BEFORE THE
ALBERTA UTILITIES COMMISSION

WRITTEN EVIDENCE
OF
BENTE VILLADSEN

FOR
THE ATCO UTILITIES
ALTAGAS UTILITIES INC.
FORTISALBERTA, INC.

2021-2022 Generic Cost of Capital

Proceeding ID No. 24110

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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, One Beacon St., Boston, MA 02108, USA.

Q2. Please summarize your qualifications.

A2. I am a principal of The Brattle Group and have 20 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 Alberta and Ontario in Canada, in Alaska, Arizona, California, Illinois, Michigan, New Mexico, New York, Oregon, and Washington in the U.S. as well as before the Federal Energy Regulatory Commission, 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 to European and Australian regulators on cost of capital.[1] I am a co-author of the text, "Risk and Return for Regulated Industries"[2] and a frequent speaker on cost of capital, capital structure and related issues. In addition to cost of capital, I have testified or filed testimony on regulatory accounting issues before the FERC, the Regulatory Commission of Alaska, 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.

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[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).

[2] Bente Villadsen, Michael J. Vilbert, Dan Harris, and A. Lawrence Kolbe, "*Risk and Return for Regulated Industries*," Elsevier, May 2017.

I note also that I submitted evidence in the Commission's 2016 Generic Cost of Capital (2016 GCOC) and 2018 Generic Cost of Capital (2018 GCOC) proceedings.

Q3. What have you been asked to do in this proceeding?

A3. I have been asked by the ATCO Utilities (ATCO), AltaGas Utilities Inc. (AUI), and FortisAlberta Inc. (FA) (jointly the "Utilities") to estimate the cost of equity and capital structure that should be allowed for the period 2021-2022 and to recommend an appropriate capital structure for each of the utilities. As informed by the Scope of Issues outlined by the Alberta Utilities Commission ("AUC" or the "Commission"),[3] I have also been asked to opine on whether a formula should be implemented starting in 2021 governing subsequent annual updates of the allowed return on equity (ROE). I have also been asked to comment on the following questions posed by the Commission.[4]

> (i) If there is a wide range of beta values provided by the experts, what methods should the Commission employ in assessing the range?
>
> (ii) What clear and objective measures should the Commission consider in determining which factor or factors explain any changes in utility credit spreads?

Q4. What are your primary conclusions and opinions on the appropriate allowed ROE and capital structure?

A4. Based on my application of established cost of capital estimation methodologies and my comparative analysis of regulatory capital structures and returns, as informed by Dr. Carpenter's evidence[5] evaluating the Utilities' business risk and Mr. Buttke's evidence[6] assessing capital market conditions, I conclude as follows.

- **The Utilities' current 37% deemed equity benchmark capital structure (39% for AUI) and 8.5% allowed ROE do not provide a levered equity return consistent with what investors could expect to earn in capital**

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3 Alberta Utilities Commission, "2021 Generic Cost of Capital Proceeding 24110," April 4, 2019.

4 Alberta Utilities Commission, "2021 Generic Cost of Capital Proceeding 24110," April 4, 2019.

5 2021 GCOC Written Evidence of Paul R. Carpenter ("Carpenter Evidence").

6 2021 GCOC Written Evidence of Robert Buttke ("Buttke Evidence").

markets on alternative equity investments of equivalent risk. Therefore, based on an assessment of how finance principles governing the compensation of risk in capital markets apply in the context of the Fair Return Standard, **it is my opinion that the deemed capital structure and ROE granted in the Commission's 2018 GCOC decision do not satisfy the "comparable returns" and "capital attraction" components of the standard.**

- Should the Commission apply a benchmark deemed equity thickness of less than 40% (such as the 37% currently granted), the allowed ROE needs to be substantially increased (above the current 8.5%) to satisfy the comparability component of the fair return standard.
    - Specifically, based on my implementation of the cost of capital models applied to benchmark samples, **I conclude that an allowed ROE of 10.0 percent within the reasonable range 9.5 – 10.5 percent is appropriate for the Utilities *if* it is applied to a benchmark equity thickness of 40%** (44% for AUI, see below).
    - I believe raising the benchmark equity thickness to 40% is reasonable as it would improve the robustness of the Utilities' credit metrics in the event of adverse economic circumstances. It would also better align with the Utilities business risk and the regulatory capital structures investors observe being applied in other Canadian jurisdictions (though still at the low end of what is typically observed for U.S. utilities).
- I emphasize that if the AUC does not accept my recommendation to raise the benchmark equity thickness from 37% to 40%, the additional financial risk inherent in the more debt-laden regulatory capital structure (*i.e.*, 63% debt vs. my recommended 60% debt) must be compensated by a higher return on the more levered equity investment.
    - Specifically, my analysis indicates **that an allowed ROE of 10.5 percent within the reasonable range 10 – 11 percent is appropriate for the Utilities if it is applied at the currently approved benchmark equity thickness of 37%** (41% for AUI, see below).
    - In general, the standard finance techniques for unlevering and relevering required returns (and betas) should be applied to ensure that a risk-comparable allowed ROE is determined in a manner that

accounts for the financial risk inherent in whatever deemed regulatory capital structure the AUC applies.

- In accordance with Dr. Carpenter's evidence, it is my opinion that the Commission should return the deemed equity thickness for AUI to a position 400 basis points higher than the benchmark deemed equity thickness, while continuing to apply the same generic ROE to AUI as to the other Utilities. In other words,
  - **My recommended ROE of 10 percent should be applied at a deemed equity thickness of 44% for AUI** (if the Commission accepts my recommendation to raise the benchmark equity thickness to 40%).
  - **My recommended ROE of 10.5 percent should be applied at a deemed equity thickness of 41% for AUI** (if the Commission maintains the benchmark equity thickness at 37%).
- Consistent with the Commission's past practice, all of my cost of equity estimates for the samples, as well as my recommended reasonable ranges and point estimates for the allowed ROE include a 50 bps adder for flotation costs.

Q5. Please briefly summarize the basis of your opinions regarding appropriate consideration of the relationship between the allowed ROE and deemed capital structure.

A5. My ROE and capital structure recommendation is part of a holistic assessment of the impact of debt financing and associated financial leverage on the comparability of equity returns. Based on a review of commonly allowed equity ratios and equity returns for regulated utilities, I conclude that *both* the equity thickness (37% benchmark deemed equity) and the allowed ROE (8.5% in the most recent GCOC) are below the industry standard in both Canada and the U.S. Additionally, the benchmark deemed capital structure that is currently applied to the utilities imposes substantially greater debt leverage than what is commonly found among the publicly traded comparable companies.[7] These facts are highly relevant in the context of ensuring risk-comparability of equity returns

[7] This statement pertains to net book as well as market value capital structures.

because it is a fundamental principle of finance that the greater financial leverage associated with a lower equity percentage should be associated with a higher return on the levered equity investment. However, while the AUC's recent decisions have acknowledged this relationship between capital structure and equity return, it has declined to reflect the impact of the relationship in its determination of the allowed return and equity thickness.[8] Consequently, I conclude that the allowed ROE must be substantially increased in order to provide a comparable return on levered equity investment, when applied at the current benchmark deemed equity ratio of 37%, or even at my recommended benchmark 40% equity ratio.

Consistent with my recommendation in the 2016 and 2018 GCOC, I recommend that the Commission increase the benchmark deemed equity percentage to be consistent with industry standards at no less than 40 percent equity (this is similar to my recommendation in the 2016 and 2018 GCOC). Doing so will ensure that the ATCO Utilities and FAI can comfortably maintain credit metrics above the threshold for an A-range. For AUI, I recommend an equity percentage of 44 percent for the same reasons, based on Dr. Carpenter's assessment that AUI's higher business risk continues to be appropriately compensated by the 400 basis point premium that had traditionally been applied by the AUC prior to the 2018 GCOC Decision.[9]

However, I emphasize that should the Commission decide to maintain a lower equity percentage, the return on equity needs to be commensurately increased to compensate for the higher financial risk associated with the increased debt leverage.

Q6. Please briefly summarize the basis for your cost of capital and capital structure recommendations.

A6. I base my ROE recommendation primarily on cost of capital estimates derived from a U.S. Gas Distribution sample and a U.S. Water Utility sample, as Dr. Carpenter's Evidence

[8] 2018 GCOC ¶836, 842 and Section III below.

[9] AUI's deemed equity percentage is currently subject to a Review and Variance of Decision 22570-D01-2018 in Proceeding 25031.

shows that these two samples have business risk characteristics that best match those of the Utilities. I additionally consider the model results based on a Canadian Utility sample and a U.S. Pipeline sample. The Canadian Utility sample provides insights into Canadian-specific economic conditions (although many Canadian utilities also invest abroad), and the U.S. Pipeline sample provides an upper bound, as this sample faces higher business risk reflective of pipeline-specific regulation and the potential for asset stranding. The latter is also a risk for the Utilities, for which reason the Pipeline sample remains a valid directional indicator that business risk factors that Dr. Carpenter testifies increase the Utilities' risk relative to the Gas Distribution sample are compensated in capital markets by higher expected returns. Lastly, I include results from a U.S. Electric sample for consistency with my 2018 GCOC evidence, but do not rely on the results, as the sample is very diverse with many companies facing unique circumstances that are not applicable to the Utilities.[10]

Informing my ROE recommendations, I consider results from CAPM-based, single and multi-stage DCF models, while applying standard finance techniques to adjust for differences in financial leverage among the sample companies and between the sample companies and the target deemed regulatory capital structure for the Utilities.

My model results indicate a wide range of estimated ROEs. However, in light of Dr. Carpenter's determination that "the business risk of the Utilities is currently higher than the business risk of Dr. Villadsen's water and gas LDC samples,"[11] I focus my recommendation on the range of results produced for my Gas Distribution and Water Utility samples. In assessing the range of reasonable results, I also consider Mr. Buttke's

[10] The utilities in the Electric sample are a mixture of integrated electric utilities and distribution and transmission utilities with a variety of state-specific issues. For example, the retirement of coal and nuclear generation, the penetration of distributed generation, decarbonization, etc. vary widely across U.S. jurisdictions and the utilities in the sample. Additionally, the sample companies have experienced unexplained changes in beta estimates in recent months.

[11] Carpenter Evidence, Q/A 5.

finding that market conditions are currently stable despite abundant political uncertainty, but are expected to improve by the 2021 GCOC period.[12]

In my judgement, the model results estimated based on a 40% equity target capital structure result in a range of 9.5 to 10.5 percent. When I instead employ a regulatory capital structure reflecting 37% deemed equity, the range increases to 10 to 11 percent.

With respect to the other samples, I note that the Canadian Utility sample results generally support these ranges, while the Pipeline sample provides higher numbers. The higher results for pipeline companies is consistent with Dr. Carpenter's business risk evidence.[13]

Q7. Please summarize your conclusions regarding the appropriateness of implementing an annual adjustment formula to determine the allowed ROE in future years.

A7. Pertaining to the Commission's questions if a formula should be implemented starting in 2021 governing subsequent annual updates of the allowed ROE, I conclude as follows:

- The pervasive departure from formula mechanisms in the post-crisis financial climate demonstrates that Canadian regulators understood that conditions were not conducive to establishing a successful, longstanding formula ROE. Since the conditions that made these formulas unworkable were expected to change but did not, I would advise the Commission against implementing a formula ROE in 2021.
- As discussed in Section VII below, the key reasons for abandoning the formula – very low current and forecasted interest rates and a flight to quality – remain in place. As investors' expected risk premium over and above the risk-free rates varies inversely with the level of interest rates, a formulaic approach likely cannot capture investor expectations. A prolonged implementation of the NEB-formula clearly demonstrates this, as the most recently calculated NEB-formula based ROE was 6.63 percent – substantially lower than any recently allowed ROE in North America.

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[12] Buttke Evidence, Q/A 6, 7.

[13] As noted previously, I do not rely on the Electric Utility sample but include it to be consistent with my evidence in the 2018 GCOC proceeding. I further note that relative to the recommendation in the 2018 GCOC proceeding, I have de-emphasized the pipeline sample and enhanced the emphasis on the water sample based on Dr. Carpenter's business risk evidence.

Q8. Please summarize your evidence in response to the Commission's specific questions regarding betas and utility credit spreads.

A8. Pertaining to the Commission's questions regarding betas and explanations for utility bond spreads, I conclude as follows:

Beta:

The variability in beta values is driven by two factors: (i) randomness in the data used for the statistical measurement, and (ii) differences in measurable systematic risk of the various samples and companies. I find that the effect of idiosyncrasies in the data can be minimized by using a larger sample of representative return observations and by taking averages from the individual sample companies. I further find that real differences in systematic market risk are driven both by different business risk characteristics (*e.g.*, due to differing business operations or industry conditions) and by differences in financial risk associated with the amount of debt in the capital structure. I explain that financial risk differences can be controlled for by unlevering the beta, such that variation in the unlevered "asset" betas and resulting leverage-adjusted CAPM estimates for the different samples reflect actual measured differences in systematic business risk.

Utility Credit Spread:

The Commission asked what objective measures to consider in determining which factor or factors explain any changes in utility credit spreads. While my evidence is not directly concerned with short or medium term variation in credit spreads, I do draw evidence from the persistent elevation of Canadian and U.S. utility credit spreads (*i.e.*, the spread between utility bond yields and government bond yields of similar maturity) since the time of the financial crisis. According to academic studies, the return premium required to hold risky assets is one factor that affects bond yield spreads. As discussed in Section IV.B, I interpret the fact that utility (and other corporate) credit spreads have been consistently higher over the last decade than in the period leading up to the great financial crisis as corroborative of other evidence (see Section IV.C) that investors' expected risk premium for equity returns (*i.e.*, the MERP) is higher at present than one would estimate by taking the long-term historical average of observed equity return premiums.

Q9. How have you structured the remainder of your evidence?

A9. In Section II, I explain my approach to estimating the cost of capital in a manner consistent with the fair return standard. In Section III, I discuss the relationship between capital structure and required return, and explain how I account for this in order to ensure comparability of returns consistent with the fair return standard. Section IV discusses how capital market conditions impact the current cost of equity; this section also addresses how the spread between utility bonds and government bonds can provide evidence regarding the prevailing risk premiums in capital markets. Section V explains the specific procedures I used to estimate the cost of equity based on selected samples and presents my results, while Section VI 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 Buttke. Finally, Section VII provides responses to the Commission's specific questions, including the appropriateness of using an annual adjustment formula to establish allowed ROEs.

II. APPROACH TO DETERMINING A FAIR RETURN RECOMMENDATION

Q10. How do you approach your estimation of the cost of capital for the Utilities?

A10. My evidence for this proceeding focuses on determining a fair return as manifested through the combined return on equity and deemed equity percentages. This is consistent with the Commission's 2018 Generic Cost of Capital ("2018 GCOC") Decision's determination that the "Commission exercises its judgment in determining **a total return** for each utility to establish rates that provide the utility a reasonable opportunity to earn a fair return on invested capital …."[14] In developing my evidence, I considered the Commission's 2018 GCOC Decision as well as the decision in the 2016 Generic Cost of Capital Proceeding ("2016 GCOC").[15] Therefore, I attempt to either follow the Commission's guidance or, otherwise, to explicitly state what has changed or why I ask the Commission to review the issue. In considering the fair return, it is important to consider both the allowed return on

[14] AUC Decision 22570-D01-2018 ("2018 GCOC Decision"), ¶37.

[15] 2018 GCOC Decision and AUC Decision 20622-D01-2016 ("2016 GCOC Decision").

equity and the capital structure. That is, business and financial risks may be reflected in either the allowed ROE, the deemed equity percentage, or both, provided that the resulting combination of the allowed ROE and deemed capital structure meets the fair return standard.

Considering the changes since the 2018 GCOC, I observe that the samples' compositions differ as some companies have engaged in merger and acquisition activity or because more data has become available. However, the selection process is the same as in my 2018 GCOC evidence. I emphasize relatively pure-play samples of highly regulated natural gas LDCs and water utilities. However, I also include a sample of regulated pipelines to provide information regarding the cost of capital for rate-regulated network companies that are subject to capital recovery risk, if their assets become stranded or underutilized due to market supply and demand dynamics.[16] Such circumstances are discussed in Dr. Carpenter's evidence. While the Utilities experience directionally lower competitive risk compared to regulated pipelines, they face, according to Dr. Carpenter, directionally higher stranding risk compared to the regulated gas distribution businesses represented in my U.S. Gas Distribution sample.[17] My Gas Distribution sample contains companies, which are essentially pure play local distribution companies, with the majority of their business activities centered on rate regulated distribution activities, providing a close analogy for the Utilities' distribution businesses. I also include a sample of regulated water utilities, which, relative to other samples, derive a higher proportion of cash flow from the provision of rate regulated utility services. Finally, I have included a sample of Canadian Utilities, which contains companies that have utility operations in Canadian regulatory jurisdictions, although these companies are also substantially diversified in terms of exposure to regulated utility operations in other jurisdictions (primarily the U.S.) and other business activities.

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[16] In the 2018 GCOC Decision, ¶273, the Commission considered the Pipeline Sample to be not comparable. However, I include it here, because it constitutes an upper bound on the ROE and provides insight into the risks associated with stranded assets as discussed in the Carpenter Evidence, Q/A 56.

[17] Carpenter Evidence, Section I.

The 2018 GCOC Decision continued the Commission's historical precedent of allowing a 50 basis point adder to compensate for flotation cost.[18] The Utilities (or their parent company) may periodically need to issue equity to fund capital expenditures, but incur costs when doing so subtracts from the issuance proceeds available to finance rate base assets. Consequently, I recommend continuing the practice and present my results including a 50 basis point flotation cost allowance (as did my 2018 GCOC evidence).

A. THE FAIR RETURN STANDARD

Q11. What are the guiding principles for determining allowed utility returns?

A11. The Canadian Supreme Court (as well as the U.S. Supreme Court) has made clear that one part of a "fair return" is that the return 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.[19] [emphasis added]

In addition to this comparability standard, the return allowed to the Utilities must be such that it enables them to attract capital on reasonable terms and maintain their financial integrity. The components of the fair return standard have been summarized by the Commission in past GCOC decisions as comprising of "three factors, namely 'comparable investments,' 'capital attraction' and 'financial integrity.'"[20] The Commission has also stated that these factors are separate but interrelated in the manner of "leg[s] of a three

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[18] 2018 GCOC Decision, ¶469.

[19] *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) (*Bluefield*); and Federal Power Com'n v. Hope Natural Gas Co., 320 U.S. 591 (1944) (*Hope*).

[20] AUC Decision 2009-216 ("2009 GCOC Decision"), ¶94. I note that the importance of capital recovery and the risk associated with the UAD are discussed in the Carpenter Evidence.

legged stool," and found that each factor must be applied to determine a fair return for rate-setting purposes.[21] Importantly, the Commission has also recognized that the fair return standard applies equally (and in my opinion *jointly*) to determination of both the allowed ROE and the deemed regulatory capital structure.[22]

Q12. How do you follow these principles in conducting your analysis and making your recommendations?

A12. The "comparable investments" component of the fair return standard defines comparability in terms of equal "attractiveness, stability, and uncertainty." In the decision establishing that standard, the Canadian Supreme Court did not distinguish between sources of stability and sources of uncertainty. Thus, it is essential to consider risk factors that affect the potential variability in expected returns, as well as the average level of those returns. In short, the "comparability" of investments and returns must be considered on a risk-adjusted basis.

The impact of risk on investors' required returns is central to the financial concept of the opportunity cost of capital, and to the "comparable investments" and "capital attraction" components of the fair return standard. Put simply, a fair return must be sufficiently attractive to compensate investors for forgoing the opportunity to earn a return from an alternative investment of comparable risk. The return that investors require to compensate for this opportunity cost is the cost of capital. Therefore, a fair allowed return must be at least as high as that available on comparable investments (*i.e.*, it must meet the comparability criteria).

The third component of the fair return standard requires that the allowed return be sufficient to maintain the company's financial integrity, such that its operations are not hampered by inadequate cash flows. This is a necessary component for a fair return, but not a sufficient

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[21] 2009 GCOC Decision, ¶107-108. The Commission has affirmed the validity of this framework, stating that it "considers these factors to be well established and continues to be satisfied that the fair return standard is met when the return satisfies these three factors […]." 2018 GCOC Decision, ¶38.

[22] *Ibid.*

one, as even a return that provides cash flow adequate to support operations may not be sufficient to attract investment capital in competition with comparably risky alternative investments. Even if an allowed return and deemed equity thickness allow a utility to maintain a high quality credit profile and raise debt capital on reasonable terms, it does not necessarily ensure that the return on equity—when appropriately accounting for the risk-impact of financial leverage inherent in the regulatory capital structure—is competitive with that available for alternative investments of comparable risk.

Q13. What specific risk considerations are relevant to whether a return is comparable to those available from alternative investments on a risk-adjusted basis?

A13. Since investors can reduce their exposure to some asset-specific risks by holding a broad and diversified portfolio of investment assets (such as in a mutual fund), they are concerned with how the returns of the individual assets in such a portfolio are expected to vary with respect to market-wide returns. This *systematic risk*—which is typically measured in terms of the market beta—cannot be diversified away, so investors require compensation (in the form of higher expected returns) for bearing systematic risk. Assets whose returns are expected to vary more with respect to the ups and downs of the broader markets have higher systematic risk, and so should offer higher expected returns in capital markets.

However, as discussed by Dr. Carpenter, investors are also concerned with the possibility of non-recovery of their invested capital (akin to the concept of default on a fixed income investment), such that a given allowed return may not be sufficient to attract capital even if it is equivalent to that available in capital markets for investments of comparable *systematic* risk. Importantly, features such as the non-recovery of capital is often not a systematic risk in that investors can diversify away from such risks. Therefore, compensation for systematic risk only does not commonly provide compensation for non-recovery of capital.[23] In addition, changes to government and policy in Alberta around de-carbonization and the rapid change in policies guiding such efforts, such as the Distribution

[23] For example, if the sample companies have no risk of non-recovery, then such risk is clearly not measured in the estimated cost of equity.

System Inquiry, has created additional uncertainty related to higher costs, lower revenues, uncertain market designs, and higher stranded asset risk. Dr. Carpenter's evidence provides a detailed comparison of the regulatory regime in Alberta and among the U.S. gas LDCs as well as the change in risk since the 2018 GCOC.[24]

In sum, the concept of risk is central to the fair return standard and to cost of capital estimation. Therefore, in evaluating the returns of comparable companies when determining an appropriate allowed rate of return, I consider all risk factors that may impact the comparable companies' returns as well as the required return of the Utilities.

Q14. What guides your choice of methodologies for estimating the cost of capital and informing your recommendations for the Utilities' allowed returns?

A14. I note that the Canadian Supreme 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.[25]

Other scholars agree. For example, Professors Berk and DeMarzo of Stanford University, 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

[24] Carpenter Evidence, Section IV.

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

> tradeoff between simplicity and precision varies across sectors, practitioners apply the techniques that best suit their particular circumstances.[26]

The reliance on multiple methods is also consistent with the Commission's recent orders on cost of capital, where the Commission in 2018 looked to the DCF models and the CAPM, while the ECAPM was not assigned significant weight and other risk premium models were assigned zero weight. Of note, the Commission "assign[ed] less weight to the CAPM ROE results" than to the DCF and acknowledged that any one company can grow at a higher rate than the economy in the near term.[27] The consideration of the DCF and CAPM as well as placing less weight on the CAPM was similar to the approach in the 2016 GCOC Decision.[28] The Commission was explicit in its 2013 GCOC Decision that the "benchmark generic ROE should be established on the results of multiple tests…"[29]

The view that multiple tests are preferable is also consistent with the approach taken by other provincial regulators in Canada as well as the U.S. Federal regulator.[30] The weight assigned to each methodology varies across jurisdiction and time.[31]

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

[27] 2018 GCOC Decision, ¶468. See also ¶356, 373, 395, 441, and 449.

[28] 2016 GCOC Decision, ¶317.

[29] 2013 GCOC Decision, ¶271.

[30] See, for example, British Columbia Utilities Commission, "Generic Cost of Capital Proceeding (Stage 1) Decision," Decided May 10, 2013 (BCUC 2013 Decision), p. 80 and confirmed in British Columbia Utilities Commission, "Decision and Order G-129-16," August 10, 2016, p. 47; 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, and Newfoundland & Labrador Board of Commissioners of Public Utilities, "Order No. P.U. 18(2016); issued June 8, 2016, p. 27. It is also consistent with the U.S. Federal Energy Regulatory Commission ("FERC') revised methodology for electric transmission ROE, which in recent decisions has relied on two (FERC Opinion 569, Docket No. EL14-12, EL15-45, December 19, 2019) or four methods (FERC Opinion 531, Docket No. EL11-66-001 et al., October 16, 2018).

[31] In the 2013 GCOC ¶270-277, the Commission considered the DCF and CAPM results as well as other evidence, but did not specify a weighting. In the 2016 GCOC, ¶189, "the Commission [placed] less weight on the resulting CAPM estimates in this decision."

B. APPROACH TO ESTIMATING THE UTILITIES' COST OF CAPITAL

Q15. How did you estimate the cost of capital for the Utilities?

A15. To assess the cost of capital for the Utilities, I start by selecting multiple samples of publicly traded companies that provide regulated utility services. Specifically, I selected a "Canadian utility" sample consisting of Canadian domiciled utility holding companies, as well as samples of U.S. Electric utilities, U.S. Gas local distribution companies (LDCs), U.S. Water utilities, and North American regulated Pipeline companies.[32]

Among the samples, the U.S. Gas LDC and Water utility samples are the closest to pure play operators of utility commodity distribution infrastructure systems. I therefore rely on these samples for their insights into the risk and returns associated with regulated distribution activities. The Canadian Utility sample provides information on the risk and return of Canadian-domiciled companies with regulated utility operations, though I note that such companies are increasingly diversified both geographically—owing to acquisitions that grant them substantial ownership of regulated network operations in the United States and elsewhere—and in terms of exposure to non-utility business operations. In assessing the comparability of the samples, Dr. Carpenter provides a detailed analysis of the Gas LDC and Water samples and finds that the Utilities have higher risk than the Gas LDC and Water samples, but not a high of a risk as the Pipeline sample.[33]

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) and two versions of the Discounted Cash Flow (DCF) model. In implementing these models using market data for the sample companies, I rely on Mr. Buttke's Evidence regarding capital market conditions.

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[32] My selection and consideration of multiple industry-based samples is consistent with my approach in the 2018 GCOC proceeding. In that proceeding, I evaluated a Canadian Utility sample and samples of U.S. Electric utilities, U.S. Gas LDC, U.S. Water utilities, and U.S. regulated Pipeline companies as I do here.

[33] Carpenter Evidence, Sections IV A and IV C.

To arrive at my final ROE recommendation, I consider (i) the range of estimates I have derived, (ii) the current economic outlook, (iii) financial risk differences, and (iv) the business risks of the Utilities relative to that of the benchmark samples. I rely on Dr. Carpenter's Evidence assessing the Utilities' business risk to inform the placement of my recommendation relative to the sample estimates.

In consideration of the comparable returns component of the fair return standard, I rely on samples with relevant features of business risk comparability and ensure that other observable differences in risk (e.g., leverage) are properly accounted for. To ensure that the financial integrity component of the standard is met, I ensure that the combined ROE and capital structure is such that the Utilities are expected to maintain credit ratings in the A range at the regulated utility level. Additionally, ROE and capital structure need to meet each component of the standard and ensure the ability to attract *equity* capital (as well as debt capital) on reasonable terms. Therefore, I additionally consider how the Utilities' ROE and capital structure (when considered together) compare to that observed for the sample companies.

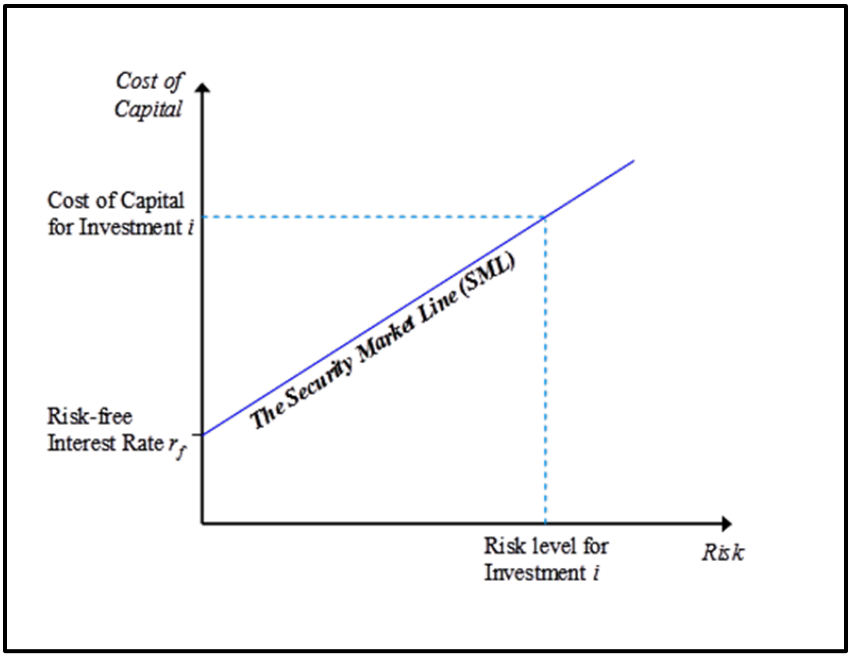
1. Cost of Capital and Risk

Q16. How is the "cost of capital" defined?

A16. 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.

Figure 1: The Security Market Line



Q17. Why is the cost of capital relevant in rate regulation?

A17. The "cost of capital" is the return that investors expect to earn on investments of comparable risk.[34] As noted above, this is consistent with the Canadian Supreme Court's decision in *Northwestern* and also with the U.S. Supreme Court's decisions in *Hope* and *Bluefield*, which concluded that

> [T]he return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks.[35]
>
> The return should be reasonably sufficient to assure confidence in the financial soundness of the utility; and […]
>
> […] should be adequate, under efficient and economical management to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties.[36]

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[34] 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).

[35] U.S. Supreme Court *Hope* Decision.

[36] U.S. Supreme Court *Bluefield* Decision.

The U.S. Court's decisions establish a three-part standard analogous to the three-legged stool mentioned in past GCOC Decisions.[37] It is not enough that the return (both the ROE and capital structure components) supports the credit of the Utilities and assures confidence in financial soundness; the return must also enable the Utilities to attract capital and meet the comparability standard to ensure fairness.

The second (financial integrity) and third (capital attraction) criteria have implications for the need for regulated companies to provide a return sufficient to compensate investors for any risk of capital non-recovery and to maintain healthy finances, including a solid credit rating and credit metrics. Both of these goals depend to some degree on the first criterion (comparable returns); however, ensuring financial stability and the ability to raise capital does not guarantee a fair return. It is essential that the return in combination with the equity thickness be comparable to the returns available on alternative investments of comparable risk.

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 similar-risk enterprises, but it also addresses the capital recovery concerns of investors and meets the expectations of credit market participants.

Q18. Are there additional economic considerations that affect the relationship between the allowed return and the cost of capital?

A18. Yes, beyond the basic elements of the fair return standard discussed immediately above (and in II.A), utility regulators and customers must concern themselves with 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"—the perception investors gain if

[37] See Section II.A above.

customers are overcharged, and customers gain if investors are shortchanged. This view is not valid. In the longer term, inadequate returns are likely to expose customers—and society generally—to risks that cost 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.[38] This is especially true in capital-intensive industries (such as the electric and gas distribution utility business), 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.

2. The Impact of Risk on the Cost of Capital

Q19. Are there Alberta-specific risk factors?

A19. Yes. As discussed in the Carpenter Evidence, the uncertainties regarding the long-run recovery created by the UAD and PBR policies are similar to those in 2018, while new trends regarding technological changes and decarbonization have been added. The significance of these new trends is exemplified by the AUC's initiation of its Distribution System Inquiry in Proceeding 24116. These risks are discussed in the Carpenter Evidence, and he concludes that the business risks of the Utilities is higher than those of the Gas LDC sample albeit not as high as those of the U.S. Pipeline sample.

Q20. Why is capital structure important for the determination of the cost of equity?

A20. As discussed extensively in Section III below, shareholders in a company with more debt face more equity risk and the return on equity needs to increase. The deemed equity thickness applied to the Utilities imposes significantly greater financial leverage—and thus greater financial risk—compared to the less levered capital structures of the benchmark

[38] See the Buttke Evidence Q/A 15 for a discussion of how investors' choice of where and what to invest in.

sample companies. (Indeed the difference is between 15 and 40 percentage points in terms of debt ratio depending on the sample.) To account for the differences in financial leverage and associated risk differences, I apply standard finance techniques to unlever and relever the cost of equity estimates and betas. I discuss the finance principles underlying these adjustments below in Section III, and provide additional technical detail and theoretical background in the Technical Appendix to this evidence.

The issue of financial leverage is also relevant to the Commission's question: "If there is a wide range of beta values provided by the experts, what methods should the Commission employ in assessing the range?"[39] Because the various sample companies have different capital structures, unlevering the directly measured equity betas and relevering them at a common target capital structure (*i.e.*, the deemed regulatory capital structure for the Utilities) can serve to eliminate variability resulting from the different degrees of financial leverage. Therefore, the unlevering and subsequent relevering of beta to the deemed equity percentage helps narrow the range.

III. CAPITAL STRUCTURE AND THE FAIR RETURN STANDARD

Q21. What is your understanding of the Commission's approach to determining the capital structure for the Alberta Utilities in recent GCOC proceedings?

A21. In the 2018 GCOC Decision, the Commission maintained its position from previous GCOC Decisions of focusing primarily on credit metrics when determining capital structures for the utilities in Alberta.[40] Specifically, the Commission has sought to set capital structures

[39] AUC: 2021 Generic Cost of Capital – Scope of Issues..

[40] 2018 GCOC Decision, ¶510, 663, and 694. I also note that, as described in the 2016 GCOC Decision, the Commission's generic determination of an appropriate benchmark capital structure thus focuses on "credit metrics as an indication of the financial risk of the affected utilities" as well as a consideration of generic business risk. 2016 GCOC Decision, ¶613.

such that the implied credit metrics were consistent with an A range rating.[41] Additionally, in the 2018 GCOC, the Commission established a view that because AUI's debt was raised by its corporate parent, which has a BBB range credit rating, and because of the "inability of AltaGas to raise debt at A-range credit rating,"[42] a higher level of debt financing should be used in the deemed regulatory capital structure for AUI at the operating utility level.[43]

Q22. What is your assessment of the Commission's statements regarding its reliance on credit metrics for determining the deemed equity capital structure in relation to the fair return standard?

A22. In its 2018 Decision, the Commission stated that "[t]he use of the A-range credit rating target is a factor that respects the financial integrity, capital attraction and comparability aspects of the fair return standard."[44] I agree with this statement in part, but not in full. While I generally concur with the Commission's assessment that "[a]n A-range credit rating should support the financial strength of the utilities under varying market conditions," this goal is in my opinion not sufficient to meet the fair return standard.[45] Specifically, "what constitutes a fair return **including capital structure**" is determined by the application of all three distinct but interrelated components of the fair return standard.[46] However, the Commission's statements regarding capital structure determination have not placed any emphasis on how the equity ratio affects the *comparability* of equity returns. Thus, in my opinion, the Commission's approach continues to neglect the comparability

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41 In its 2016 Decision, the Commission explicitly described its process of determining the benchmark deemed capital structure as focused on evaluating the credit metrics of the Alberta Utilities relative to the "credit metrics […] required by a typical pure-play regulated utility in order to maintain an A-range credit rating." 2016 GCOC Decision, ¶345-346. The Commission engaged in the same exercise in the 2018 GCOC. *See* 2018 GCOC Decision, Section 9.7.

42 2018 GCOC Decision, ¶836.

43 2018 GCOC Decision, Section 10.

44 2018 GCOC Decision, ¶694.

45 2018 GCOC Decision, ¶663.

46 AUC Decision 2009-216 ("2009 GCOC Decision") ¶94, 106-108. Emphasis added.

component of the fair return standard.[47] Consequently, my evidence considers both the appropriate equity return **and** capital structure in combination rather than just the appropriate equity return.

Q23. What is your reaction to the Commission's actions in lowering AUI's equity thickness because of its inability to access debt at the A-range credit level?

A23. In my opinion, the Commission's decision in this regard is not consistent with a fair return. In past generic cost of capital proceedings, the Commission has granted AUI a 400 bps premium above the benchmark equity thickness in recognition of its small size and associated unique business risk characteristics. In the 2018 GCOC, the Commission stated its belief that the circumstances (differentially higher business risk) supporting the 400 bps premium persist for AUI.[48] Yet, the Commission cut the premium in half, reasoning that granting AUI a capital structure that the AUC deems consistent with an A range credit rating was too high because of AUI's inability to access debt at an A range credit rating levels and the uncertainty with respect to AUI's future debt costs.[49]

Moreover, in imposing greater financial leverage on AUI, without appropriate compensating the increased financial risk through a higher ROE, the Commission harmed the standing of AUI's allowed return with respect to the comparability component of the fair return standard. Assuming for the sake of argument that the AUC's allowed ROE was risk-comparable for AUI with a 400 bps equity thickness premium, logic dictates it cannot also be sufficiently risk-comparable at a 200 bps premium unless the business risk

[47] Additionally, the benchmark credit metrics that the Commission traditionally has relied upon are near the bottom of the range provide by credit rating agencies. 2018 GCOC Villadsen Written Evidence, Section V.C.

[48] 2018 GCOC Decision, ¶836.

[49] 2018 GCOC Decision, ¶842-843.

differential has decreased, which the Commission acknowledged it had not.[50] Thus, the Commission's determination of AUI's equity thickness afforded insufficient attention to comparability and the fundamental consideration of "fairness" in the fair return standard, since AUI's business risk was acknowledged to warrant a 400 bps premium, yet only 200 bps was awarded.

Q24. How should capital structure be taken into account with respect to ensuring that the allowed returns meet the fair return standard?

A24. As discussed further below, the proportion of debt in the capital structure—also known as financial leverage—influences the risk borne by equity investors. For a given degree of business risk, a higher proportion of debt financing (*i.e.,* lower equity thickness) increases the expected variability of equity returns. Thus, an ROE that is fair at a given capital structure will **not** be comparable on a risk-adjusted basis if applied to an otherwise identical firm with a more debt-laden capital structure.

Put differently, if more debt is used, the greater financial risk imposed by the greater financial leverage must be compensated by a commensurately higher expected return on equity. Otherwise, the more leveraged firm will not receive a fair return, and will be at a disadvantage in the competition to attract capital in equity markets.

[50] I note that it is not uncommon for Canadian regulated utilities to be granted a higher equity percentage due to higher business risk. For example, the British Columbia Utilities Commission ("BCUC") grants Pacific Northern Gas a higher ROE and equity percentage than the benchmark utility regulated by the BCUC, while the Nova Scotia Utility and Review Board granted Heritage Gas a higher ROE and equity percentage than other Nova Scotia utilities. See, for example, Concentric Energy Advisors, "Authorized Return on Equity for Canadian and U.S. Gas and Electric Utilities," May 25, 2017.

A. THE AUC'S CURRENT DEEMED CAPITAL STRUCTURES AND ALLOWED ROE DO NOT PROVIDE A COMPARABLE RETURN

Q25. What was the Commission's determination regarding deemed equity ratios in the 2018 GCOC Decision?

A25. Figure 2 below summarizes the allowed ROEs and deemed equity ratios approved by the Commission for AUI, the ATCO Utilities, and FA in both the 2016 and 2018 GCOC Decisions. As shown in Figure 2, relative to the 2016 GCOC ratios, the Commission decreased equity thicknesses by two percentage points for AUI and maintained the equity thickness for the ATCO Utilities and FA, leading to a representative benchmark deemed equity ratio of 37 percent (before company specific adjustments) for both distribution and transmission utilities.[51]

Figure 2
2016-2018 GCOC Deemed Equity Ratios

	2018-2020		2017		2016	
	Allowed ROE	Deemed Equity Ratio	Allowed ROE	Deemed Equity Ratio	Allowed ROE	Deemed Equity Ratio
AUC Utilities						
ATCO Electric Transmission	8.50	37	8.50	37	8.30	37
ATCO Pipelines	8.50	37	8.50	37	8.30	37
ATCO Electric Distribution	8.50	37	8.50	37	8.30	37
ATCO Gas	8.50	37	8.50	37	8.30	37
FortisAlberta	8.50	37	8.50	37	8.30	37
Alta Gas	8.50	39	8.50	41	8.30	41

Sources and Notes
AUC allowed ROE and deemed equity ratio from 2016-2018 Generic Cost of Capital.

I note that the Commission's 2018 determination also reduced from 400 basis points to 200 basis points the deemed equity thickness premium granted to AUI relative to the benchmark level. The Commission has historically permitted AUI to use four percentage points greater equity in its capital structure in compensation for its small size and associated business risk factors—conditions which persist according to Dr. Carpenter's testimony.

[51] 2018 GCOC Decision, ¶815.

As discussed further below, I do not believe it was appropriate to reduce the equity thickness premium for AUI relative to the benchmark. However, I first address issues of comparability with reference to the AUC's allowed ROE as applied in combination with the 37 percent benchmark equity thickness.

Q26. Are the AUC's allowed returns and capital structure comparable to those awarded in other North American utility regulatory jurisdictions?

A26. No. Figure 3 below summarizes allowed ROE and capital structures granted by provincial and state regulators for Canadian and U.S. utilities in the last four years.

As the table shows, both allowed equity returns and the proportions of equity in regulatory capital structures have been substantially higher in other North American jurisdictions compared to those in Alberta. Of particular note, allowed ROEs elsewhere in Canada (excluding crown corporations) are approximately 9.2% on average across jurisdictions and are associated with deemed equity thickness of approximately 43.2%.[52] This is non-trivially higher than the ROE and capital structure allowed in Alberta.

Thus, AUC's 37% benchmark deemed equity thickness imposes higher financial leverage than is typical for equity investment in regulated utilities elsewhere in North America, but the resulting higher financial risk is not compensated by commensurately higher equity returns. To the contrary, Alberta utility equity investors are granted a *lower* return on their more leveraged equity investment. This is inconsistent with the "comparable return" component of the fair return standard.

[52] See Figure 3 and workpaper BV WP04.

Figure 3
Allowed ROEs and Capital Structures in Canada and the U.S.

Service	2019		2018		2017		2016	
	Allowed ROE (%)	Common Equity Ratio (%)	Allowed ROE (%)	Common Equity Ratio (%)	Allowed ROE (%)	Common Equity Ratio (%)	Allowed ROE (%)	Common Equity Ratio (%)
U.S.								
Natural Gas	9.71	51.75	9.59	50.09	9.72	49 88	9.54	50.06
Electric	9.65	49 94	9.60	49.02	9.74	48 90	9.77	48.91
Electric T&D	9 37	50 38	9.38	49.92	9.44	48 84	9.31	49.12
All	9.68	50.73	9.59	49.52	9.73	49 23	9.68	49.36
All - Settled	9.72	49 99	9.58	49.42	9.72	48 86	9.65	48.04
All - Fully Litigated	9.63	51 37	9.61	49.64	9.75	49.66	9.70	50.50
Canada								
Natural Gas	9.17	41.17	9.32	41.18	9.30	40 08	9.30	40.08
Electric	8.64	38.60	8.78	39.00	8.75	38 94	8.71	39.04
All	8 95	40 00	9.09	40.33	9.07	39.61	9.05	39.65
All (excluding Alberta and Crown Corp.)	9 20	43 20	9.32	41.83	9.29	40 34	9.35	40.40

Sources:
For U.S. data: Averages calculated using SNL Financial data accessed as of January 15, 2020. Data through end of year 2019.
For Canadian data: Comission filings, company financial documents, and Concentric Energy Advisors, Authorized Return on Equity for Candian and U S. Gas and Electric Utilities, 2017.

Note: The OEB recently issued its ROE for 2020 at 8.52 percent. Importantly, the award is on 40 percent equity (45% for Ontario Power Generation) and determined using a formulaic approach.[53]

Q27. Is it your contention that the Commission can or should achieve a fair return for the Alberta utilities by "simply matching the ROE and deemed equity ratios awarded by other regulators"?[54]

A27. No. I agree with the Commission that a more careful and detailed analysis is warranted, focused on the returns available in capital markets for alternative investments that are risk comparable to investment in the Alberta utilities (*i.e.*, on their cost of equity).

As discussed above and laid out below, my own recommendation for a fair return is based on analysis employing established finance models utilizing capital market data for proxy groups comprising publicly-traded comparator companies with business risk profiles representative of the regulated local distribution and transmission utility sector. My conclusions are informed by Dr. Carpenter's detailed analysis comparing the Alberta utilities' business risk to that of the regulated subsidiaries in my most pure-play distribution

[53] Ontario Energy Board, "Cost of Capital Parameters Update," October 31, 2019 and OEB Staff Report EB-2009-0084, "Review of the Cost of Capital for Ontario's Regulated Utilities," January 14, 2016.

[54] 2018 GCOC Decision, ¶39.

proxy groups, as well as by Mr. Buttke's comprehensive evaluation of the relevant capital market conditions. Thus, my evidence does not advocate that the Commission engage in "matching" of returns or equity ratios determined by other regulators.

However, I submit that investors can and do observe and compare the allowed returns and capital structures available across jurisdictions. As such, the decisions of investors—including institutional investors and utility holding companies deciding how to invest or allocate capital among regulated operating companies operating in various jurisdictions—are influenced by such comparisons.

In this context, the *lower* returns available for *more leveraged* equity investments in the Alberta Utilities could only be comparable (on a risk-adjusted basis) to those available from equity investment in other regulated distribution utilities if the Alberta Utilities faced substantially lower business risk. While a comprehensive business risk comparison of every North American regulated utility implicated in the summary statistics above (Figure 3) would be prohibitively labor-intensive, Dr. Carpenter's rigorous analysis suggests the *opposite* conclusion (*i.e.*, directionally *higher* business risk in Alberta), at least with respect to regulated gas distribution companies in the U.S.

In my opinion, the fact that the Alberta Utilities are awarded lower equity returns while being made to invest at higher degrees of debt leverage relative to other North American regulated utility operating companies is one indicator that the returns do not meet the comparability standard.

Q28. How does the degree of financial leverage imposed by the AUC's 37% benchmark deemed equity thickness compare to that inherent in the market data observed for your proxy companies?

A28. Compared to the 37% equity / 63% debt benchmark regulatory capital structure for the Alberta Utilities, investments in the publicly traded equity (stock) of the comparator companies that make up my proxy groups exhibit much lower degrees of financial

leverage.[55] Of note, the Gas LDC and Water samples that provide the closest proxies for pure play distribution utility operations are financed only 23 to 32 percent with debt, while even the more diversified Canadian sample has only 45 to 49 percent debt financing (with some preferred equity).

Figure 4
Average Capital Structures of Proxy Group Companies

	DCF Capital Structure			3-Year Average Capital Structure		
Company	Common Equity - Value Ratio	Preferred Equity - Value Ratio	Debt - Value Ratio	Common Equity - Value Ratio	Preferred Equity - Value Ratio	Debt - Value Ratio
	[1]	[2]	[3]	[4]	[5]	[6]
Electric Sample Average	63%	0%	37%	61%	0%	39%
Gas Sample Average	68%	0%	32%	69%	0%	31%
Water Sample Average	77%	0%	23%	75%	0%	25%
Pipeline Sample Average	53%	3%	44%	58%	2%	40%
Canadian Sample Average	51%	4%	45%	47%	5%	49%

Sources and Notes:
[1], [4]:Workpaper #1 to Schedule No. BV-4.
[2], [5]:Workpaper #2 to Schedule No. BV-4.
[3], [6]:Workpaper #3 to Schedule No. BV-4.
Values in this table may not add up exactly to 100% due to rounding.

Thus, cost of equity estimates based on the market-derived model inputs (*i.e.*, stock prices, dividends, betas) for these proxy companies reflect substantially lower financial risk compared to a levered equity investment in the Alberta Utilities at a 63% debt ratio. Indeed, as shown in Figure 4, an equity investment in the Alberta Utilities' rate base occurs subject to a debt ratio approximately 15 to 40 percentage points higher than do equity investments in the equity of its publicly-traded comparators. The higher debt burden on the Alberta Utilities manifests as a more leveraged equity investment, imposing higher financial risk on investors.

Consequently, absent an adjustment to account for the difference in financial leverage, the raw model results are *not* comparable for purposes of determining a fair return, even to the extent the underlying business risk is comparable. This is clearly demonstrated in Figure

[55] This is true based on both the most recent financial reporting and financial data (as relevant to the market price and dividend data used in DCF model calculations) and on average over the three-year historical period coincident with my beta estimation window.

20, which shows that the variation in betas obtained for different capital structures is influenced by those variations in leverage, such that the variability in the component of systematic risk driven by business risk factors is different once the standard unlevering techniques are applied.

Q29. Are there standard finance techniques to account for differences in financial leverage when using comparator companies as proxies to estimate a risk-comparable rate of return for a target company?

A29. Yes. The techniques for adjusting cost of equity estimates measured based on one capital structure for application at a different capital structure applicable to the target company are taught in Corporate Finance textbooks as fundamental tools for valuation and capital budgeting analysis.[56] The approach is as follows:

- First, estimate the cost of equity (or equity beta) for the proxy company at its observed capital structure.
- Second, *unlever* this cost of equity (or equity beta) by calculating the overall cost of capital (or "asset beta") that would apply if the company's assets were financed entirely with equity.[57]
- Finally, *relever* the all-equity cost of capital based on the leverage ratio associated with the target capital structure.

If the target capital structure has less debt than the capital structures of the proxy companies whose market data is used to estimate the cost of equity, then this process will adjust the measured cost of equity downward to reflect the reduced risk from lower financial

[56] *See*, for example, Brealey, Myers, and Allen, *Principles of Corporate Finance*, 10th Ed. (2011), pp. 482-86 and 491-92.

[57] As discussed below, finance theory (based on the original Nobel Prize winning work of Modigliani and Miller) posits that the *unlevered cost of capital* is constant across a broad middle range of capital structures, representing the required return for an investment in the firm's assets as a whole, independent of the particular financing decisions employed. The precise formulation of the equation representing the unlevered cost of capital depends on specific assumptions made regarding the value of tax shields from tax-deductible corporate debt, the role of personal income tax, and the cost of financial distress. Whichever formula is selected should be used both to *unlever* the observed sample company cost of equity and to *relever* at the target capital structure. Sensitivities can be performed using the various versions of the formula.

leverage. Conversely, if—as is the case in this proceeding—the target (deemed regulatory) capital structure imposes *greater* financial leverage than is observed in the capital structures of the proxy companies, the raw estimates of the cost of equity must be adjusted *upward* by the unlevering/relevering technique to reflect the commensurate higher financial risk.[58]

Q30. Are the allowed ROE and capital structures determined by the AUC in the 2018 GCOC Decision established in a manner that accounts for the much greater debt leverage imposed on the Alberta Utilities compared to the proxy group companies?

A30. No. The Commission has stated that it would not employ any of the standard finance techniques used to adjust for differences in financial leverage, "except to illustrate that a relationship [between capital structure and ROE] exists."[59] Consequently, I interpret the Commission's selection of a beta input to the CAPM and consideration of evidence from the various witnesses' model results in the 2018 GCOC Decision as relying on beta and cost of equity estimates derived directly from proxy company data and not unlevered / relevered to account for differences in financial leverage.

It is unclear to me whether the Commission's reference to "illustration" of the relationship between capital structure and ROE constitutes an acknowledgement that the presence of differentially higher financial leverage in the capital structure necessitates a commensurately higher equity return to maintain comparability on a risk-adjusted basis. However, the Commission's decision not to *apply* this fundamental finance principle to inform its determinations results in allowed ROE and deemed capital structures that fail to satisfy the comparability component of the fair return standard.

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[58] I note that, as discussed below, the unlevering / relevering of beta is a central consideration relevant to the Commission's stated desire for a principled approach to "assessing the range" of beta estimates provided by the experts in this proceeding.

[59] 2018 GCOC Decision, ¶475-476 (citing 2016 GCOC Decision) and 493.

Q31. How should the Commission modify its approach to determining the allowed ROE and capital structure to properly account for the impact of financial leverage on risk in context of the comparability component of the fair return standard?

A31. In my opinion, the Commission should expand its approach to determining deemed equity ratios beyond a narrow focus on meeting credit metric targets—which address only the financial integrity and *debt* capital attraction components of the fair return standard—to considering the requirement that the allowed equity returns must be comparable to those available in capital markets for alternative investments of equivalent risk—including financial risk. The Commission can accomplish this by considering the results of the traditional models after they have been properly adjusted using the standard finance techniques to account for differences in financial leverage.

B. FINANCIAL LEVERAGE AND THE COMPARABILITY OF EQUITY RETURNS

Q32. Why is the AUC's focus on credit quality to determine capital structure insufficient to promote comparability of equity returns?

A32. It is because capital structure affects the risk of equity holders in multiple ways. The Commission acknowledged *one* aspect of the relationship in the 2016 GCOC Decision:

> [A]s the proportion of debt in the capital structure rises, everything else equal, both debt and equity investors will perceive an increase in risk. This is because **if debt levels increase**, debt holders will be more concerned that the debt obligations of the firm may not be met, and **equity investors will be more concerned that there will be insufficient earnings from operations to cover both the debt obligations of the firm and to provide them with their expected return**.[60]

This is effectively saying that both debt and equity investors are concerned with the risk of default, a circumstance in which debt holders may not receive their full interest and principal payments and equity holders may be wiped out. Obviously, when the level of debt increases, the risk of default and hence the inability to meet debt obligations is increased.

[60] 2016 GCOC Decision, ¶342 (emphasis added).

But this tells only part of the story. It is also true that as the level of debt increases, *the risk to equity holders also increases, and importantly, this effect is felt long before there is any risk of default*. The reason is the tendency of financial leverage to amplify variability (and thus risk) of equity returns. Simply put, as the level of debt increases, the variability in equity returns increases as illustrated in the example below.

Consequently, a given return on equity when coupled with one capital structure is not, all else equal, comparable to the same ROE applied to another capital structure with a higher or lower proportion of debt. Importantly, this non-comparability can persist even if combining the ROE with *either* capital structure would meet a given threshold in terms of credit metrics.

Q33. Can you provide an example to illustrate how increased financial leverage increases the variability (and thus the risk) of equity returns, even in circumstances when the greater leverage does not substantially worsen credit conditions?

A33. Yes. Consider two hypothetical cost of service regulated utility companies: utilities A and B. Assume both utilities have the same business risk, and that they are awarded the same 10 percent allowed return on equity, but different deemed equity thicknesses—35 percent and 45 percent, respectively. Further suppose that the deemed equity thicknesses were determined consistent with a policy of maintaining FFO-to-debt credit metrics above an assumed target threshold of 9.0%, and assume for the sake of illustration that this is sufficient to provide both utilities access to credit on similar terms.[61] (In a realistic setting, the greater debt leverage for Utility A would likely also manifest in at least *some* increased borrowing cost or other deterioration in terms of access to debt capital; nevertheless, this example conservatively assumes such credit consequences away in order to emphasize that the increased financial risk consequences of greater leverage to *equity investors* occurs

[61] While utility B will have a higher FFO-to-debt as a result of the higher equity thickness, this analysis assumes for the sake of illustration that the forecast metrics of both utilities earn the same credit rating and thus both utilities are able to issue debt at the same cost. This is consistent with the AUC's "threshold" approach to classifying pro-forma credit metrics with respect to the determination of "stand-alone" credit ratings.

even in the absence of materially adverse credit consequences.) Figure 5 summarizes the assumed inputs for this example, along with the calculated FFO-to-debt metric and overall allowed return on rate base for each hypothetical utility.

Figure 5
Capital Recovery Parameters for Hypothetical Utilities A and B

		Utility A	Utility B
Equity Ratio	[1]	35.0%	45.0%
Debt Ratio	[2]	65.0%	55.0%
Return on Equity	[3]	10.0%	10.0%
Return on Debt	[4]	5.0%	5.0%
Tax Rate	[5]	23.5%	23.5%
Depreciation Rate	[6]	2.5%	2.5%
Return on Rate Base	[7]	6.75%	7.25%
Assumed Rate Base	[8]	1,000	1,000
FFO	[9]	$60	$70
FFO-to-Debt	[10]	9.2%	12.7%

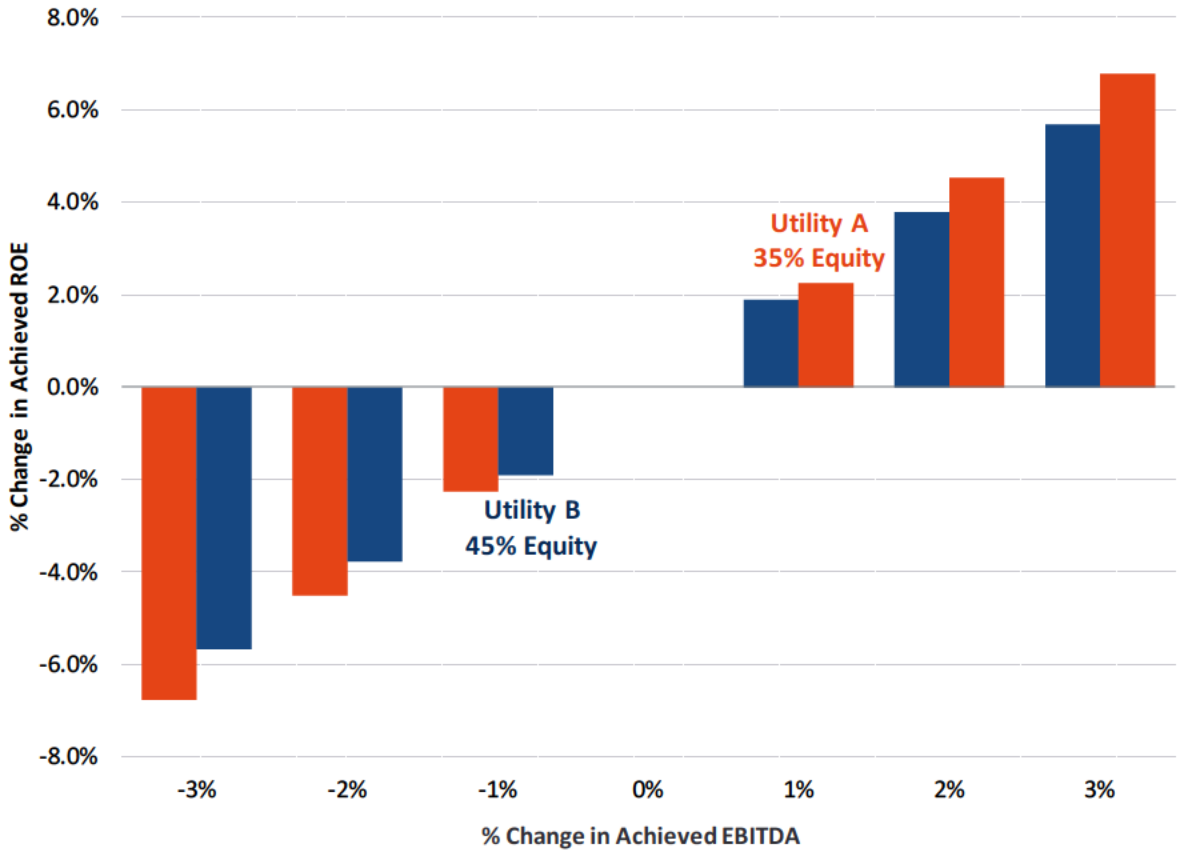
Notes:
[1] through [6], [8] are assumptions.
[7] =[1]*[3] + [2]*[4]
[9] = ([1]*[3] + [6])*[8]
[10] = [9]/([8]*[2])

In the illustrative example set out above, the two utilities have different overall allowed returns on rate base and their rates will contain provision for recovery of different levels of EBITDA,[62] but they all expect to achieve the same return on equity—10 percent—if actual revenues turn out to match the revenue requirement. Importantly however, if capital recovery cash flows *vary* from the expected levels on which rates are based, the variation impacts the equity holders of the two utilities differently. Specifically, shareholders in utility A face greater variability in realized return on equity than do utility B's shareholders. Figure 6 below illustrates this effect, showing the percent change in realized return on

[62] I focus on EBITDA in this example because in this simplified setup it represents the level of revenue allowed—or actually earned—net of operating expenses, which do not factor into capital recovery calculations or credit metrics.

equity (relative to the allowed ROE of 10 percent) for a given change in the expected level of EBITDA.

Figure 6
Percent Change in Realized Return on Equity
For a Given % Change in Realized Cash Flow



As the example illustrates, capital structure affects the risk of an equity investment in a manner distinct from its influence on credit metrics and default risk. It is clear from Figure 6 the expected equity return of 10 percent does not constitute a "comparable return" for both utilities, because there is *more equity risk* inherent in the lower equity ratio for utility A. The more leveraged returns are simply more sensitive to variability due to business risk factors (which are common to both utilities in the example), even though both meet similar credit standards.

Consequently, meeting the requirements for financial integrity is not sufficient to ensure that returns are comparable on a risk-adjusted basis. To address the comparability component of the fair return standard when setting the allowed equity ratio, it is necessary to additionally consider how the financial risk inherent in a given capital structure—when combined with an allowed return on equity—compares to the returns equity investors can earn on alternative investments of comparable business and financial risk.[63]

Q34. Does established finance theory provide a framework to account for differences in financial leverage when estimating the cost of equity?

A34. Yes. The principle that financial leverage amplifies the variability of equity returns and thereby increases the financial risk to equity investors is a firmly established core principle of corporate finance. It is directly connected to the Modigliani Miller proposition that, except as influenced by the tax-deductibility of debt and the cost of financial distress, the value of a firm's assets is independent of its choice of financing. This intuitive framework means that some measure of the *overall* cost of capital for firms with comparable systematic business should be the same regardless of capital structure,[64] even if the costs of the *equity* and/or *debt components* of financing vary in proportion to the degree of financial leverage.

In its simplest form, this relationship is illustrated in Figure 7, reproduced from the seminal textbook *Principles of Corporate Finance* by Brealey, Myers, and Allen. It illustrates that as the capital structure shifts to use a greater proportion of lower cost debt financing, the investor required return on equity (and debt, especially at higher leverage ratios) increases to compensate for the greater financial risk, such that the overall required return on assets remains unchanged.

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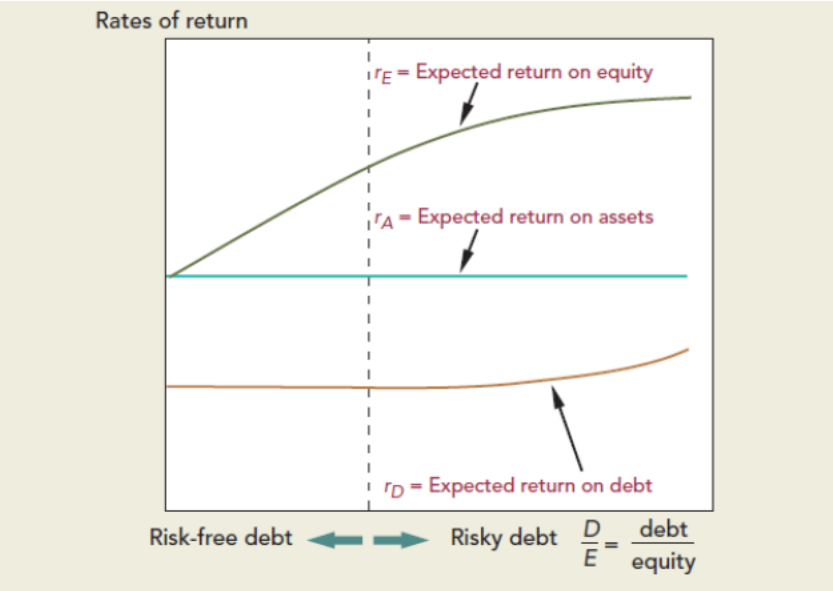
63 In addition, satisfaction of the capital attraction component of the fair return standard may require an evaluation of whether investors perceive a heightened risk of non-recovery of capital or if additional asymmetric risk factors affect the utility's ability to attract equity capital. More fundamentally, if equity investors cannot receive a comparable return for investing in a given firm (*e.g.*, Utility A), that firm will be at a disadvantage in attracting equity capital, and may face higher costs to raise capital.

64 Except in cases of extremely high or low leverage, where the tax and financial distress effects may dominate.

Figure 7
Illustration of Modigliani Miller Principle[65]



Q35. Can you provide a numerical example to illustrate this principle?

A35. Yes. Consider the simple hypothetical 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 8
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%

[65] Brealey, Myers, and Allen, *Principles of Corporate Finance*, 10th Ed. (2011), p 429, Figure 17.2.

The table above illustrates how financial risk affects returns and 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 8 is exemplary of the rationale for the adjustments I perform using standard unlevering / relevering formulas to account for differences in financial risk when conducting estimates of the cost of equity applicable to the Utilities.

Q36. How do you respond to the Commission's stated concerns about "untested assumptions" and a "lack of sensitivity analysis" with respect to the standard unlevering / relevering techniques?[66]

A36. I respectfully disagree with the Commission's concerns. First, the unlevering and relevering technique I rely upon is standard in all MBA finance textbooks I know of.[67] While there can be a discussion of which exact parameters to use in the unlevering / relevering formula, there is no dispute about the necessity to account for leverage. Second, to assess the sensitivity of the results to a range of parameters, I calculate the cost of equity using two different versions of the unlevering and relevering method. Lastly, I note that the Technical Appendix includes variations of the equation used to unlever and relever the cost of equity (or the equity beta), with the precise formulation depending on specific assumptions regarding whether the level or proportion of debt is held fixed and what is the value of tax shields arising from the tax-deductibility of corporate debt.[68] However, these

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66 2018 GCOC Decision, ¶475 (citing 2016 GCOC Decision).

67 See, for example, Brealey, Myers and Allen (2014), pp. 482-486 and 492-493, Berk and DeMarzo (2014) pp. 415-417, Ross, Westerfield and Jaffe (2013), pp. 571-573.

68 *See* Taggart, Robert A., "Consistent Valuation and Cost of Capital Expressions with Corporate and Personal Taxes," Financial Management, 1991; 20(3) for a detailed discussion of these assumptions and formulations. For a textbook treatment. Brealey, Myers, and Allen, *Principles of Corporate Finance*, 10th Ed. (2011), pp. 485-86, footnotes 14-17.

assumptions are well defined and extensively explored in the literature.[69] Importantly, my analysis considers sensitivities based on three distinct representative formulations of the unlevered cost of capital equation.

Specifically, I unlever and relever using (i) the overall after-tax cost of capital, (ii) a version of the Hamada adjustment incorporating an explicit tax-deductibility factor, and (iii) a version of the Hamada adjustment without an explicit factor for tax-deductible corporate debt.[70] I calculate the cost of equity using all three of these formulations, and present the ranges of results as sensitivities reflecting the consequences of the subtly varying assumptions.

C. Recommended Approach to Determining Capital Structure and ROE for a Fair Return

Q37. What is your recommended approach to determining a deemed capital structure and allowed ROE consistent with the comparability fair return standard?

A37. I account for comparability of business risk by selecting samples of companies with identifiable business risk characteristics and, as informed by Dr. Carpenter's business risk analysis, placing my ROE recommendation within the ranges of cost of equity estimates for those samples.

To ensure comparability of financial risk, I employ standard techniques for unlevering and relevering betas and returns to account for differences in capital structure among the sample companies and compared to the deemed capital structure for the Utilities.

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[69] For a textbook treatment, *see* Brealey, Myers, and Allen, *Principles of Corporate Finance*, 10th Ed. (2011), pp. 485-86, footnotes 14-17. As cited in my Technical Appendix, standard academic papers on the topic include Fernandez, P., "Levered and Unlevered Beta," IESE Business School Working Paper WP-488, University of Navarra, Jan 2003 (rev. May 2006); Hamada, R.S., "The Effect of the Firm's Capital Structure on the Systematic Risk of Common Stock," *Journal of Finance*, 27, May 1972, pp. 435-452; Miles, J.A. and J.R. Ezzell, "Reformulating Tax Shield Valuation: A Note," *Journal of Finance*, XL5, Dec 1985, pp. 1485-1492; Harris, R.S. and J.J. Pringle, "Risk-Adjusted Discount Rates Extensions from the Average-Risk Case," *Journal of Financial Research*, Fall 1985, pp. 237-244; Fernandez, P., "The Value of Tax Shields Depends Only on the Net Increases of Debt," IESE Business School Working Paper WP-613, University of Navarra, 2006.

[70] See my Technical Appendix for detailed derivations of the specific formulas applied.

I maintain my recommendation from the 2018 and 2016 GCOC that the benchmark equity thickness be set at 40%. I believe doing so will ensure that the Utilities can maintain credit quality above the minimum thresholds for an A-range rating, and thus be robust to potential financial pressure in event of adverse capital market conditions.

Further, provided the recommended equity percentage is applied along with an appropriately risk-comparable allowed ROE (in accordance with my cost of capital analysis), this 40% equity benchmark (along with the ROE) will appropriately reflect the business risk characteristics of the Utilities' as analyzed by Dr. Carpenter. In my opinion, my recommended benchmark capital structure has the further benefit of being in line with deemed equity ratios in other Canadian jurisdictions, and closer to (though still at the low end of) the levels of equity typically included in the regulatory capital structures of comparable U.S. regulated utilities.

Even my recommended 40% equity / 60% debt, the regulatory capital structure has much greater financial leverage compared to levered equity investments in the stock of the Gas LDC and Water utility sample companies that Dr. Carpenter identifies as being most risk-comparable to the Utilities. (See Figure 4.) However, by applying standard finance techniques to account for these differences in financial leverage, I base my ROE recommendations on cost of equity estimates that are calculated to be risk-comparable at a target capital structure (40% equity thickness) that is typical of Canadian utility regulatory regimes.

Because my cost of equity estimates (and therefore my ROE recommendation) depend on the degree of financial leverage in the capital structure to which they will be applied, I emphasize that if the AUC sets the benchmark deemed equity ratio below 40%, my ROE recommendation must increase to account for the increased financial risk.

As I discussed above, the Utilities' current deemed equity capital structure and the allowed ROE do not provide a levered equity return consistent with that investors could expect to earn in capital markets on alternative equity investments of equivalent risk. Consequently, in reporting my results and recommendations (below in Sections V and VI), I indicate what

they are if the Commission adopts my 40% equity recommendation or if the Commission maintains its current benchmark of 37% equity. Regardless, in my opinion, the current ROE of 8.5 percent is not comparable to that available on other investments of similar risk.

In either circumstance, I recommend that the ATCO Utilities and FA receive the benchmark equity thickness consistent with the allowed ROE, while I recommend AUI's equity thickness be set 400 basis points above the benchmark.

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

Q38. What do you cover in this section?

A38. 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) interest rate developments and the impact on cost of equity, (ii) the development in utility credit spreads and research attempting to explain such developments, (iii) investor perceptions of the market risk premium, and (iv) the interaction of Canadian, U.S. and world markets, indicating that investors consider the risk-return tradeoff across jurisdictions.

Preliminarily, I agree with the Utilities' witness Mr. Buttke[71] that Canadian economic growth has moderated since the 2018 GCOC as indicated by, for example, a GDP growth of 1.6% in Q2, 2019[72] and the Bank of Canada refraining from raising its policy rate since October 2018. The Bank of Canada points out that "ongoing trade conflicts and related uncertainty are still weighing on global economic activity, and remain the biggest source of risk to the outlook."[73] Economic and market uncertainty remain elevated and could

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71 Written Evidence of Robert A. Buttke for the Utilities (Buttke Evidence).

72 Consensus Forecasts, October 2019, pg. 16.

73 Bank of Canada, "Bank of Canada maintains overnight rate target at 1 ¾ per cent," Press Release December 4, 2019.

impact the cost of funding as well as funding conditions over the 2021 GCOC period.[74] I do note that uncertainty has eased as of late with the scheduled signing of Phase 1 of the China-U.S. trade agreement; passing of the Brexit Withdrawal Agreement Bill in UK Parliament; and the near completion of the United States Mexico Canada Trade Agreement. However, uncertainty still remains elevated, as evidenced by the recent U.S.-Iran conflict. When risk and uncertainty are elevated, investors will, all else equal, require a higher premium to invest in equity than they did historically. Similarly, the elevated spread between either (i) utility and government bond yields or between (ii) the yield on preferred issuances and government bonds indicate that investors require a higher premium for investing in securities that are not risk-free than they did when spreads were at the level prior to the financial crisis.[75] At the same time, forecasting agencies such as Consensus Forecast and Blue Chip Economic Indicators project that interest rates will rise over the next few years. Consequently, all indications are that the cost of debt and equity will increase going forward, so that forecasted rates are more indicative of the cost of equity going forward than the current rates.

A. DEVELOPMENTS IN INTEREST RATES

Q39. How do interest rates affect the cost of equity estimation?

A39. There are several ways in which the current interest rates environment affects cost of equity estimation. Most directly, the Capital Asset Pricing Model (CAPM) takes as one of its inputs a measure of the risk-free rate (see Figure 1). The estimated cost of equity using the CAPM decreases (increases) by one percentage point when the risk free rate input decreases (increases) by one percentage point. Therefore, to the extent that the prevailing government yield is depressed due to monetary policy or other factors, using this yield as

[74] Examples of such uncertainties are the U.S. trade policy, including new trade war fronts with the European Union. In Europe, Brexit is underway but the terms are not yet known. Slowing economic growth, particularly in countries such as China and the Euro zone. Political unrest in places such as Hong Kong, the Middle East, and South America along with the rise of protectionist and nationalist sentiments.

[75] The elevated spread between utility bond yield and government bond yields is shown in Figure A-1 in the technical appendix (Appendix B) to my written evidence. The Buttke Evidence (Q/A 37) discusses the elevated spread between preferred yields and government bond yields.

the risk-free rate will depress the CAPM estimate below what is representative of the forward-looking cost of equity during the relevant period. In its 2018 GCOC Decision, the Commission continued to acknowledge that, "in the current low interest rate environment, the forward-looking MERP should be greater than the Canadian historical average."[76] Put another way, if the current government bond rate is a downwardly biased estimate of what risk-free rates will be when rates are in effect due to accommodative monetary policy, market risk, or changes in economic expansion rates, then the CAPM estimate will also be downwardly biased. To avoid such bias, in light of the present capital market conditions, it is necessary to use a forecasted risk-free rate and consider whether the rate needs to be normalized (or if the premium investors require needs to be adjusted) to ensure the resulting CAPM estimate reflects a non-biased estimate of the cost of equity for 2021-22. Furthermore, as interest rates are expected to increase so too is the cost of equity expected to rise.[77] This suggests that the fair allowed return on equity for the Utilities should reflect the higher interest rate environment forecasted in 2021 and 2022 (the 2021 GCOC period) as compared to today's prevailing rates.

Q40. What are the relevant developments regarding interest rates?

A40. The Bank of Canada raised the target overnight interest rate three times since January 2018, with the last time being on October 24, 2018 when the overnight rate was raised 25 bps to 1.75%. This is the highest level of the target overnight rate since October 2008. However, rates remain historically low.[78] In fact, the current policy rate of 1.75% is below Bank of Canada's neutral rate of 2.25% to 3.25%.[79]

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[76] 2018 GCOC Decision, ¶323.

[77] Due to the tendency of risk premiums and risk-free returns to move inversely to one another, the change in the cost of equity should not be expected to be one-for-one with the change in bond yields. In other words, a one percentage point increase (decrease) in the risk-free rate will likely lead to an increase (decrease) of less than one percentage point in the cost of equity capital.

[78] Buttke Evidence, Q/A 41.

[79] Bank of Canada, "The Neutral Rate in Canada: 2019 Update," Pg. 2, accessed December 4, 2019, https://www.bankofcanada.ca/wp-content/uploads/2019/04/san2019-11.pdf.

At the time of the October 2018 increase, the Bank of Canada stated that "[t]he global economic outlook remains solid," but cautioned that "trade conflict, particularly between the United States and China, is weighing on global growth and commodity prices."[80] Since the October 2018 meeting, the Bank of Canada has maintained its policy as it continues to monitor increasing economic uncertainty. In its most recent rate decision, the Bank of Canada notes "nascent evidence that the global economy is stabilizing" but was still mindful of ongoing impact of trade conflicts and other global uncertainties on the global economy.[81] Some of these uncertainties were resolved at the end of 2019 with the scheduled signing of the China-U.S. Trade deal, the passing of the Brexit Withdrawal Agreement Bill, and the U.S. Mexico Canada (USMCA) Trade Agreement now awaiting signature from President Trump.

In the past year, Central Banks around the globe have also shifted their behavior from raising policy rates to maintaining or easing rates. Mr. Buttke points out in his evidence that central banks from 35 countries (70% of global GDP) have eased policy rates since April 2019.[82]

Q41. What important capital market developments have occurred since the 2018 GCOC?

A41. Based on the Bank of Canada's recent actions and its outlook reflecting moderating growth, forecasted economic growth rates have decreased since the last GCOC proceeding – Consensus Forecasts indicates Canadian real GDP growth rates in the range of 1.4% to 1.9% for Q3, 2019 through Q2, 2021 with an estimate of 1.6% for Q2, 2019.[83] In contrast, the forecasted real growth rates as of October 2017 (when the 2018 GCOC evidence was developed) ranged from a low of 1.9% to a high of 3.3% for Q3, 2017 through Q2, 2019.[84]

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80 Bank of Canada, "Bank of Canada increases overnight rate target to 1 ¾ per cent," Press Release, October 24, 2018.

81 Bank of Canada, "Bank of Canada maintains overnight rate target at 1 ¾ per cent," Press Release, December 4, 2019.

82 Buttke Evidence, Q/A 6.

83 Consensus Economic Forecasts, October 2019, p. 16.

84 Consensus Economic Forecasts, October 2017, p. 16.

The actual GDP growth over the period was in line with Consensus Forecasts estimates.[85] The Bank of Canada notes that economic expansion should gradually increase speed starting in 2020 and 2021.[86] Real GDP growth rates in Canada and the United States are expected to be 1.8% to 1.9% during the 2021 to 2022 GCOC period.[87,88]

The suppression of government bond yields due to accommodative monetary policy or growing economic uncertainty in Canada and globally means that direct reliance on current yields is likely to lead to an underestimation of the cost of equity. Consensus Forecasts expects the 10-year Canadian government bond yield to nearly double by the end of the 2021 GCOC period (from 1.4% in 2019 to 2.7% to 2022).[89] Similarly, Blue Chip Economic Indicators (BCEI) forecasts the 10-year US government bond yield to increase from 2.1% to 2.6% over the same time period.[90] Mr. Buttke notes that the real yields on U.S. 10-year bonds are two standard deviations below the average of the inflation-targeting monetary policy era. Even if the economy growth rate slows, yields are expected to rise as trade uncertainties further dissipate.[91]

As interest rates have declined, the spread between A rated utility bonds and government bonds has increased in both Canada and the U.S. and remains elevated compared to the inflation targeting era.[92] An elevated spread suggests that either government bond yields remain artificially low, the premium investors require to hold risky securities has increased relative to its long-term average level, or some combination of the two.

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85 Buttke Evidence, Q/A 19.

86 Bank of Canada, "Monetary Policy Report, October 2019," Pg. 7, Accessed December 4, 2019, https://www.bankofcanada.ca/wp-content/uploads/2019/10/mpr-2019-10-30.pdf.

87 Consensus Economic Forecasts, October 2019, p. 28.

88 Blue Chip Economic Indicators, October 2019, p. 14.

89 Consensus Economic Forecasts, October 2019, p. 28.

90 Blue Chip Economic Indicators, October 2019, pp. 2, 14.

91 Buttke Evidence, Q/A 41.

92 See Figure 9 below.

Q42. Can you provide an illustration of the recent trends in government bond yields and utility bond yields?

A42. Yes. Figure 9 below shows the development of Canadian and U.S. long-term government bond yields as well as A rated utility bonds in those countries. Both utility and government bond yields have decreased since the close of the record in the 2018 GCOC proceeding. However, the spread between utility and long-term government bond yields is nearly unchanged. The spread continues to be larger relative to the level prior to the financial crisis.

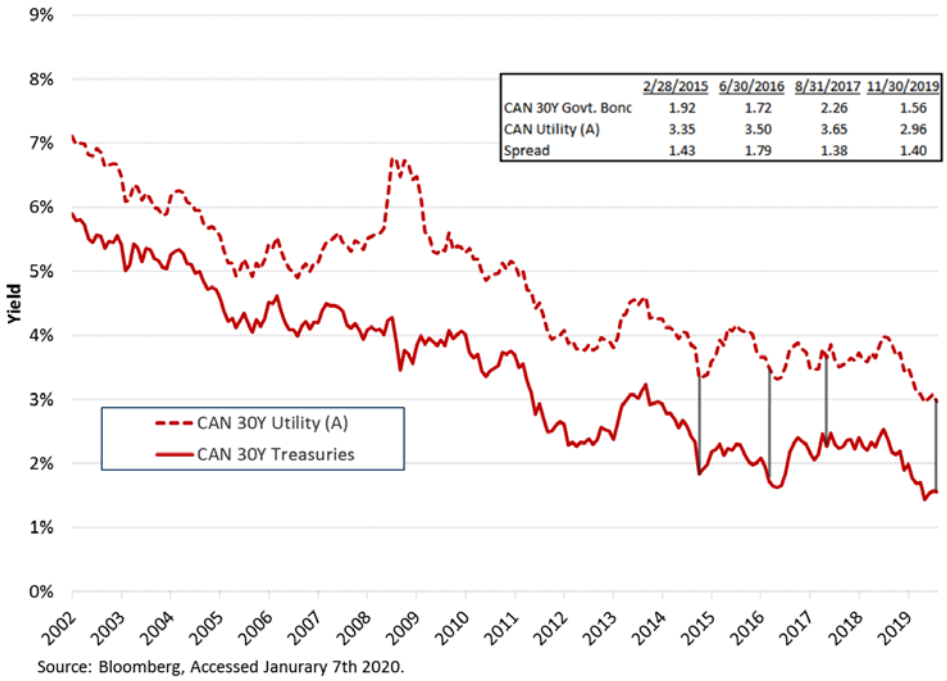
It is important to note that both utility bond yields and government bond yields are expected to increase over the next few years. As noted above, Consensus Forecasts expects the 10-year Canadian government bond yield to nearly double and be 2.7% in 2022.[93] Furthermore, the written evidence of Mr. Buttke notes that if existing risks materialize into deteriorating economic conditions, spreads between corporate bonds and government bond yields likely would increase.[94] This is significant because the ROE that is being determined in this case is expected to be in effect through at least 2022. Thus, the fact that yields are forecasted to increase for the next several years means that utilizing contemporaneous yields and even the 12-month ahead forecast of 1.7%[95] likely will under estimate the yields experienced over the period. Of note, the fact that the forecasted yields are well below their historical levels and are expected to increase mean that a formulaic approach that relies on current forecasted yields likely would be subject to substantial variability and uncertainty. For that and other reasons, I do not recommend a formula at this point in time.

[93] Consensus Economic Forecasts, October 2019, p. 28.

[94] Buttke Evidence, Q/A 10.

[95] Consensus Economic Forecasts, October 2019, p. 28.

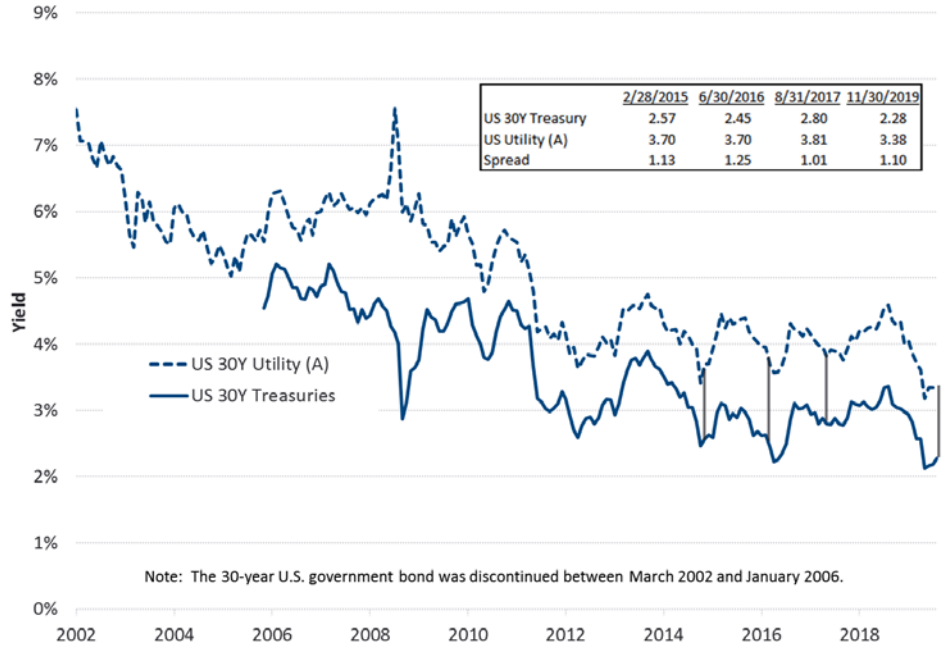
Figure 9
Canadian and U.S. Government Bond Yields 2002–2019
Panel A—Canadian Bonds



	2/28/2015	6/30/2016	8/31/2017	11/30/2019
CAN 30Y Govt. Bonc	1.92	1.72	2.26	1.56
CAN Utility (A)	3.35	3.50	3.65	2.96
Spread	1.43	1.79	1.38	1.40

Source: Bloomberg, Accessed Janurary 7th 2020.

Panel B—U.S. Bonds



	2/28/2015	6/30/2016	8/31/2017	11/30/2019
US 30Y Treasury	2.57	2.45	2.80	2.28
US Utility (A)	3.70	3.70	3.81	3.38
Spread	1.13	1.25	1.01	1.10

Note: The 30-year U.S. government bond was discontinued between March 2002 and January 2006.

Source: Bloomberg, Accessed Janurary 7th 2020.

B. YIELD SPREADS AND THE COST OF EQUITY

Q43. Why are bond yield spreads relevant to your cost of equity analysis?

A43. Bond yield spreads (also called credit spreads) reflect the premium that investors demand to hold debt securities (specifically corporate bonds) that are not risk free. Analogously, the Market Equity Risk Premium (MERP)—which is a key input to the CAPM cost of equity estimation—represents the risk premium that investors require to hold equities rather than risk-free government bonds.

If bond yield spreads are influenced to some extent by the same underlying market factors that drive the systematic risk premium for equities, shifts in directly observable credit spreads can assist with inference about changes in the MERP, which itself must be estimated.[96] More specifically, if both credit spreads and equity premiums are determined in part by the general premium required by investors for bearing systematic risk, then an increase in credit spreads may indicate an increase in the forward-looking MERP.

Q44. What is the academic evidence with respect to which factors explain changes in credit spreads?

A44. As I testified in my 2018 GCOC evidence,[97] the academic literature investigates multiple factors that may affect credit spreads, including default risk, liquidity, and tax effects, as well as the market risk premium. As pertains to the Commission's query on "what factor or factors explain" changes in credit spreads, academic finance has not derived a formula or set of weightings to precisely quantify how the various factors identified contribute to the determination of credit spreads.

However, as relevant to my cost of capital analysis, the literature does support the basic concept that changes in credit spreads serve as a meaningful directional indicator of relative

[96] This the same issue as in cost of capital estimation more generally: the cost of debt can be often be directly observed in the form of market bond yields, whereas the cost of equity must be estimated based on financial models.

[97] *See* 22570_X0193.01 (2018 GCOC Villadsen Evidence), p. 104-106.

changes in the prevailing market equity risk premium. Thus, as described below, I draw evidence from the sustained elevation in credit spreads in the time since the onset of the great financial crisis compared to pre-crisis levels. This shift corroborates other evidence (see Section IV.C below) that the forward-looking MERP is higher than its historical average level and suggests that it is appropriate to either "normalize" the risk free rate or explicitly rely on a higher forward-looking estimate of the MERP in order to accurately reflect investors' current pricing of risk.

I note that in the 2016 and 2018 GCOC Decisions, the Commission acknowledged that "in the current low interest rate environment, the forward-looking MERP should be greater than the historical Canadian average" and implemented this finding in applying an MERP point estimate of 7.0 percent.[98]

Q45. How does the current spread between utility and government bond yields compare to the historical spread?

A45. The spread between the yields on 30 year A rated utility bonds and 30 year government bonds at the end of November 2019 was 140 basis points, whereas the average spread before the financial crisis (measured from 2002 through 2007) was 99 basis points,[99] meaning, the spread is elevated by 41 basis points relative to the pre-crisis years.[100] The spread has been nearly flat since the 2018 GCOC (rising by two basis points). This is illustrated in Figure 10 below. While I do not have the same detailed forecasts for the utility or corporate bond yields as for the government bond yields, the persistence of the post-crisis elevation in the yield spread has been robust to fluctuations in risk-free rates and it is reasonable to expect it would continue even as interest rates rise.

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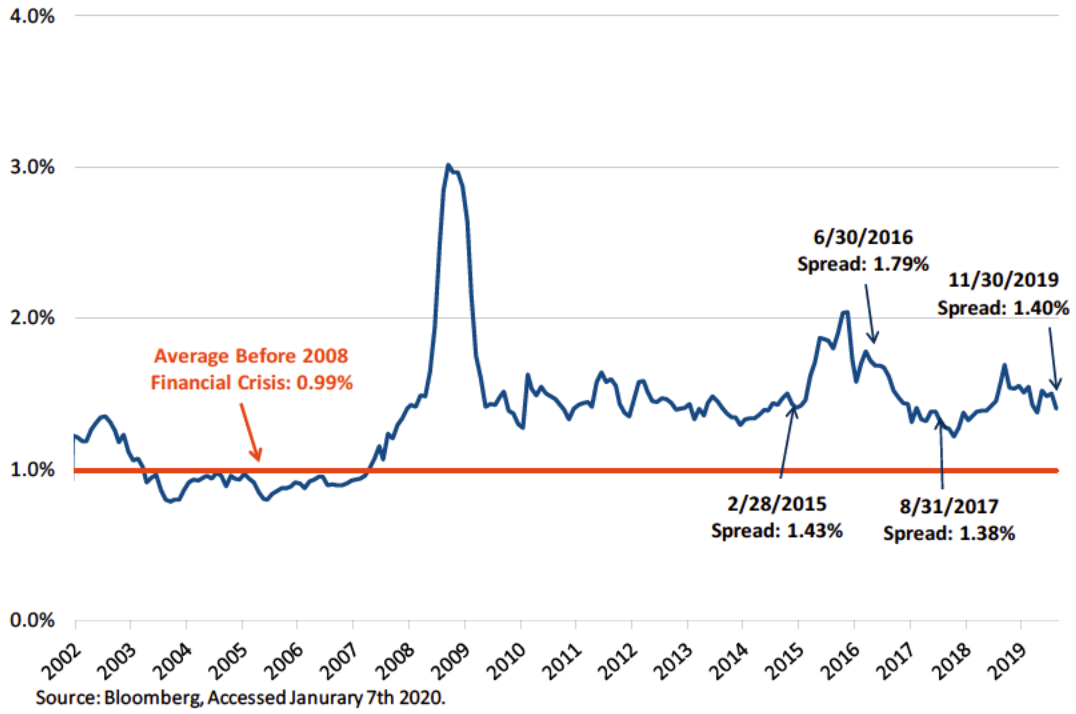
98 2018 GCOC Decision, ¶323 (citing 2016 GCOC Decision, ¶228) and ¶354.

99 In the 2016 GCOC proceeding, the Commission notes that Dr. Booth and Dr. Cleary also provided evidence supporting an approximately 100 bps credit spread increase relative to "normal" levels. 2016 GCOC Decision, ¶61.

100 See the workpaper BV WP01 for details.

Figure 10
Spread between 30-Year Canadian A-Rated Utility and Government Bond Yields



Source: Bloomberg, Accessed Janurary 7th 2020.

Q46. What are likely explanations for the sustained elevation in yield spreads?

A46. One possible explanation of the elevated yield spread is that current and near-term expected levels of government bond yields are artificially depressed due to global monetary policy.[101] Mr. Buttke posits that there has been a secular shift in investor perceptions pre- and post-financial crisis where the widening of spreads, significant positive correlation amongst asset classes, and lower liquidity have increased investors' perception of risk.[102] Since the last GCOC proceeding, spreads have generally remained the same despite investors becoming concerned about corporate earnings and highly levered balance sheets, which may have impacted the corporate bond markets.[103] That is, investors are demanding a higher premium to hold securities that are not risk free. Another possible explanation is

[101] 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.

[102] Buttke Evidence, Q/A 46 and 47.

[103] Buttke Evidence, Q/A 48 and 50.

flight to quality ("FTQ") whereby investors are buying long dated government bonds, which has resulted in real long yields becoming negative in North America. The impact on rates is discussed in the Buttke Evidence.[104] Regardless of the explanation, the elevated spread indicates that the premium on cost of capital that is not risk-free is higher today than before the financial crisis.

I emphasize that both the Canadian and U.S. government bond yields are expected to increase over the next year. For example, the Royal Bank of Canada forecast that the interest rate on 30-year government bonds will increase by 42 basis points in Canada and 38 basis points in the U.S. between Q3, 2019 and Q4, 2020.[105]

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 preferred issuances (outside the financial sector) often are issued with a rate floor – indicating that there is a lower bound on the yield investors require for investing in any type of equity. Mr. Buttke concludes that even in a low interest rate environment, investors continue to require a dividend floor.[106]

Q47. What are the implications of the elevated yield spread relative to pre-crisis levels?

A47. 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 the market equity risk premium may be elevated relative to its historical pre-recession levels. As mentioned previously, the Commission acknowledged in its 2018 GCOC decision that in a low interest rate environment, the forward looking market equity risk premium should be greater than the historical average.[107] The consequence is that if

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104 *Ibid*, Q/A 41.

105 RBC Economics, "Financial Market Forecasts," December 13, 2019. http://www.rbc.com/economics/economic-reports/pdf/financial-markets/rates.pdf

106 Buttke Evidence, Q/A 37.

107 2018 GCOC Decision, ¶323.

the 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 by taking into account the elevated spread or alternatively relying on a market equity risk premium that is higher than its historical average. An alternative was to reflect a portion of the elevated yield spread in the risk-free rate and the remainder in the market risk premium.[108]

Q48. How would a global slow down impact the spread between utility and government bond yields?

A48. In December 2019, the Bank of Canada stated that uncertainties, such as trade conflicts, continue to weigh on global economic activity and remain a large source of risk to the Bank of Canada's outlook.[109] Similarly, minutes from the December U.S. Federal Reserve Federal Open Market Committee meeting noted that the economic outlook is positive but the risk of a global growth slowdown weighing on U.S. domestic economic activity continued to pose a risk to their outlook. [110] At the end of 2019, uncertainties weighing on markets eased due to the scheduled signing of Phase 1 of the China-U.S. trade agreement; passing of the Brexit Withdrawal Agreement Bill in UK Parliament without a clear agreement as to future trade with the EU; and the near completion of the USMCA Trade Agreement, which is currently awaiting President Trump's signature. On the other hand, geopolitical tensions have increased with the recent uptick in Middle East conflicts and new trade war fronts have emerged such as between the U.S. and the European Union. In January 2020 the World Bank published its Global Economic Prospects[111] report in which it states:

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[108] 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.

[109] Bank of Canada, "Bank of Canada maintains overnight rate target at 1 ¾ per cent," Press Release, December 4, 2019.

[110] U.S. Federal Reserve, "Minutes of the Federal Open Market Committee, December 10-11, 2019," January 3, 2020, page 9.

[111] The World Bank, "Global Economic Prospects – Slow Growth, Policy Challenges," January 2020, https://www.worldbank.org/en/publication/global-economic-prospects.

> Projected recovery could be stronger if recent policy actions – particularly those that have mitigated trade tensions – lead to a sustained reduction in policy uncertainty. Nevertheless, downside risk predominate, including the possibility of a re-escalation of global trade tension, sharp downturns in major economies, and financial disruptions in emerging markets and developing economies.

Mr. Buttke states in his testimony that if global uncertainties were to increase and economic growth were to slow further, overleveraged corporations will be at risk of not being able to service their debt. This will cause ripple effects for banks and the corporate bond market that likely will lead to wider spreads than currently forecasted under base case scenarios. Mr. Buttke cites the International Monetary Fund Global Financial Stability Report (October 2019), which estimates that, under this scenario, US investment-grade spreads over government bonds would widen by approximately 180 basis points from current levels.[112]

In summary, the yield spread is an indication of investors required risk premium and any uncertainties in markets or policies affect investors required risk premium or their risk aversion – *i.e.*, they change what they invest in and hence the pricing of risk.

C. RISK PREMIUMS

Q49. How do risk premiums affect the cost of equity estimation?

A49. Risk premiums provide an indication of the compensation investors expect to hold securities that are not risk free. If an investor demands a larger risk premium then the cost of equity will be larger. There are several indicators of risk premia magnitudes in addition to the yield spreads discussed above. For example, indicators such as VIX and VIXC, which track option prices related to near-term swings in the stock market, provide insights into the risk premium required by investors. In its 2018 GCOC Decision, the Commission maintained its view that VIX and VIXC are helpful indicators of investors' perception of short-term volatility.[113] SKEW provides a useful indicator of volatility over the next 12 months whereas, the MERP measures the compensation required to hold a security over a

[112] Buttke Evidence, Q/A 52.

[113] 2018 GCOC Decision, ¶204.

long investment horizon. For this reason, the forecasted MERP is the most informative for determining the cost of equity during the 2021 GCOC period.

Q50. What is the current evidence regarding market volatility?

A50. 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 referred to as the "investor fear gauge"[114] in that they provide a market indication of how investors in stock index options perceive the likelihood of large swings in the stock market **within the next month**. At present, the VIXC and the VIX indices stand at 12.8 and 12.6, respectively, which is below the long-term historical volatility of approximately 20 for both markets.[115]

The VIX and VIXC have, on average, been slightly higher and more volatile since the time I prepared my testimony for the 2018 GCOC (August 2017). Examining the recent history of the movement of the VIX and VIXC (Figure 11) reveals dramatic movements in the short-term volatility expectations. Since the 2018 GCOC, the VIX spiked in December 2018 and February 2018 at above 36, which is a level it has previously only reached once since November 2011.[116] These spikes in volatility have generally correlated with major developments related to trade-tensions or economic uncertainty which have become a persistent risk for investors. However, Mr. Buttke in his testimony cites an IMF study which found that VIX may not fully reflect these external factors and that volatility may be dampened by record levels of share buybacks.[117]

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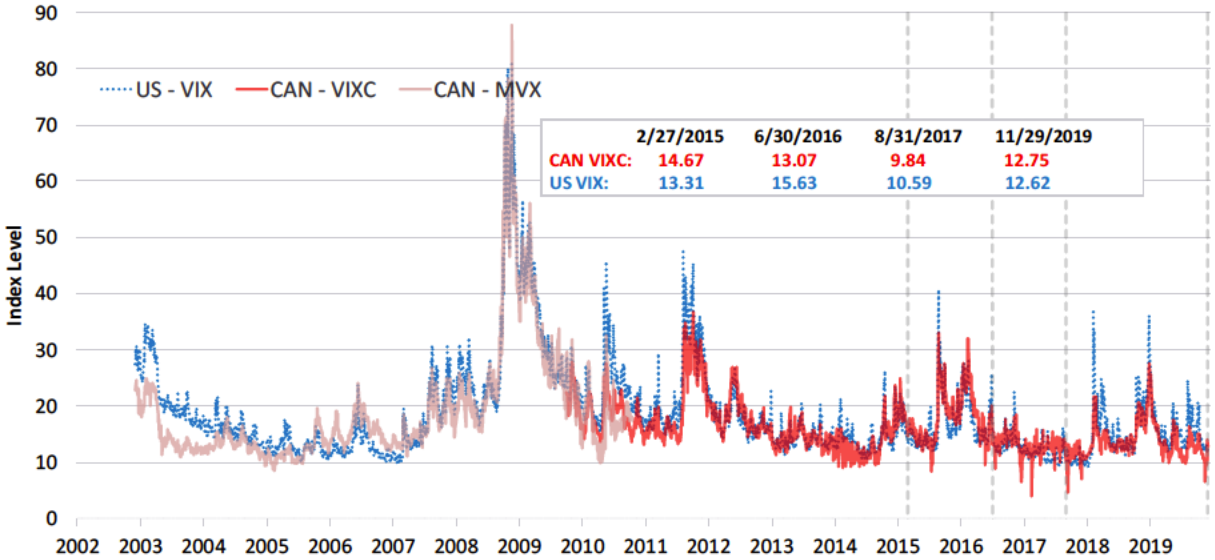
[114] Standard & Poor's Indices, "A VIX for Canada," October 14, 2010.

[115] Bloomberg as of November 30, 2019. See work paper BV WP02. Note that Canadian VIX until Dec. 2008 was the Montreal Exchange's MVX.

[116] See Figure 11 and underlying data included in BV WP02.

[117] Buttke Evidence, Q/A 35.

Figure 11
Canadian and US Volatility Index



Source: VIX and VIXC - from Bloomberg on 01/07/2020, MVX from Canadian Derivatives Exchange

In addition, poor market liquidity has further exacerbated near term price volatility. In November 2019, the Federal Reserve published its Financial Stability Report and found that illiquidity rose in early 2018, late 2018, and August 2019, coinciding with spikes in VIX. It concluded that illiquidity has been unusually high relative to its past history during times of volatility and that liquidity has become more fragile. When the Federal Reserve surveyed market and official-sector contacts on their view on risks to the U.S. Financial Stability, market liquidity concerns were the number 3 risk behind global monetary policy efficacy and trade frictions.[118]

Q51. What is the relevance of short-term volatility?

A51. As noted in my 2018 GCOC evidence, academic research has found that, all else equal, investors, demand higher risk premiums during more volatile periods. However, it is important to remember that the VIX and VIXC measure expectations for market volatility in the *near-term*—specifically over the coming 30 days. By contrast, the market equity risk premium (MERP) that is relevant in this proceeding represents the compensation investors

[118] U.S. Federal Reserve Board, "Financial Stability Report, November 2019" accessed January 8, 2020, p. 14-16, https://www.federalreserve.gov/publications/files/financial-stability-report-20191115.pdf.

require to take on risk over a long investment horizon. (Theoretically, an equity investment has a perpetual term, but it is typical to approximate this with a multi-decade investment horizon, for example by selecting a 30-year government bond as proxy for the risk free rate of interest.) Consequently, while the levels of the VIX and VIXC are useful indicators of current investor sentiment and uncertainty in equity markets, it is too simplistic to say that higher implied volatility necessarily corresponds to higher risk premiums required by investors.

Q52. Does the SKEW index provide any further insight about near-term market stability?

A52. Yes, the SKEW index measures the market's willingness to pay for protection against negative "black swan" stock market events (i.e., sudden substantial downturns) over the next twelve months. Thus, both the VIX and the SKEW provide insights about investors risk perception but look to different aspects of that perception. Mr. Buttke shows in his evidence that the SKEW declined since the 2018 GCOC proceeding but has recently began to increase as the S&P 500 and TSX recover from the 20% decline in December 2018.[119] The SKEW levels are now near levels last seen during the 2018 GCOC. This indicates that despite relatively low VIX levels (compared to long-term historical averages), investors are exhibiting signs of elevated risk aversion towards downside tail risk. Investors are willing to pay for increasingly expensive hedges to protect against downturns in the market. If the returns that investors received for this level of risk were appropriate, then they would be less willing to pay for expensive hedges.

Recent research from investment professionals attribute the high SKEW levels to trade tensions and political uncertainty.[120] Global political and economic uncertainty have eased somewhat recently but remain elevated. Global trade tensions persist along with increased protectionist sentiments; political unrest has emerged in areas such as the Middle East and Hong Kong; and GDP growth is slowing in countries and regions such as China, Europe,

[119] Buttke Evidence, Q/A 36.

[120] Gunjan Banerji, "Traders Eye Long-Term Hedges on the S&P 500; cost of hedges on major index rise, pushing option measure called skew near record," *Wall Street Journal*, December 5, 2019.

and Canada.[121] Also, oil, gas, and natural gas liquids prices remain low by historic standards – with a substantial impact on oil & gas producing countries and regions, including Alberta and Canada.[122]

Q53. Is there any market evidence that the return premium demanded by investors for taking risk remains higher than it was prior to the financial crisis?

A53. Yes. Looking to forward-looking market-implied 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. In addition, it also remains above the historical level. As shown in Figure 12 below, this is especially true for Canada, where Bloomberg's expected MERP has exceeded the U.S. MERP since 2007. Bloomberg measures the forecasted Canadian MERP at 7.24% as of November 2019, which is a 265 basis point decrease from August 2017. Recently, equity valuations have increased as a result of record volumes of share buybacks, progress on partially resolving U.S.-China trade tensions, and possibly the resolution of the Brexit uncertainty.[123] This increase in equity valuations depresses market based dividend yields, resulting in a decreased MERP. The same service measured the U.S. MERP at about 6.7% in November 2019, which is a 64 basis point decrease from the time of the 2018 GCOC proceeding. The Bloomberg MERP is measured as the market-implied forward-looking return premium of equities over the yield on a 10-year government bond, so the forecasted MERP would be about 6.84% and 6.22% relative to the 30-year government bond in Canada and the U.S., respectively.[124] Figure 12 below shows Bloomberg's forecasted MERP for Canada and the U.S. from 2005 to today.

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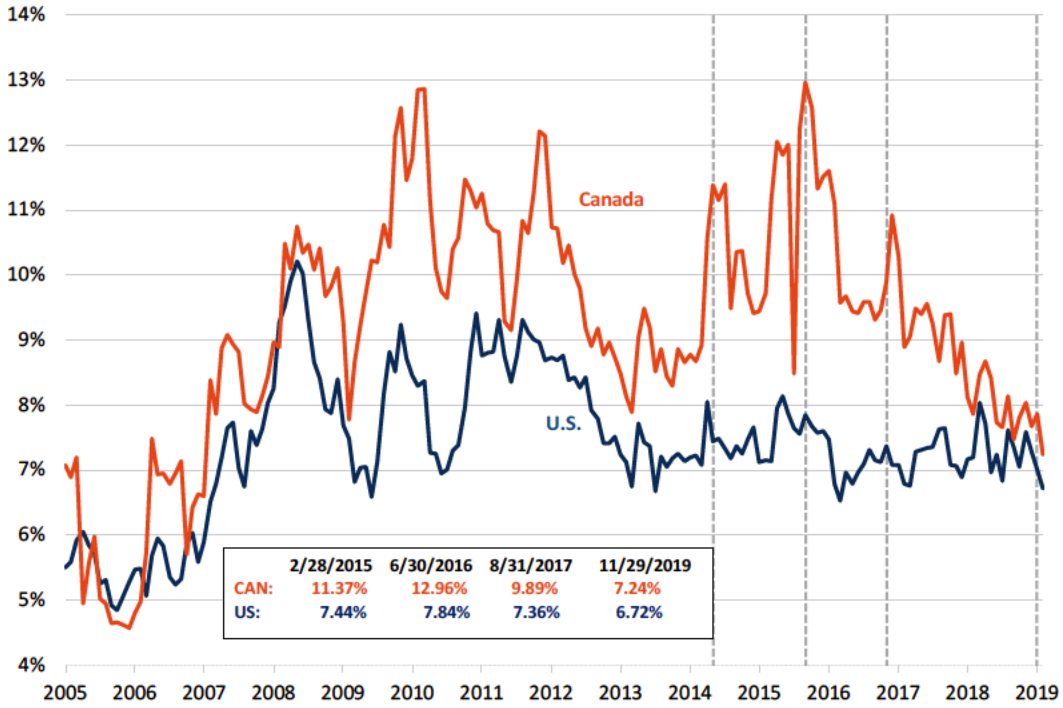
[121] Bank of Canada, "Monetary Policy Report, October 2019," p. 1, 8, Accessed December 4, 2019, https://www.bankofcanada.ca/wp-content/uploads/2019/10/mpr-2019-10-30.pdf.

[122] For a discussion of the impact on the Bank of Canada's interest rate decisions, see Canada Business, "How oil prices are messing with the Bank of Canada's interest rate math," June 27, 2017. See http://www.canadianbusiness.com/economy/how-oil-prices-are-messing-with-the-bank-of-canadas-interest-rate-math/

[123] Buttke Evidence, Q/A 33.

[124] 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 (50) basis points in Canada (the U.S). See workpaper BV WP01.

Figure 12
Forecasted Canadian and U.S. Market Equity Risk Premium
(Over 10-Year Government Bonds)



Source: Bloomberg Accessed Janurary 7th, 2020.

Of note, the U.S. Federal Energy Regulatory Commission relies on a forecasted MERP, which the most recent decision measured at 8.85 percent for the U.S.[125] This measure is substantially above the historical average MERP in the U.S. and indicates regulatory willingness to recognize the elevated MERP.

Q54. What do you conclude from the discussion above?

A54. The increase in the spread between the yield on utility and government bonds relative to the historical levels indicates that the premium investors require to hold assets that are not risk-free is elevated relative to its historical average. Bloomberg's forecast for Canada and the U.S. as well as FERC's forecasted MERP confirms this. Likewise, the presence of

[125] 169 FERC ¶ 61,129; Federal Energy Regulatory Commission, Opinion 569, Issued November 21, 2019, ¶553.

floors in preferred debt issuances and rate increases by Bank of Canada indicate that there is an expectation that interest rates and hence the cost of capital will increase during 2021 and 2022.[126]

D. CANADIAN AND U.S. MARKET INTEGRATION

Q55. How does the Canadian and U.S. market integration affect the cost of equity estimation?

A55. 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),[127] investors consider not only Alberta or Canadian utilities but also comparable U.S. investments. Since investors clearly consider investment opportunities regardless of jurisdiction, it becomes important to include both Canadian and U.S. companies as comparables in the cost of equity study. As shown in Figure 15, Canadian utilities own substantial assets in the U.S., so the cross-border investment considerations are valid for utilities as well as investments in general. The Commission continues to recognize that North American capital markets are integrated and that investors have the option to seek alternative investments in markets with higher expected returns than available in Canada.[128] This integrated market relationship is fundamental to the fair return standard and provides insight to the "comparable investments" and "capital attraction" legs of the three legged stool. Furthermore, I also consider this fact when assessing, for example, what MERP to employ in my CAPM analysis. Put simply, if U.S. and Canadian markets are highly integrated, I need to rely on comparable companies from North America rather than from just Canada.

[126] Buttke Evidence, Q/A 37.

[127] Buttke Evidence, Q/A 15.

[128] 2018 GCOC Decision, ¶462.

Q56. Please summarize the relationship between the Canadian and U.S. capital markets.

A56. 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 9 and Figure 12 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 0.82 since 2000,[129] and the volatilities of these indices tend to track one another as shown in Figure 11.

The Bank of Canada's Canadian effective exchange rate is a weighted average of bilateral exchange rates for the Canadian dollar against currencies of Canada's major trading partners. This rate weighs the U.S. the highest because of the large trading activity between the two countries.[130]

Q57. Do you have any evidence of the magnitude of investments from the U.S. into Canada or Canada into the U.S.?

A57. Yes. Figure 13 summarizes Canada's international investment position by region. It is clear from Figure 13 (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.[131] Figure 13 (Panel B) also shows the origins of foreign direct investments into Canada are split roughly 50/50 between North America and elsewhere.

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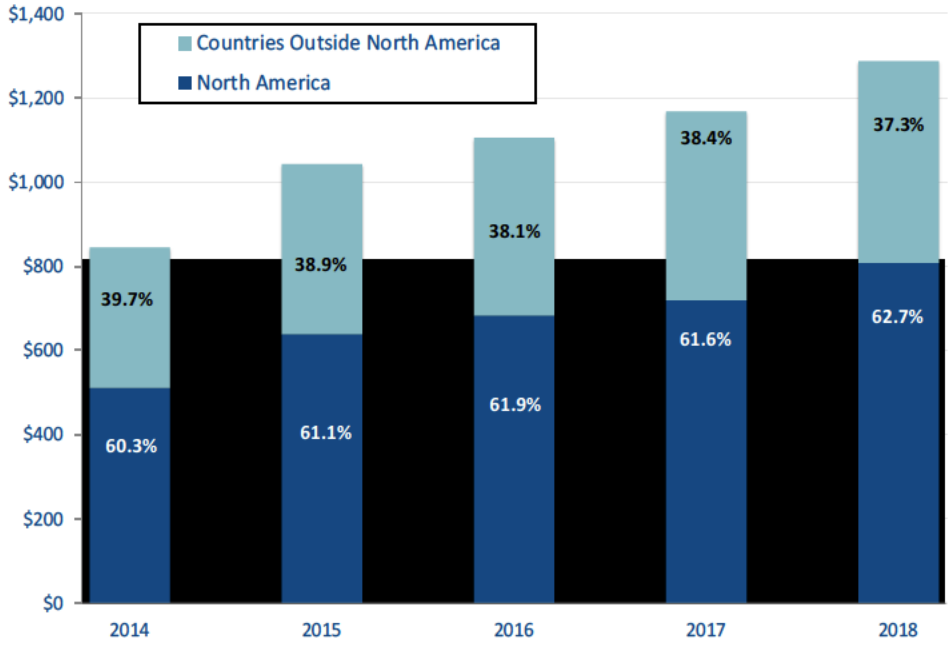
[129] See my electronic workpaper labeled BV WP02 for details.

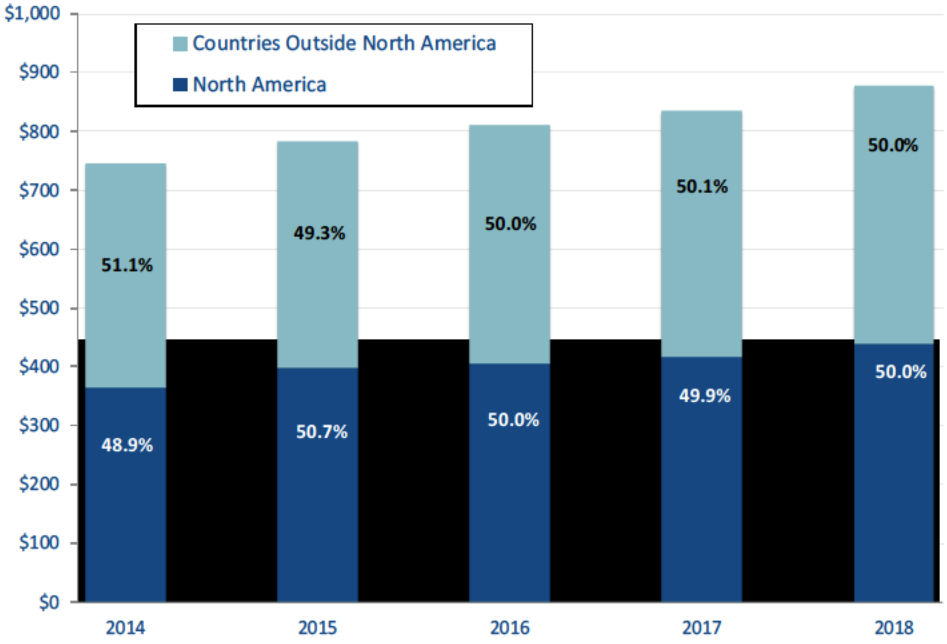
[130] Bank of Canada, *Canadian Effective Exchange Rates*, accessed December 7, 2019, https://www.bankofcanada.ca/rates/exchange/canadian-effective-exchange-rates/.

[131] Statistics Canada, Table 36-10-0474-01 International Investment position, book value, annual (x 1,000,000), accessed December 9, 2019, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610047401. *See also* the electronic workpaper labeled BV WP07.

Figure 13
Summary of Direct Investments: Canada
Panel A: Canadian Direct Investment Abroad ($CAD billion)



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



Q58. Do Canadian direct investments in U.S. equity pertain to utilities?

A58. Yes. Importantly, of the eight companies I consider for my Canadian sample, six (75%) own more regulated assets in the U.S. than in Canada,[132] so those companies are better characterized as North American than Canadian. In addition, Canadian pension funds as well as Canadian utilities have invested in U.S.-based regulated assets. For example, four Canadian pension funds hold the majority of the equity in Puget Sound Energy in the state of Washington,[133] the British Columbia Investment Management Corporation (BCI) is part of a group that acquired CLECO in the state of Louisiana,[134] and the Canadian Pension Plan Investment Board (CPPIB) teamed up with Aqua America to acquire Peoples in 2019.[135] Examining the infrastructure portfolios of Canadian pension funds (which include utility and energy sector investments) further illuminates that investors are seeking out higher returns in foreign markets. For example, the Public Sector Pension Investment Board (PSP) has invested 27% of its infrastructure portfolio in the U.S. but only 5.3% in Canada.[136] Caisse de Depot et Placement du Quebec has invested 33.9% of its infrastructure fund in the U.S. but only 12.3% in Canada.[137] Similarly, the Alberta Investment Management Corporation invests 58% of its infrastructure investments in the U.S. and only 0.4% in Canada.[138]

Investment trends are similarly evident for Canadian energy companies. Fortis Inc. acquired Arizona-based UNS Energy in 2014, CH Energy Group in 2013, and ITC

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132 See Figure 15.

133 Puget Energy and Puget Sound Energy, Q3 2019 10-Q, November 6, 2019, p. 37.

134 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.

135 CPP Investment Board Press Release, "Aqua announces $750 million investment from CCPIB," March 29, 2019.

136 Public Sector Pension Investment Board, 2019 Annual Report, p. 50, accessed January 9, 2020, https://www.investpsp.com/media/filer_public/documents/PSP-2019-annual-report-en.pdf.

137 Caisse de Depot et Placement du Quebec, 2018 Annual Report, p. 44, accessed January 9, 2020, https://www.cdpq.com/sites/default/files/medias/pdf/en/ra/ra2018_rapport_annuel_en.pdf.

138 Alberta Investment Management Corporation, 2018 Annual Report, p. 30, accessed January 9, 2020, https://www.aimco.alberta.ca/2018-annual-report/pdfs/AIMCo-AR2018.pdf.

Holdings in 2016;[139] Emera Inc. acquired Florida-based TECO Energy Inc. as well as New Mexico Gas in 2015,[140] TransCanada and Enbridge acquired U.S. pipeline companies Columbia Pipeline and Spectra Energy Corp respectively in 2016.[141] AltaGas acquired WGL Holdings in 2018.[142] Algonquin Power acquired Empire District Electric in 2017 and Enbridge St. Lawrence Gas in 2019.[143] In March 2019, ENMAX's announced the acquisition of Emera Maine.[144] Finally, in November 2019, Algonquin Power announced its subsidiary Liberty Utilities would acquire American Water's regulated operations in New York.[145] Thus, there are plenty of Canadian investments in U.S. utilities. This shows the interconnectedness of investment decisions between the two countries particularly as it relates to utility assets.

E. IMPACT ON COST OF EQUITY ESTIMATION

Q59. Please summarize how the economic developments discussed above have affected the return on equity and debt that investors require.

A59. 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

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139 Fortis Inc., "History," accessed January 9, 2020, https://www.fortisinc.com/about-us/fortis-history.

140 Albuquerque Business First, "One of NM's biggest-ever acquisition deals is finally about to close," June 22, 2016, accessed January 9, 2020, https://www.bizjournals.com/albuquerque/news/2016/06/22/prc-approves-emera-acquisition-teco.html.

141 TC Energy, "Columbia Gas Transmission," accessed January 9, 2020, https://www.tcenergy.com/operations/natural-gas/columbia-gas-transmission/. *See also*, Enbridge, "Enbridge and Spectra Energy combine to create North America's premier energy infrastructure company," accessed January 9, 2020, https://www.enbridge.com/enbridge-and-spectra.

142 AltaGas, "AltaGas Ltd. announces closing of its acquisition of WGL Holdings, Inc.," July 6, 2018, accessed January 9, 2020, https://www.altagas.ca/newsroom/news-releases/altagas-ltd-announces-closing-its-acquisition-wgl-holdings-inc.

143 Algonquin Power & Utilities Corp., "Asset Summaries," accessed January 9, 2020, http://investors.algonquinpower.com/MNA.

144 ENMAX Corporation Press Release, "ENMAX to Purchase Emera's Operations in Maine for 1.3 Billion USD," March 25, 2019.

145 Algonquin Power & Utilities Corp. Press Release, "Liberty Utilities Co. Expands Water Utility Presence with an Agreement to Acquire American Water's Regulated Operations in New York," November 20, 2019.

return tradeoff in choosing how to allocate their capital among different investment opportunities. There is evidence of investors moving capital away from Canada to other North American markets, which could have long-term impacts on capital-intensive industries. 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 affected by the global trade tensions, slowing economic growth,[146] and increasing political risk, so there are reasons to believe that their risk aversion remains elevated relative to pre-crisis periods.

The Bank of Canada has kept their monetary policy in an accommodative stance since the last GCOC proceeding. 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 corporate risk, such as the equity of regulated utilities.

Q60. How does your analysis consider the current economic conditions?

A60. The returns allowed to the Utilities must meet the Fair Return Standard and allow the Utilities to attract capital on reasonable terms and to maintain their financial integrity. Analyzing the current economic conditions is fundamental to balancing the three legs of the stool – comparable investments, capital attraction, and financial integrity – by choosing the appropriate inputs and assumptions when conducting my analysis. Specific parameters such as the risk-free rate and growth are inputs to the models, while others influence the inputs; for example, yield spreads, VIX and SKEW impact the MERP, while policy (regulatory and geopolitical) impacts growth.

[146] Bank of Canada's October 2019 Monetary Policy Report notes global GDP growth slowing from 3.7% in 2018 to 2.9% in 2019. Over the same period, Canada slows from 1.9% to 1.5%, the US from 2.9% to 2.3%, the Euro Area from 1.9% to 1.1%, and China from 6.6% to 6.1%. See Bank of Canada, "Monetary Policy Report, October 2019," p. 1, 8, Accessed December 4, 2019, https://www.bankofcanada.ca/wp-content/uploads/2019/10/mpr-2019-10-30.pdf.

In implementing the CAPM, I consider the downward pressure on the 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) incorporate a portion of the elevation in yield spread in the risk-free rate to reflect the downward bias of the risk-free yields and combine that with the historical MERP or (ii) rely on Consensus Forecasts' government bond yield forecast for the middle of the regulatory period to derive my risk-free rate input, and combine that with a MERP that reflects the strong evidence that risk premiums are elevated relative to their long-term historical average.

Regarding the risk-free rate, it is important to recognize that although the Bank of Canada has increased the bank interest rate three times since January 2018, the Bank of Canada, the U.S. Federal Reserve, and other global central banks have more recently maintained or lowered policy rates in response to increasing economic and political uncertainty.

To be conservative and consistent with the Commission's order in the 2013 GCOC, I do not simultaneously adjust the risk-free rate and the MERP. Rather, I calculate the CAPM for two input scenarios: one that normalized the risk-free rate while using the historical average Canadian MERP, and another that uses a higher MERP informed by forecasts.[147] For the reasons discussed above, the current risk-free rate is too low to accurately be used to assess the cost of equity. The yield spread is elevated and the Canadian forecasted market equity risk premium is much higher than the historical market equity risk premium, so it is necessary to rely on a forecasted risk-free rate and either "normalize" the risk-free rate and/ or rely on MERP that is higher than the historical average. Because the Bank of Canada has not engaged in formal quantitative easing, an argument could be made that the enhanced yield spread is primarily a reflection of a higher MERP, consistent with the forecasted MERP being higher than the historical MERP in Canada.

[147] Because Bank of Canada has not engaged in quantitative easing, I explicitly rely on the yield spread in Canada to assess the impact on the risk-free rate and simply adjust the forecasted MERP for Canada downward due to the interaction of markets in Canada and the U.S. (given that the U.S. forecasted MERP is presently lower than the Canadian one).

V. ESTIMATING THE COST OF EQUITY FOR BENCHMARK SAMPLES

A. SAMPLE SELECTION

Q61. 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?

A61. 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 their publicly traded corporate parents, since those corporations also contain other lines of business with different levels and sources of risk.[148] 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.

[148] Additionally, applying the standard cost of capital models to one or two traded entities would likely lead to imprecise estimates due to the influence of idiosyncratic (random) error in the estimation process. I discuss this issue further with respect to ranges of beta values in Section V.C.1.c below.

Q62. How do you identify sample companies of comparable business risk to the Utilities?

A62. The Utilities are engaged in the regulated distribution and transmission of electricity and natural gas. As discussed by Dr. Carpenter, the business risk associated with these endeavors depends on many factors, including the specific characteristics of the service territory, the regulatory environment in which the provider of these services operates, and technological changes. Additionally, there are variations in business risk characteristics and rate regulation schemes applicable to the individual utility entities operated by ATCO, AUI, and FortisAlberta (i.e., AltaGas Utilities Inc., ATCO Electric Distribution, ATCO Electric Transmission, ATCO Gas, ATCO Pipelines, FortisAlberta Inc.). Consequently, it is obviously not possible to identify publicly traded sample companies that replicate every aspect of the Utilities' risk profiles. 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 five samples—namely a Canadian sample, a Gas LDC sample, a Water Distribution sample, a Pipeline sample, and an Electric sample—each with different advantages when it comes to capturing relevant comparable business risk characteristics for estimating the Utilities' cost of capital. Dr. Carpenter opines that from a business risk perspective the Utilities are best compared to the Gas LDC and Water Distribution samples, but face higher risk than those samples albeit not as high as those of the Pipeline sample. Consequently, I focus on these samples, but include the Canadian and Electric sample to be consistent with prior GCOC evidence.

Q63. Please describe the Canadian Utility Sample.

A63. 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' common equity shares are publicly traded on the Toronto

Stock Exchange,[149] and in general the sample companies have long histories of paying periodic dividends to shareholders. The majority of the Canadian Utility sample companies are quite diversified and have some business segments engaged in unregulated operations (such as merchant power generation or the gathering and processing of natural gas) or regulated activities other than gas and electric distribution and transmission (such as common carrier oil pipelines). In addition to their Canadian business operations, many of these companies also have significant operations in the U.S., and other international jurisdictions. As I previously noted (Section IV.D), there has been significant amounts of recent acquisitions of U.S. utilities by Canadian energy companies.[150] As a result, the business operations of the Canadian Utility sample are increasingly geographically diverse.

Figure 14 reports the sample companies' annual revenues for the trailing twelve months ended September 2019 and a categorization as regulated (R) or mostly regulated based (MR) on the percentage of each company's assets devoted to regulated activities. The figure also displays each company's Market Capitalization and the S&P Credit Rating in 2019, as well as its 3-year adjusted historical beta from Bloomberg and long-term (3- to 5-year) earnings per share growth estimate for the company derived from individual estimates made and compiled (respectively) by Value Line and Thomson Reuters IBES.

[149] In some cases the stock may also trade on other exchanges.

[150] Additionally, Hydro One Limited had, now terminated, plans to acquire Avista. I did not apply my standard five year M&A screen to the Canadian sample.

Figure 14
Canadian Utility Sample Companies

Company	Annual Revenues (CAD million)	Regulated Assets	Market Cap. 2019 Q3 (CAD million)	Betas	S&P Credit Rating (2019)	Long Term Growth Est.
	[1]	[2]	[3]	[4]	[5]	[6]
Algonquin Power & Utilities Corp.	$2,131	MR	$8,920	0.51	BBB	7.0%
AltaGas Ltd.	$4,285	MR	$5,398	0.92	BBB-	16.9%
Canadian Utilities Limited	$3,022	R	$10,590	0.49	A-	0.5%
Emera Incorporated	$4,743	MR	$13,775	0.51	BBB+	3.5%
Enbridge Inc.	$37,118	MR	$94,368	0.98	BBB+	5.7%
Fortis Inc.	$6,528	MR	$24,417	0.50	A-	4.0%
Hydro One Limited	$4,714	R	$14,523	0.41	A-	3.4%
TC Energy Corporation	$10,471	R	$63,129	1.03	BBB+	2.7%
Average	$9,126		$29,390	0.67	BBB+	5.5%

Sources and Notes:
[1]: Bloomberg as of November 30, 2019. Most recent four quarters.
[2]: See Schedule No. BV-2. Key:
R - Regulated (80% or more of assets regulated).
MR - Mostly Regulated (less than 80% of assets regulated).
[3]: See Schedule No. BV-3 Panels A through H.
[4]: See Schedule No. BV-10.
[5]: S&P Rating from Bloomberg as of 2019 Q3.
[6]: See Schedule No. BV-5.

Q64. Why do you consider U.S. based samples in addition to the Canadian utility Sample?

A64. The Canadian Utility sample is limited because it is composed of a relatively small number of companies whose business operations and geographic jurisdictions are increasingly diversified relative to the Utilities. The business operations of the Canadian Utility sample are, on average, concentrated 45% in Canada, 50% in the United States and 4% in other jurisdictions (see Figure 15). Thus, while this sample consists of companies domiciled in Canada and with stock traded on Canadian exchanges, their utility operations are predominantly U.S. and international rather than Canadian.

Figure 15
Canadian Utility Companies Geographic Distribution

	Revenue			Property, Plant and Equipment		
Company	**Canada**	**United States**	**Other**	**Canada**	**United States**	**Other**
	[1]	[2]	[3]	[4]	[5]	[6]
Algonquin Power & Utilities Corp.	4%	96%	0%	7%	93%	0%
AltaGas Ltd.	39%	61%	0%	21%	79%	0%
Canadian Utilities Limited	95%	0%	5%	92%	0%	8%
Emera Incorporated	23%	70%	7%	22%	73%	5%
Enbridge Inc.	41%	59%	0%	47%	53%	0%
Fortis Inc.	26%	56%	17%	27%	65%	8%
Hydro One Limited	100%	0%	0%	100%	0%	0%
TC Energy Corporation	38%	57%	5%	35%	56%	9%
Average	**46%**	**50%**	**4%**	**44%**	**52%**	**4%**

Sources and Notes:
Companies' Annual Reports

In addition, 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 Sample companies have deferral accounts related to, for example, capital expenditures and revenue decoupling.[151]

Finally, investors in Canada consider investment alternatives in both the U.S. and Canada, as described by Mr. Buttke,[152] which makes the U.S.-based samples relevant investment alternatives to Canadian utility companies such as the Utilities. As such, they would be expected to have similar returns given their levels of business and financial risk.

[151] Carpenter Evidence, Section IV A.

[152] Buttke Evidence, Q/A 15.

Q65. Why did you select separate U.S. samples for Gas LDC, Water, Pipelines, and Electric companies?

A65. The 2018 GCOC Decision acknowledged the merits of US samples,[153] did not exclude the Water sample,[154] and found the selection process for comparable companies to be appropriate.[155] The Commission did find the Pipeline sample not risk comparable,[156] so I include is only as an upper bound on the possible cost of equity. With that in mind, I selected several US samples to span the range of risks faced by the Utilities.

The various U.S. based samples have different advantages (and disadvantages) in estimating the cost of capital for the Utilities. The **Gas LDC sample** is essentially a pure play local distribution group, with the majority of business activities centered on rate regulated distribution activities, which makes it a close analog for the Utilities' distribution businesses. However, the sample is relatively small due to the smaller number of publicly traded natural gas utility companies in the U.S.[157]

Similar to the Gas LDC sample, the **Water sample** consists of pure play distribution companies. To an even greater extent than the Gas LDC companies, the publicly traded U.S. water companies are more or less exclusively dedicated to providing a utility distribution service and earn the vast majority of their cash flows from rate regulated operations. In the U.S., rate regulation of investor-owned water utilities is generally quite similar to regulation of natural gas and electric distribution utilities. For example, they tend to have the same type of regulation as regulated electric or gas utilities in the jurisdiction For example, as with U.S. gas and electric utility regulation, the cost of service regimes for

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153 2018 GCOC Decision ¶271.

154 2018 GCOC Decision ¶274.

155 *Ibid*.

156 2018 GCOC Decision ¶273.

157 I note that owing to recent merger and acquisition ("M&A") activity that has resulted in the imminent combination or elimination of certain publicly traded natural gas LDC companies, the composition of the Gas LDC sample has shifted relative to the one I presented and studied in the AUC's last (2018) GCOC proceeding. However the same selection criteria were applied in selecting both samples, and the business risk characteristics of the current sample are substantially the same as those of the Gas LDC sample Dr. Carpenter and I analyzed in the 2018 GCOC.

water utilities increasingly incorporate mechanisms for decoupling revenue from sales and capital trackers to allow recovery of major infrastructure expenditures outside the context of a general rate case.[158]

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

Finally, the **Pipeline sample** contains U.S. and Canadian based companies—more accurately a mix of Master Limited Partnerships (MLPs) with publicly traded limited partnership units and C Corporations—that focus primarily on regulated transmission of natural gas and with some crude oil and petroleum products ("liquids") transportation operations. As explained by Dr. Carpenter, U.S. pipeline companies generally do not have monopoly franchises, which subject them to somewhat higher business risk relative to pure-play distribution utilities. Dr. Carpenter also notes that there is a greater degree of regulatory lag inherent in the regulation regimes governing pipelines in the U.S. As a result Dr. Carpenter finds that US Pipelines constitute a meaningful upper bound on the business risk of the Utilities.[159] I therefore continue to include the sample as an upper bound on the Utilities' ROE.

In light of the relative advantages and limitations of these various groups of sample companies, I believe each one provides a useful point of comparison when estimating the cost of equity for the Utilities. In making my recommendation, I consider the model results for each sample individually and use my judgement—informed by Dr. Carpenter's

[158] RRA Regulatory Focus – Adjustment Clauses: A state-by-state overview, SNL Financial, November 12, 2019 and RRA Financial Focus – Water Capital Expenditures: Accelerated CapEx spending at water utilities expected to continue, SNL Financial, August 24, 2017. See also Dr. Carpenter's Section IV.C.

[159] Carpenter Evidence, Q/A 56-57.

business risk analysis—in deciding which results are most helpful in determining a reasonable range for the Utilities' cost of equity.

Q66. Will you please summarize how you selected the Gas LDC, Water, Electric, and Pipeline samples?

A66. My procedures for identifying the members of the U.S. based samples is entirely consistent with the approach I took in the 2018 GCOC proceeding, where the Commission found the selection process reasonable.[160] I started with the universe of publicly traded companies classified in the corresponding industry groups by *Value Line*. I reviewed the business descriptions and annual financial reports of these companies and eliminated any that are not primarily focused on the business activity in question. Specifically, I eliminated any companies with less than 50%[161] of their assets dedicated to regulated utility service. Importantly, I cannot create a sample of publicly traded companies that have approximately 37 percent equity (or 39, 40 or 41 percent equity),[162] so necessarily I need to consider the impact of that difference in my recommendation.

I then applied a set of screening criteria to identify companies that cut their dividends or engaged in substantial merger and acquisition (M&A) activities over the past 3-years. My general practice is to eliminate companies that were either the target or acquirer in a major M&A transaction, since such circumstances typically impact a company's stock prices (and thus potentially influence the estimation of its equity beta) in ways that aren't necessarily representative of how investors perceive its business and financial risk characteristics. Similarly, I generally screen out companies that engage in dividend cuts, since the announcement of a cut may create sharp disturbances in stock prices and growth rate

[160] 2018 GCOC, ¶274.

[161] I relax this criteria for Emera Incorporated in the Canadian sample, whose regulated assets are on the borderline of this 50% criteria (Emera's assets are 49% regulated) but 90% of their revenues come from regulated activities. Enable and EQM also have less than 50% regulated assets and were included as they own or earn at least 35% from regulated natural gas pipeline activities.

[162] In the 2018 GCOC, the ATCO companies as well as FAI were awarded a deemed equity percentage of 37, while AltaGas was awarded 39 percent equity in 2018 down from 41 percent in 2016.

expectations, and the execution of the cut may also directly affect the dividend data relied on for the DCF calculations.

Further, I generally require that the companies have an investment grade credit rating,[163] and more than $300 million in revenues to ensure liquidity[164]. A final (and fundamental) requirement is that the sample companies have the necessary data available for estimation.

Q67. What are the characteristics of the Gas LDC sample?

A67. The Gas LDC sample consists of seven companies that have the majority of their revenue generating assets dedicated to the regulated distribution of natural gas in the U.S.

Figure 16 reports the sample companies' annual revenues for the trailing twelve months ended October 2019 and the percentage of their assets devoted to regulated activities. It also displays each company's Market Capitalization and S&P Credit Rating in 2019, as well as its 3-year adjusted historical beta from Bloomberg and the weighted average long-term (3- to 5-year) earnings growth rate estimate for the company from Thomson Reuters IBES and *Value Line*.

[163] Chesapeake Utilities does not have a credit rating from any of the major rating agencies. However, if they were to be rated, they would receive an investment grade rating. For Chesapeake Utilities I assign the company the average credit rating of the rest of the sample. I note that S&P Global's Aug. 26, 2019 RRA Financial Focus "Utility Holding Co. Quality Measures: Q2 2019," ranked Chesapeake Utilities 3rd among gas utility holding companies in overall fixed charge coverage ratio over the 12-months ending 7/30/2019 and was above the gas utility average from 2019 back to 2011.

[164] I relax this criteria to include two more companies in the Water sample, namely Middlesex Water and York Water Company, in recognition that these companies have very stable finances despite relatively low revenue. Additionally, according to Yahoo Finance, the average trading volume is solid at about 65,000 and 37,000 shares.

Figure 16
U.S. Gas LDC Utility Sample Companies

Company	Annual Revenues (USD million)	Regulated Assets	Market Cap. 2019 Q3 (USD million)	Betas	S&P Credit Rating (2019)	Long Term Growth Est.
	[1]	[2]	[3]	[4]	[5]	[6]
Atmos Energy	$2,902	MR	$13,362	0.50	A	6.0%
Chesapeake Utilities	$652	R	$1,545	0.60	A	8.1%
New Jersey Resources	$2,592	R	$4,040	0.64	AA-	4.1%
Northwest Natural	$726	R	$2,171	0.60	A+	7.0%
ONE Gas Inc.	$1,665	R	$4,922	0.55	A	6.7%
Southwest Gas	$3,058	R	$4,972	0.63	BBB+	9.7%
Spire Inc.	$1,952	R	$4,410	0.62	A-	4.4%
Average	$1,935		$5,060	0.59	A	6.6%

Sources and Notes:
[1]: Bloomberg; Q4 2018 - Q3 2019
[2]: See Schedule No. BV-2. Key:
R - Regulated (80% or more of assets regulated).
MR - Mostly Regulated (less than 80% of assets regulated).
[3]: See Schedule No. BV-3 Panels A through H.
[4]: Bloomberg
[5]: S&P Rating from Bloomberg as of 2019 Q3.
[6]: See Schedule No. BV-5.
Chesapeake Utilities Assumes Sample Average S&P Credit Rating Value
New Jersey Resources rated Aa3 by Moody's and not rated by S&P, converted to S&P Rating of AA-
Northwest Natural Gas Company rating used for Northwest Natural

The average Gas LDC sample company devotes over 80% of its assets to regulated activities, which are primarily related to the local distribution of natural gas.[165] Therefore, these sample companies are nearly pure-plays in the natural gas distribution industry.[166] Moreover, as discussed by Dr. Carpenter, the regulatory frameworks in the jurisdictions in which the Gas LDC subsample companies operate are substantially similar to those prevailing in Alberta and other Canadian jurisdictions.[167] Therefore, I believe that 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.

[165] 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.

[166] I note that these companies are primarily subject to U.S. state regulation.

[167] Carpenter Evidence, Table 3 and Section IV.A.

Q68. What are the characteristics of the Water sample?

A68. The water sample consists of five companies whose primary source of revenues and majority of assets and revenues are subject to regulation. These companies own regulated water utilities or subsidiaries that may operate in multiple states in the U.S. The water utility sample is broadly representative of the regulated water distribution industry from a business risk perspective. Additionally, it is worth noting that, like natural gas distribution companies, water utilities are highly capital intensive and face the need to maintain and upgrade aging infrastructure networks designed to deliver commodities to end users. As such, the business risk characteristics of the Water and Gas LDC samples are broadly similar. Additionally, investor-owned gas LDCs and water utilities in the same jurisdiction are generally regulated by the same regulatory entity.

Figure 17 reports the sample companies' annual revenues for the trailing twelve months ended October 2019 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 2019, as well as its 3-year adjusted historical beta from Bloomberg and the weighted average long-term (3- to 5-year) earnings growth rate estimate for the company from Thomson Reuters IBES and *Value Line*.

Figure 17
U.S. Water Utility Sample Companies

Company	Annual Revenues (USD million)	Regulated Assets	Market Cap. 2019 Q3 (USD million)	Betas	S&P Credit Rating (2019)	Long Term Growth Est.
	[1]	[2]	[3]	[4]	[5]	[6]
Amer. States Water	$472	R	$3,329	0.56	A+	6.5%
Amer. Water Works	$3,558	R	$22,176	0.65	A	7.5%
California Water	$705	R	$2,584	0.67	A+	10.1%
Middlesex Water	$135	R	$1,049	0.74	A	4.0%
York Water Co. (The)	$51	R	$534	0.74	A-	8.2%
Average	$984		$5,935	0.68	A	7.2%

Sources and Notes:
[1]: Bloomberg; Q4 2018 - Q3 2019
[2]: See Schedule No. BV-2. Key:
R - Regulated (80% or more of assets regulated).
MR - Mostly Regulated (less than 80% of assets regulated).
[3]: See Schedule No. BV-3 Panels A through H.
[4]: Bloomberg
[5]: S&P Rating from Bloomberg as of 2019 Q3.
[6]: See Schedule No. BV-5.

The average water sample company devotes over 90% of its assets to regulated activities related primarily to the distribution of water and has an average credit rating of A. Given the proven long-term financial stability of these companies, I relax my $300 million annual revenue screening criteria to include two additional companies—Middlesex Water, and York Water Company—in recognition that these companies have very stable finances despite relatively low income.

Q69. What are the characteristics of the Electric sample?

A69. 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 31 electric utilities listed in Figure 18 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).[168] 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. Many own regulated electric generation plants and some have unregulated wholesale power generation operations. It is also not uncommon for regulated utilities to own gas or water utility operations. Lastly, many US electric utilities face state-specific requirements about including renewables in the generation mix or retiring older coal plants, so that it becomes difficult to consider the group homogenous. 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.

Figure 18 reports the sample companies' annual revenues for the trailing twelve months ended October 2019 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 80% or more regulated electric assets or mostly regulated (MR), having less than 80% regulated electric assets.[169] It also displays each company's Market Capitalization and the S&P Credit Rating in 2019, as well as its 3-year adjusted historical beta from Bloomberg and the weighted average long-term (3 to 5-year) earnings growth rate estimate for the company from Thomson Reuters IBES and *Value Line*.

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

[169] Previously, EEI provided three classifications: R (as above), MR having 51-80% regulated operations and D having 50% or less regulated operations. EEI no longer uses the "D" category, so I checked on the asset classifications of those that might be borderline.

Figure 18
U.S. Electric Utility Sample Companies

Company	Annual Revenues (USD million)	Regulated Assets	Market Cap. 2019 Q3 (USD million)	Betas	S&P Credit Rating (2019)	Long Term Growth Est.
	[1]	[2]	[3]	[4]	[5]	[6]
ALLETE	$1,384	MR	$4,504	0.55	BBB+	7.1%
Alliant Energy	$3,641	R	$12,713	0.54	A-	5.2%
Amer. Elec. Power	$15,747	R	$45,922	0.51	A-	5.5%
Ameren Corp.	$6,013	R	$19,224	0.54	BBB+	5.6%
CMS Energy Corp.	$6,879	R	$17,826	0.48	BBB+	7.3%
DTE Energy	$13,271	MR	$24,085	0.49	BBB+	5.1%
Entergy Corp.	$10,929	R	$22,928	0.50	BBB+	0.6%
Fortis Inc.	$4,919	MR	$18,402	0.50	A-	3.8%
MGE Energy	$568	MR	$2,649	0.53	AA-	4.9%
OGE Energy	$2,271	R	$8,935	0.64	BBB+	5.2%
Otter Tail Corp.	$925	R	$2,140	0.59	BBB	6.4%
WEC Energy Group	$7,652	R	$29,418	0.48	A-	6.2%
AVANGRID Inc.	$6,394	MR	$15,878	0.54	BBB+	6.0%
Consol. Edison	$12,572	R	$30,551	0.47	A-	3.6%
Duke Energy	$25,091	R	$69,221	0.44	A-	4.2%
Eversource Energy	$8,511	R	$27,055	0.56	A-	5.5%
Exelon Corp.	$34,909	MR	$46,869	0.60	BBB+	2.2%
NextEra Energy	$19,007	MR	$109,914	0.51	A-	9.6%
PPL Corp.	$7,754	R	$22,551	0.68	A-	2.0%
Public Serv. Enterprise	$10,066	MR	$31,075	0.62	BBB+	2.8%
Southern Co.	$21,842	R	$63,837	0.50	A-	3.2%
Unitil Corp.	$447	R	$920	0.48	BBB+	4.2%
Black Hills	$1,758	R	$4,706	0.57	BBB+	4.5%
Hawaiian Elec.	$2,910	MR	$4,874	0.50	A-	3.5%
IDACORP Inc.	$1,365	MR	$5,570	0.53	BBB	3.4%
NorthWestern Corp.	$1,239	R	$4,009	0.62	A	3.0%
Pinnacle West Capital	$3,557	R	$10,739	0.48	A-	4.5%
PNM Resources	$1,457	R	$4,063	0.60	BBB+	5.7%
Portland General	$2,091	R	$5,012	0.53	BBB+	4.9%
Xcel Energy Inc.	$11,611	R	$33,640	0.51	A-	5.5%
Average	$8,226		$23,308	0.54	A-	4.7%

Sources and Notes:
[1]: Bloomberg; Q4 2018 - Q3 2019
[2]: See Schedule No. BV-2. Key:
R - Regulated (80% or more of assets regulated).
MR - Mostly Regulated (less than 80% of assets regulated).
[3]: See Schedule No. BV-3 Panels A through H.
[4]: Bloomberg
[5]: S&P Rating from Bloomberg as of 2019 Q3.
[6]: See Schedule No. BV-5.

Q70. What are the characteristics of the Pipeline sample?

A70. I acknowledge that the Commission in its 2018 GCOC Decision places no weight on the Pipeline sample[170] and consequently includes it only as an upper bound on any potential ROE. This is in accordance with Dr. Carpenter's finding that the Utilities face higher business risk than the Gas LDC and Water samples, but not as high a business risk as the Pipeline sample. Thus, the sample serves as a check on the reasonableness of the results from the Gas LDC and Water sample.

The Pipeline sample consists of seven U.S. based companies that operate primarily in the regulated transportation of natural gas, crude oil or petroleum products in the United States. The pipeline subsample reflects the companies within the sample that have a higher proportion of regulated assets dedicated to pipeline transportation operations.

Figure 19 demonstrates the financial information on each of the companies included in the Pipeline sample, including each sample company's most recent fiscal year revenue and market capitalization, S&P credit rating, the estimated weighted growth rate for the DCF model, and the proportion of their assets that are regulated.

[170] 2018 GCOC Decision, ¶274.

Figure 19
U.S. Pipeline Sample Companies

Company	Annual Revenues (USD million)	Regulated Assets	Market Cap. 2019 Q3 (USD million)	Betas	S&P Credit Rating (2019)	Long Term Growth Est.
	[1]	[2]	[3]	[4]	[5]	[6]
Enable Midstream Part.	$3,179	MR	$5,403	0.91	BBB-	14.8%
Enbridge Inc.	$27,973	R	$71,119	0.98	BBB+	4.5%
EQM Midstream Part.	$1,589	MR	$7,316	0.99	BBB-	3.0%
Kinder Morgan Inc.	$13,638	R	$46,645	1.07	BBB	13.5%
TC PipeLines LP	$519	R	$2,858	0.81	BBB	9.3%
TC Energy Corporation	$7,891	R	$47,576	1.03	BBB+	4.6%
Williams Cos.	$8,298	MR	$29,802	1.17	BBB	11.9%
Average	$9,012		$30,103	0.99	BBB	8.8%

Sources and Notes:
[1]: Bloomberg; Q4 2018 - Q3 2019
[2]: See Schedule No. BV-2. Key:
R - Regulated (80% or more of assets regulated).
MR - Mostly Regulated (less than 80% of assets regulated).
[3]: See Schedule No. BV-3 Panels A through H.
[4]: Bloomberg
[5]: S&P Rating from Bloomberg as of 2019 Q3.
[6]: See Schedule No. BV-5.

Q71. Are there any risks specific to the Utilities that are not captured when measuring the cost of capital for samples of comparable companies?

A71. 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) and Performance-Based Regulation (PBR) have increased the Utilities business risk and Dr. Carpenter finds that such risks are not reflected in the Gas LDC or Water sample.[171] Therefore, I include the Pipeline sample.

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

[171] Carpenter Evidence Q/A 56.

Utilities should be allowed. As discussed in Section VII below, I consider these factors when making my capital structure recommendations.

B. FINANCIAL RISK ADJUSTMENT

Q72. 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.

A72. 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 (net) book values of assets.

Q73. Why is this difference important to the estimation of the cost of equity?

A73. 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."[172] I therefore make clear that the rate base is measured using book values, and that nothing about my analysis of financial risk involves the application of the allowed return to a market value rate base.

Taking differences in financial leverage into consideration does not change the value of the rate base and consequently does not depart from original cost ratemaking principles. Adjusting for differences in leverage *does* consider the fact that the more debt a company has, the higher is the financial risk associated with an equity investment in that company.[173]

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[172] 2013 GCOC Decision, ¶141.

[173] 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.

As discussed in Section III.C above, I present two sets of cost of equity results and ROE recommendations: one set based on my recommended equity capital structure of 40% and the other that would apply if the Commission maintains its current benchmark equity thickness of 37%. Regardless of the equity determination, AUI merits a 400 bps adder.

C. THE CAPM BASED COST OF EQUITY ESTIMATES

Q74. Please briefly explain the CAPM.

A74. 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:

$$\boldsymbol{r_s = r_f + \beta_s \times MERP} \qquad (1)$$

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

Q75. What inputs does your implementation of the CAPM require?

A75. 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 Section B of the Technical Appendix to this 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.

a. Risk-free rate

Q76. What values do you use for the risk-free rate of interest?

A76. 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 for the years 2021 and 2022, I rely on the average of the forecast of what Canadian Government bond yields will be over the relevant period for this proceeding (2021-2022). Specifically, Consensus Forecasts predicts that the yield on a 10-year Government Bond will be 2.2% by 2021 and 2.7% by 2022, for average of 2.45% over the relevant period.[174] As noted in Mr. Buttke's evidence, rates forecasted for the GCOC period are likely negative or near negative real rates due to ongoing effects of quantitative easing and FTQ.[175] However, to be conservative and reasonable, I do not add a premium onto expected rates to adjust for this. However, I do adjust the forecasted value upward by 40 basis points, which is my estimate of the representative maturity premium for the 30-year

[174] Consensus Forecasts October 2019 survey. p. 28.

[175] Buttke Evidence, Q/A 40, 41.

over the 10-year Government Bond.[176] This gives me a lower bound on the risk-free rate of 2.85%.

I also consider a scenario in which the appropriate risk-free rate of interest is 3.10%. Thus, I consider a scenario where 25 basis points reflect downward pressure on the government bond yield or an increase in the MERP.[177] It also reflects the fact that (as discussed above in Section IV) economic forecasts are for 10-year government bond yields to increase over the next several years to about 2.7% by 2022.[178]

b. Market Equity Risk Premium

Q77. What values do you use for the market equity risk premium (MERP)?

A77. 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 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.[179] The average market equity risk premium from 1935 to the present is 5.5% with slightly shorter or longer periods resulting

[176] This maturity premium is estimated by comparing the average excess yield on 30-year versus 10-year Canadian Government Bonds over the period 1990 - 2019, using data from Bloomberg.

[177] As of November 30, 2019, the spread between utility and government bond yields was elevated by approximately 31-44 basis points relative to the historical norm, so the application of only 25 basis points as an upward adjustment to the risk-free interest rate is conservative.

[178] Consensus Forecasts, October 2019, p. 28.

[179] See *Duff and Phelps Valuation Handbook - International Guide to Cost of Capital, 2019,* pp. 3-9 for details.

in slightly higher or lower MERPs.[180] I use this value of the MERP in one input scenario to my CAPM analyses.[181]

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 7.0% for the Canadian market equity risk premium.[182] The 7.0% forecasted MERP is in line with the average of Bloomberg's forecasted Canadian and U.S. MERP as shown in Figure 5. In addition, as mentioned in Section IV, FERC measured the U.S. MERP to be 8.85% in its most recent decision. This forecasted MERP is also in line with the one the Commission used in the 2018 GCOC Proceeding.[183] I have determined my forecasted MERP input utilizing both the Canadian forecast and the U.S. forecast because of the substantial interaction of the two markets.

Q78. What is the evidence that the current MERP is higher than its historical average?

A78. As discussed in Section IV and in the technical appendix to this evidence, lingering elevation in credit spreads relative to their pre-financial crisis levels is broadly consistent with the forward-looking MERP's calculated by Bloomberg and shown in Figure 12, which demonstrates that the forward-looking MERP for Canada currently is about 7.24% and higher than the U.S. forecast. The six month average for the forward-looking Canadian MERP is 7.28%, after accounting for the maturity premium between 10-year government bonds used in their model and 30-year Government bonds that form the risk-free rate in

[180] See *Duff and Phelps Valuation Handbook - International Guide to Cost of Capital*, 2019, Exhibit 1-9

[181] Relative to my 2018 GCOC Evidence, I recognize the empirical evidence and have reduced the historical MERP by 20 bps and the upper bound MERP by 100 bps.

[182] Over a 30-year government bond, the Canadian MERP is 6.84%, which is high relative to the forecasted U.S. MERP of 6.22%. (*See* BV WP01.)

[183] 2018 GCOC Decision, ¶354.

this proceeding. The forecasted U.S. MERP is lower and is currently at 6.72%. The six month average for the U.S. forecasted MERP, when adjusting to a 30-year Government bond, is 6.66%. This is slightly lower but close to its long-term historical average of approximately 7.0%, when considered relative to a 30-year Treasury bond.

Therefore, I rely on an estimate of 7.0% for the forward-looking MERP in consideration of the evidence in both (Canadian and U.S.) markets. Thus, I conservatively rely on the historical average Canadian MERP of 5.5% in one scenario as well as a forward-looking MERP of 7.0% in a second scenario for my CAPM based cost of equity analysis.[184] A plausible explanation as to why the MERP differs across countries is that historically the return data relied upon came from a different composition of traded entities and going forward the differences in the composition of the local index will lead to differences in realized and expected returns.[185]

c. Betas

Q79. What betas did you use for the companies in your sample?

A79. I used adjusted historical betas obtained from Bloomberg, using weekly returns over a three-year historical estimation period.[186] For the Canadian Utility Sample, I used the S&P/TSX as the measure of overall market returns, but for the U.S. samples, I relied on the S&P 500 as the market proxy.

The levered equity betas for the sample companies and the simple average betas for each sample are reported above in Figure 14, Figure 16, Figure 17, Figure 18, and Figure 19. Importantly, however, the financial leverage inherent in the sample company capital

[184] I use 7.0% 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 Canadian utility and government bond yields. See Appendix B, Section II for details.

[185] Notably, the composition of the S&P/TSX is different from the composition of the S&P 500.

[186] 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.

structures varies both within and across the samples. Consequently, as discussed in Sections III.C and V.B above and as well as in the Technical Appendix to this evidence, I apply two formulations of the Hamada equation to unlever the individual sample company betas and relever each sample's average asset beta at the applicable regulatory capital structure. Figure 20 below summarizes this, based on my recommended deemed capital structure of 40% equity / 60% debt.

Figure 20
Unlevering and Relevering Measured Equity Betas for the Samples

		As Measured			Unlevered Betas		Betas Relevered at 40% Equity Ratio	
Sample		Levered Equity Beta	% Debt	% Preferred Equity	Asset Beta (without tax)	Asset Beta (with tax)	Hamada (without tax)	Hamada (with tax)
Canadian Utility	[a]	0.67	49%	5%	0.36	0.39	0.81	0.78
Electric	[b]	0 54	39%	0%	0.35	0.38	0.81	0.76
Gas LDC	[c]	0.59	31%	0%	0.43	0.45	0.99	0.92
Water	[d]	0.68	25%	0%	0.52	0.55	1.22	1.12
Pipeline	[e]	0.99	40%	2%	0.61	~~0.66~~ **0.67**	~~1.45~~ **1.46**	1.37

Sources and Notes:
[a] - [e]: See Tables BV-13 and BV-14.

Q80. How do you respond to the Commission's determinations with respect to beta in the 2018 GCOC Decision?

A80. The Commission took an average of certain beta estimates offered by the various experts in that proceeding (myself, Dr. Cleary, Mr. Coyne, and Mr. Hevert), to arrive at an average of 0.686.[187] The estimates included in the Commission's average ranged from Dr. Cleary's recommended 0.45 estimate at the low end and a value of 0.95 at the high end, derived from my Canadian utility sample in that proceeding.[188]

I note that while the Commission stated it was "not persuaded that weekly betas are clearly superior in all instances to monthly betas,"[189] except for Dr. Cleary's low-end recommendation all the beta estimates considered as part of the Commission's average

[187] 2018 GCOC Decision, ¶354, including footnote 477.

[188] 2018 GCOC Decision, ¶349 and 354, including footnote 477.

[189] 2018 GCOC Decision, ¶344

were estimated based on a *weekly* frequency of returns over a 3-year or 5-year historical period.[190] Consistent with my recommendation in prior proceedings, I continue to rely on Bloomberg for levered equity betas estimated using 3 years of historical weekly return data. In addition to the fact that weekly return data has increasingly become the standard among practitioners and commercial finance data providers such as Bloomberg and Value Line, I emphasize that my 2018 GCOC rebuttal evidence demonstrated that weekly betas have exhibited much better statistical precision and reliability over time compared to historical beta estimates derived from monthly returns.[191]

Similarly, except for Dr. Cleary's low-end recommendation, the beta estimates included in the Commission's average universally applied the standard Blume adjustment to derive a better forward-looking estimate of beta from the raw regression based on historical data.[192] Though the Commission indicated it held lingering doubts about whether "adjusted betas are superior to unadjusted betas in the context of regulated utilities,"[193] it remains true, as the Commission stated in its 2016 GCOC Decision, that the Blume adjustment "is a common approach used by commercial providers of financial data and this information is widely disseminated to investors."[194] Additionally, I note that the central empirical findings underlying the Blume adjustment was observed based on a portfolios constructed from the entire stock market, including *all* industries and featuring samples spanning from very low to very high systematic risk and everywhere in between. Thus, there is no support for the notion that that utility stocks (or stocks of any particular industry) would constitute a

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[190] 2018 GCOC Decision, ¶354, footnote 477. In addition to my own beta estimates derived using weekly return data over a 3-year historical window, the Commission considered beta estimates provided by Mr. Coyne and Mr. Hevert, which were also derived using weekly data, but over a 5-year estimation window. *See* 22570_X0193.01 (2018 GCOC Villadsen Evidence), PDF 61; 22570_X0131 (2018 GCOC Coyne Evidence), PDF 48-54; 22570_X0153 (2018 GCOC Hevert Evidence), PDF 76-84 and 106.

[191] *See* 22570_X0767.01 (2018 GCOC Villadsen Rebuttal Evidence, including Appendix A), PDF 46-48 and 126-133; *see also* 2018 GCOC BV Workpaper R06_TSX_Util_Betas_CONF.xlsx.

[192] *See* 22570_X0193.01 (2018 GCOC Villadsen Evidence), PDF 61; 22570_X0131 (2018 GCOC Coyne Evidence), PDF 48-54; 22570_X0153 (2018 GCOC Hevert Evidence), PDF 76-84 and 106.

[193] 2018 GCOC Decision, ¶346

[194] 2016 GCOC Decision, ¶180.

particular exception to the evidence supporting the use of adjusted betas in forward-looking implementations of the CAPM.[195]

Q81. What are the most important factors to consider when assessing a range of beta estimates produced based on different companies and samples?

A81. As I testified in the last GCOC,[196] the variation in estimated beta values derived based on the stock return data of different sample companies reflects variations due to two factors: (i) differences in systematic market risk among the individual companies, and (ii) idiosyncratic measurement error.

The latter factor is best minimized by obtaining relatively more representative data points for the statistical estimation (*e.g.*, by using weekly return observations over a recent multi-year period) and by averaging estimates across the constituent members of a large representative sample.

With respect to the first factor, variation in systematic risk of equity investments is driven by differences in both *business risk* and *financial risk.* The cost of capital analyst's goal to isolate the contribution of comparable *business risk* factors to measured beta estimates for sample companies, by controlling for the impact of differing degrees of financial leverage on the financial component of the measured systematic risk. This is done by unlevering the measured betas for the sample companies based on their market value capital structures. The resulting *unlevered* or *assets beta* reflects only the systematic risk attributable to business risk factors. These asset betas are then relevered to the target company's debt percentage to properly reflect the impact of financial leverage.

Figure 20 illustrates the importance of this approach. For example, while the average measured levered equity betas (left panel of Figure 20) for my Canadian utility and Water utility samples have similar average values of 0.67 and 0.68, respectively, the Canadian sample has significantly higher average debt leverage ~~47%~~ **49%** (with 5% preferred equity)

[195] *See* 22570_X0767.01 (2018 GCOC Villadsen Rebuttal Evidence, including Appendix A), PDF 140-142.

[196] *See* 22570_X0193.01 (2018 GCOC Villadsen Evidence), PDF 102-106.

compared to 25% for the Water utilities. Thus, financial risk contributes more to the systematic risk measured for the publicly traded stock of the Canadian sample as compared to the Water sample. As such, when the betas are unlevered to control for the differing financial leverage, the resulting asset betas (middle panel of Figure 20) are noticeably lower for the Canadian utility sample and higher for the Water sample.[197]

Ultimately, if the levered betas measured for the sample companies are not unlevered and then relevered at the target capital structure, a cost of equity analysis and ROE recommendation based on those betas fails to properly account for financial risk. Importantly, as Figure 20 shows, *all* of the samples in my analysis have significantly less debt leverage than that inherent in the 40% equity / 60% debt capital structure that is deemed as the basis for the Utilities rates. Therefore, relevering the betas for the samples at that capital structure yields higher betas compared to those directly measured based on the sample companies' stock return data.

2. The Empirical CAPM

Q82. What other equity risk premium model do you use?

A82. 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.[198] 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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[197] The effect can also be seen in the inverse direction by comparing the Canadian utility and Electric samples. While, controlling for differences in leverage demonstrates the two samples have similar average levels for the unlevered assets betas (middle panel of Figure 20), the levered equity betas (left panel of Figure 20) measured for the Canadian utility sample is higher as a result of the greater financial risk inherent in the more levered capital structure.

[198] *See* Figure A-3 in Appendix B (Technical Appendix) to this evidence 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,

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

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.

Q83. Why do you use the ECAPM?

A83. The 2018 GCOC Decision did "not assign significant weight to the ECAPM,"[199] but found that the ECAPM was an attempt to provide a practical solution to the empirical observation that the SML is too steep.[200] While I acknowledge that the data relied upon for the ECAPM dates back to the early 2000s or before, I (i) continue to find the model provides useful information about the cost of equity and (ii) have found that the necessary data for a multi-factor model are not readily available.

Looking to the model, 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. Section II of my Technical Appendix

[199] 2018 GCOC, ¶373.

[200] 2018 GCOC, ¶368.

discusses the empirical findings that have tested the CAPM and also provides documentation for the magnitude of the adjustment, α.

The 2016 GCOC Decision recognized the ECAPM as a valid and academically supported model that can "improve upon CAPM results" by addressing the established empirical observation that the risk-return relationship in equities is steeper than the security-market line (SML) assumed by the traditional CAPM.[201] I concur. However, in its 2018 GCOC Decision the Commission stated its preference to use multi-factor models to improve the CAPM results, rather than relying on empirical adjustment factors as done in ECAPM.[202] I respectfully disagree that multi-factor models (MFM) are superior for improving CAPM results. Research of MFM finds that the results from MFM are highly sensitive to the factor chosen to construct the model.[203] Research, including by Fama and French, has identified a number of additional factors, such as momentum or profitability, such that no consensus currently exists on the appropriate factors to use in MFM models.[204] Furthermore, studies have shown that MFM parameters are not stable and sensitive to changes in the time horizon.[205] Instead of estimating the premium associated with a single risk factor—the MERP—application of MFM to derive prescriptive forward-looking cost of equity estimates requires estimates of multiple risk premiums, many of which can only be derived based on long-term historical averages.[206] As a result of the complexity and potential controversy around factor premium estimation data and methods, MFM are frequently not

[201] 2016 GCOC Decision, ¶194-199.

[202] 2018 GCOC Decision, ¶373

[203] M. Michou, S. Mouselli, A. Start, "On the differences in measuring SMB and HML in the UK – Do they matter?" *British Accounting Review* 30 (2014): 12.

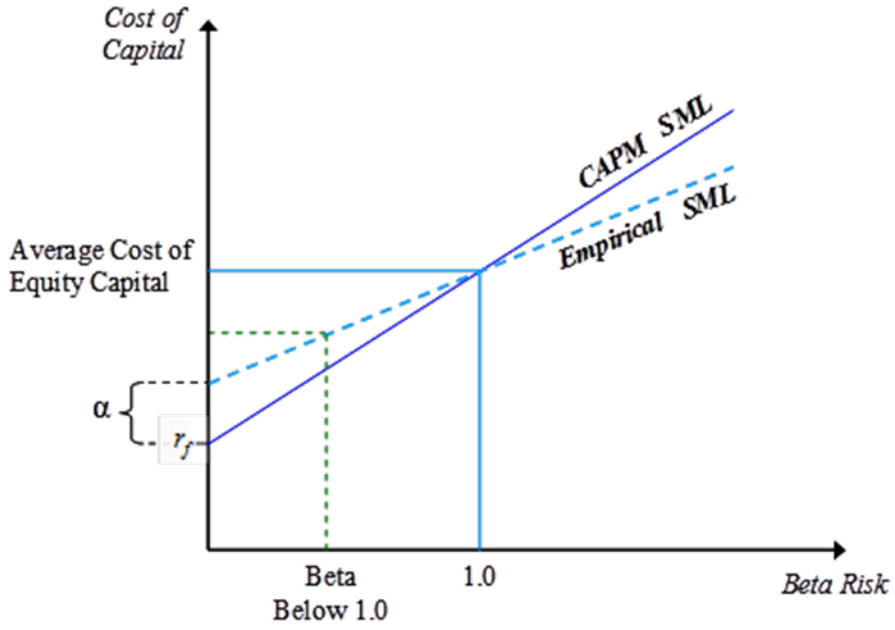
[204] John Cochrane, "Presidential address: discount rates," *Journal of Finance* 66 4 (2011) 1047-1108.

[205] Josef Lakonishok, Robert Vishny, Andrei Shleifer, "Contrarian Investment, Extrapolation and Risk," 49 5 (1994), pp. 1541-1578.

[206] Jonathan Berk and Peter DeMarzo, *Corporate Finance: The Core*, 3rd edition, 2013, (Berk & DeMarzo 2014) p. 463.

used in regulatory decisions.[207] Therefore, while I recognize the merits of multifactor models to attempt to explain *why* observed asset returns have diverged from CAPM predictions, I respectfully submit that the ECAPM remains a reasonable practical alternative to directly address the academically documented empirical tendency of the traditional CAPM to reflect too steep a risk-return relationship.[208]

Figure 21
The Empirical Security Market Line



[207] For example, versions of Fama French models have been filed in a number of regulatory proceedings in Australia, but the Australian Energy Regulator has to date not incorporated such models in the ROE determination as the regulator found that "[a] number of the other models proposed appear to be more focused on the tasks of identifying relationships that may explain past stock outcomes, rather than estimating an expected return on equity commensurate with the risks of" a relevant utility." Australian Energy Regulator, "Draft Decision – Jemena Gas Networks (NSW) Ltd., Access arrangement 2015-20," p. 3-27 and 3-28.

[208] Should multi-factor models such as the Fama French 3-factor or 5-factor model prove to result in stable and consistent results, I am not opposed to include such models in the toolkit.

3. Results from the CAPM Based Models

Q84. Please summarize the parameters of the scenarios and variations you considered in your CAPM and ECAPM analyses.

A84. The parameters for the two scenarios are displayed in Figure 22 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 22. Consistent with the Commission's expressed concern in past GCOC Decisions, 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. I also note that I rely on less than one half of the current spread to ensure conservatism given that interest rates are expected to increase and given that the Bank of Canada has not engaged in quantitative easing.

Figure 22
Risk Positioning Scenario Parameters

	Scenario 1	Scenario 2
Risk-Free Interest Rate	3.10%	2.85%
Market Risk Premium	5.50%	7.00%

Q85. Can you summarize the results from applying the CAPM-based methodologies?

A85. Yes. The results for the five samples are presented in Figure 23, Figure 24, Figure 25, and Figure 26, and Figure 27 below.[209] Consistent with Commission precedent, I have included a 50 basis point flotation cost allowance as an adder to all of my estimates. In the interest of displaying the results more compactly, the tables report ranges reflecting differences due to (i) estimation using the portfolio beta approach vs. taking the sample average of results estimated using individual company betas, and (ii) employing subtly different formulas in the financial risk adjustment calculations.

[209] Tables and supporting schedules detailing my cost of capital calculations for the Canadian Utility sample are contained in my electronic workpapers labeled BV WP05, while the Electric sample, Gas LDC sample, Water sample, and Pipeline sample calculations are contained in my electronic workpapers labeled BV WP06.

Figure 23
Canadian Utility Sample CAPM Results[210]

	Deemed Common Equity Percentage			
	40%		37%	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
	[1]	[2]	[3]	[4]
Full Sample				
CAPM	7.9% - 8.4%	8.8% - 9.3%	8.2% - 8.8%	9.2% - 9.8%
ECAPM (α = 1.5%)	8.2% - 8.9%	9.1% - 9.8%	8.4% - 9.4%	9.4% - 10.4%

Sources and Notes:
With Leverage Adjustments
Scenario 1: Long-Term Risk Free Rate of 3.10%, Long-Term Market Risk Premium of 5.50%.
Scenario 2: Long-Term Risk Free Rate of 2.85%, Long-Term Market Risk Premium of 7.00%.
Includes flotation costs of 0.5%.

Figure 24
U.S. Gas LDC Sample CAPM Results

	Deemed Common Equity Percentage			
	40%		37%	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
	[1]	[2]	[3]	[4]
Gas Sample				
CAPM	8.7% - 9.6%	9.8% - 10.7%	9.0% - 10.1%	10.2% - 11.3%
ECAPM (α = 1.5%)	8.8% - 10.7%	9.9% - 11.8%	9.0% - 11.3%	10.2% - 12.5%

Sources and Notes:
Scenario 1: Long-Term Risk Free Rate of 3.10%, Long-Term Market Risk Premium of 5.50%.
Scenario 2: Long-Term Risk Free Rate of 2.85%, Long-Term Market Risk Premium of 7.00%.
Includes flotation costs of 0.5%.

[210] Note that setting alpha (a) equal to 1.5% is a conservative estimate according to the academic research listed in the technical appendix, Figure A-3.

Figure 25
U.S. Electric Sample CAPM Results

	Deemed Common Equity Percentage			
	40%		37%	
	Scenario 1 [1]	Scenario 2 [2]	Scenario 1 [3]	Scenario 2 [4]
Electric Sample				
CAPM	7.8% - 8.5%	8.7% - 9.3%	8.1% - 8.9%	9.1% - 9.8%
ECAPM (α = 1.5%)	8.2% - 9.6%	**9.0%** ~~9.1%~~ - 10.4%	8.4% - 10.1%	9.3% - 11.0%

Sources and Notes:
Scenario 1: Long-Term Risk Free Rate of 3.10%, Long-Term Market Risk Premium of 5.50%.
Scenario 2: Long-Term Risk Free Rate of 2.85%, Long-Term Market Risk Premium of 7.00%.
Includes flotation costs of 0.5%.

Figure 26
U.S. Water Utility Sample CAPM Results

	Deemed Common Equity Percentage			
	40%		37%	
	Scenario 1 [1]	Scenario 2 [2]	Scenario 1 [3]	Scenario 2 [4]
Water Sample				
CAPM	9.8% - 11.0%	11.2% - 12.4%	10.2% - 11.6%	11.7% - 13.2%
ECAPM (α = 1.5%)	9.6% - 11.9%	11.0% - 13.3%	9.9% - 12.6%	11.4% - 14.2%

Sources and Notes:
Scenario 1: Long-Term Risk Free Rate of 3.10%, Long-Term Market Risk Premium of 5.50%.
Scenario 2: Long-Term Risk Free Rate of 2.85%, Long-Term Market Risk Premium of 7.00%.
Includes flotation costs of 0.5%.

Figure 27
U.S. Pipeline Sample CAPM Results

	Deemed Common Equity Percentage			
	40%		37%	
	Scenario 1 [1]	Scenario 2 [2]	Scenario 1 [3]	Scenario 2 [4]
Pipeline Sample				
CAPM	11.1% - ~~12.0%~~ **12.1%**	12.9% - 13.8%	11.7% - 12.8%	13.6% - 14.7%
ECAPM (α = 1.5%)	10.6% - 12.1%	12.4% - 13.9%	11.0% - 12.8%	12.9% - 14.7%

Sources and Notes:
Scenario 1: Long-Term Risk Free Rate of 3.10%, Long-Term Market Risk Premium of 5.50%.
Scenario 2: Long-Term Risk Free Rate of 2.85%, Long-Term Market Risk Premium of 7.00%.
Includes flotation costs of 0.5%.

Q86. How do you interpret the results of your CAPM and ECAPM analyses?

A86. Looking at the various samples, the model results vary over a wide range. However, as discussed in the evidence of Dr. Carpenter, the business risk of the Utilities is likely to be similar to that of the Gas LDC and Water Utility samples and lower than that of the U.S. Pipeline sample. Therefore, I focus my discussion of the recommendation on the Gas LDC and Water Utility samples, while continuing to evaluate how the other samples inform the recommendation. In addition, I discuss my recommendation for 2021-2022 relative to my recommendation in the 2018 GCOC and the 2016 GCOC Decision.

Relative to the 2018 GCOC proceeding, the forecasted risk-free rate has decreased, so it is not surprising that the CAPM results are slightly lower for the Gas LDC sample compared to my analysis for the 2018 GCOC. The CAPM results for the Gas LDC sample are in a range of 8.7 – 11.8% at 40% equity capital structure and 9.0 – 12.5% at the Commission's current 37% benchmark equity thickness. By focusing on overlapping results within the ranges produced Scenarios 1 and 2 as well as the traditional CAPM and ECAPM estimates, I interpret these results to be consistent with a reasonable range of 9.5% to 10.5% cost of equity at 40% equity capital structure and 10.0% to 11.0% at 37% equity.

Looking next to the Water Utility sample, I find results in the range 9.6% to 13.3% at 40% equity capital structure, and 9.9% to 14.2% at the Commission's current 37% benchmark equity thickness. I interpret the results to be consistent with a reasonable range of 10.0% to 11.0% estimated cost of equity at 40% equity capital structure and 10.5% to 11.5% cost of equity at 37% equity.[211]

In developing my judgement as to what constitutes a reasonable range of CAPM-based cost of equity estimates, I look to both CAPM and ECAPM, noting that the ECAPM is sometimes higher (*e.g.*, for the Electric sample) and sometimes lower (*e.g.*, in some cases for the Water sample) than the CAPM results. The Water sample generally corroborates

[211] For both the Gas LDC and Water Utility sample, I disregarded the highest and lowest results in identifying ranges. For all samples, I focused on the tendency of the estimates. I eliminated outliers to arrive at a reasonable range and attempt to narrow that range to 100 bps.

the high end of the Gas LDC sample range, while the Canadian utility and Electric sample results are directionally lower. While I do not rely on the Pipeline sample, it directionally points to a higher return on equity. As discussed previously, I utilize the Pipeline sample solely to indicate an upper bound.

Figure 28
Ranges of CAPM Based Cost of Equity Estimates (%)

Sample	Reasonable Range 40%	Reasonable Range 37%
Gas LDC	9.5% – 10.5%	10.0% – 11.0%
Water	10.0% – 11.0%	10.5% – 11.5%

In consideration that the Gas LDC sample results are bounded closely above by the Water sample results and below by those from the Canadian utility and Electric samples, I find the 9.5% to 10.5% Gas LDC sample range is representative at 40% benchmark deemed equity (44% for AUI). I judge that the corresponding CAPM-based reasonable range is 10.5% to 11.0% if results are measured based on 37% benchmark deemed equity (41% for AUI).[212]

D. THE DCF BASED ESTIMATES

1. Single- and Multi-Stage DCF Models

Q87. Can you describe the discounted cash flow approach to estimating the cost of equity?

A87. 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:

[212] I note that my conclusion regarding the reasonable ranges of ROE at 37% vs. 40% benchmark deemed equity ratio has no bearing on the recommendation that AUI should be granted a 400 bps equity thickness premium above the benchmark capital structure in accordance with its business risk.

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

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 received; and

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

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 lasts into perpetuity, so the formula can be rearranged algebraically to directly 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:

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

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.

Q88. Are there other versions of the DCF model?

A88. 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).[213] One

[213] 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.

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. [214]

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).

Q89. Are there advantages to the multistage DCF relative to the single-stage DCF?

A89. 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.[215]

Q90. What are the relative strengths and weaknesses of the DCF versus CAPM based methodologies for estimating the cost of equity capital?

A90. 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.

[214] 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.

[215] 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)

2. DCF Inputs and Results

Q91. What growth rate information do you use?

A91. 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 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.[216]

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 3.73% from Consensus Forecasts.[217] I use the most recent long-run U.S. GDP growth forecast of 4.24% from Consensus Forecasts for the U.S. samples.[218] Thus, the long-run (or terminal) growth rate in the multi-stage model is nominal GDP growth.

Q92. What are the pros and cons of the input data?

A92. 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.[219]

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[216] Since *Value Line* does not cover all Canadian companies in my sample, for those companies not followed by *Value Line*, I used only the consensus mean EPS growth rate estimates from Thomson Reuters IBES.

[217] Calculated using a forecasted 1.7% real GDP growth and 2.0% consumer price inflation for 2025-2029 [(1.017) * (1.020) - 1 = 3.73%], Consensus Forecasts, October 2019, p. 28. This figure is higher than the growth realized in Q2, 2019.

[218] Calculated using a forecasted 2.0% real GDP growth and 2.2% consumer price inflation for 2025-2029 [(1.020) * (1.022) - 1 = 4.24%], Consensus Forecasts, October 2019, p. 3.

[219] In the case of the Consensus Forecasts estimates of GDP growth, the horizon of the forecasts is 2025-2029.

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 underestimate the cost of equity for these companies.

Q93. What are the DCF based cost of equity estimates for the samples?

A93. The results are presented in Figure 29, Figure 30, Figure 31, Figure 32, and Figure 33 below.[220] 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 differences in financial leverage.

Figure 29
Canadian Utility Sample DCF Results

	Deemed Common Equity Percentage	
	40%	37%
Sample		
Simple	12.5%	13.3%
Multi-Stage	10.8%	11.5%

Sources and Notes:
Includes flotation costs of 0.5%

[220] Tables and supporting schedules detailing my cost of capital calculations for the Canadian Utility sample are contained in my electronic workpapers labeled BV WP05, while the Electric sample, Gas LDC sample, Water sample, and Pipeline sample calculations are contained in my electronic workpapers labeled BV WP06.

Figure 30
U.S. Gas LDC Utility Sample DCF Results

	Deemed Common Equity Percentage	
	40%	37%
Gas Sample		
Simple	14.5%	15.4%
Multi-Stage	11.2%	11.8%

Sources and Notes: Includes flotation costs of 0.5%.

Figure 31
U.S. Electric Utility Sample DCF Results

	Deemed Common Equity Percentage	
	40%	37%
Electric Sample		
Simple	11.9%	12.6%
Multi-Stage	10.9%	11.6%

Sources and Notes: Includes flotation costs of 0.5%.

Figure 32
U.S. Water Utility Sample DCF Results

	Deemed Common Equity Percentage	
	40%	37%
Water Sample		
Simple	15.3%	16.3%
Multi-Stage	10.2%	10.8%

Sources and Notes: Includes flotation costs of 0.5%.

Figure 33
U.S. Pipeline Sample DCF Results

	Deemed Common Equity Percentage	
	40%	37%
Pipeline Sample		
Simple	24.5%	26.2%
Multi-Stage	21.1%	22.5%

Sources and Notes: Includes flotation costs of 0.5%.

Q94. How do you interpret the results of your DCF analyses?

A94. The range of results are slightly higher but broadly supportive of the results from the CAPM-based analysis. Relative to the 2018 GCOC, the results from the samples are similar. The exception is the Pipeline sample where the range of results narrowed. However, because the growth rates for the pipelines are substantially higher than those of other utilities, I do not place any weight on the Pipeline sample DCF results.

For the same reasons as discussed above, I focus on the Gas LDC and Water Utility samples. Looking at the Gas LDC, the data shows a range of 11.2% to 14.5% at a 40% deemed equity ratio and 11.8% to 15.4% at 37% equity ratio. For the Water Utilities sample, the data shows a range of 10.2% to 15.3% at 40% and 10.8% to 16.3% at 37%.

In the 2018 GCOC Decision, the Commission acknowledged that it is appropriate to use company-specific growth rates growth rates in the initial stages of the multi-stage DCF before converging to the expected long-term nominal growth rate of GDP for the final stage,[221] but declined to rely on implementations of the "simple" results that applied a company-specific growth rates in a single stage. Consistent with this, I rely on the multi-stage DCF results to inform my recommendations.[222] Consequently, to a reasonable degree of precision, I interpret the multi-stage DCF result from the Gas LDC sample is consistent

[221] 2018 GCOC Decision ¶438 and 441.

[222] I rely on company specific growth rates for the first 5 years and then a combination of company-specific and GDP growth for years 6 through 10 after which all growth rates are based on GDP.

with 11 ¼ percent ROE at 40% equity capital structure and 11 ¾ percent ROE at 37% equity. Similarly, I find the Water sample multi-stage DCF results suggest a reasonable ROE of 10 ¼ percent at 40% equity capital and 10 ¾ percent at 37% equity.

In summary, I find the multi-stage DCF results for the Gas LDC and Water samples are consistent with a reasonable range of to 10 ¼ to 11 ¼ percent cost of equity at 40% equity capital structure (44% for AUI) and a cost of equity range that is approximately 50 bps higher (10 ¾ to 11 ¾) if the deemed equity ratio is 37% equity (41% for AUI).[223] I note that the multi-stage DCF results derived based on the Canadian utility and Electric samples fall within these ranges.

Figure 34
Ranges of DCF Based Cost of Equity Estimates (%)

Sample	Reasonable Estimate at 40% Equity	Reasonable Estimate at 37% Equity
Gas LDC	11.25%	11.75%
Water	10.25%	10.75%
DCF-Indicated Range	10.25% – 11.25%	10.75 – 11.75%

VI. RECOMMENDED ROE AND CAPITAL STRUCTURES

Q95. Please briefly reiterate your recommendation with respect to capital structure?

A95. I recommend that the equity thickness be set to meet all components of the fair return standard, including consideration of comparable returns as well as capital attraction and financial integrity.

I recommend that the Commission establish a benchmark equity thickness of 40%, which—while at the low end of allowed equity ratios for comparable Canadian utility companies and far below what is typical for U.S. companies—would (if combined with an appropriate ROE as discussed below) permit the Utilities not only to meet credit metric

[223] I note that my conclusion regarding the reasonable ranges of ROE at 37% vs. 40% benchmark deemed equity ratio has no bearing on the recommendation that AUI should be granted a 400 bps equity thickness premium above the benchmark capital structure in accordance with its business risk.

thresholds for an A range rating, but also offer risk-comparable equity returns. I recommend that the ATCO Utilities and FA receive the benchmark deemed equity thickness consistent with the 2018 GCOC determination. However, I recommend the Commission return AUI to an equity thickness 400 bps above the benchmark level. This is consistent with Dr. Carpenter's finding that the business risk of AUI merits an additional 400 bps of equity.

Figure 35
Recommended Capital Structures for the Utilities

	Recommended for 2021-2022 (%)	Allowed in 2018-2020 (%)	Recommended Increase (%)
ATCO Electric Transmission	40	37	+3
ATCO Electric Distribution	40	37	+3
ATCO Pipelines	40	37	+3
ATCO Gas	40	37	+3
FortisAlberta	40	37	+3
AltaGas Utilities	44	39	+5

Q96. What do you conclude regarding the required ROE?

A96. My primary ROE recommendations are based on CAPM and DCF model estimates that have been unlevered and relevered to apply to a 40% benchmark equity capital structure. Consequently, the comparability standard is met by applying those recommendations at that equity ratio. However, I offer an alternative recommended ROE in the event the Commission elects to maintain the benchmark equity thickness at 37%.

As discussed above, I focus on the gas LDC and water utilities, which indicates that at 40 percent equity a benchmark ROE of 9.5 to 10.5 percent is warranted. This range is supported by the CAPM / ECAPM for the Gas LDC sample and towards the bottom of the CAPM-based range from the Water sample and the estimates from the multi-stage DCF model. It is also consistent with my recommendation in the 2018 GCOC, where I recommended 10 percent on 40 (44 for AUI) percent equity and recognized the lower

interest environment – yet acknowledged the, on average, higher growth and equity percentages. The midpoint of 10% is a good point estimated at the equity percentages indicated in the table above.[224] The midpoint of 10 percent is fully supported by the CAPM model using the Hamada approach and below the multi-stage DCF estimates for the Gas LDC and Water utility samples.

Should the Commission choose to maintain the 37 percent equity as a benchmark (41 percent for AUI), I recommend the allowed ROE be increased by 50 basis points to a point estimate of 10.5 percent within a range of 10 to 11 percent. This is again consistent with the corresponding reasonable ranges supported by the CAPM-based result—and at the low end of the range supported by the multi-stage DCF results—when estimated based on a 37% equity target capital structure.

VII. APPLICABILITY OF AN ANNUAL FORMULA ROE

Q97. What is the purpose of this section of your testimony?

A97. As pertains to the Commission's questions regarding formula ROE inquiries, the Utilities have asked me to opine on whether such a formula for annually updating the allowed ROE should be implemented starting in 2021.

Q98. How has the Commission acted in the past with respect to applying a formula for annual adjustments to the allowed ROE?

A98. In the 2004 GCOC, the Commission implemented an automatic adjustment mechanism that consisted of a base ROE and an annual adjustment factor based on changes in the forecast long-term Canadian government bond yield.[225] However, the Commission discontinued the formula in the 2009 GCOC proceeding. The Commission's primary justification for suspending the formula at that time was its finding that the "traditional relationships between Government of Canada 30-year bond rates and market equity returns

[224] I note that 10 percent at 40 percent equity is between the CAPM and multi-stage DCF results for the Canadian and Electric utility samples.

[225] AUC Decision 2004-052 ("2004 GCOC Decision"), p. 32.

did not continue through the entire period of 2004 to the present."[226] Further, the Commission noted that "there remains a considerable amount of uncertainty in the financial markets and the Commission is concerned that awarding a generic ROE that does not take these uncertainties into account would be unreasonable."[227]

In subsequent GCOC proceedings, the Commission repeatedly considered reintroducing the formula, but ultimately refrained from doing so, each time determining that market conditions were not conducive to such an action.[228] However, in the 2018 GCOC, the Commission noted that it would like to consider reintroducing a formula ROE if the market conditions that justified the 2009 abandonment of the formula have changed.[229]

Q99. How has the use of formulaic approaches to annually adjusting ROE evolved historically in other Canadian regulatory jurisdictions?

A99. Like the AUC, other Canadian jurisdictions have implemented annual ROE adjustment formulas in the past, but the majority abandoned them in the wake of the financial crisis, when they were considered unworkable in the extreme low interest rate environment. The Canadian Energy Regulator ("CER," formerly the National Energy Board or "NEB"), discontinued its automatic adjustment mechanism in 2009, citing the "considerable changes in financial and economic circumstances" in the 15 years since the establishment of the formula.[230]

Also in 2009, the British Columbia Utilities Commission ("BCUC") decided to discontinue the application of its formula ROE mechanism. According to the BCUC, "a key consideration in the determination of whether to retain, amend or eliminate the AAM

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[226] 2009 GCOC Decision, ¶417.

[227] 2009 GCOC Decision, ¶330.

[228] AUC Decision 2011-474 ("2011 GCOC Decision"), ¶166, 2013 GCOC Decision, ¶414, 2016 GCOC Decision, ¶17.

[229] 2009 GCOC Decision, ¶505, 506.

[230] National Energy Board, "Letter Decision – Review of the Multi-Pipeline Cost of Capital Decision (RH-2-94)," October 8, 2009, p. 3.

[Automatic Adjustment Mechanism] is whether the ROE produced by application of the formula for 2010 is reasonably comparable to the ROE determined by the Commission Panel from the evidence before it." [231] As the ROE determined by the BCUC produced a fair return that diverged significantly from that produced by the formula ROE mechanism, the BCUC eliminated the formula in order to protect the fair return standard. The BCUC described the departure between bond yields and the cost of equity as an example of the inability of "a single variable… to capture the many causes of changes in ROE."[232] The BCUC also acknowledged the downward pressure on long-term Canada bonds and the change in the pricing of risk.[233]

In both cases, the regulators halted the use of a formula mechanism after recognizing that they could not rely on the unusually low interest rates characteristic of the post-financial crisis period to capture the risk facing utilities in their jurisdictions.

Q100. Have financial conditions changed since the elimination of or departure from annual ROE formulas in Canadian jurisdictions?

A100. No, the circumstances that lead Canadian utility regulators to abandon their formula ROE implementations have persisted throughout the last decade. As discussed at length in Section IV above, Canadian risk free interest rates have fluctuated around historically low levels as a result of sustained central bank monetary policy and a global flight to quality in sovereign debt markets. While there were robust signals around the time of the 2018 GCOC that government bond yields were set to rise in response to accelerated economic growth, subsequent global economic, political developments, and ongoing monetary policy

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[231] British Columbia Utilities Commission, "Decision, in the matter of Terasen Gas Inc., Terasen Gas (Vancouver Island) Inc., Terasen Gas (Whistler) Inc. and Return on Equity and Capital Structure," December 16, 2009, p. 72.

[232] British Columbia Utilities Commission, "Decision, in the matter of Terasen Gas Inc., Terasen Gas (Vancouver Island) Inc., Terasen Gas (Whistler) Inc. and Return on Equity and Capital Structure," December 16, 2009, p. 73.

[233] *Ibid.*

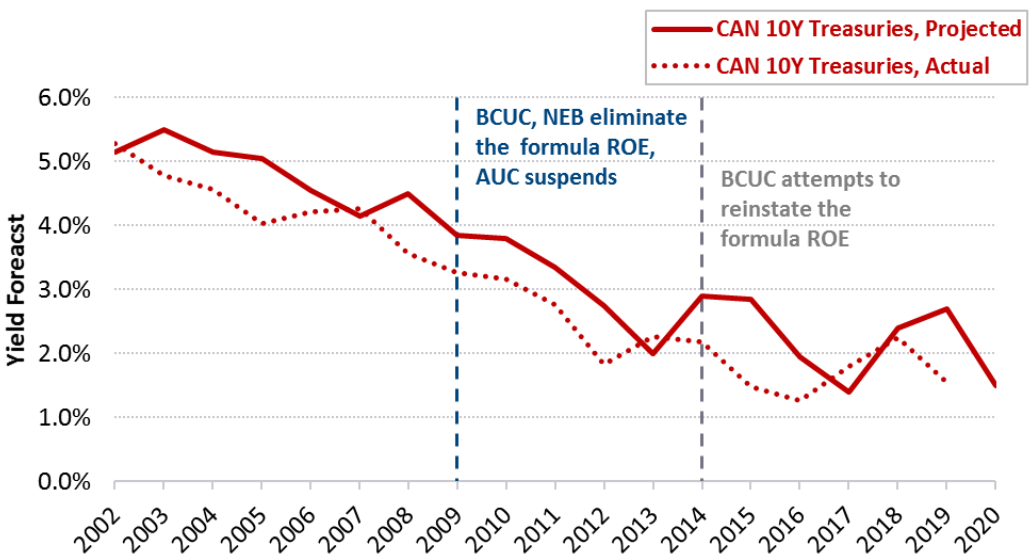
(including quantitative easing in the U.S.) have forestalled and reversed the trend of rising yields.[234]

These developments have contributed to considerable uncertainty about when government bond yields may increase. As market participants have gradually adjusted over the last decade to the many sustained downward pressures on interest rates, forecasts of long-term Canadian bond yields have likewise trended downward. The near-term (quarter-out and year-out) forecasts of the 10-year Canadian government bond yield have traditionally formed the basis of Canadian formula ROE calculations. Therefore, the historical trend in this metric is useful to illustrate how the financial conditions that contributed to the discontinuation of these ROE formulas a decade ago continue to pose a challenge for the use of such formulas today. Indeed, as shown in Figure 36, the projected risk-free rates have generally continued downward since the AUC, BCUC, and NEB all eliminated or suspended their ROE adjustment formulas in 2009.[235]

[234] See Section IV above and Buttke Evidence Q/A 6.

[235] See also workpaper BV WP03.

Figure 36
Long-Term Canadian Bond Yield



Source: Projected yield is equal to average of 3- and 12-month out forecast for 10-year Canadian bond yield from OEB Annual Letters, if available (relied on Nov. issues of Consensus Foreasts when OEB letters not available). Note that 2019 yield is the projection for 2019, as forecasted in 2018. Actual yield is equal to average of monthly yields for Canadian 10Y bonds, as reported by Bloomberg.

The persistent low levels of the central metrics driving the traditional Canadian formula ROE mechanisms also thwarted the BCUC's attempt to reinstate its formula in 2014. The BCUC's attempt to revive its formula failed because it was predicated on a yield threshold that was never reached. Specifically, for the year 2014, the BCUC re-established an automatic ROE adjustment mechanism with the caveat that the formula would only be triggered if the 30-year Canadian bond yield reached 3.8%.[236] As the bond yield failed to reach this threshold in the following years, the BCUC re-suspended their formula, claiming "economic conditions are uncertain" and acknowledging an intervener's argument that "long Canada bond yields are less affected by investors and more by central banks' policies."[237]

[236] BCUC Letter L-53-13, September 16, 2013.

[237] BCUC Letter L-63-14, December 22, 2014. See also BCUC Decision and Order G-129-16, August 10, 2016.

The CER has also refrained from reintroducing a formula, but it publishes an annual letter detailing how it would have calculated the ROE, if the formula were still in effect. The resulting calculation remains highly sensitive to the continued low interest rate environment, reflecting the persistent unsuitability of such a formula in the current financial conditions.[238]

Q101. How has the Commission responded to these persistent financial conditions?

A101. At the time of the 2018 GCOC, market trends and forecasts signaled upward movement in yields that caused the AUC to inquire whether "the reasons justifying a departure from the annual adjustment formula in 2009 may no longer be a concern." However, as happened to the BCUC following its conditional reinstatement of its formula, subsequent market movements have revealed that the concerning conditions continue to manifest.

This is consistent with the Commission's decade-long hesitation to reintroduce a formula mechanism in Alberta. The Commission stated in 2011 that it is "prepared to revisit the re-introduction of an automatic adjustment mechanism once the credit markets are more predictable and the Commission can be confident that the relationships implied in the formula will continue."[239] However, the Commission has been unable to restore its' confidence in credit market conditions in recent years. As the Commission noted in the 2013 GCOC, "[I]n the current environment of historically low interest rates, market conditions may not be reflective of a typical risk-return relationship for an investor."[240] Similarly, in 2016, the Commission found that "current capital market conditions do not support a return to a formula-based approach in the near term."[241] The continued validity of this finding is clearly supported by the CER's recent calculation of the ROE per the discontinued NEB formula.

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238 See, for example, the CER's recent letter for 2020, which includes the lowest calculated ROE since the formula's introduction (6.63%). Canadian Energy Regulator, "Rate of Return on Common Equity (ROE) per Discontinued RH-2-94 Formula for 2020," December 10, 2019.

239 2011 GCOC Decision, ¶166.

240 2013 GCOC Decision, ¶411.

241 2016 GCOC Decision, ¶17.

Q102. Are there any Canadian jurisdictions that have maintained the existence of the annual ROE adjustment formula?

A102. Certain jurisdictions have maintained the existence of ROE formulas, but even in these cases, the formulas have not unilaterally determined the annual allowed ROE. Notably, the Quebec Règie has held a constant rate of return for Gaz Metro since the 2012 revision of its utility-specific ROE formula.[242] The regulator has defined an effective ROE "floor" by choosing to maintain the ROE at its base level each year, rather than calculate an updated ROE using a risk-free rate that it considers too low to be reasonable.[243]

The Ontario Energy Board ("OEB") maintained a formula approach to annual ROE updates, but revised it formula in 2009 in response to the same market conditions as led other jurisdictions to abandon the formula. Specifically, the formula revisions included a new (higher) base ROE and updating the calculation to apply an equal weighting to developments in the risk-free rate and utility bond yields. The OEB has relied on a formula ROE for the past decade.[244] Despite the 2009 updates, the formula remains highly sensitive to abrupt changes in bond yield forecasts. Since its redefinition, the allowed ROE has fluctuated by up to 50 basis points in a single year, driven by even larger reductions in bond yield forecasts.[245] As stated by the Commission and referenced above, it would be unwise to determine an ROE without accounting for the sensitivity inherent in an *automatic* adjustment mechanism, which does not account for many factors that affect the cost of

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[242] Concentric Energy Advisors, "Authorized Return on Equity for Canadian Gas and Electric Distributors and Select Comparators," vols. I, III, and V, dated October 1, 2013, May 1, 2015, and May 25, 2017. See also, Energir Annual Information Form, dated December 14, 2018.

[243] Note that risk-free rate considered unreasonable because it diverged significantly from the range of risk-free rates used to develop the formula. Régie de L'Énergie, D-2013-036, March 5, 2013, English translation.

[244] Ontario Energy Board, "Report of the Board on the Cost of Capital for Ontario's Regulated Utilities (EB-2009-0084)," dated December 11, 2009. See also, Ontario Energy Board, "OEB Staff Report: Review of the Cost of Capital for Ontario's Regulated Utilities (EB-2009-0084)," January 14, 2016.

[245] The OEB's 2020 allowed ROE, for example, is 46 basis points lower than the 2019 allowed ROE. This decrease was driven by the fall of the 10-year Canadian bond yield forecast from 2.7% in September 2018 to 1.5% in September 2019. See Ontario Energy Board, "Letter Re: 2019 Cost of Capital Parameters," November 22, 2018. See also, Ontario Energy Board, "Letter Re: 2020 Cost of Capital Parameters," October 31, 2019.

equity.[246] In my opinion, this degree of sensitivity in a formula to near-term changes in the forecasted risk-free rate and the inability to account for unusual circumstances makes me recommend against the use of a formulaic approach at this point in time.

Q103. How do U.S. examples of formulaic ROE adjustment mechanisms relate to the question of whether the Commission should implement a formula ROE of the kind previously employed in Canada?

A103. Formulaic approaches to annual adjustment of utility allowed returns are not common in the United States, and the mechanisms that do exist are materially different from the formulas previously employed by Canadian regulators.

For example, in 2008, the California Public Utilities Commission established a mechanism that calls for the ROE to be adjusted in the case of substantial fluctuations in utility bond indices **between** regularly litigated cost-of-capital proceedings, which commonly take place every third year.[247] This is distinct from the Canadian examples in that California's mechanism only envisions interim adjustments, with the base level to be reset every three years according to the outcome of a litigated case. Further, this mechanism addresses only extreme departures in utility bond indices, because it is only triggered when the most recent average utility bond yield differs from the benchmark by more than 100 basis points.[248] This large "deadband" prevents California's mechanism from being triggered regularly, which distinguishes it from the traditional Canadian formula mechanisms that are automatically applied on an annual basis. Of note, the formula relies exclusively on utility

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246 *See* 2009 GCOC Decision, ¶330, 417, 421. For example, changes in financial leverage and/or in the level of risk aversion among equity investors may affect risk premiums required in equity markets. As discussed above, such changes in risk premia tend to move opposite the yields on risk-free government debt (such that the MERP tends to increase when the risk-free rate declines and vice versa), but while such shifts may be directionally similar to changes in credit spreads, the latter may not be a reliable proxy for changes in equity premia on a year-to-year basis.

247 California Public Utilities Commission, "Decision Establishing a Multi-Year Cost of Capital Mechanism for the Major Energy Utilities (Decision 08-05-035)," May 29, 2008.

248 California Public Utilities Commission, "Decision Establishing a Multi-Year Cost of Capital Mechanism for the Major Energy Utilities (Decision 08-05-035)," May 29, 2008, p. 15-16.

bond yields (as opposed to government bond yields or a combination of yields). Since the mechanism applies only between proceedings and is mediated by the deadband, the CPUC continues to exercise judgment in determining the ROE.[249]

The Illinois Commerce Commission ("ICC") provides another example of a unique approach to formulaic determination of ROE that fundamentally diverges from the Canadian implementations. Pursuant to prescriptive 2011 legislation, the ICC grants its two largest electric utilities a formulaically calculated ROE in exchange for their commitment to invest in grid modernization efforts, including the installation of advanced metering infrastructure and security and resilience upgrades that would become part of the utilities' rate base.[250] Importantly, the Illinois process also involves an annual true-up mechanism to retroactively guarantee that the utilities earn precisely what the formula ROE determines in relation to average yields on the specified benchmark corporate bonds in the year the rates are in effect.[251] Since this formula eliminates any variability of achieved returns with respect to allowed returns and is part of a larger legislative and regulatory effort in Illinois, it is materially different from the typical use of annual ROE formulas in Canadian jurisdictions.

Q104. What do you recommend with respect to the Commission's consideration of re-implementing a formula for annual updates to the allowed ROE starting in 2021?

A104. The pervasive departure from formula mechanisms in the post-crisis financial climate demonstrates that Canadian regulators understood that conditions were not conducive to

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249 For example, the CPUC recently maintained the utility ROE's and maintained or increased the equity percentage despite declining yields. California Public Utilities Commission, "Decision 19-12-056, Decision on Test Year 2020 Cost of Capital for the Major Energy Utilities," December 19, 2019. See also, California Public Utilities Commission, "Decision Regarding Joint Petition for Modification of Decisions 12-12-034 and 13-03-015 (Decision 17-07-005)," July 13, 2017, p. 7.

250 220 ILCS 5, Sec. 16-108.5, "Infrastructure investment and modernization; regulatory reform."

251 The original EIMA legislation specified that the true-up could be used to correct variance of the actual achieved ROE outside a 50 basis point collar on either side of the allowed ROE, but this was updated in 2017 to allow reconciliation to the precise ROE as determined by the current year's Treasury bond yields. 220 ILCS 5, Sec. 16-108.5, "Infrastructure investment and modernization; regulatory reform." See also, Illinois Future Energy Jobs Act, PA 99-0906, as cited in Illinois Commerce Commission Order 18-0808, December 4, 2018.

establishing a successful, longstanding formula ROE. Since the conditions that made these formulas unworkable remain unchanged, I would advise the Commission against implementing a formula ROE in 2021.

Q105. Does this conclude your evidence?

A105. Yes.