framework in which a utility does business. The first factor is the deemed equity ratio and a "Satisfactory" ratio is 40.00% to 44.99% equity to rate base. Higher ratios are "Good" or "Excellent," while lower ratios are "Below Average" or "Poor."[106]

Standard & Poor's criteria links the regulatory profile and the credit ratio needed, but I note that S&P observes that a "Strong" regulatory advantage is required to consider ratios pertaining to low volatility companies. For such companies an FFO to Debt ratio below 13% combined with an excellent business profile the anchor rating is "BBB."[107] Thus, S&P expects ratios above that for "A" range ratings.

Similarly, Moody's benchmark for an A range rating for a low business risk electric or gas utility is 40-50% debt to capitalization (so 50-60% equity)[108] and Moody's benchmark for regulated electric and gas networks is that net debt to rate base is 45-60% (so 40-55% equity) for an A range rating.[109]

The low end of the range makes the utilities vulnerable to credit issues as the low end of the credit metrics commonly are associated with utilities, jurisdictions, and economic circumstances that are stable and expected to remain stable.

Q86. Are the current, realized credit ratios you observe for A range rated utilities consistent with the minimum specified by the Commission?

A86. No. Just as the Commission's benchmark in the 2013 GCOC Decision was at the or below the credit rating agencies benchmarks, the observed credit metrics associated with an A rating in Canada or the U.S. are higher. This is illustrated in Figure 24 below.

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[106] DBRS, "Rating Companies in the Regulated Electric, Natural Gas and Water Utilities Industry," October 2014, p. 11. This same document notes that DBRS does award A ratings for a wider range of benchmark debt to capital ratios.

[107] Standard & Poor's, "Assessing Regulatory Advantage in Canada," April 21, 2015, p. 13.

[108] Moody's, "Regulated Electric and Gas Utilities," December 23, 2013, p. 24.

[109] Moody's, "Regulated Electric and Gas Networks," November 25, 2014, p. 29.

Figure 24: Credit Ratios of Canadian and U.S. Utilities[110]

	EBIT interest coverage	FFO coverage	FFO to debt
Commission guidelines	2.0	3.0	11.1–14.3%
Canadian utilities (DBRS average)	2.55	n/a	16.0%
Canadian utilities (DBRS median)	2.48	n/a	16.8%
U.S. utilities	n/a	5.0	28.6%

Sources: DBRS, Fitch Ratings.

In addition to the credit ratios listed above, I note that DBRS provides data that result in an average and median equity ratio 40.3% and 44.3%, respectively when Crown corporations are ignored. At the same time, the average allowed equity ratio for state regulated electric and gas utilities ranged from 49-51%, while electric distribution and transmission ranged from 47 to 49 percent in 2014 - 2015.[111]

Q87. Are there any other relevant information regarding credit metrics and the credit rating agencies actions?

A87. Yes. While the credit rating agencies have not downgraded the Utilities recently, ATCO Ltd., Canadian Utilities, and CU Inc. were put on negative outlook by Standard & Poor's in July of last year.[112] This is important because the fact that credit rating agencies have not downgraded the Utilities is not sufficient to ensure that the combined equity ratio and allowed ROE is sufficient. Standard & Poor's, as well as other credit rating agencies, looks forward and assesses their ratings continually. It is therefore important not to target historical or low-end benchmark credit ratios.

[110] See Workpaper 10. Note that the DBRS average and median ratios exclude crown corporations, which may have some credit support from the province in which it is located. Note also that the Fitch FFO coverage is an adjusted FFO to "fixed charge" coverage ratio which accounts for rental payments as well as interest.

[111] See Figure 21 and Workpaper 9.

[112] Standard & Poor's, "ATCO Ltd. And Subsidiaries Outlook To Negative From Stable on Weaker Operating Environment, Forecast Financial Metrics," July 7, 2015. See also, Standard & Poor's, "ATCO Ltd.," July 30, 2015.

Q88. What do you make of the analysis above?

A88. Based on the benchmarks from DBRS, Moody's, Standard & Poor's and to a lesser degree Fitch Ratings, I recommend that the Commission increase its benchmarks to be towards the middle of the range of the benchmarks listed by credit rating agencies and recognize that credit rating agencies base their rating on not only observed metrics but also on forecasted trends. Specifically, they are concerned with potential risks facing the utilities in Alberta. The evidence of Dr. Carpenter and Mr. Buttke discuss at length the potential risks facing regulated utilities in Alberta and Mr. Buttke looks especially at credit rating agencies views.[113] The utilities need some flexibility to consistently achieve the minimum ratio (or higher) and should meet not just DBRS' benchmark but also that of other credit rating agencies. I recommend that the Commission as a minimum seek to obtain credit ratios towards the middle of the range DBRS recommends and well above the low end of Moody's / Standard & Poor's range such as:[114]

- EBIT Coverage of at least **2.5** times.
- FFO Interest Coverage of **3.5 to 4.0** times with the higher end being preferable.
- FFO to Debt of at least **15%**.

Q89. Have you performed any calculations to see what this would entail?

A89. Yes. I estimate the credit ratios that would result from using reasonable parameters for inputs such as the tax rate, embedded cost of debt, depreciation rate, and CWIP as a percentage of the rate base. I combine the 2013 GCOC Decision's allowed ROE as well as my recommended ROE with a range of capital structures to determine at what level the credit ratio benchmarks are satisfied. For illustrative purposes, I use a hypothetical utility with a rate base of $1,000 (not including CWIP) and calculate the credit ratios as follows using a hypothetical ROE of 8.3% and 10%. Following the Commission's historical practice, I determine calculate the ratios without regard to leases or other adjustments, so

[113] Carpenter Evidence, Section IV and Buttke Evidence, Section III.

[114] The recommendation takes the midpoint of DBRS' range except for FFO interest coverage, which uses Moody's and S&P's benchmarks.

EBIT Interest Coverage = EBIT / Interest

FFO Interest Coverage = (FFO + Interest) / Interest

FFO-to-Debt = FFO / Debt

where FFO equals Net Income plus depreciation and EBIT is calculated as Net Income divided by (1 – tax rate) plus interest.

The specifics of the calculation are shown in Appendix B, Section V.

Q90. Please summarize your input parameters and results.

A90. My inputs are summarized below and detailed in Figure 25. I note that I use the same depreciation and CWIP rate that were used in the Commission's decision in the 2013 GCOC as a review of the Utilities Rule 005 filings found that while the CWIP to rate base ratio varied widely with an average of 4.8% and a median above 12%,[115] so 5% did not appear unreasonable. Similarly, a review of the Rule 005 filings revealed that the depreciation to rate base figures also varied, but the both the average and median were close to 5%. Looking to the embedded cost of debt, I calculated the average and median embedded cost of debt are approximately 5% as of mid-year 2014, with a range of 4.2% to 5.9%. The lower end of that range is driven by ENMAX's embedded cost of debt, which the Commission previously has recognized is below that of a typical utility because of its access to Alberta Capital Financing Authority funds.[116] To further determine the relevant embedded cost of debt, I considered the magnitude of the debt amount that will mature over the next two years and found that to be minimal. Based on this information, I use an embedded cost of debt of 5.2% as representative for the embedded cost of debt of the Utilities.

[115] See Workpaper 11 for details.

[116] 2013 GCOC Decision, p. 91.

Figure 25: Parameters Relied Upon to Determine Credit Ratios

	Parameter Value
Allowed ROE	8.3% and 10%
Embedded Cost of Debt	5.2%
Tax Rate	27%
Depreciation Rate	5%
CWIP / Rate Base	5%

Based on the data above I summarize my findings below in Figure 26.[117] In the table, I highlight the minimum credit ratios that meet the benchmarks listed above and observe that to be consistent with the benchmarks for an A range rating, it is necessary that the equity ratio be about 40% if the allowed ROE is about 10% and higher if the allowed ROE is lower. A lower equity ratio is inconsistent with being in the middle of the benchmarks provided by credit rating agencies.

Figure 26: Credit Metrics Resulting from Selected Capital Structures

8.3% Allowed ROE

Equity % of Cap Structure	*35.0%*	*37.5%*	*40.0%*	***42.5%***	***43.0%***	***44.0%***	***45.0%***	***47.5%***	***50.0%***
EBIT Coverage Ratio [1]	2.09	2.21	2.35	2.49	**2.52**	**2.58**	**2.64**	**2.81**	**2.99**
FFO Interest Coverage [2]	3.17	3.31	3.46	**3.62**	**3.66**	**3.73**	**3.80**	**3.99**	**4.20**
FFO to Debt [3]	11.3%	12.0%	12.8%	13.6%	13.8%	14.2%	14.6%	**15.6%**	**16.6%**

10.0% Allowed ROE

Equity % of Cap Structure	*35.0%*	***37.5%***	***38.0%***	***39.0%***	***40.0%***	***42.5%***	***45.0%***	***47.5%***	***50.0%***
EBIT Coverage Ratio [1]	2.32	2.46	2.49	**2.56**	**2.62**	**2.79**	**2.98**	**3.18**	**3.39**
FFO Interest Coverage [2]	3.34	3.49	**3.53**	**3.59**	**3.66**	**3.85**	**4.04**	**4.26**	**4.50**
FFO to Debt [3]	12.1%	13.0%	13.1%	13.5%	13.8%	14.8%	**15.8%**	**17.0%**	**18.2%**

Footnote:
[1] EBIT Interest Coverage = EBIT / Interest
[2] FFO Interest Coverage = (FFO + Interest)/Interest
[3] FFO to Debt = FFO / Debt

[117] Details are provided in Appendix B, Section V and calculations are shown in Workpaper 11.

Q91. Do you have any recommendations as to whether the Commission should continue to use the credit metric ratios it currently relies on in its capital structure analyses?

A91. Yes. I find that the ratios that the Commission currently considers, the FFO coverage, FFO-to-debt, and EBIT coverage are commonly used, but ideally could be supplemented by considering (i) the credit rating agencies benchmarks regarding leverage and (ii) the equity ratio that is commonly allowed in other jurisdictions. Both would serve as important comparators. The published benchmarks are important in addition to observed credit metrics and vital for an assessment of the viability of the Utilities ability to maintain their credit rating. Compared to observed, historical credit ratios, which by definition are backward looking and can be biased by the specific period over which they were calculated, the published benchmarks are guidelines from the credit rating agencies on what ratio is needed for an A range ratio. I therefore recommend that the Commission take notice of the benchmarks published by the credit rating agencies.

Q92. What do you conclude the analysis above?

A92. The calculations above confirm that the credit rating agencies benchmark upward of 40% equity is needed to obtain solid credit ratios and also consistent with the recent observation on actual capital structure as calculated by DBRS. It is also consistent with the equity ratio commonly awarded to investor-owned utilities in Canadian jurisdictions and well below the equity ratios commonly awarded in the U.S. As a result I recommend that the Commission consider moving to a base equity ratio of 40% for an average risk utility. This is also the minimum level commonly observed in other jurisdictions. The equity ratio observed elsewhere is relevant as it is one input to investors' decision.[118]

[118] See Workpaper 9 for the U.S. data and, for example, Australian Energy Regulator, "Victorian electricity distribution pricing review, 2016-2020," June 2015 for an Australian example.

VI. IMPACT OF NON-TAXPAYING STATUS[119]

Q93. What do you cover in this section?

A93. This section discusses how non-taxpaying status affects credit metrics and explains my recommendation that the Commission continue its policy of adding 2% equity to non-taxpaying entities. I summarize the recommended equity ratios at the end of Section VII; including the positioning of the individual Utilities.

Q94. Please summarize how non-taxpaying utilities' equity percentage has been adjusted in past Commission decisions.

A94. The Commission's predecessor, the Alberta Energy and Utilities Board (EUB), has in past decisions recognized that

> …a non-taxable entity has a higher volatility of earnings than an otherwise equivalent taxable company, arising from the lack of an income tax component in its forecast revenue requirement. The [EUB] notes that there was no disagreement that the absence of taxation, while lowering costs, increases the volatility of earnings.[120]

The Commission in its most recent decision noted that the non-taxpaying status lowers a company's costs, increases its earnings volatility and decreases the interest coverage and held that the 2% equity adder for non-taxpaying entities remained valid.

Q95. Does the policy of increasing the equity thickness for non-taxpaying entities have an economic justification?

A95. Yes. Some of the volatility in the pre-tax returns generated by a regular tax-paying utility is passed on to the Government through the payment of taxes. All else equal, the volatility of a non-taxpaying entity is higher than for a regular utility because the tax authority does not take any risk in respect of the non-taxpaying utility, and investors bear

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[119] By a non-taxpaying status, I refer to both entities that are tax exempt and entities that are not expected to pay taxes over the next two years (e.g., ENMAX, EPCOR, and FortisAlberta).

[120] EUB Decision 2004-052, July 2, 2004, p. 45.

all of the risk in the pre-tax returns. This increased volatility for non-taxpaying utilities should be recognized by the regulator through an increase in the equity thickness.

As a non-taxpaying entity in Alberta does not gross its revenue requirement up for taxes, its Earnings before Interest and Taxes (EBIT) and revenue requirement are lower than those of a taxable entity. For the non-taxpaying entity to have the same ratios as the tax-paying entity (and hence the same credit rating, all else equal), it would need a higher equity thickness. Second, because a non-taxpaying entity has no tax deduction to buffer potential increases in cost (or decreases in revenue), it entity will face a larger volatility in its net income or earnings than a comparable taxpaying entity.

It is important to point out that the customers of a non-taxpaying entity pay a lower overall revenue requirement because there the utility does not collect income taxes (under current Alberta regulation). This benefits customers.

Q96. Can you illustrate the difference between a non-taxpaying entity and taxable entity?

A96. Yes. Using the rate base, embedded cost of debt, tax rate, depreciation and CWIP rate from Section V above, Figure 27 illustrates that the difference in EBIT coverage at the parameters allowed in the 2013 GCOC Decision (ROE at 8.3%, Equity ratio at 36%).[121]

[121] Appendix B, Section V provides the same calculation for alternative equity ratios and ROEs. See also Workpaper 11.

Figure 27: Impact of Non-Taxpaying Status: EBIT Coverage

	Non-Tax Paying Entity	Taxable Entity
EBIT	$66	$77
CWIP	$50	$50
Depreciation	$50	$50
Interest	$36	$36
Income before Tax	$30	$41
Income Tax	-	$11
Net Income	$30	$30
Debt	$690	$690
Equity	$360	$360
EBIT Coverage	**1.83**	**2.14**

Second, a non-taxpaying entity faces higher earnings volatility. To demonstrate this, Figure 28 below increases the depreciation and interest by 10%. For the taxable entity net income decline by approximately 20%, but for the non-taxpaying entity the decline is 30%.

Figure 28: Impact of Non-Taxpaying Status: Earnings Volatility

	Non-Tax Paying Entity	Taxable Entity
EBIT	$61	$72
CWIP	$50	$50
Depreciation	$55	$55
Interest	$39	$39
Income before Tax	$21	$32
Income Tax	-	$9
Net Income	$21	$24
Debt	$690	$690
Equity	$360	$360
EBIT Coverage	**1.54**	**1.82**

This analysis shows that a 2% increase in the equity ratio is below that required to offset the EBIT coverage difference and that at a 2% level; the revenue requirement remains lower for the non-taxpaying entity.[122] While a larger equity adder is needed to fully restore the EBIT coverage ratio, I understand that the Utilities have historically had an adder of 2% in place.

Q97. How do you determine that an adder higher than 2% is needed to restore the EBIT coverage?

A97. Looking to the results in Figure 27 above, I add equity to the capital structure and retire debt until the EBIT coverage ratio for the non-taxpaying and taxable entity is identical. This is illustrated in Figure 29 below.

Figure 29: Increase in Equity Percentage Needed to Ensure the Credit Metrics Are Comparable for Taxpaying and Non-Taxpaying Entities

	Non-Tax Paying Entity	Taxable Entity	Non-Tax Paying Entity w/ added equity
Increase in Equity Percentage			7.75%
EBIT	$66	$77	$68
CWIP	$50	$50	$50
Depreciation	$50	$50	$50
Interest	$36	$36	$32
Income before Tax	$30	$41	$36
Income Tax	-	$11	-
Net Income	$30	$30	$36.32
Debt	$690	$690	$612
Equity	$360	$360	$438
EBIT Coverage	**1.83**	**2.14**	**2.14**

In Figure 29 above, the equity percentage (and therefore dollar amount of the return on equity) was increased while the debt percentage (and therefore interest expense) was decreased until the EBIT coverage of the non-taxpaying and the taxable entity were identical. In this hypothetical example, the equity percentage needs to be increased by about 7.8% to equalize the EBIT coverage ratio.

[122] To fully restore the EBIT coverage ratio, a larger adjustment to equity would be needed.

It is important to note that the required increase in equity percentage (1) is substantially higher than the 2% allowed by the AUC in recent decisions and (2) the revenue requirement corresponding to the increased equity thickness remains below that of the taxable entity.

Q98. Based on the discussion above, what do you recommend?

A98. I recommend that the Commission maintain its policy of adding 2% to the equity thickness of non-taxpaying entities. The addition of 2% to the equity thickness of non-taxpaying utilities results only in a partially restoration of the EBIT coverage ratio, as a substantially higher adder would be needed to fully compensate the utilities. At the same time I note that, all else equal, the revenue requirement remains lower for a non-taxpaying entity than for a taxable entity.

VII. RECOMMENDED ROE AND CAPITAL STRUCTURES

Q99. Please summarize the ROE evidence.

A99. Focusing on the multi-stage DCF analyses, which prevent the long-term growth rate from exceeding that of the economy, I find that all three samples support an ROE upward of 11.5% when taking flotation costs and financial risk into account, while the Canadian Utility sample's estimates before any financial risk consideration is in the range of 11-11.5 percent. The U.S. samples' DCF results are lower, with non-leverage adjusted estimates in the range 8.8 to 9.8 percent.[123] In consideration of results both with and without adjustment for financial risk I therefore believe the DCF results support a range of approximately 9% to 11.5%.

The CAPM based results exhibit a wider range, with the Canadian Utility sample estimates primarily falling between 10 and 12 percent (9% to 11% if financial risk is

[123] I note that the single-stage DCF result for the Electric sample reflects the fact that a substantial number of the electric utility companies have company-specific forecasted growth rates below the GDP growth rate. I therefore consider this a reliable estimate, despite giving little weight to the single-stage result for the Canadian Utility and Gas LDC samples, which apply perpetual company specific growth rates that substantially outpace long-term GDP growth.

ignored). The results for the Gas LDC sample display a range concentrated around 10 – 11.5 percent (about 8 to 9 percent ignoring financial risk). The Electric sample displays the lowest results, concentrated in the approximate range 9.5 to 11 percent (about 8 to 9 percent ignoring financial risk). Taken as a whole, I believe the results from the CAPM-based models are most consistent with and ROE for the Utilities in the reasonable range from 9.5 to 11 percent.

Finally, my risk premium analysis find an ROE of approximately 10% (not including flotation costs or leverage adjustments) and recent allowed ROEs in Canada and the U.S. are generally in the range of 9.3% to 10% on equity ratios that range from approximately 40% to 50%.

Based on the data above, I consider a range of 9.5% to 10.5% to be within reason. This is based on the fact that it is within the range of all three samples' estimates and supported by the Canadian Utility sample estimates even before any consideration of financial risk.

Mr. Buttke expresses the view that market volatility is high with 2016 being a challenging year and I concur. I consider Mr. Buttke's view that market volatility is high and 2016 is a challenging year along with my own study of the required MERP in Canada to recommend that the Utilities be placed in the upper half of the reasonable range: 10.0 to 10.5%. A reasonable point estimate would be the midpoint, 10.25%, for 2016 and 2017.

I note that for the ROE recommendation to be reasonable, I recommend that the Utilities' equity thickness be increased relative to the deemed equity in the 2013 GCOC Decision.

Q100. What do you recommend regarding capital structures?

A100. I recommend that the equity thickness be set so that the credit ratios target the midpoint of the DBRS benchmark range and above the low end of Moody's and S&P's range, which are similar to DBRS middle range. For that to be achieved, the benchmark equity ratio needs to be at 40% for the average risk utility.

Having recommended an equity ratio of 40% for the average risk utility, I recommend that the Commission's relative equity percentages stay in place. Therefore, to determine my recommended equity ratios for the Utilities individually, I have increased the deemed equity ratios from the 2013 GCOC Decision uniformly so that the benchmark ratio is 40%.

Finally, as illustrated in Section VI, the 2% equity adder for non-taxpaying entities is below what is required to fully restore these entities coverage metric, so the equity adder remains valid. As noted in Section VI above, the magnitude for the adder that is needed for a non-taxpaying entity to fully restore its coverage ratio is above 7% at reasonable parameters, so the 2% adder is conservative. I also note that the non-taxpaying status makes net income more volatile all else equal, so such entities have a more difficult time meeting credit metric benchmarks.

Q101. Can you summarize what specific ROE and Capital structure you recommend?

A101. Yes. I recommend that the Utilities be allowed an opportunity to earn an ROE in the range of 10–10.5% with 10.25% as a reasonable point estimate. I also recommend that the Commission consider using the midpoint of credit rating agencies benchmarks to assess the equity ratio. Such an assessment results in my recommendation that the capital structures listed in Figure 30 below be allowed:

Figure 30: Equity Ratios

	Deemed Equity for 2013-15	Recommended for 2016-17
ATCO Electric (transmission)	36	38
ENMAX (transmission)	36	38
ATCO Pipelines	37	39
ATCO Electric (distribution)	38	40
ENMAX (distribution)	40	42
ATCO Gas	38	40
FortisAlberta	40	42
AUI	42	44

I note that the recommended capital structures maintain the relative capital structures for the Utilities including the 2% adder for non-taxpaying entities as in the 2013 GCOC Decision.

Q102. Does this conclude your evidence?

A102. Yes.