BEFORE THE
ALBERTA UTILITIES COMMISSION

WRITTEN REBUTTAL EVIDENCE OF BENTE VILLADSEN ON COST OF CAPITAL, CAPITAL STRUCTURE, AND REGULATORY TAX TREATMENTS

FOR
THE ATCO UTILITIES
ALTAGAS UTILITIES INC.

2018-20 Generic Cost of Capital

Proceeding ID No. 22570

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BEFORE THE
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2018 GENERIC COST OF CAPITAL
VILLADSEN REBUTTAL EVIDENCE

I. INTRODUCTION AND SUMMARY

Q1. Are you the same Bente Villadsen, who filed Written Evidence on cost of capital, capital structure and regulatory tax treatment in Proceeding ID No. 22570 on October 31, 2017?

A1. Yes.

Q2. What is the purpose of this written rebuttal evidence?

A2. I have been asked by The ATCO Utilities (ATCO) and AltaGas Utilities Inc. (AUI) (collectively, "the Utilities") to respond to the written evidence and responses to information requests as they pertain to cost of capital, capital structure or my regulatory tax evidence. Specifically, I respond to the written evidence of Mr. Jan Thygesen ("Thygesen Evidence") and Mr. Dustin Madsen ("Madsen Evidence") on behalf of the Consumers' Coalition of Alberta ("CCA"), Mr. Hugh W. Johnson ("Johnson Evidence") on behalf of the City of Calgary ("Calgary"), and Dr. Sean Cleary ("Cleary Evidence") and Mr. Russ Bell ("Bell Evidence") on behalf of the Office of the Utilities Consumer Advocate ("UCA").

In responding to the above cited evidence, I focus on aspects of the cost of capital, capital structure, and regulatory tax treatment. Dr. Paul R. Carpenter discusses business risk and Mr. Bob Buttke discusses economic conditions and financial markets.

Q3. Please summarize your reply evidence.

A3. Having read the Bell, Cleary, Johnson, Madsen, and Thygesen evidence as well as considered the developments in the economy since my written evidence, I continue to find that my original recommendation of an ROE 10% with a range of 9½ to 10½ percent and an equity percentage of 40 percent for the ATCO utilities and 44 percent for AltaGas

is reasonable.[1] I also remain confident that there is no clear economic advantage in switching to the FIT method for regulatory tax treatment, but a switch would necessitate substantial considerations regarding increases in the revenue requirement, the collection of currently unfunded FIT liabilities, and regulatory actions that would be needed should the income tax rate change in the future.[2]

Regarding the presented evidence, I conclude as follows:

- The combined ROE and capital structure proposals from the intervener witnesses are too low.
  - The recommendations fail to consider current market evidence such as the increasing interest rate environment, the increasing risk of Canadian utilities as evidenced by increasing betas, and the increasing business risk of the Alberta utilities as demonstrated by Dr. Carpenter.
  - The recommendation is substantially below what other regulated utilities in Canada have recently awarded, calling into question the fair return standard's comparability requirement.
  - Dr. Cleary's implementation of the CAPM relies on a risk-free rate, MERP and beta estimates that are not reflective of the expected risk-free rate for the 2018-20 period
    - The risk-free rate reflects the historical risk-free rate and 2018 rather than 2018-20
    - The beta estimates are based on long-term averages than include anomalous periods, and which are not consistent with the forward-looking risk. In additions, the reliance on monthly returns results in statistically poor results.
    - The MERP is based on Dr. Cleary's subjective view and in part on outdated surveys.

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1 Exhibit 22570_X0193_02, 2018 GCOC Bente Villadsen Written Evidence ("Villadsen Evidence"), PDF pp. 99-101.

2 Exhibit 22570_X-0170_25, 2018 GCOC Bente Villadsen Written Tax Evidence (Villadsen Tax Evidence), PDF pp. 4-5.

- Dr. Cleary ignores the beta unlevering and relevering approach in this proceeding.

- Mr. Johnson's suggestion to use a risk-free rate above 4% as trigger to change the ROE is based on outdated information previously filed by Professor Booth and unsupported in this proceeding. Mr. Johnson comments on the MERP are based on one source for 2017 and not otherwise supported. As for Mr. Johnson's limited evidence on beta estimates, he presents no evidence on the comparability of the companies he selects nor does he provide evidence regarding the properties of the betas presented.

- Mr. Thygesen suggests that the allowed ROE should be reduced below 8%, but provides no financial model to back up his proposal. Instead, he suggests that Consensus Forecasts upwardly biases the expected risk-free rate based on limited data and despite academic evidence that there is no inherent bias.

- Dr. Cleary's DCF estimates are too low for several reasons:

  - Although the DCF model inherently is a forward-looking model, Dr. Clearly uses historical data to implement his versions of the model

  - His sustainable growth DCF fails to incorporate a standard term related to the growth from new share issuances

  - His market DCF fails to recognize share buybacks as a source of cash for shareholders

  - There are several inconsistencies in Dr. Cleary's implementation of the DCF models.

- Mr. Johnson and Mr. Madsen proposals to reduce the ATCO utilities equity thickness are misguided.

  - Dr. Carpenter shows an increased business risk.

  - I demonstrate below that the combined ROE and equity ratio proposals lead to a return on equity that is not comparable to that awarded other utilities.

- Mr. Madsen inaccurately believes that a switch to FIT will enhance credit metrics sufficiently that the allowed equity thickness can be reduced. This fails to consider that credit metrics measure default risk and capital

attraction – not whether the fair return's standard regarding comparability is met.

- Mr. Madsen's arguments regarding the benefits of FIT are unconvincing. He fails to account for the time value of money when modeling timing differences under flow-through and FIT, and therefore assigns the same value to $100 change in customer rates today as 20 years down the road.
- Mr. Madsen fails to bring forth concrete proposals on how to handle a switch to FIT, which would (i) causes an immediate and large increase in customer rates, (ii) will require the collection of currently unfunded FIT balances, and most importantly, (iii) while not reducing business risk leads the CCA to suggest a reduction in the allowed return through a lower equity ratio. None of these issues are trivial, but would need to be resolved subject to both the fair return standard and reasonableness for customer rates.

Q4. What ROE and capital structures were recommended in the CCA, Calgary and UCA evidence?

A4. The recommendations are summarized in Figure 1.

Figure 1: CCA, Calgary, and UCA's Recommended ROE and Capital Structure

Witness		Return on Equity	Equity %
Bell (UCA)	[a]	n/a	37%, 41%
Cleary (UCA)	[b]	6.3%	37%, 41%
Johnson (City of Calgary)	[c]	7.5%	35%
Madsen (CCA)	[d]	n/a	35%, 36%, 41%
Thygesen (CCA)	[e]	less than 8%	n/a

Sources:
[a]: Bell Evidence, PDF p 23; 37% for ATCO utilities, 41% for AUI
[b]: Cleary Evidence, PDF p 5, 6; 37% for ATCO utilities, 41% for AUI
[c]: Johnson Evidence, PDF p 8, 2; Recommendations only for ATCO Gas
[d]: Madsen Evidence, PDF p 74; 35-36% for ATCO, 41% for AUI
[e]: Thygesen Evidence, PDF p 5

Q5. What is your reaction to the recommendations listed in Figure 1 above?

A5. The combined ROE and capital structure is simply too low. There are several reasons why the recommendations are too low. The recommendations fail to consider current market evidence such as the increasing interest rate environment,[3] the increasing risk of the Canadian utilities as evidenced by increasing betas, and the increasing business risk as evidenced by Dr. Carpenter. As shown in Figure 2 below, the ROE recommended by Dr. Cleary and Mr. Johnson is well below any recently allowed ROE in Canada and even further below recently allowed ROEs in the U.S. Not only are the recommended ROEs below the norm for Canadian and U.S. utilities but the fact that it is substantially below what other utilities have been granted calls into question whether the recommendation meet the fair return standard's requirement 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.[4]

To further exaggerate the degree to which the recommended ROEs are inadequate, I note that the recommended equity percentages are 35 to 37 percent, while the average deemed equity percentage in Canada most recently was ~~37~~ 36.59 percent for electric distributors and higher at 39.86 percent for gas distributors.[5]

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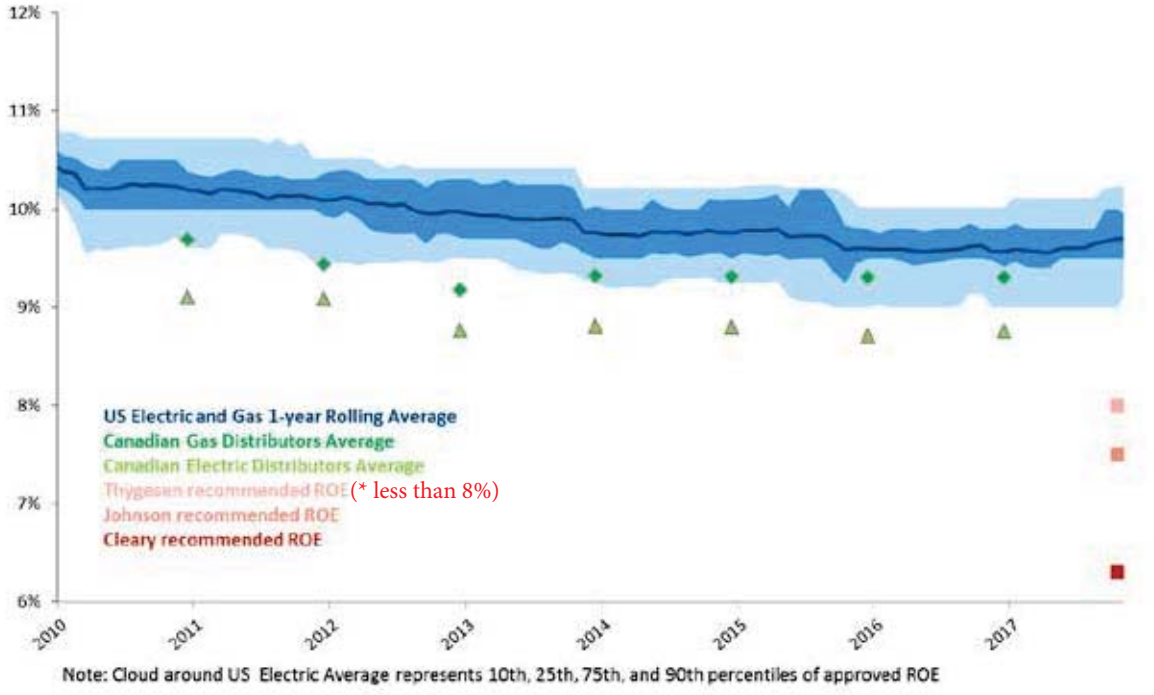
[3] A speech before Congress on February 27, 2018 Federal Reserve Chairman, Jerome Powell, led the WSJ analyst to conclude that there are higher odds of a fourth rate increase in 2018. Source: WJS News Alert; https://www.wsj.com/livecoverage/fed-jerome-powell-february-2018-testimony?mod=djemalertNEWS

[4] *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*).

[5] Concentric Energy Advisors, "Authorized Return on Equity for Canadian and U.S. Gas and Electric Utilities," May 25, 2017.

Figure 2: Recently Allowed ROEs



Source: BV Workpaper R01.

Q6. What were the recommendations regarding the regulatory tax methodology?

A6. The recommendations of intervening parties are summarized in Figure 3 below.[6]

Figure 3: UCA and CCA's Recommended Tax Methodology

Witness		Recommendation
Bell (UCA)	[a]	Flow Through
Madsen (CCA)	[b]	Future Income Tax

Sources:
[a]: Bell Evidence, PDF p 26
[b]: Madsen Evidence, PDF p 5

[6] The City of Calgary's witness, Mr. Johnson, does not address tax methodology.

Q7. What is your reaction to the regulatory tax recommendations?

A7. Preliminarily, I observe the only party that has recommended the use of Future Income Taxes (FIT) is the CCA. I find that a switch to FIT would be problematic because it (i) causes an immediate and large increase in customer rates, (ii) will require the collection of currently unfunded FIT balances for which no mechanism has been proposed, and most importantly, (iii) while not reducing business risk leads the CCA to suggest a reduction in the allowed return through a lower equity ratio. Fundamentally, the purpose of this proceeding is to determine the fair return for Alberta-based utilities regardless of tax methodology. I address each of the issues listed above in Section V below along with the challenges posed by future income tax rate changes under FIT as evidenced by the recent tax reform in the U.S. This section also discusses Mr. Madsen's tax model and his suggestions to modify depreciation and salvage rates and to indefinitely delay recovery of unfunded FIT liabilities to mitigate the substantial rate shock his model illustrates

II. UNREASONABLENESS OF INTERVENING WITNESSES' COST OF CAPITAL RECOMMENDATIONS

Q8. Why do you find that the allowed ROE recommended by the intervening witnesses is too low?

A8. As shown in Figure 2 above, the recommendations of an ROE in the range of 6.3% to 8.0% is out of line with recently allowed ROEs in Canada and the U.S. and much below market expectations. A return on equity of 8.0% or less would be below any allowed ROE observed among Canadian or U.S. utilities during 2015-2017.[7] As noted by DBRS following the 2016 GCOC

> The decision saw the allowed return on equity (ROE) remain at 8.3% for 2016, with a 20 basis point (bps) increase to 8.5% for 2017. As DBRS had previously noted, the Alberta Utilities' 2013 to 2015 allowed ROE of 8.3% was the lowest among North American utilities (excluding crown corporations), which has placed pressure on some of their profitability measures and credit metrics. DBRS sees the slight increase for 2017 as a

[7] Source: SNL Rate Case History as of January 2018 and Concentric Energy Advisors, "Authorized Return on Equity for Canadian and U.S. Gas and Electric Utilities," May 25, 2017.

> modest improvement in the regulatory regime in Alberta, as the ROE will be more in line with the Alberta Utilities' peers across Canada.[8]

Clearly, DBRS viewed the prior decision as low relative to the Canadian peers. In an increasing interest and ROE environment, a ROE in the range of what Mr. Johnson or Dr. Cleary recommends will **negatively impact investor perception** given the 2016 reaction.

In comparison, the Ontario Energy Board ("OEB") as recently as on November 23, 2017 found that the 2019 ROE for Ontario's electric and gas distributors would be 9.0% (up from 8.78% in 2017).[9] At the same time, the Ontario electric distributors have an equity ratio of 40% while the gas distributors have an equity ratio of 36%. Thus, the OEB found that the cost of equity has increased, but made no adjustments to the capital structures.[10] The most recent ROE decision from, the British Columbia Utilities Commission ("BCUC") awarded a ROE of 8.75% to the benchmark utility on 38.5% equity, but allowed higher return to other, non-benchmark utilities. For example, the allowed ROE for Fortis BC Inc. is 9.15% at 40.0% equity.[11]

Q9. What are investor expectations going forward?

A9. As discussed in the Buttke Rebuttal Evidence, GDP growth rates have increased, government bond yields are increasing and expected to increase further while the spread between utility bond yields and government bond yields have declined.[12] As the yield on

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8 DBRS, "Comments on Impact of the Generic Cost of Capital Decision on Alberta Utilities," October 14, 2016.

9 Ontario Energy Board, "Cost of Capital Parameter Updates for 2018 Cost of Service and Custom Incentive Rate-setting Applications," November 23, 2017 and Ontario Energy Board, "Cost of Capital Parameter Updates for 2017 Cost of Service and Custom Incentive Rate-setting Applications," October 27, 2016.

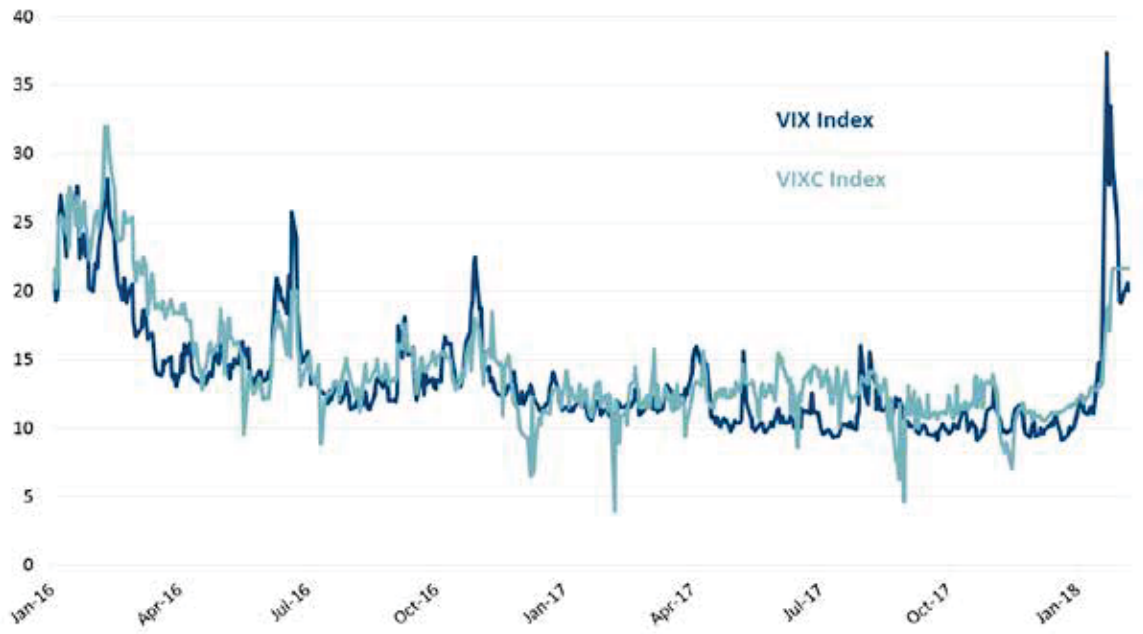
10 The OEB has a 2016 hearing that, among others, determined Ontario Power Generation's equity percentage. The OEB decided to maintain OPG's 45% equity. Source: OEB Decision EB-2016-0152, p. 100.

11 Fortis Press Release, "FortisBC receives BCUC return on equity and common equity component decision," Aug. 10, 2016; https://www.fortisbc.com/MediaCentre/NewsReleases/2016/Pages/FortisBC-receives-BCUC-return-on-equity-and-common-equity-component-decision.aspx

12 Buttke Rebuttal Evidence, Section VIII.

bonds increase, the expected return on equity is also expected to increase. Additionally, as shown very recently, volatility indices such as the VIX and VIXC volatility index can move very quickly and has recently reached a level higher than any time since the 2016 GCOC (U.S. VIX) or on par with that level (Canadian VIXC). The quickness with which the VIX and VIXC react to market movements is shown in Figure 4 below, which depicts the VIX and VIXC from January 2016 through February 21, 2018. The fact that interest rates are increasing along with growth rates and the quickness with which market volatility changes makes clear that **not** "all indications suggest risk aversion levels are now normal" as Dr. Cleary contends.[13] Thus, indications remain that investor perceptions remain cautious and that the equity risk premium may be elevated. As a result, investors are unlikely to expect a return below that of the recent past and given that financial markets function across borders, they will look not only to Canada but also across the border and plausibly globally.[14]

Figure 4: VIX and VIXC Volatility Indices 2016 through February 21, 2018



Source: BV Workpaper R02_CONF.

[13] Exhibit 22570_X0562 Evidence of Dr. Sean Cleary PDF p. 48, lines 20-21.

[14] See also Buttke Evidence, PDF p. 14, lines 5-7.

Q10. What would be the consequences of allowing an ROE in the range of what interveners have suggested?

A10. As shown in Figure 2, the ROEs suggested by the CCA, the UCA, and the City of Calgary are well below anything other regulators recently have allowed and well beyond market expectations. In the light of market expectations and the fact that other regulators have increased rather than decreased ROE allowances, the recommendations are simply unrealistic. In an environment where the Alberta utilities are already considered as having a less favorable ROE than other utilities, the ROEs in the range of the recommendations by the CCA, UCA, and City of Calgary could have serious implications for investors' interest in the Alberta utilities and their ability to attract capital on favorable terms. I address the equity return in Alberta relative to that available in other jurisdictions in Section IV below.

III. ESTIMATING THE COST OF EQUITY

A. COMPARABILITY AND THE FAIR RETURN STANDARD

Q11. How do the intervening witnesses address the requirement that the allowed ROE must be commensurate with returns investors could expect to earn on a comparable investment of equivalent risk?

A11. CCA witnesses Mr. Madsen and Mr. Thygesen do not consider comparable companies City of Calgary witness Mr. Johnson considers, in a limited manner, Canadian utilities, while UCA witness Dr. Cleary also considers only Canadian companies. The failure to consider U.S. or other non-Canadian utilities has two major flaws: (i) it fails to recognize that capital markets are integrated and investors are not restricted to a specific country and (ii) relies on a limited set of Canadian utility holding companies, few of which are pure-plays in the regulated utility industry.

Importantly, Mr. Johnson and Dr. Cleary make no attempts to demonstrate that the Canadian utility companies they present as comparable are, in fact, comparable. In their analyses of betas and other financial metrics for these companies, they make arbitrary

decisions to exclude or emphasize results from certain companies without providing any analysis to justify these choices.[15]

1. Dr. Cleary's Comparison of U.S. and Canadian Utility Betas

Q12. What about Dr. Cleary's statement that "U.S. utility beta estimates are significantly higher than those for Canadian utilities, and should not be considered"?[16]

A12. There are two problems with this statement: (1) it fails to recognize that betas do not directly measure characteristics that determine business risk comparability and (2) it is factually incorrect. I address each of these issues in turn.

First, betas measure how the stock returns of publicly traded comparable companies move relative to the market; they do not measure the business risk characteristics that determine which companies are comparable in the first place. So the fact that betas may be higher or lower for one group of companies or another is not the relevant question. What is relevant is whether the business risk is comparable, as Dr. Cleary himself acknowledges.[17] However, Dr. Cleary does not attempt any analysis or comparison of business characteristics that determine risk, either for the Canadian holding companies he considers or for the companies in my U.S. based samples. Rather, he merely *presumes* that the Canadian companies he considers are more comparable to the Alberta utilities, and asserts that if U.S. samples have higher betas, they must have higher business risk. This line of reasoning ignores the fundamental question of comparability, which is key to the fair return standard.

It is noteworthy that Dr. Cleary never addresses or acknowledges certain samples that have been brought forth as potential comparables. Not once, for example, does Dr. Cleary mention the Water utility sample. This sample has characteristics Dr. Cleary seems to

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15 See Cleary Evidence, PDF p. 47 and Johnson Evidence, PDF p. 7.

16 Cleary Evidence PDF p. 44, lines 9-10.

17 Cleary Evidence PDF p. 44, line 14.

favor:[18] (1) the Water sample companies have little to no unregulated businesses and are generally able to flow costs through to customers and (2) the ROE variability is relatively low.[19] Thus, there is no evidence presented to justify why Dr. Cleary chooses to reject the Water sample as a comparable sample, and to give almost no attention to my Gas LDC sample, which Dr. Carpenter found to be of directionally lower risk compared to Alberta distribution and transmission utilities based on a principled and rigorous business risk analysis.[20]

Q13. Why is Dr. Cleary incorrect in asserting that "U.S. utility beta estimates are significantly higher than those for Canadian utilities?"

A13. Evidence on record contradicts this claim. Figure 34 of my written evidence,[21] reported the sample average betas for each of the five samples I considered. It showed that the levered equity betas measured for the Canadian sample are on average *higher* – at 0.85 – than those of any of the U.S.-based samples except the Pipeline sample.

However, as Dr. Cleary correctly points out, the companies in the Canadian sample generally have more debt in their capital structures than do the U.S. sample companies, and this higher degree of financial leverage imposes greater financial risk on investors in Canadian equities.[22] Since the impact of increased financial risk is reflected in the levered equity beta measured based on the sample companies' stock returns, I also presented the

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[18] Cleary Evidence PDF p. 82, lines 1-4.

[19] See Figure 7 below.

[20] Carpenter Evidence, PDF p. 7, lines 8-12..

[21] Villadsen Evidence, PDF p. 106.

[22] Cleary Evidence, PDF p. 44, note 50 and Exhibit 22570_X0565 ("Cleary Appendix B"), PDF p. 6, lines 8-13. Note that Dr. Cleary emphasizes differences in financial leverage between the *allowed* capital structures of regulated utility operating companies in the Canada (approximately 40% equity) and the U.S. (approximately 50% equity), whereas I focus on the actual market capital structures of the publicly traded sample companies for which the betas are measured. My approach is more appropriate because it matches the sample companies' measured equity betas with the capital structures that affect the stock movements of those companies. However, the directional effect is the same, since the companies in my Canadian Utility sample have approximately 50% equity in their market value capital structures, versus 60-70% equity for the U.S. samples. In short, Canadian utility betas are measured for companies that impose greater financial risk on stockholders compared to U.S. utilities.

sample average *unlevered* or *assets* beta for each sample,[23] which provides a more direct comparison of the market sensitivities of asset-generated cash flows among the samples. This comparison indicates that Canadian utility betas are very much in line with those of U.S.-based natural gas and water distribution companies, directionally slightly higher than those of U.S. electric utility holding companies, and somewhat lower than those of pure play U.S. natural gas transmission pipelines. I have reproduced Figure 34 from my initial evidence below for ease of reference.[24]

Figure 5
Sample Average Levered and Unlevered Betas
(Copy of Figure 34 from Villadsen Written Evidence)

		As Measured			Unlevered Betas	
Sample		Levered Equity Beta	% Debt	% Preferred Equity	(without tax)	Assets Beta (with tax)
		[1]	[2]	[3]	[4]	[5]
Pipeline Subsample	[a]	1.07	38%	0.0%	0.70	0.77
Water	[b]	0.75	30%	0.1%	0.55	0.59
Gas LDC	[c]	0.67	33%	0.1%	0.47	0.51
Canadian Utility	[d]	0.85	44%	5.7%	0.47	0.52
Electric	[e]	0.61	41%	0.3%	0.40	0.43
Min		0.61			0.40	0.43
Max		1.07			0.70	0.77
Range		0.46			0.31	0.34

Sources:
[a]: Table No. BV-PIPE-13
[b]: Table No. BV-WATER-13
[c]: Table No. BV-GAS-13
[d]: Table No. BV-CAN-13
[e]: Table No. BV-ELEC-13

[23] Note that I unlever betas using two versions of the Hamada formula, both of which are conceptually equivalent to that used by Mr. Hevert and which Dr. Cleary employs in his Appendix B. The precise calculation is most similar for the "with taxes" version of my calculation.

[24] The figure presents adjusted betas, since those are what I rely on in my analysis. However, in terms of relative magnitude, the comparison of levered equity and unlevered assets betas among samples would be the same using unadjusted betas.

Q14. How then does Dr. Cleary reach the opposite conclusion about the relative magnitudes of betas for U.S. and Canadian sample companies?

A14. As I will explain in Section III.B.4 below, there are multiple conceptual and methodological issues with Dr. Cleary's discussion of betas. However, the primary driver of his inaccurate statement that "U.S. utility betas are significantly higher than those for Canadian utilities," is his misguided focus on historical averages of beta measurements over 20-25 year periods.[25] Dr. Cleary relies on long-term averages that *he* calculates based on rolling raw historical betas provided in Mr. Hevert's and Mr. Coyne's evidence and information responses as the basis for his comparison of U.S. and Canadian sample betas.[26] However, in doing so, he ignores the fact that *current* beta measurements tell a different story. Just as the betas for my Canadian utility sample are higher than those of all but the U.S. pipeline sample, so are the current betas from Mr. Hevert and Mr. Coyne as shown in Figure 6.[27]

As I discuss further below, the notion that a multi-decade historical average provides the best indication of *forward-looking* systematic risk is conceptually unsound and inconsistent with both empirical evidence and industry best practice.[28] It also ignores the fact that industries, classes of investment assets, and financial markets themselves can and do change over time, such that relative variability of returns (as measured by beta) for different groups of companies can meaningfully shift over long time horizons. Given the evolving nature of the interrelationship between specific industry groups and broader

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[25] Cleary Appendix B, PDF p. 8, lines 21-23.

[26] Cleary Appendix B, PDF p. 6, lines 5-8 and PDF p. 8, lines 3-14.

[27] For ease of comparison to my beta estimates summarized in Figure 5, as well as to Mr. Coyne's betas discussed in Dr. Cleary's Appendix B discussion, I present adjusted betas in Figure 6. I note that current levered equity betas for Canadian utilities are greater than those estimated for U.S. utilities on an unadjusted basis as well. I further note that Mr. Hevert's and Mr. Coyne's current adjusted beta estimates of approximately 0.77 – 0.84 for Canadian utilities which are very much in line with the 0.85 average for my Canadian sample shown in Figure 5. Similarly, the current U.S. utility adjusted beta estimates of 0.63 – 0.66 from Mr. Hevert's and Mr. Coyne's analyses (unsurprisingly given the overlap in sample companies) align closely with the sample average betas for my Gas LDC and Electric samples.

[28] For example, Jonathan Berk & Peter DeMarzo, "Corporate Finance," 3rd Edition, 2014, p. 407 suggests that weekly or monthly betas over 2-5 years are common.

markets, it is unsurprising that Dr. Cleary's comparison of "long-term average" Canadian and U.S. utility betas do not accurately describe the current market.

Figure 6
Witnesses' Adjusted 5-year Weekly Beta Measurements
Current Estimate vs. Cleary "Long-term Average"

		Current Estimate			Cleary-calculated Long-term Average		
		Canadian [1]		U.S. [2]	Canadian [3]		U.S. [4]
Hevert Samples	[a]	0.80	>	0.66	0.59	<	0.67
Coyne Proxy Groups	[b]	0.77	>	0.64	0.55	<	0.69
Coyne Utility Indices	[c]	0.84	>	0.63	0.60	<	0.71

Sources and Notes:
[a]: Exhibit 22570_X0155, Evidence of Hevert Workpaper, tabs "Weekly CAN Beta", "Weekly US Beta"
[b], [c]: Exhibit 22570_X0320_Coyne-UCA-2017NOV21-006eAttachment, tab "Utility Index (5yr)"
[3], [4]: Cleary Appendix B, PDF pp. 5-8. Hevert Sample betas are adjusted here for comparison to Coyne betas as reported in IR responses and Cleary Appendix B

2. Dr. Cleary's Analysis of Variability in Achieved ROE

Q15. Does Dr. Cleary draw conclusions about the relative riskiness of the samples compared to the Alberta utilities from measurements of historical variability in earned ROE?

A15. Yes. Dr. Cleary computes coefficients of variation ("CV") of the annual achieved book returns on equity form 2005-2016 for 11 Alberta utilities (Table 21), as well as for 32 U.S. gas and electric utility companies (Table 24) that are members of my Gas LDC and Electric samples.[29] He then argues that the higher average and median CV(ROE) that he finds for the U.S. companies compared to the Alberta utilities "[suggests] that the U.S. utilities have greater risk than Alberta utilities."[30]

[29] Cleary Evidence PDF pp. 81 and 90. It is not clear why Dr. Cleary examines a different group of Canadian utility companies for this analysis compared to his DCF estimates and analysis of price-to-book ratios.

[30] Cleary Evidence, PDF p. 91.

Q16. Did Dr. Cleary perform a similar analysis in his 2016 GCOC evidence?

A16. Yes, albeit with a few differences. In the 2016 GCOC proceeding, Dr. Cleary performed this analysis on the same 11 Alberta utilities, but his "U.S. Utilities" samples contained all 37 of the companies that were in the Gas LDC and Electric samples I analyzed in that proceeding. In 2016, he focused on the time period 2005-2014 for both groups.

In his 2018 GCOC evidence, Dr. Cleary appears to have "updated" his 2016 GCOC analysis, but in doing so he has made some inconsistent changes. First, Dr. Cleary's current list of 32 "U.S. Utilities" contains only companies that were in my 2016 GCOC samples. His analysis ignores any "new" companies that were included in my 2018 GCOC analysis, including the entire pipeline and water samples. Second, Dr. Cleary analyzes different periods for his two samples. He uses data from the entire 2005-2017 period for the Alberta utilities, but restricts his analysis of "U.S. Utilities" to only 2007-2016.

It is also worth noting that in his 2016 analysis, Dr. Cleary included a group of publicly traded Canadian utility holding companies, for which his results were more comparable to the U.S. Utilities than to the Alberta utilities. Dr. Cleary's 2018 GCOC evidence provides no explanation as to why he dropped these Canadian sample companies from consideration.

Q17. Is Dr. Cleary's analysis of variability in achieved book ROE informative as to the relative risk of the samples he examines?

A17. No. I agree with Dr. Carpenter that an analysis based entirely on a very small sampling of annual historic accounting earnings does not provide the market-based perspective that is needed to assess uncertainty in expected returns.[31]

Further, Dr. Cleary's comparison relies on historical information to draw conclusions about risk and return going forward. This is problematic when the fundamental

[31] For a detailed discussion in the context of Dr. Cleary's discussion of variability in EBIT metrics, see Carpenter Rebuttal Evidence, Section III.C.

characteristics that affect returns (and variability of returns) may be different in the future. Finance textbooks, including one co-authored by Dr. Cleary, address this issue in the context of measuring risk through beta:

> Estimating beta coefficients is tricky because we are interested in the extent that an asset's returns move with the market over a future period. We typically estimate beta coefficients by using historical data, which assumes that what has happened in the past is a good predictor for the future. Typically, betas for securities are estimated by using 60 months of monthly returns, but sometimes 52 weekly returns are used. Betas change through time as the risk of the underlying asset or portfolio changes. This is particularly important for individual securities, for which betas can change quite dramatically over relatively short periods.[32] [emphasis added]

Importantly, the underlying assets and operations for the publicly traded utility companies considered by Dr. Cleary have changed substantially during the period Dr. Cleary studies.[33]

Q18. Does the coefficient of variation of book ROE provide a valid measure of the type of risk that affects the cost of equity?

A18. No. It is a fundamental principle of finance that (as Dr. Cleary and his co-authors Dr. Booth and Dr. Peterson Drake put it in their textbook),

> [r]ational investors are not compensated for unique or diversifiable risk because it can be eliminated through diversification. This implies that **market risk** is the appropriate measure of risk to determine the risk premium required by investors for holding a risky security."[34]

In other words, the non-diversifiable or systematic risk for which investors must be compensated is measured relative to returns on the broader market portfolio, *i.e.,* in terms of a market beta. For investors in the equity of a publicly-traded company, it is the sensitivity that company's (market value based) stock returns have to returns on the broader market (as measured by beta) that affect the required risk-adjusted rate of return.

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[32] Laurence Booth, Sean Cleary, and Pamela Peterson Drake, "Corporate Finance," 2014, p. 339.

[33] For example, Alberta has seen a substantial build-out in transmission assets.

[34] Booth, Cleary, and Drake, p. 339 [Emphasis added]

By contrast, the *total* variability in accounting returns on book equity is not informative for comparing systematic risk from an investor's perspective.

Q19. Do you have any other comments concerning Dr. Cleary's comparisons of historical variability in earned ROE?

A19. Yes. In addition to the conceptual flaws discussed above, Dr. Cleary's analysis is misleading regarding the variability of achieved book ROEs for the Alberta utilities relative to my U.S. proxy companies. This becomes clear if Dr. Cleary's methodology is applied to my individual samples, which I present in Figure 7 below.[35] This analysis shows that the companies in my U.S. Gas LDC and Water samples have a much lower coefficient of variation than the group of U.S. Utilities Dr. Cleary focuses on.

Figure 7
Comparison of Utility ROE Level and Variation

	Cleary Tables 21, 24		Adapted to Villadsen Samples				
	Alberta Utilities	U.S. Utilities	Water	Gas LDC	Electric	Pipeline	Canadian
Average of Utility ROE							
Average	9.3%	9.8%	9.6%	10.1%	9.4%	12.5%	9.2%
Median	9.4%	9.6%	9.9%	9.8%	9.6%	10.8%	8.4%
Coefficient of Variation for Utility ROEs							
Average	0.17	0.41	0.16	0.17	0.45	0.36	0.41
Median	0.17	0.24	0.13	0.17	0.29	0.36	0.30

Notes:
- Dr. Cleary uses 2005-2016 for Alberta Utilities, 2007-2016 for his 32 U.S. Utilities.
- Villadsen adaptations use 2005-2016 Compustat data as of Feb 6, 2018.
- Water sample excludes AWK, which has an outlying CV(ROE) of 6.5 due to having negative achieved ROE for 2005-2009. Including AWK does not change the Water sample median CV(ROE), but reduces the median ROE to 9.4%.
- Pipeline sample excludes MMP, which has an outlying ROE figure. Including MMP does not change the average CV(ROE), but decreases the median to 0.35. With MMP, the average and median ROE are 15.4% and 11.4% respectively.

[35] Note that when adapting Dr. Cleary's analysis, I use the same time period (2005-2017) for all samples, rather than looking at different data for different groups as Dr. Cleary does. See BV Workpaper R03_CONF.

Source: BV Workpaper R03_CONF.

When compared to Dr. Cleary's data for the Alberta utilities, the average and median CV(ROE) for my Gas LDC and Water samples are of similar magnitude. By Dr. Cleary's logic, this would imply that these U.S.-based samples are in fact quite comparable to the Alberta utilities, and yet the Alberta utilities have earned lower returns on average than either the U.S. Water or Gas LDC sample companies.

Additionally, I note that the pipeline sample achieved higher returns on average than the companies in my electric utility sample (which also make up the majority of companies in Dr. Cleary's "U.S. Utilities" group, while having a lower average CV(ROE). According to Dr. Cleary's interpretation, this would suggest that the pipeline sample is lower risk on average than the U.S. electric and gas utilities Dr. Cleary selectively grouped together, yet still able to earn higher returns. This is another counter-intuitive conclusion from Dr. Cleary's misguided attempt to use a small and infrequent sample of accounting returns to "measure" risk.

The fact that simply applying Dr. Cleary's methodology to different groupings of my sample companies produces results that are so different from the results Dr. Cleary presented in his evidence suggests that meaningful conclusions cannot be drawn from this analysis. Similarly, as Dr. Carpenter demonstrates in his rebuttal,[36] correcting errors in Dr. Cleary's parallel analysis of variability in operating earnings (EBIT) and making relatively minor and reasonable modifications to certain assumptions, inputs, and methods of that analysis also leads to substantial changes in the results.

Q20. Please summarize your conclusions regarding Dr. Cleary's discussion of comparability.

A20. Despite his assertion to the contrary, Dr. Cleary's has not "*quantified"* the business and total risk[37] of the companies in his samples by analyzing volatility of operating earnings

[36] Carpenter Rebuttal Evidence, Section III.C.

[37] Cleary Evidence, PDF pp. 85 and 89.

and earned ROE. Dr. Cleary's analysis is conceptually unsound in that it fails to provide the kind of forward-looking, market-based analysis that is needed to study the cost of equity. Additionally his approach to the data is selective and misleading, such that the results—and Dr. Cleary's conclusions—are not robust to straightforward corrections and adaptations to the relevant samples. I recommend the analysis be given no weight.

Similarly, Dr. Cleary's assertion that U.S.-based sample companies are not comparable because they have higher betas than Canadian utility holding companies is inaccurate and conceptually flawed. Dr. Cleary's claim is premised on a selective and misleading comparison of multi-decade averages of certain historical betas that does not accurately represent the current data.

Ultimately, Dr. Cleary's attempts to distinguish the Canadian and U.S. samples' business risk on the basis of quantitative metrics are not supported by the data. Moreover, they are undermined by the fact that he has performed no comparative analysis of the business risk characteristics of the companies in my samples or his own. In contrast, I have screened my samples carefully for important comparability characteristics,[38] and Dr. Carpenter has submitted evidence rigorously analyzing business risk based on an accepted framework.[39]

B. CAPM ESTIMATION ISSUES

Q21. What issues do you address relating to the CAPM?

A21. In this section of my rebuttal evidence, I respond to (1) Dr. Cleary's discussion of reliance on the CAPM by financial managers,[40] (2) Dr. Cleary's flawed and downwardly-biased implementation of the CAPM, and (3) Mr. Johnson's and Mr. Thygesen's comments regarding certain inputs to the CAPM, namely the risk-free rate and MERP. Since the choice of input parameters is central to the implementation of the CAPM, I

[38] Villadsen Evidence PDF pp. 41-55.

[39] Carpenter Evidence, Section II.A.

[40] Cleary Evidence PDF p 29.

address each of the relevant inputs in turn: the risk-free rate, the MERP, and betas. Additionally, in critiquing Dr. Cleary's implausibly low CAPM results, I respond to his mischaracterization of the purpose of adjusted betas, and correct his inaccurate statements about application of the ECAPM.

Q22. What does CCA witness Mr. Thygesen recommend with respect to the CAPM and its inputs?

A22. Mr. Thygesen makes no explicit recommendations with respect to CAPM inputs, and his evidence does not even mention beta or the market risk premium. However, he devotes substantial portion of his evidence to various arguments that are seemingly intended to persuade the Commission not to consider Consensus Forecasts when determining an appropriate risk-free rate.[41]

Q23. What does City of Calgary witness Mr. Johnson recommend with respect to the CAPM and its inputs?

A23. Like Mr. Thygesen, Mr. Johnson makes no explicit recommendations regarding the appropriate risk-free rate. His discussion of the topic is restricted to "observations" about RBC's interest rate forecasts, which he attempts to interpret in relation to testimony by Dr. Booth in past GCOC proceedings.[42]

Mr. Johnson's only comment on the MERP relates to Duff & Phelps' recommended U.S. equity risk premium as published in October 2017 and reflecting that publication's perception of market changes from January 2016 to July 2017.[43]

Mr. Johnson presents betas for certain Canadian utility holding companies sourced from three websites—Google, Yahoo!, and the Globe and Mail—but he explains few if any

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41 Exhibit 22570_X0551 Evidence of Jan Thygesen ("Thygesen Evidence"), Section 4 (PDF pp. 9-33).

42 Exhibit 22570_X0611 Evidence of Hugh Johnson ("Johnson Evidence") PDF pp. 9-10.

43 Johnson Evidence, PDF pp. 10-11.

details of how beta estimate were derived by those providers.[44] Mr. Johnson does not explain whether or how these beta estimates relate to his suggestion that "the Commission could safely assume a beta […] of .5 to .6" for ATCO Gas,[45] nor does he provide any other support for that recommendation.

Q24. What does UCA witness Dr. Cleary recommend with respect to the CAPM and its inputs?

A24. Of the witnesses for intervening parties, Dr. Cleary is the only one who puts forth a complete CAPM calculation intended to estimate the cost of equity for the utilities. Dr. Cleary employs the following inputs.

- Risk-free rate of 2.6%, which is the mid-point between a current (December 2017) prevailing 30-year government bond yields and a one-year out forecast from Consensus Forecasts' October 17 edition.[46]
- MERP of 5%, which is the mid-point of what Dr. Cleary characterizes as "the commonly used 4-6% range."[47]
- Beta point estimate of 0.45, which he considers reasonable relative to his calculated "long-term average" historical Canadian utility beta of 0.35 and various somewhat more recent raw historical beta estimates,[48] and to which he does not apply the standard Blume adjustment.

Combining these inputs in the CAPM produces the following unreasonably low result.

$$ROE = 2.6\% + 0.45 \times 5\% = 4.85\%$$

Even after the application of Dr. Cleary's "spread adjustment," and incorporation of the Commission's standard 50 bps flotation cost adjustment, Dr. Cleary's recommended

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44 Johnson Evidence, PDF p. 7 (Table 2).

45 Johnson Evidence, PDF p. 7.

46 Cleary Evidence PDF p. 30.

47 Cleary Evidence, PDF p. 37.

48 Cleary Evidence, PDF pp. 44, 45.

CAPM cost of equity is 5.49%,[49] which is less than one percentage point higher than the cost of debt assumed for the Alberta utilities by UCA witness Mr. Bell.[50]

Q25. What are the central considerations when evaluating the proper implementation of the CAPM?

A25. When considering the proper implementation and interpretation of the CAPM in the context of this proceeding, two points are fundamental: (1) the allowed return that is being determined must meet the fair return standard, and (2) the cost of capital is a forward-looking measure, which in this case will apply for 2018, 2019, and 2020.

Central to the fair return standard is the idea of comparability – that investors in a regulated utility should be granted a return that is consistent with that available on alternative investments of similar risk. In finance terms, the fair return compensates investors for the opportunity cost of capital, which is the return investors require to undertake the investment. Any model for estimating the cost of equity must take a *forward-looking* perspective.

For CAPM estimates to reflect the fair return standard, it is necessary that (1) the risk-free rate reflects the yields on risk-free long-term government debt that are expected to *prevail* during the period 2018-2020, (2) the MERP reflects market expectations for the equity premiums that *will be available* on long-term equity investments made during the period 2018-2020, and (3) beta estimates that reflect the best estimate of the systematic market risk for the relevant comparable sample companies *going forward*.

Finally, to the extent that there are expected changes in the business risk of the Utilities, the CAPM estimated ROE needs to rely on samples that incorporate such changes.

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[49] Cleary Evidence PDF p. 48. Note that Dr. Cleary employs only this version of the traditional CAPM and not consider the ECAPM.

[50] See Information Request BELL-ATCO/AUI-2018JAN26-002 (a).

Q26. What are your primary conclusions in response to the intervening witnesses' discussion of CAPM and its inputs?

A26. Contrary to the key considerations laid out above, Dr. Cleary's CAPM calculations—as well as Mr. Thygesen's and Mr. Johnson's comments about certain CAPM inputs—are fundamentally *backward* looking and do not reflect investors' expectations – let alone their required return. For this reason, and because they contain other consequential flaws, I find these witnesses CAPM-based calculations and comments to be downwardly biased and inconsistent with the fair return standard.

Additionally, I note that Dr. Cleary's reliance on surveys about the relative prevalence of CAPM compared to other cost of equity estimation methods does **not** constitute support for his downwardly biased implementation of that model (the "Cleary CAPM"). I reach the following specific conclusions about the Cleary CAPM:

- The Cleary CAPM overemphasizes current bond yields, which do not reflect investor expectations of risk-free returns for 2018-2020 in the current rising interest rate environment.
- The Cleary CAPM relies on an arbitrarily-selected MERP that assigns weight to geometric average estimates, over-weights selected pension and other fund estimates, considers outdated surveys, and ignores forward-looking market evidence reflecting the elevated risk aversion in capital markets.
- The Cleary CAPM uses backward-looking beta estimates that are notionally based on multi-decade "historical averages," and are inconsistent with the best current estimates of systematic market risk for comparable companies.
- The Cleary CAPM ignores well-established academic evidence supporting the common practice of applying the Blume adjustment to improve forward-looking predictive power of historically-measured betas.
- The Cleary CAPM does not apply standard finance techniques for unlevering and relevering beta that are necessary to adjust for differences

> in financial leverage;[51] thus, the Cleary CAPM fails to properly account for financial risk.

Finally, I note that in eschewing the ECAPM (and misleadingly implying that it is somehow the same as or redundant with the Blume adjustment to beta), Dr. Cleary's CAPM analysis ignores well-established empirical evidence that the risk-return relationship is somewhat "flatter" than that predicted by the traditional CAPM.

1. Survey Evidence Does Not Support the "Cleary CAPM"

Q27. What is your reaction to Dr. Cleary's assertion that the CAPM "is widely used" and quotation that "practitioners should use the CAPM"?[52]

A27. Practitioners should and do use the CAPM as one of several models to estimate the cost of equity, but (1) implementation considerations are very important and (2) it is not the only model practitioners should or do use.

Q28. Please elaborate on the implementation issue.

A28. The surveys cited by Dr. Cleary shows that CEOs use the CAPM, but they provide no support for Dr. Cleary implementation of the CAPM. For example, Professor Berk (author of one of the articles relied on by Dr. Cleary) in his textbook with DeMarzo clearly recognizes the need to unlever and relever betas depending on capital structure and states that:

> The levered equity return equals the unlevered equity return, plus and extra "kick" due to leverage. … The amount of additional risk depends on the amount of leverage, measured by the firm's market value debt-equity ratio, D/E….[53]

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[51] As noted below, such techniques are taught in finance texts co-authored by Dr. Cleary. See Booth, Laurence & Cleary, Sean W., "Introduction to Corporate Finance," 2008, p. 838.

[52] Cleary Evidence, PDF p. 29.

[53] Berk & DeMarzo 2013, p. 489. Similar comments appear in Richard A. Brealey, Stewart C. Myers, and Franklin Allen, 2014, Principles of Corporate Finance, 11th edition, McGraw-Hill Irwin (Brealey, Myers & Allen 2014), p. 433.

The authors show how to unlever and relever betas to account for financial risk.[54] Hence, their implementation of the CAPM differs from that of Dr. Cleary.

Q29. What about your second point that the CAPM is not the only model practitioners should or do use?

A29. As for the second point, the data provided by Dr. Cleary shows that the use of the CAPM is lower in Canada at 40% versus the U.S. at 70%. It is not even half of Canadian CFOs that use the CAPM. More importantly, however, is the fact that even if they do use the CAPM, it is not necessarily the only model used. My written evidence cited the text by Professor Berk and his co-author, Professor DeMarzo, as well as that of Professor Myers; all of whom agree that there is no unilaterally agreed upon model.[55]

In addition to the academic texts that acknowledge there is no unilaterally accepted model for cost of equity estimation, practitioners and regulatory commissions,[56] including the Commission,[57] commonly look to multiple models. As a result, Dr. Cleary's unilateral focus on the CAPM is misguided.

2. Misconceptions Regarding the Risk-Free Rate

Q30. What are your key concerns with Dr. Cleary's choice of risk-free rate?

A30. I have two key concerns. First, Dr. Cleary chooses a range for the risk-free rate based on the actual yield as of December 2017 and the October 2018 forecast from Consensus Forecast.[58] However, the cost of capital that is being determined in this proceeding will be in effect for 2018-2020, so a better estimate would use an average or midpoint for the period. Second, Dr. Cleary suggests that because his 2016 risk-free rate forecast for 2017

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54 Berk & DeMarzo, (2014), *Corporate Finance* (3rd ed.), pp. 492-493.

55 See Villadsen Evidence PDF p. 11 as well as the texts cited in footnotes 15 and 16.

56 See Villadsen Evidence PDF p. 12, footnote 19.

57 2016 GCOC Decision ¶317 and 2013 GCOC Decision ¶271.

58 Cleary Evidence PDF p. 30.

was approximately correct,[59] the same will be true for 2018-2020. That is much too simplistic.

Q31. Why are you critical of Dr. Cleary's range for the risk-free rate?

A31. Clearly, the parameters underlying the cost of equity for the 2018 GCOC, which is expected to be in effect during the period 2018-2020, would reflect the best estimate for the year 2018-2020. The importance of accurately reflecting the relevant period increases during times of changing interest rates. Currently, most market observers expect interest rates to increase. For example, Dr. Cleary suggests using the actual risk-free rate as of December 19, 2017 as a lower bound and the Consensus Forecast for October 2018 as an upper bound. This provides a range of 2.2% to 3.0%. However, the current yield on 30-year Canadian bonds is approximately 2.5% and the forecasted yield for 2020 is approximately 3.6% for a midpoint of 3.05%.[60] Thus, Dr. Cleary midpoint of 2.6% downwardly biases the cost of equity by approximately 45 basis points (3.05% minus 2.6%).

The recommendation is additionally biased in that Dr. Cleary uses an observed risk-free rate as of December 19, 2017 for evidence filed on January 12, 2018, when the 30-year yield already had started to climb.[61]

Q32. Have there been any changes to the risk-free rate since Dr. Cleary filed his evidence?

A32. Yes. On January 17, 2018, the Bank of Canada raised the target overnight rate to 1.25% following increases in July and September 2017. The U.S. Federal Reserve had previously raised the federal funds rate on December 13, 2017 to 1.25% to 1.50%. Further, the yield on 30-year Canadas has increased as has the yield on long-term U.S.

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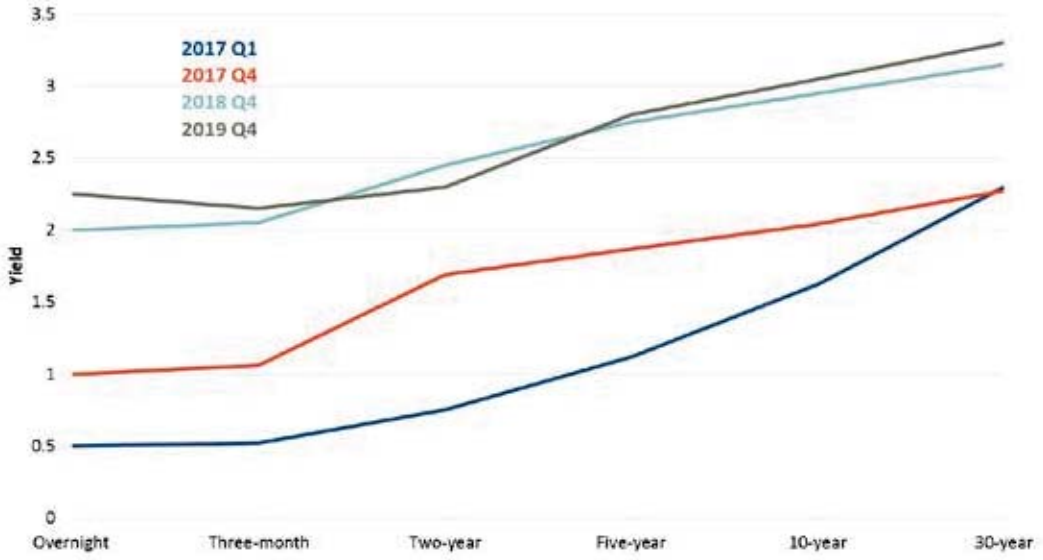
[59] Cleary Evidence PDF p. 11.

[60] Calculated as Consensus Forecasts' (Oct. 2017) estimated yield on 10-year Canadian bonds in 2020 of 3.1% plus Dr. Cleary's estimated maturity premium of 50 basis points (p. 30 of Cleary Evidence).

[61] As of January 12, 2018 the yield on the 30-year Canadian bonds had increased to 2.37% per Bloomberg.

government bonds. The historical and expected yield curve for Canada is shown in Figure 8, below.

Figure 8
Development in Canadian Long-Term Government Bond Yields



Source: RBC actual and forecast yield curves as reported in Johnson Evidence, Table 3 (PDF p. 9).

The data in Figure 8 not only shows that interest rates have increased and are expected to increase further, but also that the yield curve is expected to return to a more normal shape than what Mr. Johnson observed in late 2017.

Q33. Do you have any reactions to Mr. Johnson's observations regarding the development in Government of Canada bond yields?

A33. Yes. First, Mr. Johnson refers to evidence presented by Dr. Booth in prior proceedings, which is out of date.[62] No evidence has been presented to demonstrate that data presented in 2011, 2014 or 2016 represent the interest rate environment in early 2018 or that expected for the remainder of 2018 through 2020. Second, Mr. Johnson states that "Professor Booth's 4.0% trigger to change the allowed ROE" has not been met. However, Mr. Johnson has not filed any evidence regarding the relevance of the 4.0%

[62] Dr. Booth has not filed evidence in this proceeding.

level or its impact on the fair return (and neither has Professor Booth). Instead Mr. Johnson provides data that show the yield on the 30-year Canadian government bond is expected to increase by more than 100 basis points between Q4, 2017 and Q3, 2019.[63] This is actually consistent with my evidence, which shows that the yield on 30-year Canadian bonds is expected to increase substantially and have already begun to increase as shown in Figure 8 and indicated by the recent increase in the Government of Canada target overnight rate. Thus, Mr. Johnson is incorrect when he states that "there has been no change in the forecast interest rate environment relevant to the determination of the fair ROE."

Q34. What about Dr. Cleary's claim that his 2016 GCOC risk-free rate recommendations were more accurate than Consensus Forecasts?

A34. Dr. Cleary appears to compare his forecasts of risk-free rate for 2016-17 to the actual rates and concludes that one of his forecast was closer to the 2016-17 realized rate than other forecasts.[64] Cleary's 2016 GCOC Evidence presented one forecast for the risk-free rate,[65] but one observation is hardly sufficient to conclude anything. As for the point that forecasts submitted to the Commission over the years following the financial crisis has been higher than realized risk-free rates, there are several problems making any conclusions. First, the period depicted in Figure 2 of Dr. Cleary's Evidence shows forecasts for three GCOC proceedings (2011, 2013, and 2016), which makes a very small sample. Second, the period over which the forecasts were made followed the financial crisis and exhibited, as acknowledged by the Commission, many unusual characteristics. Third, academic analyses of economic forecasts of government bond yields more generally have found that any "bias" in forecasts is not consistently upward or downward, but rather towards the status quo.

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63 Johnson Evidence, Table 3 (PDF p. 9).

64 Cleary Evidence, PDF pp. 11-12.

65 Evidence of Dr. Sean Cleary, 2016-2017 Generic Cost of Capital Proceeding, Application 20622, p. 43.

Q35. Why does the number of forecasts matter?

A35. Because the degree to which statistical analyses accurately measure a phenomena (in technical terms – the phenomenon is statistical significant) depends greatly on the number of observations available for analysis. Even if I count each forecast as one observation, Figure 2 in Dr. Cleary's Evidence[66] has only 10 forecasts over a seven year period. This is by any means a small sample.[67]

Q36. Please elaborate on the academic findings regarding forecasts of government bond yields.

A36. As noted above and in my 2016 GCOC Rebuttal Evidence, economic forecasters tend to place too much weight on yields prevailing at the time they are predicting future yields. Under the "status quo bias" hypothesis, forecasts will tend to over-predict actual yields when yields are decreasing (as they have done recently) and under-predict yields when yields are increasing. In a study published in the Journal of Applied Finance and Banking, Gubdaydullina, Hein, and Spiwoks studied forecasts of interest rates from the Consensus Forecasts surveys for 12 industrial countries from 1989 to 2009—a much larger sample than that used by Dr. Cleary. They found that, on average, the forecasted *change* in interest rates was much smaller than the eventual realized change. In other words, the forecasts were too close to the prevailing interest rate at the time the forecast was made.[68] Put differently, they did not find a systematic upward or downward bias, but rather that forecasts systematically under estimated the pace of change.

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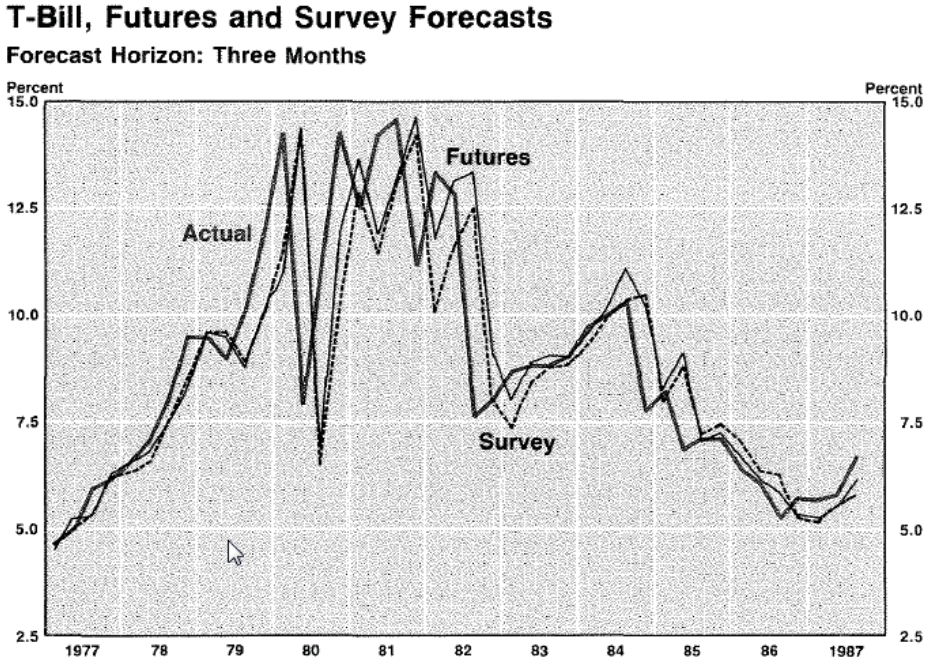
66 Exhibit 22570_X0567_Exhibit B-Figure 2 Data shows 10 distinct forecasts.

67 Simply put, the sample is too small to draw any conclusions. From a statistical perspective, if you assume a normal distribution, want to be wrong less than 10% of the time, and the standard deviation is 0.6, then the sample needs to include approximately 65 observations (calculated as $1.6452 \times 0.6 \times (1 - 0.6)/0.102 = 64.9$).

68 Gubaydullima, Hein, Spiwoks. "The status quo bias of bond market analysts." *Journal of Applied Finance and Banking.* 1.1 (2011)

Federal Reserve Researchers Hafer and Hein found evidence of a similar pattern of status-quo bias in the forecasting of U.S. T-Bills.[69] Figure 9 reproduces a chart from their paper comparing 3-month out forecasts of T-bill rates to the corresponding actual rates during the period 1977-1987. The results showed that survey forecasts (the dotted line in the figure) consistently "lagged" the actuals—under-predicting when yields were rising and over-predicting when yields were falling.[70] However, there is not compelling evidence in the chart that the forecasts are nearly always too high or nearly always too low.[71]

Figure 9: Figure from Hafer and Hein



Source: R.W. Hafer and S.E. Hein. "Comparing Futures and Survey Forecasts of Near-Term Treasury Bill Rates."

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69 R.W. Hafer and S.E. Hein. "Comparing Futures and Survey Forecasts of Near-Term Treasury Bill Rates." *Federal Reserve Bank of St. Louis Review*. May/June, (1989), 33-42 ("Hafer and Hein").

70 Note that the Hafer and Hein paper also evaluated exchange-traded interest rate futures contracts to see whether the collective expectations of market participants served as a more accurate predictor of eventual realized yields. As shown in Figure 9, the futures exhibited the same tendency to lag the actuals as the survey forecasts.

71 Note also that Hafer and Hein performed the same analysis for a six month forecast horizon, and found a similar pattern, with a longer lag, consistent with forecasters and futures markets placing too much weight on the status quo. *See* Figure 2 of Hafer and Hein.

Q37. Do you have any comments on Mr. Thygesen's discussion of studies of forecasted GDP growth as it relates to interest rate forecasts?[72]

A37. Yes. Mr. Thygesen cites articles from 2001 and 2014 that study the ability of forecasters to predict recessions—not GDP growth—one year ahead. Thus, the articles are not looking to the accuracy or bias in interest rate forecasts, but to the ability to forecast "extreme" economic events such as recessions. It is also noteworthy that the second article finds that not only did private forecasters as well as the IMF and other government entities fail to predict the 2009 recession, but by 2009 they predicted more recessions than actually occurred.[73] Thus, the forecasters both over and under estimated the impact on the economy.

Forecasting interest rates and recessions are different in that interest rate developments are not unique (or unusual) events as is recessions. This is especially true for the second article, which looks to the financial crisis of 2008-09 and subsequent recessions. Predicting the failure of Lehman Brothers in September 2008 and the impact hereof is distinctly different from forecasting the interest rate one, two or three years out. As a result, Mr. Thygesen's discussion of the ability to forecast recessions has no bearing on interest rate forecast.

Q38. What do you conclude regarding the risk-free rate?

A38. Based on recent actions by the Government of Canada and the U.S. Federal Reserve as well as recent movement in the risk-free rate and forecasted risk-free rates, it is clear that interest rates are expected to increase over the coming years. In addition, academic research has shown that there is no reason to believe that forecasts are biased or that futures are "better" predictors. This is not surprising as forecasters such as those included in Consensus Forecasts are market participants that are well aware of both current and forward rates at the time they make their forecasts.

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[72] Thygesen Evidence, ¶ 44-46 PDF pp. 15,16.

[73] Tim Harford, "An Astonishing Record – of Complete Failure," June 2014. See also, Hites Ahir and Prakash Loungani, "Fail Again? Fail Better? Forecasts by Economists during the Great Recession," George Washington University presentation, January 30, 2014.

3. Choice of the Market Equity Risk Premium

Q39. What do you address in this section?

A39. I address the MERP related discussion by Dr. Cleary, Mr. Johnson and Mr. Thygesen. Specifically, I discuss Dr. Cleary's views that the expected market returns are in the 6-9% range and the best MERP estimate is 5%,[74] Mr. Johnson's use of the data from Duff & Phelps,[75] and Mr. Thygesen's failure to recognize the inverse relationship between the risk-free rate and the MERP.

Q40. Please address Dr. Cleary's conclusion that "a more appropriate range for expected long-term Canadian stock market returns is 6-9%, and the mid-point of 7.5% represents a better point estimate."[76]

A40. Dr. Cleary draws this conclusion despite presenting evidence that the arithmetic,[77] historically realized nominal return in Canada was over 9% and over 10% in the U.S.[78] In addition, I note that the third source cited in Dr. Cleary's Table 7 calculates a real return of 8.9% (approximately 10.9% nominal) for the U.S. during 1985-2014.[79] This data ignores the very high market returns in 2017 and also ignored historical data from Duff & Phelps, which cites average historical MERPs of 5.7% and 7.3% for Canada and the U.S., respectively.[80]

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74 Cleary Evidence, PDF p. 35.

75 Johnson Evidence PDF pp. 10-11.

76 Cleary Evidence PDF p. 35, lines 14-16.

77 For the purpose of determining the expected return, it is the arithmetic average that is relevant.

78 Cleary Evidence PDF p. 32, Table 7 assuming the difference between nominal and real returns is 2% as indicated by Dr. Cleary on PDF p. 34, line 4.

79 McKinsey&Company, "The Real Economy and Future Investment Returns," CalPERS, January 17, 2017, p. 7 (https://www.calpers.ca.gov/docs/board-agendas/201701/day1/3.3-2018-alm_presentation-2-mckinsey.pdf)

80 Duff & Phelps, "International Cost of Capital Handbook," 2017, Exhibit 1-9 for Canada, Exhibit 1-52 for U.S. These figures correspond to data from 1935 to 2016.

Looking to the various forecasted market return referenced by Dr. Cleary, I note that (i) the range of forecasts vary widely from about below 2% to 8.5% for Canada[81] and (ii) none of the sources cited are dated during Q4 of 2017, which experienced record high returns. It is also noteworthy that while Dr. Cleary chooses to present these forecasts as evidence of the market return and MERP without any specification as to how the figures are calculated – yet he dismisses Bloomberg's forecasted MERP as "not meaningful" based on his (inaccurate) assertion that it is inadequately documented.[82] Bloomberg's forecasted MERP for Canada was approximately 9.9% and 7.4% for the U.S. at the time of my analysis.[83]

Dr. Cleary chooses to ignore these observations and in discussing survey results, he relies on data only up until 2013 despite the fact that Professor Fernandez has issued a similar survey each year.[84] The most recent survey by Professor Fernandez estimates the Canadian median MERP at 6.4% (average at 6.0%),[85] which is 60 to 100 basis points above the MERP estimate Dr. Cleary reports from the Fernandez studies.[86, 87]

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81 In the remainder of this section, I ignore the cited forecast from CIBC as I cannot locate the cited figures in the document provided.

82 For the record, detailed information about Bloomberg's methodology was provided in the confidential attachment to IR response Villadsen-UCA-2017NOV21-007.

83 Villadsen Evidence, Figure 5 PDF p. 32. Bloomberg's current forecast (as of February 16, 2018) for the Canadian MERP has averaged 9.1% during 2018 and remains well over 8%.

84 Cleary Evidence PDF p. 37, Figure 11.

85 Pablo Fernandez, Vitaly Pershin and Isabel F. Acin, "Discount Rate (Risk-Free Rate and Market Risk Premium) used for 41 Countries in 2017: a survey," April 17, 2017 (Fernandez (2017).

86 See Cleary Evidence PDF p. 37, Figure 11..

87 It is noteworthy that Pablo Fernandez, "CAPM: An Absurd Model," IESE Business School, Spring 2015 was very critical of the CAPM assumptions and predictions.

Q41. Do you have any other concerns about Dr. Cleary's discussion of historical and forecasted market returns and market risk premiums presented in his Table 7, Figure 10, and Figure 11?[88]

A41. Yes. To the extent Dr. Cleary relies on any *geometric average* historical results or forecasted compound annual rates of return, he is wrong to do so.[89]

While geometric means are useful for measuring historical performance (in the form of compound annual returns), they are downward biased as estimates of expected future returns. This is because they represent the average of a single ex-post realization of the distribution of possible ex-ante expected returns, and as such do not account for year-to-year variation around the expected value. Academic evidence and practitioner custom supports the use of arithmetic averages (when using historical data) or arithmetic expectations (for forward-looking models) as the most appropriate forecasts of expected returns.[90] Additionally, the Commission and its predecessor have consistently recognized that near-term expected returns should be calculated and considered on an arithmetic rather than geometric basis.[91] As also noted in the Buttke Rebuttal Evidence, the use of a geometric average does not reflect the expected return and downward bias the results. Therefore, Dr. Cleary's geometric averages and compound annual return expectations from pension funds and other investment managers deserve no weight.

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88 Cleary Evidence, PDF pp. 32-37.

89 In Dr. Cleary's Table 7, he denotes historical geometric averages by "GA." As Mr. Buttke points out in Section X of his rebuttal, many of the forecasted market returns considered by Dr. Cleary are expected compound annual rates of return, which are equivalent to geometric averages and thus not appropriate benchmarks for the MERP.

90 *See* for example, Morin, R.A., *New Regulatory Finance*, Public Utilities Report, Inc., 2006, Appendix 4A, which summarizes the theoretical, empirical, practical, and academic evidence on this issue. *See also* Duff & Phelps 2017 Valuation Handbook: US Guide to Cost of Capital, p. 3-34 and footnotes 3.63 and 3.64.

91 *See* Alberta EUB Decision 2004-052, pp. 19 and 29, AUC Decision 2191-D01-2015, paragraphs 237-238.

Q42. Do you have any comments on Mr. Johnson's use of Duff & Phelps' MERP of 5.0% (with a risk-free rate of 3.5%)?[92]

A42. Yes. The recommendation pertains to the U.S. as of July 2017. First, the fact that Duff & Phelps lowered the U.S. MERP in July 2017 does not mean that the MERP for 2018-2020 is lower. I continue to find that the historical arithmetic average and current forecasts remain the best estimates as they avoid subjective evaluation. Second, evidence indicates that the current forecasts for the Canadian MERP are higher than the forecasted U.S. MERP. For example, Bloomberg's forecasted the MERP for Canada to be more than 250 basis points higher than for the U.S. in August 2017[93] and currently expect the Canadian MERP to exceed the U.S. MERP by nearly 100 basis points.[94] Similarly, Fernandez (2017) similarly found that the Canadian MERP was higher than that in the U.S. by 30-70 basis points.[95]

As a follow on, Mr. Johnson's statement that "not one of the ten factors they examined indicated an increase in the equity risk premium"[96] is not valid. For example, market volatility has increased as shown in Figure 4 and historic GDP growth has been increasing,[97] so Mr. Johnson's statement would not pertain as of early 2018.

I find Mr. Johnson's discussion of the MERP to be incomplete in that it references only one observation on the MERP and that observation pertains to the U.S. There is no discussion as to why the Duff & Phelps figure is preferable to that of other data

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92 Johnson Evidence PDF p. 11.

93 Villadsen Evidence, PDF p. 31.

94 As of February 16th 2018, Bloomberg forecasts the Canadian MERP at 8.17% and the U.S. MERP at 7.19% over 10-year bonds.

95 Fernandez (2017) report the U.S. average and median MERP at 5.7%, while the Canadian average and median MERP is reported at 6.0% and 6.4%, respectively.

96 Johnson Evidence PDF p. 11. It bears noting that even the Duff & Phelps figure presented by Mr. Johnson did identify that changes in actual and forecast real GDP growth indicated a directionally higher MERP.

97 According to the Bureau of Economic Analysis, real GDP increased at annual rates of 3.2% and 2.6% in the third and fourth quarters of 2017, respectively.
https://www.bea.gov/newsreleases/national/gdp/gdpnewsrelease.htm

providers. In addition, some of the factors cited no longer pertain, so Mr. Johnson MERP reference cannot be used to assess the MERP.

Q43. How about Mr. Thygesen's observation that "the return should be reduced" because "three financial condition indices all show low financial stress"?

A43. Importantly, Mr. Thygesen does not recognize that the MERP and the risk-free rate are interrelated, so that the MERP usually is high when the risk-free rate is low.[98] Mr. Thygesen does not recognize this observation – nor does he attempt to refute it.

4. Beta Estimation Methodology

Q44. What concerns do you have about to Dr. Cleary's and Mr. Johnson's beta evidence?

A44. Both Dr. Cleary and Mr. Johnson put forth beta estimates and recommendations that are downwardly biased and unrepresentative of forward-looking systematic risk for utility companies. In addition to inappropriately ignoring beta evidence for U.S.-based comparable companies,[99] both Dr. Cleary and Mr. Johnson present backward-looking historical beta estimates that have not been properly adjusted to be better predictors of future systematic risk.

Dr. Cleary exacerbates the backward-looking nature of his beta recommendation by focusing on downwardly-biased multi-decade historical averages that do not reflect systematic risk as measured in the current market environment.

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[98] Morin, Roger A., *New Regulatory Finance*, Public Utilities Reports, Inc., 2006 pp. 128-129. See also Bente Villadsen, Michael J. Vilbert, Dan Harris, and A. Lawrence Kolbe, "*Risk and Return for Regulated Industries*," Academic Press 2017, pp. 118-120.

[99] *See* Section III.A.1 above, demonstrating that Dr. Cleary's claims that U.S. samples are riskier than Canadian utilities are unsupported by evidence.

Finally, and importantly, Mr. Johnson and Dr. Cleary present only monthly beta estimates,[100] which—as I demonstrate below and in Appendix A to this rebuttal—are currently unreliable from a practical and statistical standpoint. Dr. Cleary relies nearly exclusively on monthly betas to inform his recommendation,[101] ignoring the fact that betas estimated using weekly data have been statistically superior to monthly betas during most of the multi-decade historical periods he examines, including in the recent past.

a. Dr. Cleary's recent beta estimates are unreliable and unreasonably low

Q45. Does Dr. Cleary discuss or present any beta estimates that use recent data?

A45. Yes. In Table 8 of his evidence, Dr. Cleary provides raw (i.e., unadjusted) betas for a sample of Canadian utility companies, which he claims to have procured from Bloomberg as of some date in November, 2017.

Dr. Cleary states that these recent measurements of raw historical Canadian utility betas are below his recommended 0.45 point estimate and finds them to be consistent with his calculations of a "long-term average" historical beta of approximately 0.35. [102]

Q46. Do you have any concerns about how Dr. Cleary's current beta estimates provided in his Table 8 were derived?

A46. Yes. Dr. Cleary claims in his evidence that these betas are estimated "based on 60 months of returns",[103] however, when ATCO and AUI inquired further about the source and information underlying these estimates, Dr. Cleary claimed in information responses that "they were calculated using weekly return data."[104]

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[100] Johnson Evidence, Table 2 (PDF p. 7); Cleary Evidence, Figure 12 and Table 8 (PDF pp. 46-47). Note that while Dr. Cleary made inconsistent statements in his evidence and IR responses about whether the Bloomberg betas in his Table 8 use monthly or weekly data, my own research using Bloomberg strongly suggests Table 8 contains monthly betas.

[101] Dr. Cleary's Appendix B discusses rolling historical weekly and monthly beta estimates that I provided in my 2016 GCOC Rebuttal, but only calculates averages based on the monthly data.

[102] Cleary Evidence, PDF p 47, lines 6-9.

[103] Cleary Evidence, PDF p 46, lines 5-6.

[104] Cleary-ATCO/AUI-2018JAN26-011 response (a).

Importantly, if Dr. Cleary did pull unadjusted Bloomberg betas based on 5 years of monthly data as he originally stated, he must have explicitly manipulated the settings to achieve that specification, since Bloomberg's default settings provide Blume-adjusted betas calculated using 2 years of weekly data.[105]

As Dr. Cleary did not precisely specify the dates or data parameters used to estimate the betas in his Table 8, I attempted to verify them using my firm's Bloomberg subscription. Figure 10 below portrays the (unadjusted) Bloomberg betas I obtained—estimated using 5 years of return data as of November 30th, 2017—alongside the betas reported by Dr. Cleary in Table 8 of his evidence.

The Bloomberg betas in column [1] use 60 months of returns, which is the number of data points Dr. Cleary claims to have used in his evidence. The betas in column [2] use 260 weekly returns, which the number of data points Dr. Cleary seems to have identified in responding to information requests.[106] Despite using Bloomberg terminal settings consistent with what Dr. Cleary appears to have used, I was unable to exactly replicate his Table 8 results (which are displayed in column [3] of Figure 10) based on *either* weekly or monthly returns. (For example, Dr. Cleary reports an "NA" value for TransAlta, when Bloomberg did in fact have a beta available in November 2017.)

[105] Note that my analysis extend the estimation window to 3 years in order to strike a balance between stability (by incorporating a longer history of data) and forward-looking predictive power has been found to be better for shorter estimation windows. However, my beta estimates otherwise conform to the Bloomberg default settings.

[106] See Cleary-ATCO/AUI-2018JAN26-011 response (a): "Bloomberg didn't provide data to estimate this field, but they were calculated using weekly return data."

Figure 10
Comparison of Cleary Table 8 Betas
To Unadjusted 5-year Weekly and Monthly Bloomberg Betas

Firm	Weekly [1]	Monthly [2]	Cleary Table 8 Reported [3]
Fortis	0.59	0.01	0.41
Emera Corp.	0.55	0.01	0.20
TransAlta	1.51	1.19	NA
Northland Power Inc.	0.79	0.45	0.16
Algonquin Power and Utilities Corp.	0.72	0.34	0.33
ATCO	0.83	0.76	0.99
Canadian Utilities Ltd.	0.81	0.50	0.48
Enbridge	1.01	0.61	0.59
TransCanada Corp.	0.89	0.56	0.26
Average	0.86	0.49	0.43
Excluding TransAlta and NPI	0.77	0.40	0.47
(Fortis, Emera, Enbridge, TransCanada)	0.76	0.30	0.37

Source: BV Workpaper R04_CONF.

Q47. What do you observe when comparing November Bloomberg betas to Dr. Cleary's reported betas?

A47. First, I note that while Dr. Cleary's betas do not match either column [1] or [2] of Figure 10, they are generally more in line with the Bloomberg monthly estimates, which are much lower than the weekly estimates. Relatedly, I observe that the November 30, 2017 monthly raw beta estimates for Fortis and Emera are unreasonably low, at 0.01. A beta of essentially zero implies that a rational investor would not require *any* premium above the risk-free rate to hold these companies' stocks. This is simply not plausible. These nonsensical results are in line with my finding—discussed further below—that monthly estimates betas are currently unreliable.

Additionally, it is worth noting that while some of Dr. Cleary's Table 8 beta values are slightly higher than the Bloomberg monthly values in column [2] of Figure 10, his full-sample average is lower. This is due largely to Dr. Cleary not reporting any beta for TransAlta.

Q48. Is there any other evidence indicating that Dr. Cleary's current beta estimates are unreasonably low?

A48. Applying Dr. Cleary's estimates in the context of the CAPM leads to implausible results. If Dr. Cleary used the monthly beta estimates with his assumptions for the risk-free rate, MERP, and spread adjustment, his results for the return on equity would imply risk premiums over the yield on Canadian A and BBB-rated utility debt far less than the 2.5 percent he applies in his BYPRP calculations, if not being less than the return on debt altogether. (See Figure 11.) Dr. Cleary does not attempt to reconcile the inconsistencies between his recommended cost of equity and his recent beta estimates.

Figure 11
CAPM ROE Estimates Using Dr. Cleary's Inputs and Recent Betas

	Minimum Risk Free Rate	Beta	Minimum MRP	Minimum Spread Adjustement	Financial Flexibility Adjustment	Implied ROE	Implied Risk Premium over 4.00% Debt Yield
Fortis	2.2%	0.41	4.5%	0.0%	0.5%	4.55%	0.55%
Emera	2.2%	0.20	4.5%	0.0%	0.5%	3.60%	-0.40%
TransAlta	2.2%	N/A	4.5%	0.0%	0.5%	N/A	N/A
Northland Power	2.2%	0.16	4.5%	0.0%	0.5%	3.42%	-0.58%
Algonquin Power	2.2%	0.33	4.5%	0.0%	0.5%	4.19%	0.19%
ATCO	2.2%	0.99	4.5%	0.0%	0.5%	7.16%	3.16%
Cdn Utilities Ltd.	2.2%	0.48	4.5%	0.0%	0.5%	4.86%	0.86%
Enbridge	2.2%	0.59	4.5%	0.0%	0.5%	5.36%	1.36%
TransCda	2.2%	0.26	4.5%	0.0%	0.5%	3.87%	-0.13%
Average						4.62%	0.62%
Average excl. TransAlta and Northland						4.80%	0.80%
Average (Fortis, Emera, Enbridge, TransCda)						4.34%	0.34%

Source: BV Workpaper R05.

b. Mr. Johnson's beta estimates are also unreliable and unreasonably low

Q49. Have you performed a similar analysis to test the plausibility of the beta estimates presented by Mr. Johnson?

A49. Yes. Figure 12 below shows CAPM calculations using the betas presented by Mr. Johnson in Table 2 of his evidence.[107] While the risk-free rate and MERP discussed by Mr. Johnson are not quite as low as those recommended by Dr. Cleary (although they are

[107] Mr. Johnson presents betas from Google, Yahoo, and the Globe & Mail. For purposes of Figure 12, I use the average of the three estimates for each company in Mr. Johnson's sample.

still too low to reflect forward-looking economic conditions), several of Mr. Johnson's beta estimates are close to zero or even negative. As shown in Figure 12, this leads to ROE estimates close to or below a representative utility bond yield, even after the 50 bps flotation cost adjustment is incorporated.

Figure 12
CAPM ROE Estimates Using Johnson's Inputs and Recent Betas

	Risk Free Rate	Beta	MRP	Flotation Cost	Implied ROE	Implied Risk Premium over 4.00% Debt Yield
TransCanada Corporation	3.3%	0.41	5.0%	0.5%	5.87%	1.87%
Enbridge Inc.	3.3%	0.59	5.0%	0.5%	6.73%	2.73%
Canadian Utilities Limited	3.3%	0.30	5.0%	0.5%	5.32%	1.32%
Emera Inc.	3.3%	-0.06	5.0%	0.5%	3.48%	-0.52%
Fortis Inc.	3.3%	0.02	5.0%	0.5%	3.88%	-0.12%
Valener Inc.	3.3%	0.23	5.0%	0.5%	4.97%	0.97%
AltaGas Ltd.	3.3%	0.59	5.0%	0.5%	6.73%	2.73%
Algonquin Power	3.3%	0.48	5.0%	0.5%	6.22%	2.22%
Hydro One	3.3%	N/A	5.0%	0.5%	N/A	N/A
Average					5.40%	1.40%

Source: BV Workpaper R05.

Q50. Are there any reasons to doubt the reliability of Mr. Johnson's beta estimates?

A50. Yes, there are several such reasons. First, while Mr. Johnson emphasizes that the estimates he presents are publicly available, this is not necessarily a virtue if the estimation methods and statistics are not transparent and replicable. In response to information requests, Mr. Johnson could only confirm that the betas were estimated using the TSX index as the market proxy and that "the period of calculation was 36 months," but claimed that he could not obtain statistical measures associated with the estimates. Further, he indicated that he "[had] not tried to replicate the beta's [sic] provided by each source," and stated that "Google does not seem to be as open as to how it calculates its betas."[108]

Second, 36 data points is simply too small a sample of returns to derive a statistically meaningful beta estimate. As I will demonstrate below, even monthly betas estimated using 5-years of monthly return data (*i.e.*, 60 data points) are, at present, extremely

[108] See response to information request Johnson-ATCO-2018JAN26-002 (a-h).

imprecise for Canadian utilities. I am not aware of any academic or practitioner standards that recommend using 3-years of monthly returns.

Q51. Have you compared Mr. Johnson's beta estimates to weekly and monthly betas from Bloomberg estimated over the same time period?

A51. Yes. Mr. Johnson's Table 2 reports 3-year monthly betas over return windows ending in January.[109] Figure 13 compares Mr. Johnson's betas to unadjusted Bloomberg betas estimated using either weekly (column [1]) or monthly (column [2]) returns over the same 3-year period relied on by Mr. Johnson.

Figure 13:
Comparison of Johnson Table 2 Average Unadjusted 3-year Monthly Betas to Unadjusted 3-year Weekly and Monthly Bloomberg Beta

Firm	Weekly [1]	Monthly [2]	Average of Johnson Quoted [3]
TransCanada Corporation	0.86	0.58	0.41
Enbridge Inc.	1.05	0.76	0.59
Canadian Utilities Limited	0.94	0.44	0.30
Emera Inc.	0.58	-0.07	-0.06
Fortis Inc.	0.73	0.07	0.02
Valener Inc.	0.36	0.29	0.23
AltaGas Ltd.	1.19	0.72	0.59
Algonquin Power	0.78	0.28	0.48
Hydro One	N/A	N/A	N/A
Average	0.81	0.38	0.32

Source: BV Workpaper R04_CONF.

Three things are clear from Figure 13. First, weekly betas are substantially higher than monthly betas for all of Mr. Johnson's sample companies. Second, unadjusted 36-month betas from Bloomberg are generally in line with the average betas from Mr. Johnson's sources. Third, and most relevant, three year monthly betas from all sources appear unreliable, as exemplified by the near zero or negative values for Emera and Fortis. As

[109] The footnote to Mr. Johnson's Table 2 states that the estimates were pulled on January 9, *2017*, but I believe this was a typo and that Mr. Johnson actually obtained them on January 9, 2018. (To verify this supposition, I checked Mr. Johnson's sources on January 16, 2018 and obtained numbers that were essentially identical to those reported in Mr. Johnson's Table 2.)

discussed above, these estimates are simply not plausible as measures of systematic risk, which casts doubt on the reliability of monthly beta estimates in the current market environment.

c. Current monthly beta estimates are statistically imprecise and unreliable

Q52. What is the difference between weekly and monthly betas?

A52. Beta measures the sensitivity of a company's or portfolio's returns to returns on the market. The difference between weekly and monthly betas is the frequency with which the returns are measured. If week-to-week total returns are used, there will be 156 data points over a 3-year estimation window (or 260 over a 5-year window) used to calculate the beta coefficient. In contrast, if total returns are measured from one month to the next, only 60 data points will be used to calculate beta over a 5-year window.

Q53. What are common practices regarding the frequency of returns (e.g., weekly or monthly) for estimating beta?

A53. Both monthly and weekly betas are discussed in textbooks, including one co-authored by Dr. Cleary.[110] However, as computing power and the robustness of stock market data collection has improved dramatically since the early days of beta research, estimates based on weekly and even daily data are becoming more common in academic research.

Bloomberg's default is to calculate adjusted betas on a weekly basis over a two-year period. It also allows users to calculate betas using monthly *or daily* returns.[111]

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[110] "Typically betas for securities are estimated by using 60 months of monthly returns, but sometimes 52 weekly returns are used." See Booth, Laurence, Cleary, W. Sean, and Drake, Pamela Paterson, *Corporate Finance: Financial Management in a Global Environment* (Hoboken, NJ: Wiley, 2014) ("Booth, Cleary, and Drake"), p. 339.

[111] See field description for the "EQY_BETA" Bloomberg field.

Q54. What are the important considerations when deciding what frequency of returns to use for beta estimation?

A54. When trying to estimate forward-looking expected returns, the key trade-off is between statistical precision (*i.e.*, how confident you can be that your estimate is correct) and the relevance of the estimation window to current market conditions (*i.e.*, how recent the data is). Using more data points improves statistical precision, all else equal, but doing so may require using a longer historical period for estimation—especially if monthly betas are used. Using weekly returns to estimate beta can allow a more precise estimate while using more recent (and therefore relevant) data.

Q55. How have weekly and monthly utility betas compared in the recent past?

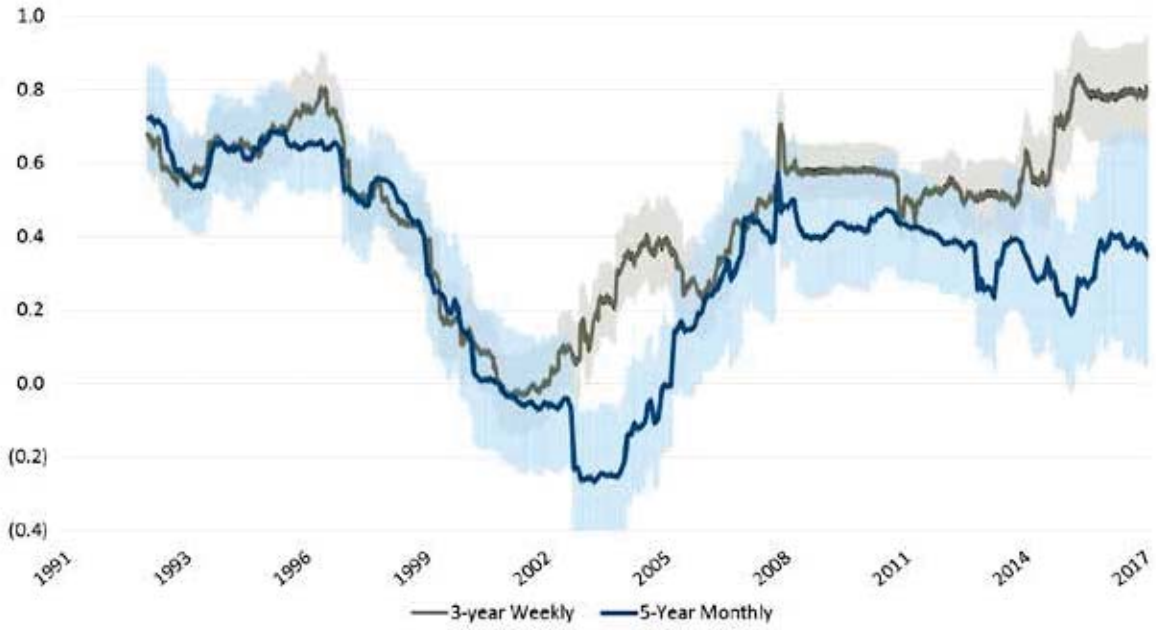
A55. A key concern in the current proceeding is that monthly betas for the Canadian utility companies have become statistically imprecise and unreliable in the years following the global financial crisis. Figure 14 illustrates this by superimposing confidence intervals (sometimes also referred to as "error bars") around the lines representing the rolling weekly and monthly beta point estimates for the TSX Utility sub-index, which Dr. Cleary discusses extensively in his evidence. [112]

It is clear that error bars for the 3-year weekly estimates have consistently been narrower than the 5-year monthly estimates. This means that the weekly estimates are more precise. Importantly, though, the error bars for the 5-year monthly betas are currently quite a bit *wider* than they have been over the majority of the time depicted in the chart. Specifically, as shown in Figure 14, the estimation error for the most recent 5-year monthly beta is *twice* the error for the corresponding 3-year weekly beta. Thus monthly betas are currently even *more* imprecise (relative to the weekly estimates) than they have been in the past. I present further evidence of this in my Rebuttal Appendix A.

45-46

[112] Cleary Evidence, PDF pp ~~42-43~~ (Figure 12) and Cleary Appendix B, PDF pp. 2-4, 8. In this section I show unadjusted betas for easier comparison with Dr. Cleary's discussion. However, academic evidence, as presented in my initial Written Evidence and the associated Technical Appendix, show that the use of adjusted betas provides a better estimate of the forward-looking cost of capital.

Figure 14
Comparison of Unadjusted 3-year Weekly and 5-year Monthly Betas for TSX-Utility Index with 90% Confidence Interval



Source: BV Workpaper R06_CONF.

d. Dr. Cleary's "long-term average" betas are downwardly biased

Q56. In your opinion, can the "long-term average" historical beta values used by Dr. Cleary meaningfully predict the forward-looking systematic risk facing the Utilities?

A56. No. The implication inherent in Dr. Cleary's emphasis on multi-decade historical averages is that utility betas should be expected to have some stable long-term value over time. There is no support for this assumption, either in finance theory or empirically. As Dr. Cleary acknowledges in his co-authored textbook, "[b]etas change through time as the risk of the underlying asset or portfolio changes."[113] While Dr. Cleary then argues in his textbook that this is more relevant to individual assets, one cannot expect that the risk of an industry or the market over 20-30 years would remain the same.

[113] Booth, Cleary, and Drake, p. 339.

Some reasons that business risk can change over time are highlighted in the written evidence of Dr. Carpenter.[114] In addition, a company's systematic risk can increase or decrease, not because of any change in its business, but because of changes its relationship to the market portfolio of all available investments. In other systematic risk for a security can change market conditions change and evolve around it.

Therefore, absent specific empirical evidence that a "long-term average" beta is representative of current risk conditions, Dr. Cleary's reliance on such averages amounts to using vastly out of date information to justify a beta estimate that no longer applies. Instead, it is preferable to rely on estimates of the systematic risk for utilities that use the up-to-date data appropriately reflecting current market conditions.

Q57. Why is Dr. Cleary's long-term average beta estimate downwardly-biased and unrepresentative of current conditions?

A57. There are three main reasons why the multi-decade historical average relied on by Dr. Cleary are downwardly-biased and unrepresentative. First, Dr. Cleary primarily takes averages of monthly betas, which have been highly imprecise and unreliable estimates since the time of the great financial crisis if not before. Second, Dr. Cleary includes in his averages a great deal of data from periods that Dr. Cleary himself acknowledges were anomalous and unrepresentative. Finally, the manner in which Dr. Cleary calculates his averages gives extra weight to older periods that include the anomalous data.

Q58. Are there other reasons Dr. Cleary's betas are backward-looking?

A58. Yes. In addition to relying on betas based on multi-decade historical averages, the Cleary CAPM exacerbates this problem by using raw rather than adjusted betas. In doing so, Dr. Cleary ignores well-established academic evidence showing that the Blume adjustment (so-named to recognize Professor Marshall Blume who originally developed it) improves

[114] Carpenter Evidence, Section II.A and Carpenter Rebuttal Evidence, Sections IV and V. Over the last decade, there have been many changes to the utility industry, including the development of renewables and the impact on the grid, water conservation, and the changes in gas flow on pipelines to mention a few.

forward-looking predictive power relative to raw historical betas.[115] Because the raw betas for most (though not all) relevant comparator companies in this proceeding are somewhat less than one, failing to implement the Blume adjustment—which adjusts beta estimates toward the market-wide average of one—biases Dr. Cleary's estimates downward.

Q59. Do commercial data providers apply the Blume adjustment?

A59. Yes. Services such as Bloomberg and Value Line that cater to investors apply the Blume adjustment to their "off-the-shelf" betas. While Bloomberg allows users to manually specify beta estimation parameters, its *default setting is an adjusted beta* based on two years of weekly return data. Value Line provides only adjusted betas.

Q60. Has the Commission recognized the merits of adjusted betas?

A60. Yes. In the 2016 GCOC Decision, the Commission stated

> The Commission accepts the evidence of Dr. Villadsen and Mr. Hevert that adjusting betas to one is a common approach used by commercial providers of financial data and this information is widely disseminated to investors. … Accordingly, the Commission considers that it is a reasonable practice when using CAPM for utility stocks to adjust the betas towards one, as for example in the "Blume" adjustment.[116]

Thus, the Commission recognizes that while "both raw betas and adjusted betas provide useful directional information,"[117] about changes in systematic risk over time, it is appropriate to rely on adjusted betas when implementing the CAPM to estimate the cost of equity for utilities. I agree with the Commission on this point.

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[115] For a detailed rebuttal of Dr. Cleary's arguments against using adjusted beta, see my Rebuttal Appendix A.

[116] Decision 20622-D01-2016, paragraph 180.

[117] Decision 20622-D01-2016, paragraph 181.

Q61. Does Dr. Cleary consider the impact of financial leverage on beta?

A61. No. Dr. Cleary does not consider the impact of financing through a textbook approach to unlevering and relevering betas.[118] It is standard finance technique to unlever the estimated beta assuming all assets are equity financed and then relever the beta estimate using the target's equity percentage.[119] While some variation exists in the exact specification of formulas used (e.g., the treatment of taxes and the beta on debt), the procedure is taught in virtually all finance textbooks,[120] including the undergraduate text co-authored by Dr. Cleary.[121] Since in this proceeding, betas for the publicly traded sample companies are estimated for entities with more equity than the Utilities, omitting the consideration of leverage biases Dr. Cleary's beta estimates downward.

5. Dr. Cleary's Unreasonably Low CAPM Cost of Equity Estimates

Q62. Please summarize how Dr. Cleary's choices for the CAPM inputs discussed above affect his CAPM estimates.

A62. As discussed above (at the start of this Section III.B), the Cleary CAPM relies on an insufficiently forward-looking risk free rate of 2.6%, a 5% MERP that does not reflect current economic conditions or market expectations, and a downwardly-biased backward-looking beta of 0.45.

Plugging these inputs into the CAPM formula gives a result of 4.85%, which is simply not a reasonable estimate of the cost of equity for the Utilities. Even after adding Dr.

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[118] I note that Dr. Cleary does selectively employ this technique as part of his comparison of betas for U.S. and Canadian utility holding companies. (*See* Cleary Appendix B, PDF p. 6) However, his implementation there improperly uses average deemed capital structures for regulated entities in the two countries, rather than the actual capital structures of the entities whose betas are measured. Inconsistently, Dr. Cleary does not employ the same technique when implementing the Cleary CAPM.

[119] Details are in my Written Evidence, Appendix B, Section IV.B.2.

[120] *See* for example: Brealey, R. Myers, S., & Allen, F. (2017), P*rinciples of Corporate Finance* (12th ed.), pp. 505-507; Berk, J & DeMarzo, P. (2014), *Corporate Finance* (3rd ed.), pp. 492-493; Ross, S., Westerfield, R., Jaffe, J., & Roberts, G. (2003), *Corporate Finance* (3rd Canadian ed.), pp.492-95.

[121] Booth, Laurence & Cleary, W. Sean (2008), *Introduction to Corporate Finance* ("Booth and Cleary"), p. 838.

Cleary's 13 bps "spread adjustments" and the Commission's standard 50 bps allowance for flotation costs, the "best estimate" produced by the Cleary CAPM is 5.49%, less than one percentage point higher than the embedded cost of debt for the Utilities.[122]

I also note that the low end estimate in the range of CAPM calculations put forth by Dr. Cleary is 4.05%, inclusive of flotation costs (but applying a 0% spread adjustment).[123] This instance of the Cleary CAPM utilizes a 2.2% risk-free rate, 4.5% MERP, and beta of 0.30, which together yield a "CAPM result" of 3.55%. This is lower than the current yield on 30-year A-rated Canadian Utility bonds,[124] and cannot be a reasonable estimate of investors' required equity return.

Additionally, Dr. Cleary ignores the ECAPM and does not make any attempt to correct for the well-established academic evidence that the empirically observed risk-return relationship for market-traded securities is "flatter" than the security-market line posited by the traditional CAPM.[125] This empirical result indicates that the traditional CAPM underestimates it for companies with lower than average systematic market risk. Thus, in the context of this proceeding, ignoring the evidence supporting the ECAPM contributes to the downward bias in Dr. Cleary's results.

Q63. What are Dr. Cleary's criticisms of the ECAPM?

A63. Dr. Cleary provides no stand-alone argument against applying the ECAPM. Rather, he links his objection to his rejection of adjusted betas, and attempts to argue that the two techniques are equivalent or redundant, asserting that the ECAPM "implicitly adjusts the beta used in the traditional CAPM estimates," and that applying ECAPM with adjusted betas "essentially adjusts raw betas up twice."[126]

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122 See BV Workpaper R09 tab "Bell-WP 1 2016 Rule 005 Data" or tab "Madsen-Rule 005 Simple Average"

123 Cleary Evidence, PDF p. 48 (Table 9).

124 The Bloomberg reported yield as of Feb. 22, 2018 is 3.73.

125 Villadsen Initial Evidence, Appendix B.II, "Risk Positioning Models – CAPM and ECAPM."

126 Cleary Evidence, PDF p. 49.

Q64. Do these criticisms have merit?

A64. No. Dr. Cleary attempts to conflate two separate and distinct empirical findings: (i) the observed market security line is flatter than the theoretical market security line and (ii) adjusted betas are better predictors of expected betas than raw betas. The ECAPM corrects for the former observation, while the Blume adjustment corrects for the latter.[127]

Getting the relative risk of the investment correct does not correct for the empirical observation that the risk-return trade-off has a "flatter" slope than that posited by the traditional CAPM, nor does adjusting that slope correct for the tendency of raw historical betas to be biased predictors of the true beta that measures systematic risk in forward-looking applications of either the traditional CAPM or ECAPM. Simply put, the ECAPM and the Blume adjustment are not redundant. Both are warranted when deriving a forward-looking estimate of the cost of equity.

C. DCF ESTIMATION ISSUES

Q65. Did any of the intervening evidence present DCF estimates of the Alberta Utilities' cost of equity?

A65. Only Dr. Cleary presented such evidence. Specifically, he presented (i) a 6.4 percent "best estimate" (including 0.50% for flotation costs) based on a single-stage DCF analysis for his sample of Canadian utility holding companies, and (ii) a 7.4 percent "best estimate" (again including flotation costs) resulting from application of his "H-Model" to the same sample.

Dr. Cleary also attempted to apply his versions of single-stage and H-model DCF analyses to the Canadian market as a whole, deriving "market estimates" of 7.9 percent and 8.5 percent, respectively, inclusive of flotation costs.[128]

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[127] For a more detailed explanation and illustration of this point, see my Rebuttal Appendix A.

[128] Cleary Evidence, PDF p. 61 (Table 15).

Q66. What comments do you have regarding Dr. Cleary's DCF-based "market estimates and "utility estimates"?

A66. I find Dr. Cleary's DCF estimates too low to be representative of investors' required equity return. Not only are they inconsistent with market evidence about the cost of equity for the Canadian utility companies in Dr. Cleary's sample, but also with other components of Dr. Cleary's own evidence.

For example, when Dr. Cleary's utility DCF estimates are considered alongside his market level estimates, they imply an MERP in the range 5.3 – 5.9% and a CAPM beta of 0.72 – 0.81. (See Figure 15 below) Both of these implied figures are substantially higher than those Dr. Cleary uses in his CAPM analysis.

Figure 15
MERP and CAPM Beta Implied by Cleary DCF Estimates

	DCF Cost of Equity Estimate	DCF "Market Estimate"	Risk-Free Rate	Implied MERP	Implied CAPM Beta
[1]	[2]	[3]	[4]	[5]	[6]
Single-stage	6.4%	7.9%	2.6%	5.3%	0.72
H-Model	7.4%	8.5%	2.6%	5.9%	0.81
Combined	6.9%	8.2%	2.6%	5.6%	0.77

[1]-[3]: Exhibit 22570_X0562 Evidence of Dr. Sean Cleary, Table 15 PDF p 61
[4]: Exhibit 22570_X0562 Evidence of Dr. Sean Cleary, Table 9 PDF p 48
[5] = [3] - [4]
[6] = ([2] - [4]) / [5]

Dr. Cleary's approach to implementing the models is conceptually flawed and inconsistent with the finance principles underlying the DCF model because—as with the Cleary CAPM—Dr. Cleary's inputs are largely backward-looking. Additionally, Dr. Cleary applies arbitrary and generic limitations on growth that are not consistent with economic reality. I discuss these shortcomings further below.

1. Dr. Cleary's Market Level DCF Estimates

Q67. Please summarize your views on Dr. Cleary's Dividend Discount Model and its estimates of the expected market return.

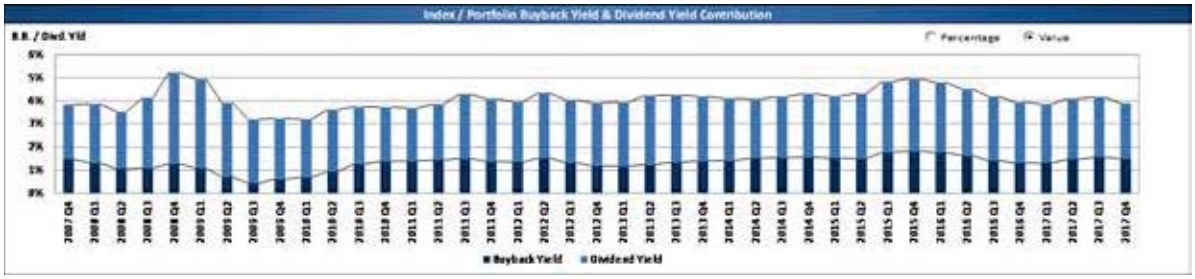
A67. Dr. Cleary's market-level DCF analysis has several flaws. Dr. Cleary implements a pure dividend discount model (DDM) for the TSX index and therefore ignores share repurchases, which have been and remain an important source of cash flow for investors. Thus, Dr. Cleary ignores a source of return for investors and therefore the resulting market return is downwardly biased.

Since the DCF model assumes that the present market price of a security (or a portfolio of securities such as a market index) is the present value of *all* future cash flows accruing to investors, it is important to consider both dividends and share repurchases as ways in which investors receive cash. For example, Figure 16 below shows that for the S&P500, stock buybacks make up approximately 2 percentage points and dividends only 1.7 percentage points of the total payout yield for the index. Similarly, Figure 17 shows that buyback yields for the TSX are about 1.5 percent versus dividend yields of about 2.5 percent. Thus, share buybacks comprise more about 60% of the payout from the S&P 500 and about 37% of the payout from the TSX.

Figure 16: Dividends vs. Buybacks for the S&P 500 Index

Source: Bloomberg as of 2/25/2018.

Figure 17: Dividends vs. Buybacks for the TSX Index



Source: Bloomberg as of 2/25/2018.

By failing to incorporate the share repurchase component of payout yield for the market index, Dr. Cleary' introduces a substantial downward bias into his DDM estimates (single-stage and H-model) of the implied expected return on the market.[129]

Q68. What are your comments on Dr. Cleary's single-stage estimation of the expected equity return for the market as a whole for 2016?

A68. First, the expected equity return for the market in 2016 is irrelevant for this proceeding, which intends to determine the cost of equity for 2018-2020. Second, Dr. Cleary estimates the expected equity return of the market in 2016 in two ways. He first estimates a constant-growth (single stage) dividend discount model (DDM). Dr. Cleary defines the constant-growth rate as the average rate of Canadian GDP growth from 1962-2016, or from 1992-2016, adjusted for inflation. As noted above, no justification for the selected time periods or their reflection of the 2018-20 period has been provided. Dr. Cleary's use of long-term historical average GDP growth rates in a forward-looking DCF models implies that he believes past is prologue. However, future growth of earnings and cash flows will not necessarily follow the past growth of the economy and using a selected historical period exaggerates the error being made.

[129] I note that share repurchases are not as significant a contributor to totally cash payouts for utilities as compared the broader stock markets. Therefore, (with the possible exception of the Water sample, which contains some companies that have engaged in stock buybacks), focusing exclusively on dividends for individual company DCF calculations does not introduce as substantial a downward bias as it does for Dr. Cleary's market-level estimates.

Q69. What are your comments on Dr. Cleary's H-model estimation of the expected equity return for the market as a whole?

A69. The H-model assumes that the growth rate will shift from a short term to a long term stage. For the short term growth rate, Dr. Cleary uses Consensus Forecasts of Canadian GDP growth in 2023-2027. The use of forecasted GDP growth rates for the short term growth rate implicitly assumes that corporate earnings (and distributable cash flows) are expected to grow at the same rate as GDP *in the short term*; Dr. Cleary has not justified such an assumption.

For the long term component of his H-model, Dr. Cleary again uses long-term historical averages of GDP growth over arbitrarily-chosen periods. As mentioned in my discussion of Dr. Cleary's single stage estimation for the market, just because GDP grew at a certain rate over a given multi-decade period does not mean that corporate earnings should be expected to grow at a similar rate into the future.

Q70. Do you find any inconsistencies in Dr. Cleary's treatment of growth forecasts?

A70. Yes. While Dr. Cleary criticizes Consensus Forecasts for having predicting government bond yields in excess of what actual transpired since the last GCOC, he relies on Consensus Forecasts estimates of future GDP growth despite the fact that such forecasts have recently *under*predicted actual GDP growth. As can be seen from Figure 18 below, Dr. Cleary's forecast from the 2016 GCOC was below the actual (compound average) rate of GDP growth for 2016-2017 by more than 40 basis points.

Figure 18
Real GDP Growth – Forecast and Actual

		Cleary Forecast	Actual	Forecast Error
[1]		[2]	[3]	[4] = [2] - [3]
2016	[a]	1.70%	1.47%	0.23%
2017	[b]	1.80%	3.00%	-1.20%
2016-2017	[c] = average([a],[b])	1.75%	2.23%	-0.48%

Sources and Notes:
[2]: [a] Exhibit 20622-A001 Evidence of Dr. Sean Cleary, Section 3.2
[b] Exhibit 22570_X0562 Evidence of Dr. Sean Cleary, Section 3.2.2
[3]: [a] 22570_X0566_ExhibitA-Figure1andTable1Data_0697
[b] Rebuttal Evidence of Buttke, Section VII

Contrary to Dr. Cleary's contention with respect to interest rate forecasts, this does not mean that all forecasts are unreliable and should be ignored. Rather, it demonstrates that the timing with which any particular forecasted outcome may (or may not) materialize is by nature uncertain, such that the usefulness of forecasts cannot be meaningfully judged by selective hindsight comparisons to actual outcomes.

As for the reliability of his market-level DDM estimates, it is worth noting Dr. Cleary's inconsistent treatment of forecasts. Dr. Cleary critiques Consensus Forecast for forecasting a yield in excess of what actual transpired, but fails to undertake the same analysis for the GDP growth forecasts he relies on.

Q71. Have you presented evidence on expected market returns based on a multi-stage DCF model?

A71. Yes. In my initial evidence for this proceeding and in the 2016 GCOC proceeding, I presented the results of Bloomberg's forward-looking MERP estimates for the Canadian and U.S. markets.[130] To derive these estimates, Bloomberg subtracts prevailing 10-year government bond yields from expected market returns. The latter is calculated by

[130] Villadsen Evidence, PDF p. 31, 2016 Villadsen Evidence, PDF p. 25.

applying a multi-stage dividend discount model to the constituents of the relevant market index (i.e., the S&P 500 Index for the U.S. and the TSX Composite Index for Canada).

Q72. How do you respond to Dr. Cleary's criticism of your reliance on the Bloomberg forward-looking MERP estimates and his assertion that these estimates are "based on the constant-growth version of the DDM which uses analyst growth estimates as the perpetual long-term growth rate"?[131]

A72. Dr. Cleary is incorrect. In the documentation for its MERP model, Bloomberg explains that the forward-looking estimate of market return is calculated as a market-weighted average of the internal rate of return for each member of the market index. It further states that the internal rate of return calculation is performed using Bloomberg's Dividend Discount Model (DDM) function."[132] In turn, Bloomberg's documentation for the DDM function makes clear that it is, in fact, *a three-stage dividend discount model*, with the three stages comprising growth, transition, and steady-state.[133]

These statements are clearly laid out in the four pages of Bloomberg documentation I provided in response to the UCA's information request. I provided the identical documentation in response to a similar information request from the UCA in the 2016 GCOC.[134] As such, I do not understand Dr. Cleary's assertion that the documentation "provides insufficient detail." While the precise parameters of Bloomberg's model are proprietary, the underlying principles and calculations are clearly articulated. Moreover, I do not see how Dr. Cleary can conclude that Bloomberg's "MRP estimates are […] not meaningful" without articulating a valid objection as to the methodology or data employed.

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131 Cleary Evidence, PDF p. 43.

132 *See* page 1 of the confidential attachment to IR response Villadsen-UCA-2017NOV21-007. Bloomberg's terminology for country-specific MERP is "Country Risk Premium" (CRP).

133 *See* page 2 of the confidential attachment to IR response Villadsen-UCA-2017NOV21-007. Emphasis added.

134 *See* attachment in response to information request UCA-Utilities-2016FEB18-031(c).

Q73. How does Bloomberg address earnings growth in its three-stage DDM model used for estimating the market return?

A73. For the initial "growth" stage of its model, Bloomberg uses the growth rates of the index companies' forecasted earnings per share. For the terminal or "steady state" stage, Bloomberg employs sustainable growth rates calculated by multiplying the 1 minus the retention ratio by the required rate of return. Bloomberg's application of a sustainable growth follows the same formula as Dr. Cleary's own sustainable growth DCF calculations. However, by linking the growth rate to the *forward-looking* required rate of return (*i.e.*, the quantity the CRP function is ultimately solving for), Bloomberg's sustainable growth methodology constrains the terminal stage growth of each company so it cannot exceed the overall expected market return. [135] Bloomberg's sustainable growth rate differs from Dr. Cleary's in that it does not rely on Dr. Cleary's flawed assumption that *historical* retention ratios and achieved ROEs provide the best estimate of future growth. Bloomberg's application of a sustainable growth follows the same formula as Dr. Cleary's own sustainable growth DCF calculations. However, by linking the growth rate to the *forward-looking* required rate of return (*i.e.*, the quantity the CRP function is ultimately solving for), Bloomberg's sustainable growth methodology constrains the terminal stage growth of each company so it cannot exceed the overall expected market return. [136] Bloomberg's sustainable growth rate differs from Dr. Cleary's in that it does not rely on Dr. Cleary's flawed assumption that *historical* retention ratios and achieved ROEs provide the best estimate of future growth.

Q74. How do the market return estimates from Bloomberg's multi-stage DDM model using sustainable terminal growth rates compare to Dr. Cleary's single-stage and H-model DDM estimates?

A74. As I explained in my initial evidence, Bloomberg derived a forward-looking estimate of 9.9% for the Canadian MERP as of August 2017, corresponding to an expected market

[135] *See* page 2 of the confidential attachment to IR response Villadsen-UCA-2017NOV21-007.

[136] *See* page 2 of the confidential attachment to IR response Villadsen-UCA-2017NOV21-007.

return of 11.7%.[137] This estimate—derived by a highly-regarded independent data provider (which Dr. Cleary also relied on for financial data)—is more than 3 percent higher than Dr. Cleary's highest market-level DCF estimate of 8.5 percent.[138]

My Scenario 2 MERP estimate of 8.0%, which I conservatively placed closer to the forward-looking U.S. MERP estimate of 7.4%, is consistent with an expected market return of approximately 11.3% when considered alongside the corresponding Scenario 2 risk-free rate estimate of 3.3%.[139]

2. Dr. Cleary's Individual Company DCF Estimates

Q75. Do you have any issues with Dr. Cleary's single-stage estimation of the expected equity return for his sample of Canadian utilities?

A75. Yes. For his single-stage DDM, Dr. Cleary attempts to use a sustainable growth rate, which estimates a company's EPS growth based on projections of more fundamental financial metrics. However, Dr. Cleary leaves out important components of the calculation and fails to take a forward-looking approach to forecasting the inputs necessary for the other component.

The sustainable growth rate has two components – growth based on retained earnings and growth from new (net) equity issuance. Technically, the growth rate, g, is determined as $g = b \times r + s \times v$, where b is the proportion of earnings that are expected to be retained in the company, r is the expected rate of return on book equity, s is the percent of new common equity expected to be issued and v is the equity accretion ratio.[140] Dr. Cleary leaves out the second term, $s \times v$. As s and v commonly are positive among utilities, the absence of this term from the Cleary DDM calculation biases the cost of equity estimation downward as most utilities periodically issue equity.

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[137] *See* BV WP01_CONF tab "Canada".

[138] Cleary Evidence, PDF p. 61.

[139] Villadsen Initial Evidence, PDF p. 65, Figure 15.

[140] The U.S. Federal Energy Regulatory Commission has in the past used this formula. See FERC Docket No. EL11-66-001.

Additionally, it is worth emphasizing that DCF models are inherently forward-looking. The fundamental theory underlying the DCF is that the *current* market price of a stock reflects investors' expectations about *future* cash flows. However, Dr. Cleary chooses inputs to his DDM that do not conform to this fundamental framework. Instead of calculating the dividend yield using current market prices, he uses a one-year historical average of each company's dividend yield. Rather than reflecting forward-looking expectations for the retention ratio and return on book equity, Dr. Cleary's growth rate calculations rely on multi-year historical averages of those quantities for each company.

Dr. Cleary's approach relies on an unsupported assumption that past performance is the best predictor of future growth. Further, he combines backward looking and incomplete (i.e., lacking a term to account for new share issuances) growth rates with dividend yields that do not reflect current market prices. Based on this approach, Dr. Cleary produces DDM results that deviate from the basic finance principles that the DCF model is forward looking and biases his results downward.

3. Response to Dr. Cleary's Criticisms of my Multi-stage DCF Analysis

Q76. What criticisms does Dr. Cleary put forth of your multi-stage DCF model implementation?

A76. He suggests that that my model (as well as multi-stage DCF models presented by Mr. Hevert and Mr. Coyne) is upwardly biased due to initial stage growth rates exceeding the forecast rate of long-term GDP growth. Dr. Cleary opines that since these "high" growth rates eventually decline to what he categorizes as "a somewhat ambitious" long-term terminal growth rate, my multi-stage DCF estimates "clearly violate the condition that the Commission has expressed with regards to using growth rates in a single-stage DCF model that exceed expected nominal GDP growth."[141] His only support for this point is an example calculation of an "implied constant perpetual growth rate" which he argues represents growth in a single-stage DCF equivalent of my multi-stage model.

[141] Cleary Evidence. PDF p. 64.

Q77. How do you respond to Dr. Cleary's critique?

A77. Dr. Cleary's argument is misleading in that it confuses the growth constraints in a multi-stage DCF model and mischaracterizes the Commission precedent on the topic.

Q78. How does Dr. Cleary's critique confuse the issue of growth constraints?

A78. First, it ignores important differences between near-term and long-term economic growth expectations. Dr. Cleary criticizes my approach because the earnings growth rates applied to some of my sample companies in the initial and transition stages of my multi-stage DCF growth rate exceed 3.85%.[142] But 3.85% is my estimate of the *long-term perpetual* nominal GDP growth *beginning* from a point some years in the future.[143] There is no reason to believe that any one company cannot grow at a higher or lower rate than the economy in the near term. Further, the 3.85% GDP growth is quite low relative to recent historical GDP growth in Canada,[144] and in fact Consensus Forecasts indicates nominal Canadian GDP growth of 4.35% in 2018.[145]

A good argument also exists that, in the context of this proceeding, the economy of Alberta is a relevant benchmark, especially in the near term. And as Mr. Buttke has explained in his evidence, Alberta's contribution to GDP grew dramatically in 2017, rebounding from its downturn in 2015-2016, and is expected to continue to grow faster than Canadian GDP in the near future.[146]

Thus, near-term GDP growth expectations will very likely differ from long-term expectations. Consequently, contrary to Dr. Cleary's criticism, there is no valid reason that my estimate of *future* long-term nominal Canadian GDP growth should constrain the near-term growth rates in my multi-stage DCF model (or even the "implied constant perpetual growth rate" Dr. Cleary attempts to construct).

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142 Cleary Evidence, PDF p. 64, lines 7-9.

143 Villadsen Evidence, PDF p 72, lines 1-3 and PDF p. 73, lines 1-6.

144 Buttke Evidence, PDF p. 33.

145 *Consensus Forecasts*, February 12, 2018

146 Buttke Evidence, PDF pp. 33-36.

Q79. Does Dr. Cleary himself also apply a different GDP growth rate in the long-term than in the short term?

A79. Yes. In performing his H-model "market estimate," Dr. Cleary uses a terminal nominal GDP growth rate of 5.26%, despite (inexplicably, in my opinion) using Consensus Forecasts' 3.84% forecast for 2022-2027 as his *short-term* growth rate.[147] He also applies the 5.26% growth rate in his *single-stage* DDM estimate of market returns, though he bases his "average estimate" on the single-stage DDM calculation using 4.55% for constant perpetual GDP growth.[148] Importantly, if Dr. Cleary were to apply his "implied constant perpetual growth" calculation[149] to my multi-stage DCF model using the Canadian sample average initial-stage growth rate of 8.3%, he would calculate 4.2%,[150] well below the nominal GDP growth estimates he applies in both his single and multi-stage (H-model) DDM implementations.

Q80. How does Dr. Cleary mischaracterize the Commission's past rulings about growth rates in multi-stage DCF models?

A80. He does so by attempting to extend the Commission's statement that it "will not accept in a *single-stage DCF model*, the use of long-term or terminal growth rates that exceed estimates of the nominal long-term GDP growth rate for the economy,"[151] to somehow apply to his notion of an "implied constant growth rate" in a *multi-stage* DCF model.

In attempting to make this extension, Dr. Cleary quotes the Commission's summary of *his own testimony* in the 2016 GCOC Decision, rather than any statement of Commission findings from that decision.[152] At the same time, he ignores a clear and explicit finding by

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147 Cleary Evidence, PDF p. 53, lines 23-25.

148 Cleary Evidence, PDF p. 53, lines 6-8.

149 Cleary Evidence, PDF p. 63, lines 20-22.

150 $(1.0834^{5}\times1.0609^{5}\times1.0385^{90})^{\frac{1}{100}}-1=4.18\%$, where 6.08% is the average growth rate in the transitional stage between the initial stage and the terminal perpetual stage.

151 Decision 20622-D01-2016, ("2016 GCOC Decision"), paragraph. 287 [emphasis added]

152 Cleary Evidence, PDF p. ~~60~~, lines 5-7, citing the 2016 GCOC Decision, paragraph 264, which is two paragraphs before the "Commission findings" section begins.

the Commission that it "does, however, accept that the use of growth rates above the nominal long-term GDP growth for the economy in *the initial stages of multi-stage DCF models* may be reasonable in some circumstances."[153]

Indeed, the Commission's findings on this topic in the 2016 GCOC Decision were entirely consistent with its rulings in the 2013 GCOC Decision, where it stated that while 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 a single-stage DCF model," the Commission "does, nonetheless, accept that the use of higher growth rates in initial stages of multi-stage DCF models may well be justified in some circumstances as a means of addressing a time period that precedes the establishment of a stable, terminal growth rate."[154]

Thus, contrary to Dr. Cleary's arguments, the Commission clearly recognizes the distinction between constraints on *terminal growth* that is assumed to continue into the perpetual future and nearer-term growth rates that may apply before the terminal growth phase of a multi-stage DCF model is reached.

Q81. Is it logical that an individual company's earnings would grow in the near term at a rate different than the rate of GDP growth?

A81. Yes. The constraint that earnings growth should not exceed the growth rate of the overall market or economy is a constraint that applies to the phase of growth occurring into the perpetual future. As the Commission has recognized, the reason for the constraint is that if an individual company were to grow faster than GDP *forever* it would overtake the economy in size.[155] It is also worth noting that this principle applies in reverse: applying terminal perpetual growth rate *lower* than the rate of long-term expected GDP growth to an individual company (or portfolio, or market) is equivalent to forecasting that the company will eventually shrink to represent 0% of the overall economy.

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153 2016 GCOC Decision, paragraph 287 [emphasis added]

154 Decision 2191-D01-2015 ("2013 GCOC Decision"), paragraph 186.

155 Decision 2191-D01-2015 ("2013 GCOC Decision"), paragraph 186.

However, there is no such constraint over a near to medium term horizon, such as the 5-10 years making up the first two stages of my multi-stage DCF model. Companies can, and routinely do, experience earnings growth that is either faster (or slower) than the rate of GDP growth over such horizons. Consequently, it is perfectly reasonable for investors to expect earnings growth rates that are higher (or lower) than the expected rate of GDP growth.

Q82. Can you provide an example of utility company earnings growing faster than GDP over the near to medium term?

A82. Yes. For illustrative purposes I have calculated historical compound historical growth rates over the last 15, 10, and 5 years (ending in 2016—the last year for which all companies have reported financial results) for the companies in my Gas LDC subsample and Water sample, and compared these to the forward-looking growth estimates that I employ for the first 5 years of my multi-stage DCF model in this proceeding.[156]

As shown in Figure 19 below, historical average and median EPS growth for these sample companies over the 5-years ending in 2016 was in line with or higher the current estimates of EPS growth over the next 3-5 years that I apply in my multi-stage DCF model. Additionally, I note that historical compound average earnings growth rates for the median and average company over the last 5 and 10 years have exceeded the growth in nominal U.S. GDP over the same periods.

[156] Note that I focus on the Gas LDC subsample (i.e., those firms currently passing my sample selection screens) and the Water sample because these samples have not been substantially affected by recent merger and acquisition activity that would likely affect the forward-looking expectations for EPS growth. The companies from my 2016 GCOC Gas LDC sample that had recent M&A discussions or announcements are excluded. Likewise, nearly all of the holding companies in the Canadian sample have had recent or on-going M&A activity, making them unsuitable for this comparison.

Figure 19
Historical EPS Growth Compared to Villadsen MSDCF Initial Growth Rates

	10 Year CAGR	5 Year CAGR	Forward-Looking Villadsen MSDCF 5 Year Growth Rate
U.S. Nominal GDP	3.0%	3.8%	N/A
Gas LDC Sample			
Atmos Energy	6.3%	10.0%	6.8%
Chesapeake Utilities	9.3%	8.4%	10.7%
Northwest Natural Gas	-0.8%	-2.1%	6.4%
ONE Gas Inc.	n/a	9.5%	6.3%
Southwest Gas	4.5%	5.6%	6.4%
Spire Inc.	4.2%	2.6%	4.8%
Average	**4.7%**	**5.7%**	**6.9%**
Median	**4.5%**	**7.0%**	**6.4%**
Water Sample			
Amer. States Water	9.3%	7.8%	5.8%
Amer. Water Works	n/a	8.6%	7.3%
Aqua America	9.0%	10.0%	7.6%
California Water	4.2%	2.4%	6.7%
Conn. Water Services	9.9%	10.0%	5.4%
Middlesex Water	5.3%	10.3%	8.1%
SJW Corp.	2.1%	18.2%	5.7%
York Water Co. (The)	4.7%	5.3%	8.0%
Average	**6.4%**	**9.1%**	**6.8%**
Median	**5.3%**	**9.3%**	**7.0%**

Source: BV Workpaper R07_CONF.

To be clear, unlike Dr. Cleary, I emphatically do **not** take the position that historical results are the best or (even necessarily good) predictors of expected growth; especially over the next 5-10 years. I merely present the comparison in Figure 19 to demonstrate that it is not at all unusual for utility company earnings to grow faster than the rate of GDP growth over short or medium term horizons.

Q83. Are there good reason to expect that regulated utility companies such as those in your samples can grow earnings at rates faster than the rate of GDP growth over the near to medium term?

A83. Yes. Distribution and transmission utilities are fundamentally infrastructure companies. When they invest in new infrastructure to improve and expand service, the value of their rate base increases, and so, in turn, do their earnings. Importantly, the same mechanism applies when utilities invest to upgrade, modernize, and replace aging infrastructure. Thus, during periods of substantial rate base investment, utility earnings should absolutely be expected to grow faster than the average rate of broader economic activity.

Q84. Does this apply to any of the companies in your samples?

A84. Yes. Especially for natural gas transmission and distribution companies and water utilities, now is a time of substantial investment in infrastructure improvement.

To illustrate this, I have reviewed reports written by equity analysts contributing to the 3-5 year EPS growth forecasts for companies in my samples, with a focus on companies that are most purely dedicated to regulated distribution and transmission operations. Below is sampling of equity analysts' statements highlighting the role of infrastructure improvement and rate base growth in in driving earnings growth expectations.

ONE Gas, Inc. (Gas LDC sample; 6.3% 1st-stage growth in multi-stage DCF):

> This year's capital expenditures are expected to lie between $350 million and $360 million. (That would be some 15% above the 2016 level if the midpoint of that range is used.) Over 70% of the budget is dedicated to system integrity and pipeline replacement projects. Finances are quite sufficient to make those moves possible.
>
> *– Value Line, December 1, 2017*

Chesapeake Utilities (Gas LDC sample; 10.7% 1st-stage growth in multi-stage DCF):

> Chesapeake Utilities appears to be headed for a down year, earnings-wise, versus 2016. … We believe brighter things are in store for 2018, nevertheless. That ought to be brought about by growing benefits from new projects, additional natural gas infrastructure improvement initiatives, plus further

> expansions of Chesapeake's natural gas distribution and transmission systems. Consequently, profits stand to advance more than 10% ….
>
> – *Value Line, December 1, 2017*

American Water Works (Water sample; 7.3% 1st-stage growth in multi-stage DCF):

> The regulated growth increase is driven by $7.2B of infrastructure investments over the 2018-22 period – a $1.3B bump from the previous 5-yr forecast.
>
> – *Wells Fargo Securities, December 11, 2017*
>
> The capital budget has been raised substantially. Even though the company is already in the midst of a major construction program, management just increased the estimated outlays by about $1 billion to bring the new expected five-year total to somewhere between $8.0 billion and $8.6 billion.
>
> – *Value Line, December 1, 2017*

Canadian Utilities, Ltd. (Canadian sample; 4.5% 1st-stage growth in multi-stage DCF):

> CU's overall growth plan and outlook remain healthy…CU's secured growth outlook remains healthy, with the Company's ~$5B near-term investment plan unchanged over the next three years. Growth is expected to come primarily from organic rate base investment, plus the Alberta PowerLine Fort McMurray transmission project.
>
> – *Industrial Alliance Securities, July 28, 2017*

Emera, Inc. (Canadian sample; 6.8% 1st-stage growth in multi-stage DCF):

> Meanwhile, EMA's overall regulated growth outlook remains strong. We continue to forecast strong rate base growth across EMA's businesses, predicated on >$7B of regulated investments through 2020, …. We expect that regulated earnings will remain >85% of EMA's consolidated total (higher in periods where Emera Energy is weak, like 2017). Regulated earnings growth is expected to support the Company's 8%/year dividend growth target.
>
> – *Industrial Alliance Securities, November 13, 2017*
>
> Elsewhere, Emera's strategic initiatives remain on track. At the top of the docket, the Maritime Link Transmission project is on course to come into service in January. The $1.6 billion endeavor includes two 170-kilometer subsea cables connecting Newfoundland and Nova Scotia. Meanwhile, a joint $3.7 billion electricity transmission project in Newfoundland and Labrador is scheduled to begin generating power in 2019.
>
> – *Value Line, December 22, 2017*

As these examples illustrate, equity analysts appropriately consider impending infrastructure improvement, as well as other forms of rate base growth, when forecasting earnings growth. Importantly, they do not perceive the potential of such growth to be constrained by expectations of growth in the broader economy.

Q85. Can infrastructure improvement be an important driver of regulated rate base growth for AUI and ATCO?

A85. Yes. As highlighted in the most recent PBR rebasing proceeding, a significant driver of ATCO Electric Distribution and ATCO Gas's recent high rate base growth has been replacement and refurbishment of aging assets.[157] ATCO noted that it is facing a period when many older assets are reaching the ends of their useful lives and must be replaced.[158] Similarly, AUI highlighted the need to replace a significant amount of infrastructure that is "near the end of its lifespan."[159] Therefore, rate base investment for infrastructure replacement and improvement can be expected to be a significant driver of earnings for the next 5-10 years.

Importantly, replacement investment activity of this type is not closely linked to or substantially constrained by the rate of broader economic growth in the near term.

Q86. Please summarize your conclusions in response to Dr. Cleary's critique of your multi-stage DCF model?

A86. Dr. Cleary's critique is based on his incorrect interpretation of Commission precedent and his presupposition that individual companies can never be expected to grow faster than the broader economy, even in the near to medium term. As I have demonstrated above, this is not the case.

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[157] Proceeding ID 22394 (2018-2022 Performance Based Regulation Rebasing Application), ATCO Argument, paragraphs 93, 98.

[158] Proceeding ID 22394 (2018-2022 Performance Based Regulation Rebasing Application), ATCO Supplemental Evidence, paragraphs 35-37.

[159] Proceeding ID 22394 (2018-2022 Performance Based Regulation Rebasing Application), AltaGas Utilities Inc. Argument, paragraphs 69-70.

It is entirely appropriate for equity analysts and investors to focus on company-specific drivers such as regulated infrastructure improvement when forecasting earnings growth. Furthermore, this company-specific perspective is exactly what is warranted when using DCF analysis to estimate the cost of equity *for a specific company*.

Thus, in my opinion, Commission should continue to recognize that growth rates different from—including above—the nominal long-term GDP growth rate are appropriate in the initial stages of multi-stage DCF models.

D. DR. CLEARY'S BOND YIELD PLUS RISK PREMIUM ESTIMATES

Q87. Does Dr. Cleary report a bond yield plus risk premium estimate of the cost of equity?

A87. Yes. Dr. Cleary estimates a return on equity of 5.5 – 6.5 percent as the sum of the current (November 15, 2017) 3.5 percent yield on A rated Canadian utility bonds plus a risk premium of 2-3 percent.[160] There are several problems with this approach. First, it is not clear that the yield as of November 2017 yield will be relevant for the 2018-2020 period for which the cost of equity currently is being set, because bond yields are likely to increase. Second, Dr. Cleary does not provide any analysis to support the range of 2-3 percent and fails to recognize that the risk premium increases as interest rates decline.[161, 162]

As illustrated in several texts, the allowed risk premium over the risk-free rate is inversely related to the risk-free rate. For example, Villadsen et al. (2017) found that the allowed risk premium increases by approximately ~~0.44%~~ 0.56% for each 1% decline in the risk-

[160] Cleary Evidence, p. ~~62-63~~. 65-66

[161] Morin, Roger A., *New Regulatory Finance*, Public Utilities Reports, Inc., 2006 pp. 128-129.

[162] Note that in the IR response Cleary-ATCO/AUI-2018JAN26_013(a), Dr. Cleary cites several sources for the level of his risk premium. However, the range provided in the cited sources range from 1 to 5 percent with the most commonly cited range being 3-5 percent. Additionally, the newest source is from 2011 and therefore fails to consider the impact of the inverse relationship between the risk premium and the risk-free rate in the recent low interest environment.

free rate.[163] Morin finds that the risk premium increases by ~~0.52%~~ 0.48% for each 1% decline in the risk-free rate.

Because the allowed ROE that is being determined in this proceeding is expected to be in effect over a 3-year period, the relevant bond yield will be the yield that is expected during that period. The yield on 10-year government bonds is expected to increase as is the yield on A range rated utility bonds. Therefore, using the current yield leads to a ROE estimate that does not reflect the expected market conditions during the 2018-2020 period and result in a downward biased ROE.

E. Other Issues Related to the Cost of Equity

1. Dr. Cleary's discussion of Price-to-Book Ratios

Q88. Has Dr. Cleary presented evidence related to the price-to-book ratios of publicly traded companies?

A88. Yes. Dr. Cleary presents average price-to-book ratios for a sample of nine publicly traded Canadian utility holding companies, and notes that they are almost all above 1.0.[164] He further argues—based on a rearrangement of the Dividend Discount Model relying on restrictive growth rate assumptions—that this constitutes evidence that realized ROEs have exceeded the cost of equity capital for Canadian utilities.[165]

Q89. Do you find Dr. Cleary's price-to-book ratio evidence convincing?

A89. No. Dr. Cleary's analysis is unconvincing for several reasons. First, it rests on a form of the Dividend Discount Model that assumes constant perpetual dividend growth equal to the historical earned ROE times the historical retention ratio.[166] As discussed in Section

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[163] Bente Villadsen, Michael J. Vilbert, Dan Harris, and A. Lawrence Kolbe, "*Risk and Return for Regulated Industries*," Academic Press, 2017, pp. 118-119. Roger A. Morin, "*New Regulatory Finance*," Public Utilities Reports, Inc., 2006, pp. 123-125 finds a similar result.

[164] Cleary Evidence, PDF p. 70.

[165] Cleary Evidence, PDF p. 72.

[166] Cleary Evidence, PDF p. 54.

III.B, this "sustainable growth" formulation assumes that retained earnings are the only source of equity capital for the comparable companies and that historical average returns on equity are predictive of returns on marginal equity investments. Additionally, Dr. Cleary's DDM ignores alternative forms of distributions, such as stock repurchases, and does not account for option value that may influence stock prices. All of these factors complicate the "simple" relationship between earned ROE and price-to-book ratios posited by Dr. Cleary, and help explain how a company's price-to-book ratio can exceed 1.0 without its historical earned ROE exceeding its cost of equity.

With regard to Dr. Cleary's specific calculations, it is particularly difficult to believe that the "current" price-to-book ratios of the Canadian utility holding companies in his sample are fully explained by "the average 2003-Q2/2017 utility index ROE of 8.2%."[167] The latter figure was apparently derived for companies in the TSX Utilities Index, which has constituents beyond the nine companies for which Dr. Cleary measured price-to-book ratios. These constituents include renewable energy companies and independent power producers, whose earnings are clearly not representative of utilities. Moreover, Dr. Cleary's historical average ROE, calculated over an arbitrarily chosen long-term period, is ill-suited to forecast future growth for Canadian utility companies for at least two reasons. First, the financial crisis of 2008-09 and the lingering effects are included in the period. Second, it ignores new growth potential from non-regulated businesses and expansion/acquisition activity, including international investment. In my opinion, the mismatches among companies and time periods in Dr. Cleary's data render his analysis unreliable and uninformative about the adequacy of earned ROEs for Canadian utility companies.[168]

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[167] Cleary Evidence, PDF p. 72.

[168] Interestingly, the finance textbooks co-authored by Dr. Cleary do not discuss the application of the price-to-book (or market-to-book) ratio as a method for estimating or making inferences about the cost of capital in the Chapters devoted to that topic. *See* Booth, Cleary, and Drake, Chapters 9 ("Asset Pricing") and 14 ("Cost of Capital"). *See also* Booth and Cleary, Chapter 20 ("Cost of Capital").

Q90. What has the Alberta Utilities Commission previously found with regard to the type of price-to-book ratio evidence presented by Drs. Booth and Cleary?

A90. The Commission stated in the 2011 GCOC decision that it was "unable to derive any useful information about the price-to-book ratios of stand-alone utilities from the price-to-book ratios of utility holding companies."[169] In the 2013 GCOC decision, the Commission reiterated this position and explained that its concern related to the "dirty window" problem associated with "interpreting market-to-book value ratios of corporate shares where the subject company has significant unregulated activities in addition to regulated operations."[170] Clearly, this very concern applies to the Canadian utility holding companies in Dr. Cleary's analysis. The Commission is correct to recognize that information about the price-to-book ratios of the companies Dr. Cleary analyze do not provide useful information about the relationship between allowed ROE and the cost of equity for the Utilities. Therefore, I recommend that the Commission give no weight to Dr. Cleary's arguments in this area.

2. Mr. Johnson's references to Dr. Booth's past statements about the ROE

Q91. What comments do you have on Mr. Johnson's comments on the ROE?

A91. I have two main comments. First, Mr. Johnson never performs any calculations regarding the ROE but instead simply refers to historical evidence by Professor Booth, who is not a witness in this proceeding. Second, Mr. Johnson's focus on the Long-Term Canada bond trigger previously presented by Dr. Booth in prior proceedings.[171] The required return on equity is based on **current** market expectation and does **not** simply change if a 4.0% trigger is met. The 4% trigger's impact on the cost of equity (i) has not been supported in the current evidence and (ii) the Commission has not accepted in the past.

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169 AUC Decision 2011-474, PDF p. 29, paragraph 122.

170 AUC Decision 2191-D01-2015, PDF p. 50, paragraphs 211-212. *See also* Decision 20622-D01-2016, PDF p. 72, paragraph 305, confirming that the Commission gave no "material weight to P/B evidence in [the 2016 GCOC] proceeding."

171 Johnson Evidence PDF p. 8.

Q92. Please elaborate the issues associated with the 4.0% trigger.

A92. As noted above, the required return on equity should be based on current market expectations. Mr. Johnson has not presented such evidence – his merely refers to past evidence prepared by Dr. Booth in the 2013 and 2016 GCOC.[172] Based on the 2013 GCOC evidence, the Commission did not adopt a trigger mechanism.[173] Similarly, the 4.0% trigger was not adopted in the 2016 GCOC. Indeed, in the 2016 GCOC, the Commission instead looked to market conditions and forecasted market conditions.[174] Contrary to the formulaic prescription of the "trigger," the Commission did indeed increase the ROE in 2017, without linking that decision to any observed outcome involving prevailing long-term government bond rates.

As the cost of capital inherently is a forward-looking concept and based on investor expectations, the estimation of the cost of equity cannot remain constant simply because a specific trigger has or has not been met. Instead it needs to be based on current market expectations, which Mr. Johnson fails to provide.

3. Mr. Thygesen's use of historical realized ROE data for certain U.S. electric utilities.

Q93. Does Mr. Thygesen purport to compare realized returns to allowed returns for certain utilities you presented as comparators?

A93. Yes. Specifically he claims to have "examined the actual return on equity of the utilities underlying" Figure 28 from my initial Written Evidence, and compared them to the allowed ROE figures reported in that figure.[175]

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172 Johnson Evidence PDF p. 8.

173 2013 GCOC Decision paragraph 405 and 410-415.

174 2016 GCOC Decision paragraphs 336-338.

175 Thygesen Evidence, paragraph 136 (PDF p 58).

Q94. Has he actually done that?

A94. No, he has not. The data that Mr. Thygesen claims represents "the actual return on equity of the utilities underlying the table" was provided in response to information request Villadsen-CCA-2017NOV21-011. In responding to that request, I made very clear that the attachment contained "confidential data from SNL pertaining to the earned ROE for **certain electric utilities**," and indicated that it was an unmodified data set that had previously been compiled for other purposes. The remainder of the response explained why it was infeasible for me to gather and provide "the actual ROE for each of the [sic] 2016 and 2017 for the same group of companies as used to constructed [sic] the table" as the CCA had requested.[176]

There is nothing about this response that Mr. Thygesen could reasonably have interpreted to indicate that the data contained in "Villadsen-CCA-2017NOV21-011 Attachment_CONF corresponded to the specific utilities "underlying" Figure 28 of my evidence.

Importantly, Figure 28 reported the average allowed ROEs and capital structure *that had been awarded* in 2016 and 2017 to various categories of regulated Canadian and U.S. utility operating companies. Meanwhile, the realized ROE data Mr. Thygesen "examined" was for a large group of mostly-U.S. based electric utilities, many if not most of which would not have had a rate case settled or decided in 2016 or 2017 that would have awarded an ROE.

Hence, contrary to Mr. Thygesen's mischaracterization, the companies whose realized ROE data he analyzed do not correspond in any meaningful way to the allowed ROEs reported in my Figure 28.

[176] Exhibit 22570_X0427 Villadsen IR Responses to CCA IRs, PDF pp. 22-23.

Q95. Please elaborate on the ways in which Mr. Thygesen's realized ROE calculations do not correspond to the allowed ROEs reported in Figure 28 of your Written Evidence.

A95. First, and most obvious, Figure 28 contains information on ROEs awarded to natural gas and electric utilities in Canada and the U.S. The data Mr. Thygesen relies on is only for certain electric utilities operating in the U.S. This makes it particularly confusing that Mr. Thygesen compares the average realized ROE from the U.S. electric data to the average allowed ROE for all *Canadian* utilities (excluding Alberta) as reported by Concentric.[177]

Second, the average allowed U.S. ROEs reported in Figure 28 were those awarded in natural gas and electric utility rate cases that were decided in 2016 or 2017. As mentioned above, the realized ROE data provided in Villadsen-CCA-2017NOV21-011 Attachment_CONF is not restricted to match only electric utilities that had ROEs awarded in those years.

If Mr. Thygesen had gone through the data underlying Figure 28, which was provided in Villadsen-UCA-2017NOV21-017 Attachment_CONF, he could have attempted to identify which of the companies in the realized ROEs data actually did match up to one of the allowed ROEs included in the Figure 28 averages. However, he did not do this. Instead, he simply took the average and standard deviation of *all* the data provided in Villadsen-CCA-2017NOV21-011 Attachment_CONF, inexplicably including data going back to 2012, and then comparing it to 2016 allowed ROEs awarded to a totally different set of companies.

Thus, Mr. Thygesen has performed a meaningless comparison. However, even if he had managed to compare realized and allowed ROE values for the same set of companies, Dr. Carpenter explains why such an analysis is not informative as to the cost of equity for the Utilities.[178]

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[177] Thygesen Evidence, paragraph 137.

[178] Carpenter Rebuttal Evidence, Section VI.

IV. CAPITAL STRUCTURE

A. WHAT CONSTITUTES A REASONABLE CAPITAL STRUCTURE?

Q96. Please summarize the capital structure recommendations put forth by witnesses for CCA, City of Calgary and UCA.

A96. The details of the proposed equity percentages are shown in Figure 20 below.

Figure 20: Equity Percentage Proposed by Witness

	Bell (UCA) [a]	Cleary (UCA) [b]	Johnson (Calgary) [c]	Madsen (CCA) [d]
ATCO Electric Transmission	37%	37%	n/a	35%
ATCO Electric Distribution	37%	37%	n/a	36%
ATCO Gas	37%	37%	35%	35%
ATCO Pipeline	37%	37%	n/a	36%
AUI	41%	41%	n/a	41%

Sources:
[a]: Exhibit 22570_X0559, Evidence of Mr. Russ Bell, PDF p 23
[b]: Exhibit 22570_X0562, Evidence of Dr. Sean Cleary, PDF p 6
[c]: Exhibit 22570_X0611, Evidence of Hugh Johnson, PDF p 2
[d]: Exhibit 22570_X0557, Evidence of Dustin Madsen, PDF p 74

Thus, Mr. Madsen and Mr. Johnson propose to reduce the equity percentage for the ATCO utilities and maintaining the equity percentage for AltaGas. Mr. Bell and Dr. Cleary propose to maintain the most recently awarded equity percentage.

Because all witnesses agree that AUI merits a higher equity percentage than that assigned to other Alberta utilities, I shall not address the adder for AUI.

Q97. Do you have any comments on the recommendations?

A97. Yes. First and foremost, the deemed capital structure and the allowed ROE work together to establish the fair return. As such it is vital that the allowed ROE and capital structure together ensure that all three legs of the fair return standard are met: comparability, capital attraction, and financial integrity. Yet, the evidence put forth by

Mr. Madsen to suggest a reduction in the equity thickness focus on the ability to meet credit metrics with no consideration of comparability.[179]

The evidence of Mr. Johnson looks primarily to evidence from realized returns and compares the equity thickness of ATCO Gas to that awarded **two** Ontario-based gas distribution utilities and wrongly claims that Enbridge Gas Distribution and Union Gas have this [35%] equity level.[180] Both approaches are misguided. Dr. Carpenter's rebuttal evidence addresses why earned return as displayed by Mr. Johnson is not informative as to any changes in risk characteristics.[181] As for the equity thickness of the Ontario gas distribution utilities it is 36% (and not 35%) and the 2018 allowed ROE is 9.0%,[182] so the dollar return on equity is materially higher than what Mr. Johnson recommends.

Mr. Bell similarly focus on the Utilities earned ROE to assess the impact of PBR 2, but fails to consider (1) prior evidence that earned ROEs do not provide evidence on business risk[183] and (2) that data from PBR 2 has yet to become available. The issue with earned ROE and the risks associated with PBR 2 are addressed in the rebuttal evidence of Dr. Carpenter.

Q98. Why is it not sufficient to consider credit metrics for the purpose of establishing the equity thickness?

A98. Credit metrics measures an entity's ability to pay interest and repay debt. Consequently, credit metrics provide a measure of the ability to raise **debt capital** on reasonable term and financial integrity. Credit metrics, however, does not provide information about the degree to which the equity thickness or the allowed ROE are comparable to what is

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179 Exhibit 22570_X0557 Evidence of Dustin Madsen ("Madsen Evidence") paragraphs 240-320 (PDF pp. 59-74).

180 Johnson Evidence PDF pp. 2-3.

181 Carpenter Rebuttal Evidence, Sections IV.B and VI.

182 OEB Staff Report, "Review of the Cost of Capital for Ontario's Regulated Utilities," January 14, 2016 and Ontario Energy Board, "Cost of Capital Parameter Updates for 2018 Cost of Service and Custom Incentive Rate-setting Applications," November 23, 2017

183 See Carpenter Rebuttal Evidence, Sections IV.B and VI.

available to equity investors from alternative investments of similar risk. On this point, I note that if I look to regulated utilities, the average allowed equity percentages are as follows.

Figure 21
Allowed Capital Structure Equity Percentage[184]

	Average
Canadian Electic Distributors*	38.9%
Canadian Gas Distributors*	40.1%
U.S. Electric Utilties**	48.8%
U.S. Gas LDCs	50.6%
U.S. Water Utilites***	47.5%

*Excludes Crown Corporations
** Transmission and Distribution only
***Covers only January – May 2017 (the average for 2016 was 50.60%)

Regardless of which group of comparable companies I look to, the equity percentages are higher than what Mr. Bell, Dr. Cleary, Mr. Johnson or Mr. Madsen recommends. While the average equity thickness in Canadian jurisdictions are lower than those in the U.S., the U.S. data illustrates that there is little difference between the capital structure of integrated electric utilities, T&D electric utilities, and gas utilities. The Canadian averages in turn are much closer to my recommended 40% (before any adder for AltaGas specific risks) for the Utilities than to the recommendations of interveners.

I further note that the average book value equity percentage of my comparable samples range from 41.0% (Canadian) to 52.7% (U.S. Gas LDC).[185] Thus, not only are the

[184] Sources: BV Workpaper R01, Regulatory Research Analysts, "Major Rate Case Decisions 2017," January 30, 2018, RRA Water Advisory, "RRA Water Major Rate Case Decisions – Wading Through Water Trends," June 8, 2017.

[185] Source: Confidential workpapers: BV WP05_CAN_CoE_Conf.xlsx, BV WP06_ELEC_CoE_Conf.xlsx, BV WP07_GasLDC_CoE_CONF.xlsx, BV WP08_Water_CoE_CONF.xlsx, and BV WP09_Pipeline_CoE_CONF.xlsx. In each instance the data is reported in the Tab "Cap_Struct_Book"). My other samples average at 45.7% (U.S. Electric), 48.9% (Pipeline), and 52.2% (Water).

regulatory capital structures in both Canada and the U.S. higher than what the CCA, City of Calgary and UCA have recommended, but so are the equity percentages on the comparable companies' balance sheets. To illustrate the impact of this discrepancy, I determined the dollar return on $1,000,000 of rate base for the average Canadian Electric Distributor, the average Canadian Gas Utility and the average U.S. Gas LDCs (ignoring any crown corporations). I show the results of these calculations in Figure 22.

Having calculated the dollar equity return available using recently allowed ROE and equity thickness data from Canada and the U.S. as well as from the recommendations of CCA, Calgary, and UCA, I can determine the difference. Figure 22 shows the difference between the equity return available using the recently allowed ROE and equity thickness from the comparator utilities listed at the top relative to the recommendations of the parties listed in the left column. For example, using the UCA recommendations, utility would have 32% *lower* dollar returns than those available to an average Canadian Electric Distributor given identical rate bases.

Figure 22
~~Figure 23~~
Difference Between Dollar Equity Returns Available to Comparators and Proposed by CCA, Calgary, and UCA

Party/Dollar Returns		Canadian Electric $34,089	Canadian Gas $37,275	U.S. Gas LDC $49,147
UCA	$23,310	-32%	-37%	-53%
City of Calgary	$26,250	-23%	-30%	-47%
CCA	$28,800	-16%	-23%	-41%

Notes:
-Returns for Intervenor Parties calculated using their recommended RoE and Capital Structures. Returns for Canadian Electric, Canadian Gas, and U.S. Gas LDC calculated using 2017 average approved RoE and Capital Structure.

Source: BV Workpaper R01_CONF.

I do not see any evidence in the submitted material that indicates that the Utilities' equity merits a dollar return on equity that is 16-37 percent lower than that granted other

Canadian utilities and more than 41 percent lower than what is available to U.S. gas LDCs.

Q99. Please elaborate on your comments regarding the comparability of the two gas distribution utilities discussed by Mr. Johnson.

A99. Mr. Johnson states that his recommended 35% equity for ATCO Gas "is the level of common equity for the two large gas distribution companies in Ontario."[186] First, Mr. Johnson does nothing to establish comparability of the two utilities and ATCO Gas. Second, observations on two utilities are not sufficient for a solid comparison. Third, as noted above, the two larger gas distribution companies in Ontario have a deemed equity thickness of 36% (not 35%) and were awarded an ROE of 9.0% for 2018. Thus, the equity return on $1 million of rate base is $32,400 for the large Ontario gas distributors. In comparison, Mr. Johnson recommends an equity thickness of 35% and an ROE of 7.5%,[187] so that the equity return on $1 million of rate base for ATCO Gas is $26,250; close to 20% below the level to which Mr. Johnson compared ATCO Gas.

Q100. What do you conclude based on the discussion above?

A100. I consider the equity recommendation of CCA, City of Calgary, and UCA too low to be consistent with the comparable returns and capital attraction portions of the fair return standard. This conclusion become clear when the results that obtain from combining the ROE and capital structure recommendation is calculated as I did above in Figure 22.

B. Response to Credit Metric Calculations

Q101. What do you cover in this section?

A101. I discuss flaws in the implementation and interpretation of credit metrics in the Bell Evidence. Specifically, Mr. Bell incorrectly assumes that the FIT method tax treatment is in place, when calculating EBIT and EBITDA for his credit metric analysis, despite the

[186] Johnson Evidence, PDF pp. 2-3.

[187] Johnson Evidence, PDF pp. 2 and 8.

UCA recommendation to maintain the flow-through method. He also neglects to calculate or consider one of S&P's "core metrics"—Debt to EBITDA—despite emphasizing the EBITDA coverage ratio.

I also discuss Mr. Madsen's "base" credit metric analysis, which likewise fails to calculate credit metric benchmarks in a manner consistent with the current flow-through tax methodology, and assumes that the Commission has placed an "implied weighting" on specific credit metrics in arriving at past capital structure decisions.

Finally, I address comments made by the UCA and CCA witnesses in response to the Commission's information requests asking about "Target credit ratings in the A-range."[188] I note that the responses of all three witnesses minimize potential negative implications for financial integrity and completely ignore the comparable returns component of the fair return standard.

Q102. How does Mr. Bell's evidence use credit metrics?

A102. Mr. Bell performs a pro forma credit metric analysis of the type relied on by the Commission in the past. His analysis employs inputs for CWIP, debt cost, and depreciation as a percentage of rate base; his specific inputs are derived from Rule 005 filings.[189] Using these inputs along with an assumed ROE of 8.5% and the current combined federal and provincial statutory tax rate of 27%, Mr. Bell calculates EBIT, EBITDA, and FFO interest coverage ratios, as well as FFO-to-debt percentage, at a variety of equity thicknesses. Importantly, Mr. Bell's assumed allowed ROE of 8.5% is inconsistent with Dr. Cleary's much lower recommendation (6.3%).

Based on the results of this analysis (which is presented in Table 1 of his evidence), Mr. Bell then concludes as follows:

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[188] Exhibit 22570_X0675 (UCA Responses to AUC IRs), UCA-AUC-2018JAN26-005 (PDF pp. 11-15); Exhibit 22570_X0701 (CCA Responses to AUC IRs), CCA-AUC-2018JAN26-001 (PDF pp. 1-6).

[189] In response to information request BELL-ATCO/AUI-2018JAN26-002, Mr. Bell indicates that he used a weighted average for mid-year debt cost and a simple average for depreciation percentage and CWIP percentage.

> When one looks at the S&P guidelines, an equity ratio of approximately 35% would well satisfy the EBITDA Coverage, FFO/Interest Coverage, and FFO/Debt targets for S&P. A ratio that is slightly higher would satisfy the DBRS thresholds.[190]

In response to information requests, Mr. Bell confirmed that the S&P "targets" and "DBRS thresholds" referenced in his evidence come from PDF page 12 of Altalink information response AML-CCA-2017NOV21-007, which identifies the following ranges as being associated with A range ratings according to S&P and DBRS methodology documents.

Figure 24
Credit Metric Thresholds Relied on by Mr. Bell

	DBRS	S&P
Debt to capital	55% to 65%	
EBIT interest coverage	1.8x to 2.8x	
EBITDA interst coverage		2.5x to 4.0x
FFO interest coverage		2.0x to 3.0x
FFO / Debt	12.5% to 17.5%	9.0% to 13.0%
Debt / EBITDA		5.0x to 4.0x

Source: Information Request AML-CCA-2017NOV21-007.

Q103. What issues do you have with Mr. Bell's pro forma credit metric conclusions and results?

A103. First, I note that there is a large discrepancy between the S&P and DBRS thresholds relied upon by Mr. Bell. Contrary to Mr. Bell's conclusion that an equity ratio "slightly higher" than 35% would satisfy the DBRS thresholds, his calculations indicate that an equity ratio of at least 39% would be required to *just to satisfy the low end* of DBRS's

[190] ("Bell Evidence"), PDF p. 22.

recommended FFO / Debt range. And even a 39% equity ratio would be below the mid-point of the DBRS-recommended 35% - 45% equity to capital ratio.

Relatedly, as I discussed extensively in my Written Evidence, I have significant concerns about the S&P targets employed by Mr. Bell. These ranges derive from S&P's "low volatility table," rather than the medial volatility table by which ATCO's and AUI's corporate parent companies are evaluated (and which thus impact ATCO and AUI due to S&P's "group" evaluation method. Further, the FFO / Debt range in particular is much lower than the threshold metric levels mentioned by S&P in recent report noting the "group" downgrade of ATCO Ltd. and its subsidiaries.[191]

In light of these issues and the inconsistency with guidelines from other credit rating agencies, I believe it is inappropriate to rely exclusively or even primarily on the S&P low volatility metrics cited by Mr. Bell. As I explained in my Written Evidence, targeting too low credit metrics is problematic in that even a modest down-turn in cash flows could jeopardize the ability of AUI and ATCO to raise debt capital on favorable terms.[192] This is particularly true in the current environment of rising interest rates, wherein an actual or potential credit downgrade could exacerbate already rising debt costs.

Q104. What about Mr. Bell's decision to emphasize S&P's EBITDA interest coverage ratio, but not to calculate or mention its "core" Debt to EBITDA metric?

A104. Although the Commission has not traditionally calculated or considered EBITDA coverage in its pro forma calculations, Mr. Bell presents this metric. This is consistent with what UCA witness Mr. Stauft did in the 2016 GCOC proceeding. However, the S&P methodology report that is the source of Mr. Bell's "low volatility" target ranges (shown in Figure 24) explicitly identifies a different EBITDA metric—Debt / EBITDA—as one of its two "core ratios" (with the other being FFO / Debt), while designating EBITDA

[191] Villadsen Evidence, PDF pp. 93-96.

[192] Villadsen Evidence, PDF p. 93.

interest coverage and FFO interest coverage as a "supplementary coverage ratios."[193] As shown in Figure 24, the S&P low volatility guidelines relied on by Mr. Bell suggest a Debt / EBITDA ratio of 4.0-5.0x is consistent with a "Significant" financial risk rating (and thus an A range ratings anchor). I note that the medial volatility table lists a range of 3.5-4.5x, as lower ratios indicate better credit quality for this metric.

In Figure 25 below I replicate Mr. Bell's Table 1, but add a column for Debt/EBITDA. This metric is calculated leaving Mr. Bell's inputs unchanged and using the same formulas for the numerator (Debt) and denominator (EBITDA) that he uses to calculate those quantities for other metrics. Of note, the Debt/EBITDA metric does not meet the maximum (i.e., lowest credit quality) of the S&P low-volatility range until equity thickness goes above 41%.

Figure 25
Mr. Bell's Table 1 with Debt/EBITDA Calculation Added

Equity %	EBIT/Int Coverage	EBITDA Coverage	FFO/Int Coverage	FFO/Debt	Debt to EBITDA
30%	2.005	3.419	3.137	9.984%	6.378
31%	2.055	3.490	3.194	10.247%	6.248
32%	2.107	3.563	3.253	10.517%	6.120
33%	2.160	3.638	3.314	10.796%	5.993
34%	2.216	3.716	3.377	11.083%	5.868
35%	2.272	3.796	3.441	11.379%	5.745
36%	2.331	3.878	3.508	11.685%	5.623
37%	2.391	3.963	3.577	12.000%	5.502
38%	2.454	4.051	3.647	12.325%	5.383
39%	2.518	4.141	3.721	12.661%	5.265
40%	2.585	4.235	3.796	13.008%	5.149
41%	2.654	4.332	3.875	13.366%	5.034
42%	2.725	4.432	3.955	13.737%	4.920
43%	2.799	4.536	4.039	14.122%	4.808
44%	2.875	4.643	4.126	14.520%	4.696

Source: BV Workpaper R08.

[193] Exhibit 22570_X0464 AML IR Responses to CCA, at PDF pp. 59 and 64.

Q105. What are the issues with Mr. Bell's calculation of EBIT and EBITDA for his pro forma credit metric calculations?

A105. EBIT and EBITDA are pre-tax quantities. Therefore, the amount of tax assumed to be recovered in revenue is relevant to the calculation of pro forma credit metrics involving EBIT and EBITDA. Mr. Bell calculates EBIT by "grossing up" the allowed equity return at the statutory tax rate of 27% and then adding the allowed debt return. This calculation is consistent with the inclusion of both current and future taxes (e.g., accrued tax obligations) in the revenue requirement. In other words, it is consistent with the EBIT as calculated under the FIT method.

Obviously, this does not reflect the amount of tax recovery revenue included in pre-tax cash flows if the flow-through method is applied, as is currently the case for AUI and ATCO.[194] Under flow-through tax treatment, the pre-tax cash flows contain only enough tax recovery revenue to cover the current tax liability, which (unless the utility is nearing or past the aggregate crossover point) is less than what would be collected under FIT.

Importantly, Mr. Bell explicitly recommends that the Commission continue to apply the flow through method as the generic tax treatment.[195] Therefore, the pro forma EBIT and EBITDA values he calculates are too high relative to what AUI and ATCO could realistically expect to obtain under the income tax method he himself recommends.[196] This further undermines the reliability of Mr. Bell's pro forma credit metric calculations.

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[194] I note that ATCO Electric Transmission currently has FIT treatment with respect to its Federal, but not provincial, taxes.

[195] Bell Evidence, PDF pp. 25-26.

[196] I note that, according to Mr. Bell's 2016 Rule 005 input calculations, the five Alberta Utilities that were taxable in that year (*i.e.,* AUI and the four ATCO Utilities) had an average effective tax rate of 8.8%, and a median effective rate of 2.9%.

Q106. Are you aware the Commission has addressed the issue how to calculate the tax component for EBIT metrics in the 2011 GCOC Decision?

A106. Yes. In that decision, the Commission correctly noted that the amount of tax collected is a relevant consideration for credit rating agencies, and acknowledged that the actual amount collected is different under flow-through tax method compared to what would be calculated by simply grossing up allowed profit at the statutory rate. However, the Commission went on to note that effective income tax rates vary on a utility specific basis and to suggest that any utilities whose credit quality was challenged under the flow-through method could seek permission to use FIT instead. The Commission therefore found that EBIT metrics should be calculated at the statutory tax rate as though FIT were in place.[197]

While I am mindful of this ruling, I submit that in the present proceeding, one of the issues under consideration is which income tax method should be generically applied to the Alberta utilities. Thus, I believe it is appropriate to consider credit metrics in a manner consistent with the tax method actually applied and/or recommended. Given that flow-through is both the currently applicable tax method and Mr. Bell's recommendation, Mr. Bell's calculations should reflect a reasonable estimate of the impact of lower flow-through tax collections on pro forma EBIT and EBITDA metrics.

Q107. Does Mr. Madsen also calculate EBIT metrics as though the FIT method were in place?

A107. Yes. And it is problematic for him to do so. Although Mr. Madsen does recommend that the FIT method be generically applied to the Alberta utilities, he structures his evidence such that his "base" credit metric analyses are intended to be applicable to the status quo situation of flow-through tax treatment.[198] In responding to the Commission's IR AUC-CCA-2018JAN26-015, Mr. Madsen did attempt to recalculate FFO-based metrics for

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[197] AUC Decision 2011-474, paragraphs 220-221.

[198] Madsen Evidence, paragraph 238, PDF p. 59 ("I have not calculated the revised actual credit metrics for each utility upon applying the FIT method to the recovery of income taxes....").

each utility based on FIT tax treatment, but he did not adjust his EBIT metrics. This highlights the inconsistency in Mr. Madsen's original "base" credit metric calculations—they reflect the FFO that would be achieved under flow-through tax treatment, but the EBIT that would occur under FIT.

As discussed below in Section ~~Q110,~~ V Mr. Madsen's arguments for applying FIT generically are unconvincing, and his proposal that the Commission switch to FIT as a means to *further* reduce equity thickness below his base recommendation is inconsistent with the fair return standard.

In context of the credit metric calculations underlying Mr. Madsen's base capital structure recommendations (which do not incorporate his recommended switch to FIT), it is inappropriate for him to calculate EBIT metrics by grossing up at the full statutory tax rate.

Q108. Have you calculated the upward bias on EBIT and EBITDA metrics for AUI and ATCO created by Mr. Bell's and Mr. Madsen's use of the full statutory tax rate?

A108. Yes. In Figure 26 below, I have calculated the EBIT and EBITDA credit metrics for AUI and the four ATCO Utilities that arise using Mr. Madsen's and Mr. Bell's respective inputs and calculations and at their recommended equity thickness for each utility.[199] I have then recalculated the same metrics, using the same inputs, but applying the effective flow-through tax rate for each utility instead of the 27% statutory rate.[200]

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[199] While Mr. Bell did not calculate pro forma credit metrics on an individual utility basis, his workpapers did calculate depreciation, CWIP, and debt cost as a percentage of rate base for each utility based on 2016 Rule 005 filings. Mr. Madsen used utility specific inputs calculated from Rule 005 filings, although his depreciation and CWIP percentages differed somewhat from Mr. Bell's. Note also that Mr. Madsen employed an 8.30% ROE, versus Mr. Bell's 8.50%. For the calculations in Figure 26, I have used both witnesses' utility specific inputs as provided in their respective workpapers.

[200] To calculate the flow-through based metrics using Mr. Bell's inputs, I employed the effective tax rates he calculated for each utility in his workpapers. For Mr. Madsen, I used the effective tax rates he put forth in his response to information request AUC-CCA-2018JAN26-015.

As the table shows, adjusting the EBIT and EBITDA calculations to reflect flow-through rather than FIT income tax recovery has a substantial impact on the metric, ranging from 0.1x to 0.4x depending on the utility. Additionally, the EBIT metrics based on the flow-through tax method currently applied are at or below the low end of the 1.8-2.8x DBRS range cited by Mr. Bell. Finally, I note that S&P's core Debt/EBITDA ratio also depends on the amount of tax assumed to be recovered in rates. While Figure 25 shows this metric calculated using the full statutory rate consistent with Mr. Bell's other calculations, applying the effective flow-through rate would increase the Debt/EBITDA metrics, meaning an even higher equity ratio would be required to meet the S&P target in the table of ranges relied on by Mr. Bell.

Figure 26
Impact on Credit Metrics of Reflecting Flow-through Rather than FIT Taxes In EBIT and EBITDA Calculations`
Using Madsen and Bell Inputs and Equity Ratio Recommendations

Company Witness (Equity % Rec)	EBIT Coverage			EBITDA Coverage		
	Bell/Madsen FIT	Corrected Flow-Through	Difference	Bell/Madsen FIT	Corrected Flow-Through	Difference
ATCO Electric Distribution						
Bell (37% equity)	2.3x	2.0x	-0.3x	3.5x	3.2x	-0.3x
Madsen (36% equity)	2.2x	1.9x	-0.3x	3.8x	3.5x	-0.3x
ATCO Gas Distribution						
Bell (37% equity)	2.2x	2.2x	-0.1x	4.0x	4.0x	-0.1x
Madsen (35% equity)	2.1x	2.0x	-0.1x	3.8x	3.7x	-0.1x
ATCO Electric Transmission						
Bell (37% equity)	2.4x	2.2x	-0.2x	3.4x	3.2x	-0.2x
Madsen (35% equity)	2.2x	1.9x	-0.3x	3.4x	3.0x	-0.3x
ATCO Pipelines						
Bell (37% equity)	2.1x	1.7x	-0.3x	3.6x	3.2x	-0.3x
Madsen (36% equity)	2.0x	1.7x	-0.3x	3.5x	3.2x	-0.3x
AUI						
Bell (41% equity)	2.7x	2.3x	-0.4x	4.5x	4.1x	-0.4x
Madsen (41% equity)	2.7x	2.3x	-0.4x	4.5x	4.0x	-0.4x

Source: BV Workpaper R09.

Q109. What are your other comments about Mr. Madsen's "general and utility specific" credit metric calculations?[201]

A109. First and foremost, I disagree with his exclusive focus on credit metrics for purposes of informing his capital structure recommendations. Mr. Madsen states categorically that "linking equity thickness to credit metrics satisfies the fair return standard,"[202] but provides no evidence or argument to support his assertion. As I explained in my Written Evidence (Section V.A-B) and as I discuss further in Section IV.A and V.A.1 of this Rebuttal Evidence, it is simply not the case that ensuring financial integrity through adequate credit metrics is sufficient to ensure a comparable (and, therefore, fair) return. In advocating that the Commission focus narrowly on credit metrics, Mr. Madsen is attending to only one leg (financial integrity) of the fair return standard's three-legged stool.

Second, I note that Mr. Madsen's calculations assume an allowed ROE of 8.30%, which is inconsistent with Mr. Thygesen's recommendation of 8.0% or lower.

Third, Mr. Madsen's approach of mapping each individual company's credit metrics to a "calculated equity thickness" confusing and arbitrary.[203] Mr. Madsen derives these results by applying numerical "weightings" to the three credit metrics he considers—FFO/Debt, FFO interest coverage, and EBIT interest coverage. He attempts to infer these weightings formulaically based on the Commission's 2016 credit metric calculations and approved generic equity thicknesses for distribution and transmission utilities.[204]

In doing so, he makes the arbitrary assumption that the two coverage metrics should be given the same weight (x), such that the FFO/Debt metric receives a weight of $(1 - 2x)$. He then determines what value of x sets the "weightings" so that—if applied to the equity

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201 Madsen Evidence, Section 4.11 (PDF pp. 59-74).

202 Madsen Evidence, paragraph 153 (PDF p. 40).

203 Madsen Evidence, paragraph 266 and Table 12 (PDF p. 67).

204 Madsen Evidence, paragraphs 243 (PDF p. 60), 245 (PDF pp. 62), and 255 (PDF pp. 65).

thicknesses he infers correspond to the Commission's "target" for each metric[205]—the resulting weighted average is the 2016 GCOC approved equity thickness of 37%.

This approach is not only overly formulaic and arbitrary, but also yields nonsensical results. Mr. Madsen's implied weightings based on 2016 credit metrics for distribution utilities place identical *negative* weightings (-163% each) on the two coverage metrics, and a positive 425% weighting on FFO/Debt. This means that under Mr. Madsen's formulaic approach, distribution utilities with *stronger* FFO and EBIT coverage (*i.e.* those that can achieve higher interest coverage at any given equity ratio) will, all else equal, be assigned *higher* "derived equity thicknesses."

Despite this counterintuitive result, Mr. Madsen nevertheless applies these weights to credit metrics calculated using current data to determine his "Derived equity thickness per Commission" for transmission utilities as a group, distribution utilities as a group, and for each utility individually. However, he then ultimately ignores these "calculated equity thicknesses," seemingly whenever they are too high or low for his liking. For example, his recommended deemed equity ratios for AUI (41%) and ATCO Electric Transmission (35%) are 4 percentage points below his calculated result for those companies (45% and 39%, respectively). Conversely, he recommends 35% equity for ATCO Gas Distribution and 36% for ATCO Pipelines, despite having "calculated" equity thicknesses of only 30% and 34%, respectively, for those companies.

Q110. Have you reviewed the comments of the UCA and CCA witnesses in response to the Commissions information requests on the Issue/sub-issue of "Target credit ratings in the A-range"?

A110. Yes. Dr. Cleary and Mr. Bell of the UCA each provided their comments separately,[206] while Mr. Madsen and Mr. Thygesen provided joint comments in the CCA's response.[207]

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[205] Based on the calculations in his workpaper, Mr. Madsen apparently believes these mathematical targets are 2.0 for EBIT coverage, 3.0 for FFO coverage, and the midpoint of a 9-13% range for FFO/Debt.

[206] UCA response to UCA-AUC-2018JAN26-005.

[207] CCA response to CCA-AUC-2018JAN26-001.

All of these witnesses noted in their comments that credit ratings in the BBB range are considered "investment grade," and suggested that such ratings are adequate to allow sufficient access to debt capital. Dr. Cleary and Messrs. Thygesen and Madsen also perform various illustrative calculations to argue that there is a "trade-off" between higher debt financing costs at BBB-range rather than A-range ratings and lower equity returns if the equity ratio is reduced to "target" lower credit metric ranges that may be associated with BBB-range credit ratings. Mr. Bell sums up this argument and states his agreement: "To the extent that utilities can access debt financing at an investment grade with lower equity thickness, it should result in a lower weighted average cost of capital (WACC) and lower customer rates."[208]

Q111. How do you respond to these comments?

A111. First, I direct the Commission to Mr. Buttke's and my comments in response to the same question from the AUC.[209] In those comments, I demonstrated (i) that credit rating agencies view the Commission's support for A-range ratings as an important consideration of the credit quality of the Alberta utilities, and (ii) that BBB rated companies can face (and have in fact faced) challenges in accessing debt financing during adverse capital market conditions.

Mr. Buttke also explained that in Canadian bond markets—as compared to the much larger and more liquid U.S. markets—lower rated issuers may face detrimental impacts—such as accepting reduced proceeds or paying premiums well in excess of the average spread between A and BBB bond yields. Mr. Buttke's rebuttal evidence further explains that (i) the reaction to a **change** from an A rating to a BBB rating can have a substantial impact on the cost of debt and (ii) an A rating makes the utilities more attractive to, for example, insurance entities. Therefore, despite BBB ratings being broadly classified as "investment grade" ratings, there are clearly financial integrity and (debt) capital

[208] UCA response to UCA-AUC-2018JAN26-005, PDF p. 15.

[209] Exhibit 22570_X0308 (AUI/ATCO responses to AUC IRs), AUI/ATCO-AUC-2017NOV17-001 (PDF pp. 1-5).

attraction implications of targeting this lower ratings range, and a deviation from the Commission's past practice in support of A credit rating will undoubtedly be negatively perceived by debt capital investors and rating agencies in assessing the credit quality of the Alberta utilities. It is not simply a matter of considering the difference in the current yield on BBB versus A issuances.

Second, I note that the intervener witnesses' discussion of "trade-offs" focuses exclusively on the customer cost implications of using *more* debt capital (and at a higher debt cost) if targeting a lower credit rating.[210] This presupposes that reducing the equity ratio to (or toward) the minimum level necessary to meet lower credit metric thresholds if targeting BBB rather than A ratings is consistent with the fair return standard. As I have explained above and in my initial written evidence, this is simply not the case.

Increasing the proportion of debt financing in the capital structure *increases financial risk to equity holders*. Thus, if a given combination of ROE and equity ratio provides a comparable return (*i.e.,* a return equal to what investors could expect to earn on an alternative investment of equal risk), it follows that the *same* ROE combined with a lower equity ratio **does not** provide a comparable return.

Put simply, a fair return is a fair return. The combination of allowed ROE and deemed equity thickness must provide a comparable return that enables the utility to attract equity capital. Arbitrarily lowering equity thickness below such levels, for example, to mitigate rate shock would violate the comparability and capital attraction components of the fair

[210] Dr. Cleary also argues that if a utility's debt costs are based on BBB range rated issuances, then the Commission's current stated intention to support credit metrics sufficient for a "stand-alone" A-range rating are effectively wasted, stating that in such circumstance, customers bear "'both' the additional cost of the [higher equity ratio] 'and' the cost of paying interest rates above those for an A-rated utility." This ignores that fact that determining the "stand alone" credit rating of a company that does not actually issue debt is not a simple matter; credit metrics are not the sole determinant of a company's actual credit rating. In the case of AUI, its small size is a complicating factor when attempting to infer what terms it might receive in attempting to issue its own debt rather than obtaining funding from bonds issued by its corporate parent.

return standard. The fair return standard cannot be ignored in order to lessen rate impacts on customers.[211]

V. REGULATORY TAX TREATMENT

Q112. What is the purpose of this section of your rebuttal evidence?

A112. The purpose is to address Mr. Madsen's comments on issues related to the regulatory income tax treatment for setting the Utilities' rates. In doing so, I reach the following conclusions.

- Mr. Madsen's proposal to reduce the Utilities' equity thickness in response to improved cash flows if the FIT method is adopted is not supported by the evidence and is fundamentally inconsistent with the fair return standard.
- Contrary to Mr. Madsen's argument, the FIT methodology is not "fundamentally superior" to flow-through tax treatment, and the use of flow-through tax treatment does not unambiguously reduce intergenerational equity for customers.
- Mr. Madsen oversimplifies the concept of intergenerational equity by conflating it with the accrual method of accounting, and ignores the complications of switching associated with the unfunded FIT liability.
- Mr. Madsen's comparison of customer costs under FIT versus flow-through misleadingly disregards the time value of money.
- Mr. Madsen has not proposed any appropriate means of mitigating the rate shock that would likely arise from a switch to FIT, nor has he proposed a way to address the substantial unfunded FIT liabilities that would arise.
- The types of challenges posed by a switch to FIT—including the issue of the unfunded FIT liability—are illustrated by the challenges U.S. utilities and regulators now face due to the recent U.S. federal tax reform.

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[211] *See TransCanada PipeLines Ltd. v. Canada (National Energy Board), 2004 FCA 149,* paragraphs *35, 36 and 43*

A. Response to Mr. Madsen's Discussion of FIT vs. Flow-Through Tax Treatment

Q113. What does CCA witness Mr. Madsen recommend with respect to the regulatory treatment of income taxes for the Alberta utilities?

A113. In Section 2 ("Summary of conclusions and recommendations") of his evidence, Mr. Madsen states that he "recommend[s] that the Commission direct the Alberta utilities to implement the FIT method of accounting for income taxes in revenue requirement."[212]

Only a few pages later, in Section 3 of his evidence, Mr. Madsen seems to caveat this recommendation, arguing that "the Commission must take into consideration other factors in determining whether to approve the use of FIT or flow-through taxes for a utility," and stating that "[m]any of [these] factors … are specific to each utility and in some cases, pose significant limitations on the ability of the Commission to establish a generic approach to setting income taxes."[213] He concludes that "regardless of whether the Commission establishes a generic method for collecting income taxes in utility rates, the Commission will inevitably have to assess whether its generic method must vary from utility to utility."[214]

Ultimately, Mr. Madsen's recommendation seems to be that the Commission should direct all of the Alberta utilities to adopt the FIT methodology for ratemaking purposes, but that each utility's transition to FIT be considered separately, including any proposals "to mitigating any rate shock" that may arise.[215]

Importantly, however, Mr. Madsen goes on to advocate "the benefits of using the FIT method as … a means of reducing equity thickness," and argues that implementing FIT would allow the Commission to reduce equity thickness for **all** the Alberta utilities.[216]

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212 Madsen Evidence, PDF p. 5.

213 Madsen Evidence, PDF p. 8.

214 *Ibid*.

215 Madsen Evidence, PDF p. 9. *See also* the response to Madsen-ATCO/AUI-2018JAN26-011.

216 Madsen Evidence, paragraphs 228 (PDF page 57) and 237 (PDF page 59).

1. Switching to FIT as a "means to reduce equity thickness" is fundamentally inconsistent with the fair return standard.

Q114. What is the basis of Mr. Madsen's argument that switching to FIT would allow the Commission to reduce equity thickness for the utilities?

A114. Based on my reading of his evidence, Mr. Madsen's primary argument is that improved cash flows under FIT would enable the Alberta utilities to meet minimum credit metric standards with a lower deemed equity thickness. Mr. Madsen sets forth this argument in paragraph 237 of his evidence:

> Implementing the FIT method could result in significantly improved cash flows and credit metrics for Alberta utilities and would allow the Commission to further reduce the required equity thickness to support an A category credit rating by between 1 and 2%, depending upon the utility.[217]

Q115. Is this argument consistent with the fair return standard?

A115. No. By focusing solely on cash flows and credit metrics, Mr. Madsen addresses only the financial integrity component of the fair return standard, while ignoring the principles of comparable returns and (equity) capital attraction that are also essential to ensure a fair return.

While improved cash flows under FIT could lead to a marginal reduction to the risk of default faced by bond investors,[218] it would not do anything to reduce the risk of an *equity* investment.[219]

By contrast, reducing the equity ratio both reduces cash flows *and increases* the variability of returns to equity investors.

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[217] Madsen Evidence, PDF page 59.

[218] Importantly, as the Appendices to the Villadsen Evidence (22570_X0192_03) footnote 18 noted, the default risk is miniscule for utilities with credit ratings in the A range, so modest changes in cash flow and credit metrics may have very small effects on the risk of default.

[219] Carpenter Rebuttal Evidence, Section VII.

Therefore, the combination of switching to FIT and reducing the equity ratio might have partially off-setting effects for credit metrics, but it **would unambiguously increase the financial risk to equity investors**. Moreover, reducing the fair return to mitigate rate shock would undercompensate equity investors for business risk, independent of the increased financial risk to which they would now be exposed. Thus, it is fundamentally inconsistent with the fair return standard to reduce the equity thickness in order to cushion the adverse impact on customers of switching to FIT.

Thus, it is fundamentally inconsistent with the fair return standard to reduce the equity thickness in order to cushion the effects of switching to FIT.

Q116. Please explain further why switching to FIT does not mitigate financial risk for equity investors, even if it leads to improved credit metrics.

A116. In contrast to debt holders, who are primarily concerned with the risk of default, and thus with the strength of debt service ratios such as the metrics examined by Mr. Madsen and the Commission,[220] equity investors are primarily concerned with the expected variability of their returns.[221]

FIT can provide higher *cash flows* in the early years of an investment, but these cash flows accumulate as no cost capital and constitute a reserve for future income tax payments. Changes in the timing of cash flows do not change the level—or expected variability—in the *returns to equity holders*. Thus, such changes do not affect the form of financial risk most relevant to equity holders.

As a result, a switch to FIT does not compensate for the increased financial risk to equity holders from the incremental reduction in equity thickness proposed by Mr. Madsen.

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[220] Madsen Evidence PDF pp. 43-46; also, AUC Decision 20622-D01-2016 PDF pp. 84-85.

[221] Financial risk—namely that increased financial leverage (i.e., higher debt ratio), which *amplifies the variability of equity returns*. Thus, even if default remains a remote possibility, equity investors experience financial risk as the debt amount in the capital structure increases.

Q117. Does Mr. Madsen consider or adjust for the impact of his proposed 1-2% reduction to equity thickness on the level of financial risk faced by equity investors?

A117. No. In paragraphs 263 and 264 of his evidence, Mr. Madsen explicitly admits that his recommended "base level" equity thicknesses of 35.5% for transmission utilities and 36.0% for distribution utilities take into account his assessments of business risk, but do not factor in "the potential to adjust the ratio further as a result of the adoption of the FIT method."[222]

Even under assumption that Mr. Madsen's proposed 35.5% and 36.0% equity thicknesses—when combined with the CCA's recommended ROE— were sufficient to provide a fair return that is *comparable* to what investors can earn on an investment of equivalent business risk (and for clarity, I do **not** agree with this proposition), it follows that Mr. Madsen's proposal to reduce equity thicknesses by a further 1-2% does not meet that standard.

In sum, a reduction in equity thickness would increase the financial risk to equity investors. This increased risk would not be compensated. Consequently, the comparability of the allowed returns would be compromised, in violation of the fair return standard.

Q118. How do you respond to Mr. Madsen's comment that the 200-bps equity thickness adder that was previously provided to ATCO Electric Transmission and Altalink due to their large capital spending programs "remains embedded within the previously approved 37% equity thickness for both [utilities]"?[223]

A118. Mr. Madsen is incorrect about this. The 37% equity thickness approved by the Commission for ATCO Electric Transmission in the 2016 GCOC does not contain any equity ratio premium associated with its "big build." In the 2016 GCOC Decision, the Commission set the "generic" deemed equity ratio at 37% for both the average

[222] Madsen Evidence, PDF p. 66.

[223] Madsen Evidence, paragraph 63 (PDF p. 17).

transmission and distribution utilities, and determined that "**company specific adjustments were not required** to the 37 per cent deemed equity ratio for the average distribution utility and **the average transmission utility** for … the large capital build program of AltaLink."[224]

In the 2016 GCOC Decision, the Commission approved the 37% equity thickness for ATCO Electric Transmission on an interim basis (pending any impact of ATCO Electric Transmission's 2015-2017 GTA Decision), but ultimately confirmed a deemed equity ratio of 37% for 2016 and 2017 on a final basis in ATCO Electric Transmission's compliance filing for the 2016 GCOC Decision.[225] Since ATCO Electric Transmission's deemed equity ratio (like Altalink's) equals the Commission equity ratio for the average transmission utility, it does not contain any premium associated with capital spending.

Since there is no equity thickness adder for credit metric relief reflected in the deemed capital structure of ATCO Electric Transmission, Mr. Madsen is incorrect in his assertion that improved credit metrics from instituting FIT "should permit the Commission additional room to reverse previously granted credit metric relief in the form of equity thickness increases."[226]

Q119. Did Mr. Madsen perform any quantitative calculations related to his proposal to reduce equity thickness in response to a switch to FIT?

A119. Mr. Madsen did not do so in his written evidence. However, in responding to the AUC's information request, Mr. Madsen performed illustrative calculations for each utility to determine the degree to which he believes the equity thickness can be reduced if the FIT tax treatment were universally imposed.[227] To calculate this, Mr. Madsen (1) determined representative pro-forma FFO credit metrics under flow-through treatment, using his

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[224] 2016 GCOC Decision, paragraphs 619-620 (PDF p. 139).

[225] Decision 22121-D01-2016: ATCO Electric Ltd. Transmission Operations Application for Finalization of Return on Equity and Deemed Equity Ratio for 2016-2017 (December 16, 2016), para. 8.

[226] Madsen Evidence, paragraph 67 (PDF p. 18).

[227] Madsen response to information request CCA-AUC-2018JAN26-015.

recommended equity thickness for each utility (2) estimated a "FIT percentage" for each utility and recalculated the FFO credit metrics using the assumed additional cash flows, (3) determined how far the equity thickness could be cut to restore the "original" (i.e., flow-through based) credit metrics.[228]

Q120. What are your reactions to this approach?

A120. Mr. Madsen's approach is focused exclusively on meeting minimum credit metric thresholds, and so addresses only the financial integrity component of the fair return standard, while completely neglecting the comparability and capital attraction components.

Importantly, the "first step" in Mr. Madsen's calculation applies his recommended capital structures, which he claims are appropriate based on business risk. But Mr. Madsen goes on to suggest that "representative" equity reductions of 1% - 5% below these levels would be possible with a switch to FIT.[229]

In his information response as well as in his evidence, Mr. Madsen proposes to *incrementally* reduce the equity thickness *below what he believes is appropriate based on business risk*. Moreover, Mr. Madsen does not propose any action to mitigate the increase in financial risk to equity holders that such a reduction in equity would impose.

For these reasons, Mr. Madsen's proposal to use FIT as a "means to reduce equity thickness" is inconsistent the comparable return component of the fair return standard.

[228] Madsen response to information request CCA-AUC-2018JAN26-015.

[229] Madsen response to information request CCA-AUC-2018JAN26-015.

2. Mr. Madsen oversimplifies the issue of intergenerational equity

Q121. What arguments does Mr. Madsen make to support his assertion that "[t]he FIT method is the preferred income tax method?"[230]

A121. Mr. Madsen devotes substantial portions of his tax evidence to discussing the "[c]redit metric and cash flow considerations of using the FIT method" and "[t]ransition considerations of moving to FIT."[231] However, addressing the *implications* of the recommended switch to the FIT methodology is not the same as addressing the merits of that recommendation.

Fundamentally, Mr. Madsen's argument for preferring FIT is that it follows the accounting principle of "cost-causation" as embodied in the accrual method of accounting employed in international financial reporting standards.[232]

Mr. Madsen connects this principle to the concept of intergenerational equity, arguing that because the taxes collected under the flow-through method do not match the taxes accrued on the utility's books during a given year, using the flow-through tax method for ratemaking creates inequity between generations of customers.[233] Specifically, he states that applying the flow-through method "results in a significant unreported liability accruing to future ratepayers, for the benefit of existing ratepayers."[234]

Q122. Is it the case, as Mr. Madsen seems to suggest, that any departure from the accrual method of accounting necessarily creates intergenerational inequity?

A122. No. Mr. Madsen equates accrual accounting with intergenerational equity, but they are not equivalent. Mr. Madsen emphasizes the matching of cost recovery revenue to the "cause" of the cost, and points specifically to depreciation, capitalization of overheads,

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230 Madsen Evidence, PDF p. 8.

231 Madsen Evidence, Sections 3.2 (PDF pages 9 – 18) and Section 3.3 (PDF pages 19 – 20).

232 Madsen Evidence, paragraphs 15-16 (PDF page 8), and paragraph 21 (PDF page 9).

233 Madsen Evidence, paragraphs 43-44 (PDF page 14).

234 Madsen Evidence, paragraph 19 (PDF page 9).

and use of salvage reserves as examples of how this "cost causation principle" is applied in the Commission's rate-making practices.

> Cost causation, in addition to inter-generational equity, is the reason why an asset is depreciated rather than paid for all at once in the year the asset is added. This is also, why the Commission approves the advance collection of salvage costs and smooths the collection of overheads over the life of the assets, again through depreciation.[235]

This is the essence of accrual accounting. Mr. Madsen then explicitly links these accrual accounting principles to intergenerational equity, and uses them as an analogy to FIT versus flow-through tax treatment.

> Ignoring the principles of cost causation for these items would result in inter-generational inequity for ratepayers. Similarly, there is simply no principled basis to argue that the same would not be true for the income tax impacts of all these items.[236]

However, in making this link, Mr. Madsen glosses over a key distinction between the recovery *of* capital (e.g., depreciation) and the return *on* capital (allowed profit) that gives rise to income tax obligations.

When capital expenditures (including overheads) and salvage costs are recovered via depreciation and salvage charges, that recovery *of* capital is distributed *evenly* over the life of the asset. In contrast, under depreciated original cost ratemaking, the return *on* capital is *unevenly* distributed, with more of the cost recovered in the early years of the asset's life. Since taxes arise from profits, this also applies to the recovery of income tax costs.

The end result is that, compared to later generations of customers, customers using an asset early in its life contribute more to the recovery of capital costs. Importantly, this is true precisely *because* depreciated original cost ratemaking aligns return on capital with an accrual-based rate base value. Furthermore, this effect occurs regardless of the income

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[235] Madsen Evidence, paragraph 43 (PDF page 14).

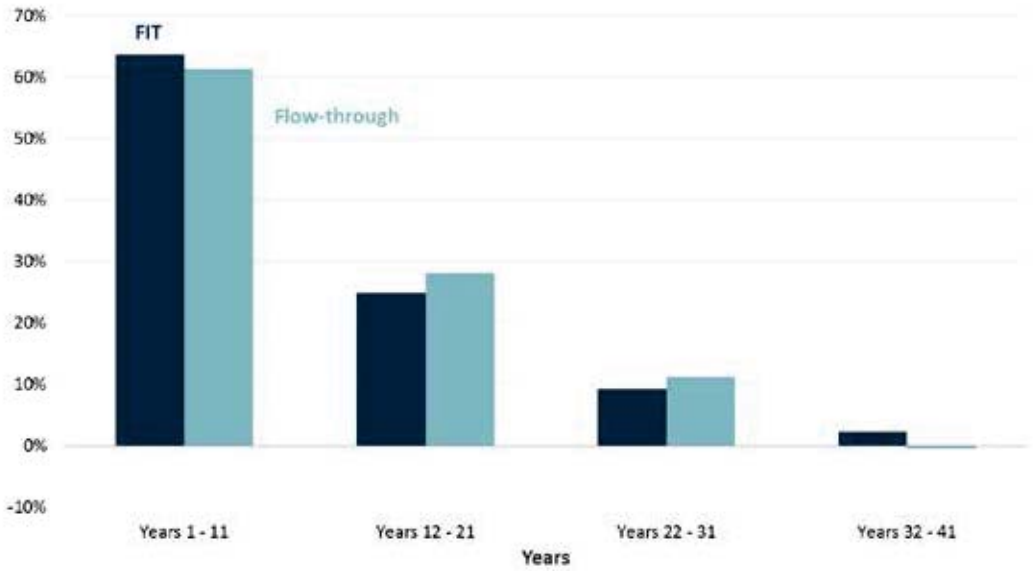
[236] Madsen Evidence, paragraph 44 (PDF page 14).

tax method applied for ratemaking, although it is mitigated to slight degree when income taxes are flowed through rather than charged as accrued under FIT treatment. Additionally, a switch in the middle of an asset's life further implicates the question of how to allocate the unfunded portion of the FIT liability.

Q123. Can you provide an illustration of this pattern of capital cost recovery?

A123. Figure 27 illustrates this cost recovery pattern based on Mr. Madsen's model of a single asset for a cost of service entity.[237] It shows the percentage of the total lifetime sum of Present Value of the Revenue Requirement (PVRR) that is recovered in Years 1-11 and in each of the subsequent three decades of the assets life.

Figure 27
Percent of Total PVRR Recovered by Period



Source: BV Workpaper R10

The figure shows that more than 60% of the value associated with capital recovery revenue (i.e., the return of and on capital investment) is concentrated in Years 1-11, and

[237] As discussed below, Mr. Madsen's model contained several errors, including the miscalculation of the revenue requirement under flow-through tax treatment. I have corrected this error, and applied discounting to appropriately express the relevant quantities in present value terms. However, I have otherwise retained all of Mr. Madsen's assumptions for this and other illustrations in my Rebuttal Evidence.

less than 15% of the total value is recovered in the second half of the asset's life. This essential pattern of capital recovery is present regardless of which tax treatment is applied, with only subtle differences between flow-through and FIT. Specifically, FIT treatment places a slightly higher share of recovery in first decade of the asset's life, whereas flow-through taxes result in a slight reduction in the effect as recovery is shifted to subsequent decades.

Q124. How does this relate to Mr. Madsen's oversimplification of intergenerational equity?

A124. As shown in Figure 27, accrual-based depreciated original cost ratemaking assigns a higher share of capital cost recovery to the early part of an assets life, even though the service provided by the asset is not necessarily more valuable to customers in those early years. Importantly if taxes are flowed through on a cash basis rather than accrued based on book depreciation (as under the FIT method), some of the early recovery is shifted to later years.

Thus, contrary to Mr. Madsen's implication, the question of what is an equitable sharing of costs across generations of customers is not equivalent to the question of whether rate-design precisely aligns with accrual-based accounting methods.

Q125. Do you have any additional observations on this point?

A125. Yes. Consistent with the conclusions of my initial Written Tax Evidence, the example in Figure 27 shows that, when viewed in present value terms over the long periods of time for which most customers use assets, revenue requirement differences between FIT and flow-through method are relatively insignificant.

Mr. Madsen, by contrast, focuses narrowly on what might happen if a given customer is or isn't connected to the system during two specific years: either the first year of an asset's life (when tax deductible overheads are taken) or the last year (when salvage is

taken).[238] Importantly, this point becomes even less relevant in the more realistic setting of continuous ongoing investment, wherein some overheads and salvage may occur in any given year. Compared to Mr. Madsen's model, differences in tax deductions between FIT and flow-through are less lumpy for an actual utility revenue requirement, which reflects a rate base composed of many assets of different ages.

Q126. Are there any other inconsistencies in Mr. Madsen's discussion of intergenerational equity as relates to FIT versus flow-through tax treatment?

A126. Yes. There are at least two major inconsistencies, both related to Mr. Madsen's acknowledgement that there is a potential for rate shock in a transition from flow-through to FIT tax treatment, owing to the recovery of future taxes in rates.[239]

First, among Mr. Madsen's suggestions for mitigating rate shock, he mentions "addressing salvage rates and depreciable lives," by which he apparently means manipulating these quantities to reduce the revenue requirement.[240] Since depreciable lives and salvage rates are calculated so as to appropriately reflect economic realities of how assets are used, changing them arbitrarily would violate the principle of cost-causation. Such an action would therefore presumably be inconsistent with Mr. Madsen's position that matching of revenues to costs is essential for ensuring intergenerational equity.

Second, Mr. Madsen notes that the issue of how to handle significant unfunded FIT liabilities would arise with a switch from flow-through to FIT, but suggests the Commission could arbitrarily delay funding these portions of the future tax liability as a means of mitigating rate shock.[241] As Mr. Madsen acknowledges, these unfunded

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238 Madsen Evidence, paragraph 41 (PDF p. 13): "Additionally, items like salvage and overheads under the flow-through method actually greater [sic] inter-generational equity than under the FIT method, as the benefits of the deductions are isolated to only a few years within the asset life."

239 Madsen Evidence, paragraphs 19 – 23 (PDF p. 9).

240 Madsen Evidence, paragraphs 20 (PDF p. 9) and 48 (PDF p. 15).

241 Madsen Evidence, paragraphs 70-75 (PDF p. 19).

portions of the future tax liability represent costs that will have to be recovered from current or future customers. However, according to accrual accounting methods, they were incurred by—but not recovered from—past customers. According to Mr. Madsen's definition, this is another source of intergenerational inequity—one that must be dealt with following a transition to FIT, but one that Mr. Madsen seems to advocate exacerbating by delaying the recovery (although Mr. Madsen does acknowledge indefinite delay is not a preferred option).

Q127. Do you have any other responses to Mr. Madsen's argument that intergenerational equity mandates a shift to FIT tax treatment?

A127. Yes. As discussed above, I find Mr. Madsen's discussion of intergenerational equity to be internally inconsistent, as well as overly simplistic in its exclusive focus on the accounting principle of cost-causation. However, it is also important to note that intergenerational equity is just *one* consideration relevant to the Commission's decision on a generic tax treatment for the Alberta utilities. It is also important to consider the immediate impact on customer rates, as well as other practical considerations associated with any potential transition between tax treatments.

3. Mr. Madsen does not adequately address concerns of increased revenue requirement under a switch to FIT

Q128. What are Mr. Madsen's comments regarding the "rate shock" that may occur as a result of switching from flow-through to FIT tax methodology?

A128. Mr. Madsen acknowledges that including recovery of future income taxes—in addition to the cash taxes payable—in the revenue requirement could lead to a substantial increase in the revenue requirement if a switch to the FIT method is implemented. However, he minimizes this concern in three ways: (1) by suggesting that reducing equity thickness could partially offset customer rate increases,[242] (2) by arguing that the *flow through* tax

[242] Madsen Evidence, paragraph 68 (PDF p. 18).

treatment introduces "a different form of rate shock" related to salvage and overheads,[243] and (3) by referring to his illustrative example, wherein he claims increased customer costs under FIT dissipate and reverse within 6 years for a single new investment.[244] All of these arguments are flawed.

With respect to the first argument, I have explained at length above (in Section V.A.1) why Mr. Madsen's proposal to reduce equity thickness in conjunction with a switch from flow-through to FIT tax treatment is (absent a commensurate increase in allowed ROE) incompatible with the fair return standard. Consequently, this is not a valid means of mitigating rate shock.[245]

Q129. What about Mr. Madsen's second argument, that flow-through tax treatment actually introduces an alternative form of "rate shock"?

A129. I find Mr. Madsen's assertions on this point confusing. He claims to have "demonstrated [that] the flow-through method increases rate shock by not smoothing out items such as overheads and salvage," and goes on to state that "[t]hese two items contribute to a different form of rate shock, as it is not from an unexpected increase in rates, but from an unexpected decrease in rates."[246]

First, it is important to recognize that Mr. Madsen's model considers only a single asset. In reality, utilities invest continuously, so that some overhead deductions may be taken in each and every year. Likewise, with respect to salvage costs, utilities retire and replace assets on a continual ongoing basis. Therefore, when considered as a proportion of tax deductions associated with all assets in an actual utility's rate base, a given year's salvage expenses would not result in dramatic drops of the type depicted as taking place between

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243 Madsen Evidence, paragraph 229 (PDF pp. 57-58).

244 Madsen Evidence, paragraph 31 (PDF p. 12). *See also* Madsen Evidence, paragraph 47 (PDF p. 15): "Even in the absence of a detailed model using actual utility results, I submit that the above high-level evidence supports the use of the FIT method as the rate impacts diminish quickly in later years."

245 *See TransCanada PipeLines Ltd. v. Canada (National Energy Board), 2004 FCA 149,* paragraphs *35, 36 and 43*

246 Madsen Evidence, paragraph 229, (PDF pp. 57-58).

the penultimate and final years (i.e., Years 40 and 41) in Mr. Madsen's model. There is a smoothing effect when tax deductions are taken for the entire rate base in aggregate.

Second, under flow-through tax treatment, the deductions for overheads and salvage costs are not "unexpected" at all, but rather an expected benefit provided by the tax code that is passed through to customers. Indeed, the benefits of immediate deductions for overheads is one reason why employing FIT rather than flow-through leads to such a dramatic *increase* in the revenue requirement in the first year of service for a new plant investment. This is actually illustrated compellingly by Mr. Madsen's own model.

Q130. What are your comments about Mr. Madsen's discussion of his illustrative model?

A130. Mr. Madsen's illustrative model compares the revenue requirements for utility investment under FIT and flow-through tax treatments as did the model I presented in my written tax evidence. However, Mr. Madsen's model contains one consequential error in his calculation of the flow-through revenue requirement and ignores the continual nature of capital investments. Additionally, his model ignores the time value of money by not discounting the revenue requirement.

If Mr. Madsen's error is corrected and present values are considered, his results are actually consistent with the conclusions I reached in my initial tax evidence:

- Looking to the sum of present value of the revenue requirement (PVRR), over the full economic life cycle of a single stand-alone utility investment, customers have no reason to prefer FIT to flow-through tax treatment.
- FIT leads to substantially higher customer costs in the early years of a utility asset's life, and (accounting for the time value of money) FIT costs remain higher on average well beyond the crossover point.
- Higher levels of on-going capital additions make FIT relatively more costly to customers over longer time horizons.

As noted above, owing to Mr. Madsen's more detailed modeling of immediate deductibles, his model actually illustrates a more dramatic initial rate shock than does the model I presented in my Written Tax Evidence.

Q131. Please elaborate on the issues you find with Mr. Madsen's calculation of flow-through tax treatment.

A131. In modeling the revenue requirement under flow through tax treatment, Mr. Madsen calculates the current tax incorrectly. Specifically, he uses the same current tax cost under Flow-through as for his *FIT method calculations*, rather than separately calculating the amount of tax that is expected to be paid under the flow-through method. This is incorrect, as demonstrated below. The result of this error is that Mr. Madsen dramatically overstates the revenue requirement in Year 1 of his model, as well as in subsequent years.

Figure 28: Year 1 Revenue Requirement Calculation
Comparison of FIT to Flow through

		Madsen FIT (correct) [a]	Madsen Flow-through (Incorrect) [b]	Flow Through (corrected) [c]
Opening RB and no-cost capital		$0.0	$0.0	$0.0
Closing RB and no-cost capital		$1,008.8	$1,008.8	$1,026.9
Mid-year RB and no-cost capital		$504.4	$504.4	$513.4
Allowed Return on Equity	[1]	$15.5	$15.5	$15.8
Return on Debt	[2]	$14.3	$14.3	$14.6
Depreciation	[3]	$13.1	$13.1	$13.1
Salvage	[4]	$10.0	$10.0	$10.0
Current Tax Expense	**[5]**	**-$12.3**	**-$12.3**	**-$18.9**
Future Tax Expense	[6]	$18.1	$0.0	$0.0
Revenue Requirement	[7] = sum of[1] through [6]	$58.6	$40.6	$34.5
Tax Deductable Overheads	[8]	$50.0	$50.0	$50.0
CCA Claims	[9]	$40.0	$40.0	$40.0
Interest Expense	[10]	$14.3	$14.3	$14.6
Taxable Income	[11] = [7] - [8] - [9] - [10]	-$45.7	-$63.7	-$70.0
Cash Taxes Paid	**[12] = [11] * 27% Statutory Tax Rate**	**-$12.3**	**-$17.2**	**-$18.9**

Sources and Notes:
Columns [a] and [b], row [7] and above are replications of IR: CCA-AUC-2018JAN26-013(a)
*Numbers do not match exactly due to rounding.
Column [c] is a corrected calculation of Flow Through tax treatment
[8]: Madsen assumption of year 1 deductable overheads
[9]: Madsen assumption for year 1 CCA Claims
[10]: Tax deductable interest expense on debt

Source: BV Workpaper R11.

Figure 28 above demonstrates why Mr. Madsen's calculation is incorrect. This table replicates the table appearing in the response to CCA-AUC2018JAN26-013, with additional rows and columns to highlight the errors and how they would be corrected.

In the AUC's information request, Mr. Madsen was asked to confirm that the calculations in the AUC table presented reflect the year one figures in his illustrative income tax calculations. Mr. Madsen does confirm this statement and replications of calculations are shown in rows [1] through [10], columns [a] and [b] of Figure 28. The AUC asked Mr. Madsen to use "the revenue requirement of $41 for year one under the flow-through method in Mr. Madsen's illustrative income tax calculations as a starting point, [and] please demonstrate how the resulting current income tax is ($12)."[247]

Mr. Madsen did not perform this calculation as requested, but rather simply claimed that the "revenue requirement and current income taxes continue to be $41 and ($12), respectively, on a rounded basis."[248]

Since Mr. Madsen chose not to perform the calculation requested by the Commission, I show this calculation in rows [10] through [15] of column [b] in the figure above. Starting with a $41 revenue requirement and removing the tax write-offs Mr. Madsen includes in his model ($50 for overheads, $40 in Year-1 CCA claims, and $14 interest expense) I arrive at -$64 of taxable income. By applying a 27% tax rate to this value, I arrive at a cash tax value of -$17, which clearly does not match the -$12 Mr. Madsen uses for current income tax in calculating his flow through revenue requirement.

Using column [c], I illustrate the adjustments necessary to properly calculate flow-through income taxes using identical inputs to those applied to columns [a] and [b], and those used in Mr. Madsen's model.

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[247] AUC information request CCA-AUC-2018JAN26-013 (a), (d)

[248] Madsen response (d) to Information Request CCA-AUC-2018JAN26-013 (d)

Q132. What are the important differences between Mr. Madsen's erroneous flow-through revenue requirement calculations and the corrected ones?

A132. First, there is the role of no-cost capital from the accrued FIT balance. One difference between flow-through and future income tax treatments is that the deferred taxes are removed from the rate base under FIT, but they are not removed from the rate base under flow through. As Mr. Madsen explained in response to information request CCA-AUC-2018JAN26-013, he used the FIT rate base in his flow through calculations, leading to incorrect values in the "Revenue Requirement without FIT" row (line 49) of his model. However, he included a separate row calculating the "Return offset on FIT liability" (line 53). To get the correct revenue requirement under flow through tax treatment, it is necessary to add these two lines of Mr. Madsen's original model. In column [c] of Figure 28 above, I have applied the correct rate base for calculating the FIT liability.

More consequentially however, Mr. Madsen also errs in assuming that current income tax payment under flow-through should be equal to the current income tax expense under FIT. This is simply incorrect, as the higher revenue collected under FIT leads to higher current tax expense. Under flow-through tax treatment, the taxes recovered in the revenue requirement are intended to match the current taxes payable to the government. Column [c] show the correct calculation, as demonstrated by the fact that rows [8] and [15] are equal.

Q133. What is the effect of correcting Mr. Madsen's error when comparing his modeled revenue requirement under FIT versus flow-through for a single asset?

A133. Mr. Madsen's error has a substantial effect on the results when the impact on the revenue requirement of a switch to FIT is considered. To illustrate, I focus on the percentage increase in revenue requirement realized in the first three years of a new asset's life by a change to future income tax relative to the incorrect flow-through revenue requirement calculated by Mr. Madsen as well as a correctly calculated flow-through revenue requirement. Figure 29 shows the implications of Mr. Madsen's error.

Figure 29: Effect of Correcting Mr. Madsen's Flow-through Calculation Error

Year		1	2	3	Average
Revenue Requirement					
Madsen correct under FIT	[a]	$59	$115	$112	$95
Madsen incorrect under Flow Through	[b]	$41	$108	$107	$85
Corrected under Flow Through	[c]	$35	$106	$105	$82
Percent Increase in Revenue Requirement - switch to FIT					
Madsen incorrect Flow Through calculation	[d]	43%	6%	5%	11%
Corrected Flow Through calculation	[e]	70%	9%	7%	17%

Notes:
[b]: This value accounts for "Return offset on FIT liability" used by Mr. Madsen in his model
[d] = ([a] / [b]) - 1
[e] = ([a] / [c]) - 1
*Average of years 1 through 3

Source: BV Workpaper R10.

In the first year of the new asset, Mr. Madsen severely understates the revenue requirement under FIT, as compared to the flow through method, showing a 43% higher revenue requirement rather than the actual 70% higher revenue requirement consistent with the assumptions of his model. Considering the average revenue requirement over the first three years of the asset's life, Mr. Madsen's error causes him to understate the impact on the revenue requirement by 6 percentage points—he shows the FIT revenue requirement as only 11% higher than the flow through revenue requirement instead of the correct 17%.

Q134. What accounts for the much higher initial impact on revenue requirement modeled by Mr. Madsen compared to the 24% increase in Year-1 capital recovery revenues you modeled in your initial tax evidence?

A134. The difference derives from the fact that Mr. Madsen's model provides a more detailed treatment of tax deductions than did my illustrative model. Whereas my model employs representative composite depreciation rates (which implicitly include both depreciation and salvage) and CCA deduction rates, and ignored immediate deductibles for simplicity, Mr. Madsen's model treats depreciation and salvage separately, and explicitly models deductible overheads.

It is due to Mr. Madsen's inclusion of overheads that his model reveals a much higher initial increase in the revenue requirement from a switch to FIT. Under the flow-through method, these deductions are passed through to customers in the 1st year of service for a new investment, whereas the Year-1 FIT revenue requirement reflects their capitalization and incorporation into the annual depreciation schedule. Thus, the immediate deductibility of certain overhead costs contributes substantially to increased revenue requirement when the FIT method is applied for new investments. While my simple illustrative model did not capture this effect, Mr. Madsen is correct that deductible overheads are a reality of "the actual recovery of costs over the life of an asset regulated in Alberta."[249] Thus, the revenue requirement increase inherent in Mr. Madsen's model is representative of how a switch to FIT would affect capital recovery revenues from new investments by the Alberta utilities.

Q135. How do you respond to Mr. Madsen's assertion that his assumed "combined depreciation and salvage rate of 4.50%" is "relatively conservative"?[250]

A135. Mr. Madsen's 4.50% combined rate is based on a 40-year asset life (2.50% annual depreciation) with -80% net salvage (corresponding to 2% annual salvage collection). He claims that this is conservative in comparison to "the parameter values used by the Commission in Decision 20622-D01-2016." However, the referenced parameter values express depreciation and net salvage expense as a percentage of *invested capital* as reported in the Rule 005 filings.

Invested capital reflects the funds used to finance rate base, which is based on *net* utility plant. However, Mr. Madsen's assumed combined depreciation and salvage rate is applied to gross investment balances. Hence his comparison is not meaningful.

On an apples-to-apples basis Mr. Madsen's assumed 4.50% combined depreciation and salvage rate is **not** "conservative," but rather quite high relative to a more typical

[249] Madsen Evidence, paragraph 32.

[250] Madsen Evidence, paragraphs 26-27.

composite depreciation rate.[251] In this regard, Mr. Madsen's model *understates* (i) the amount of time it takes to reach crossover, and (ii) the magnitude of revenue requirement increases due to using FIT in the years leading up to crossover.

Despite this, as I demonstrate below, Mr. Madsen's model and assumptions show substantial and sustained increases in revenue requirement on a present value basis.

Q136. Have you also analyzed the impact of incorporating present value calculations into Mr. Madsen's model?

A136. Yes. In contrast to my own initial Written Tax Evidence, Mr. Madsen's evidence does not address the Commission's question as to how "differences in the sum of the present discounted value of the revenue requirement,"[252] should factor into the Commission's determination about a generic income tax method. As I explained in my Written Tax Evidence, it is essential to consider the time value of money when comparing the near-term increased customer costs under FIT versus flow-through to the later cost reductions. By failing to incorporate discounting in his model, Mr. Madsen presented an inaccurate picture of the impact of a switch to FIT on utility customers. Consequently, I have added new lines to his model to allow for proper comparison of revenue requirement in present value terms.[253]

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[251] Under Mr. Madsen's assumption of 4.50% composite depreciation, the flow-through rate base (net of no-cost capital salvage reserve) for his single asset becomes negative after approximately 23 years of service, whereas in the single-investment version of my illustrative model assuming 2.50% composite depreciation, rate base reaches zero in the 40th year. *See* BV Workpaper R10 and Exhibit 22570_X0169_VilladsenTaxWorkpaper01.

[252] Exhibit 22570-X0114 (July 5, 2017 letter), paragraph 28.

[253] BV Workpaper R10. Note that I calculate the discount rate based on Mr. Madsen's financing assumptions, but properly employ the after-tax cost of debt rather than the pre-tax cost of debt.

Q137. What do you find when you compare the present value of the revenue requirement (PVRR) for a single asset under the two alternative tax methods using Mr. Madsen's modeling assumptions?

A137. Mr. Madsen's model shows that FIT is substantially more costly for customers in the early years, and that—even though the FIT revenue requirement is slightly lower than the flow-through revenue requirement starting in Year 7—FIT remains more expensive on average until Year 19. Additionally, I find that over the full 40 year life of the asset (i.e., through Year 41 of Mr. Madsen's model), the average PVRR is nearly identical between the two treatments—a mere 0.01% higher under FIT.

Q138. Have you also evaluated the impact of including incremental capital additions in Mr. Madsen's model?

A138. Yes. As I did in my initial Written Tax Evidence, I compared FIT and flow-through PVRR at various levels of on-going capital additions, but this time using the assumptions and (corrected) calculations of Mr. Madsen's model. The results, which are summarized in Figure 30 below, are analogous to those in Figure 9 of my initial Written Tax Evidence.[254] I note that a 10% capital addition rate, for example, represents $100 of new investment in each year subsequent to the initial Year-1 investment of $1,000.

[254] Villadsen Written Tax Evidence, PDF pp. 20-21.

Figure 30
Results of Mr. Madsen's Model
Over 40-Year Observation period
For $1000 Initial Investment
With Varying Incremental Capital Investment Rates.

Capital Addition Rate (%)	0%	5%	10%	15%	20%
% Diff in Year 1 PVRR (FIT vs. Flow-through)	69.8%	69.8%	69.8%	69.8%	69.8%
FIT Crossover year	9	11	13	14	15
% Diff in Avg. PVRR (FIT vs. Flow-through)					
through year 10	4.8%	5.6%	6.2%	6.6%	7.0%
through year 20	-0.7%	0.4%	1.0%	1.4%	1.6%
through year 30	-2.6%	-1.7%	-1.2%	-1.0%	-0.8%
through year 41	0.0%	-0.8%	-1.0%	-1.2%	-1.3%

Source: BV Workpaper R10.

Consistent with the results of my model, incorporating capital additions into Mr. Madsen's model demonstrates that FIT is more expensive—and stays more expensive for longer—when rates of ongoing investment are higher.[255] Continual capital additions are more reflective of reality.

Q139. Have you also conducted a sensitivity calculation using a more representative composite depreciation rate assumption in Mr. Madsen's model?

A139. Yes. Based on Mr. Madsen's assumption of -80% net salvage percentage, an assumed life of 50 years would correspond to 2.0% annual depreciation and 1.6% annual salvage expense, for a combined rate of 3.6%, which is more representative of composite depreciation rates for utility rate base. To run Mr. Madsen's model using this alternative assumption (rather than Mr. Madsen's aggressively high assumption of 4.50%), I simply input "1/50" into line 5 (depreciation rate) of my corrected version of his spreadsheet. The results, shown in Figure 31 below, serve to reinforce my conclusions using Mr. Madsen's original assumptions: FIT leads to substantially higher customer costs that persist far into the future in present value terms.

[255] Note that since the observation period corresponds to the life of the initial investment, the calculation only reflects the final-year payment of net salvage costs for that initial asset. That is why FIT maintains a slight cost advantage on average through Year 41 when nonzero capital additions are incorporated.

Figure 31
Results of Mr. Madsen's Model
Using Representative Composite Depreciation Rate
Over 50-Year Observation period
For $1000 Initial Investment
with Varying Incremental Capital Investment Rates.

Capital Addition Rate (%)	0%	5%	10%	15%	20%
% Diff in Year 1 PVRR (FIT vs. Flow-through)	90.8%	90.8%	90.8%	90.8%	90.8%
FIT Crossover year	11	16	19	21	22
% Diff in Avg. PVRR (FIT vs. Flow-through)					
through year 10	8.3%	9.3%	10.0%	10.5%	10.9%
through year 20	1.6%	2.9%	3.6%	4.1%	4.4%
through year 30	-1.0%	0.2%	0.8%	1.1%	1.3%
through year 40	-1.9%	-1.0%	-0.6%	-0.4%	-0.3%
through year 51	0.0%	-0.4%	-0.6%	-0.6%	-0.7%

Source: BV Workpaper R10.

Q140. Based on your evaluation of Mr. Madsen's illustrative tax model, do you believe he has adequately addressed concerns of increased customer costs resulting from a switch to FIT?

A140. No. Contrary to Mr. Madsen's misleading statement that his model "supports the use of the FIT method as the rate impacts diminish quickly in later years," a corrected model that allows for capital additions shows that the substantial increases in near-term revenue requirement under FIT persist for a significant period of time. In terms of PVRR, higher capital recovery charges under FIT last for nearly two decades of a new asset's life, or longer depending on the rate of incremental capital additions.

4. The credit metrics calculated in Mr. Madsen's tax model do not support his argument.

Q141. What does Mr. Madsen claim based on the credit metric calculations included in his illustrative tax model?

A141. With the caveat that these calculations "should be reviewed primarily for informational purposes," Mr. Madsen does state that his calculations "supports the conclusion that

under the FIT method, a utility's cash flows (and thus credit metrics) for a single asset, using the parameters provided would be supportive of an A category credit rating."[256]

Q142. In your opinion, are these calculations reliable for the purpose Mr. Madsen suggests?

A142. No. First, I note that the credit metric calculations in Mr. Madsen's tax model are incorrectly calculated and therefore unreliable.

However, I do agree that "the forecast credit metrics for a single asset in 5 or 10 years would not be indicative of the current credit metrics and business risks faced by the Alberta utilities in the 2018 to 2020 period."[257] Contrary to Mr. Madsen's implication, however, even the near-term metrics in his single-asset model do not constitute evidence of what ratings would be achievable for the various Alberta utilities under FIT tax treatment, since the portfolio of assets for a real utility is significantly more complex than the simple single-asset example.

Q143. What are the errors in Mr. Madsen's tax model credit metric calculations?

A143. First, Mr. Madsen calculates debt and interest for his metrics based on the net asset balance, rather than the net rate base. This does not make sense. Given that the existence of no cost capital means that not all of the net asset balance needs to be financed with debt and equity, Mr. Madsen's choice attributes too high levels of debt and interest in both the numerators and denominators of his metrics. It also introduces internal inconsistency with how he calculates the equity return portions of the metrics, since he (correctly) uses net rate base for that purpose. Furthermore, this calculation is inconsistent with the other credit metric calculations performed by Mr. Madsen in his evidence (*i.e.*, those included in his "Attachment 2").

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[256] Madsen Evidence, paragraphs 33 and 35.

[257] Madsen Evidence, paragraph 33.

Second, Mr. Madsen's tax model "FFO coverage" metric is calculated as FFO divided by interest, rather than FFO plus interest divided by interest as it has traditionally been defined by the Commission.[258]

5. Mr. Madsen does not adequately address the concern of unfunded FIT liabilities

Q144. In your initial Written Tax Evidence, did you explain how unfunded FIT liabilities arise from a switch to the FIT method?

A144. Yes. In Figure 5 of that evidence, I illustrated what would happen if a representative utility asset received flow-through treatment for its first 3 years of service before a switch to FIT.[259] In such an instance, prospective accruals of deferred taxes beginning after the switch will be insufficient to pay all future taxes over the remaining life of the asset. Unless this "gap" is funded via additional collections from customers, the utility will not recover its income tax costs associated with prudent investment.

Q145. Does Mr. Madsen acknowledge that unfunded FIT liabilities would arise with a switch to FIT?

A145. Yes. Mr. Madsen correctly states that the unfunded FIT liability is "a true liability that is being accumulated annually by each Alberta utility, and is an amount that will ultimately be paid for by Alberta ratepayers."[260] However, he does not propose any mechanism for funding this "true liability," instead suggesting that recovery could be delayed for an unspecified period of time or even that the Commission could "do nothing with the accumulated FIT liability on transition" (although he admits the latter is "not a preferred option").[261]

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[258] *See*, for example, Decision 20622-D01-2016, paragraph 356.

[259] Villadsen Tax Evidence, PDF pp. 14-16.

[260] Madsen Evidence, paragraph 71.

[261] Madsen Evidence, paragraphs 72-74.

Q146. Approximately how large are the unfunded FIT liabilities for AUI and ATCO?

A146. They are substantial. According to information provided to me by AUI and ATCO, their unfunded FIT liabilities range from 40% to 93% as a percentage of the annual revenue requirement. (See Figure 32 below.)

Figure 32
Unfunded FIT Liabilities for AUI and ATCO

	Annual Revenue Requirement*	Unfunded FIT**	Unfunded FIT as % of RR
ATCO Utilites Total	$1,906	$1,069	56%
AltaGas	$73	$29	40%

Sources and Notes:
All values in millions CAD
*As last approved/applied for
**ATCO: Information request ATCOUTILITIES-AUC-2017NOV21-005
**AUI: 2016 Rule 005

Q147. How does the recovery of the unfunded FIT liabilities affect intergenerational equity?

A147. Mr. Madsen finds that FIT promotes intergenerational equity, but does not propose a specific method to handle the unfunded FIT liability. Looking to the December 2017 tax reform in the U.S.,[262] it is evident that the treatment of the unfunded FIT liability—or in the case of the U.S. the overfunded FIT liability (accrued deferred income taxes in excess of the expected tax liability)—has material implications for administrative burden, regulatory uncertainty, and intergenerational equity.

Most, if not all, U.S.-based utilities recover income taxes based on a normalized tax treatment (akin to FIT). Consequently, they recover tax costs based on the statutory tax rate and accumulate deferred income tax balances due to the accelerated tax deductions available for property, plant and equipment investments. Due to the recently-enacted reduction of the Federal corporate tax rate, current utility rates collect more income tax

[262] Tax Cuts and Jobs Act of 2017.

costs than will be paid, and current accumulated deferred income tax balances are *overfunded* relative to the actual expected future income tax liability.

If the deferred income tax in excess of what is owed to the U.S. government is refunded to customers, then current and future customers will benefit from the payments of previous customers. In the case of Mr. Madsen's proposal to switch to FIT, the unfunded FIT liability will necessarily need to be collected from current and future customers leading to a transfer of funds from current and future generations to past generations. In both situations, issues of under or overfunded future tax liabilities complicate the issue of intergenerational equity.

Q148. Does the U.S. tax reform example provide any other insight with respect to Mr. Madsen's evidence?

A148. To date, at least 30[263] of the 50 U.S. states have started to consider how to handle the change in tax regime. Specifically, what should be done not only to the current tax collections but also to those that have accrued in excess of the expected tax liability. This has two implications for Mr. Madsen's evidence.

The fact that the majority of U.S. states have initiated proceedings regarding the treatment of the tax reform indicates that a change to the tax collection (even if just a tax rate change) is not straightforward to implement. It serves as a warning that under FIT any future income tax rate change will necessarily result in an underfunded or overfunded FIT liability that somehow needs to be transferred between generations of customers. Under deferred tax treatment, the effects of any tax rate changes on utilities can vary widely. For these reasons, as I stated in my initial written evidence, "[i]f implementing FIT for rate-setting purposes, it is essential to specify *up front* how any such tax rate changes will be handled."[264]

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[263] Bob Mudge, Bente Villadsen and Mike Tolleth, "Six Implications of the New Tax Law for Regulated Utilities," January 2018. *See also* S&P Global, "Tax Reform Proceedings, Merger Developments Dominate January Regulatory Sphere," February 6, 2018.

[264] Villadsen Tax Evidence, PDF p. 17.

Q149. Does this conclude your Rebuttal Evidence?

A149. Yes, it does.

BEFORE THE
ALBERTA UTILITIES COMMISSION

WRITTEN REBUTTAL EVIDENCE
OF
BENTE VILLADSEN

APPENDIX A
BETA ESTIMATION ISSUES

2018-20 Generic Cost of Capital

Proceeding ID No. 22570

February 28, 2018

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BEFORE THE
ALBERTA UTILITIES COMMISSION

2018 GENERIC COST OF CAPITAL
VILLADSEN REBUTTAL - APPENDIX A
APENDIX ON BETA ESTIMATION ISSUES

I. INTRODUCTION AND PURPOSE

Q1. What is the purpose of this Appendix?

A1. This technical appendix is in support of Section III.B of my Rebuttal Evidence regarding the imprecision and downward bias associated with Dr. Cleary's beta estimates. More specifically, I provide additional detailed rebuttal regarding (1) the current imprecision of monthly beta estimates, (2) the inclusion of anomalous data leading to downward bias in Dr. Cleary's long-term historical average beta, and (3) the effects of these factors on Dr. Cleary's implausibly low CAPM cost of equity estimates. I also further explain the conceptual deficiencies in Dr. Cleary's objections to adjusted betas and the ECAPM.

II. CURRENT MONTHLY BETA ESTIMATES ARE STATISTICALLY IMPRECISE AND UNRELIABLE

Q2. What are the important considerations when deciding what frequency of returns to use for beta estimation?

A2. When trying to estimate forward-looking expected returns, the key trade-off is between statistical precision (*i.e.*, how confident you can be that your estimate is correct) and the relevance of the estimation window to current market conditions (*i.e.*, how recent the data is).

When fewer data points are used, "noise" (i.e., random variation) in the returns data can exert more influence and disguise the "signal" (*i.e.*, the covariation between security and market returns) that beta attempts to measure. Thus, all else equal, more data improves statistical precision.

Given this, reliance on more frequent return observations allows for more current beta estimates as, for example, the same three year window allows for 156 weekly observations but only 36 monthly observations. Because systematic market risk changes over time, it is desirable to estimate beta using the most recent data possible.

For example, the estimation error for a three-year monthly beta estimate using 36 months of Canadian utility index and market index returns,[1] is such that the 90% confidence interval (i.e., the range of numbers within which we can be 90% "confident" of finding the actual beta) stretches from -0.10 to 0.74. This is a very wide window, especially compared to the 90% confidence interval for the more precise three-year weekly beta obtained using 156 weekly data points over the same time interval: 0.65 to 0.94.[2]

Thus, while using more recent data (*e.g.*, returns from the last three rather five years) to estimate forward-looking systematic risk is desirable, statistical considerations make it unadvisable to use only three years of *monthly* data as Mr. Johnson has done.

Q3. How have weekly and monthly utility betas compared in the recent past?

A3. A key concern in the current proceeding is that monthly betas for the Canadian utility companies have become statistically imprecise and unreliable in the years following the global financial crisis. Figure A-1 illustrates this by superimposing confidence intervals (sometimes also referred to as "error bars") around the lines representing the rolling weekly and monthly beta point estimates for the TSX Utility sub-index, which Dr. Cleary discusses extensively in his evidence. [3]

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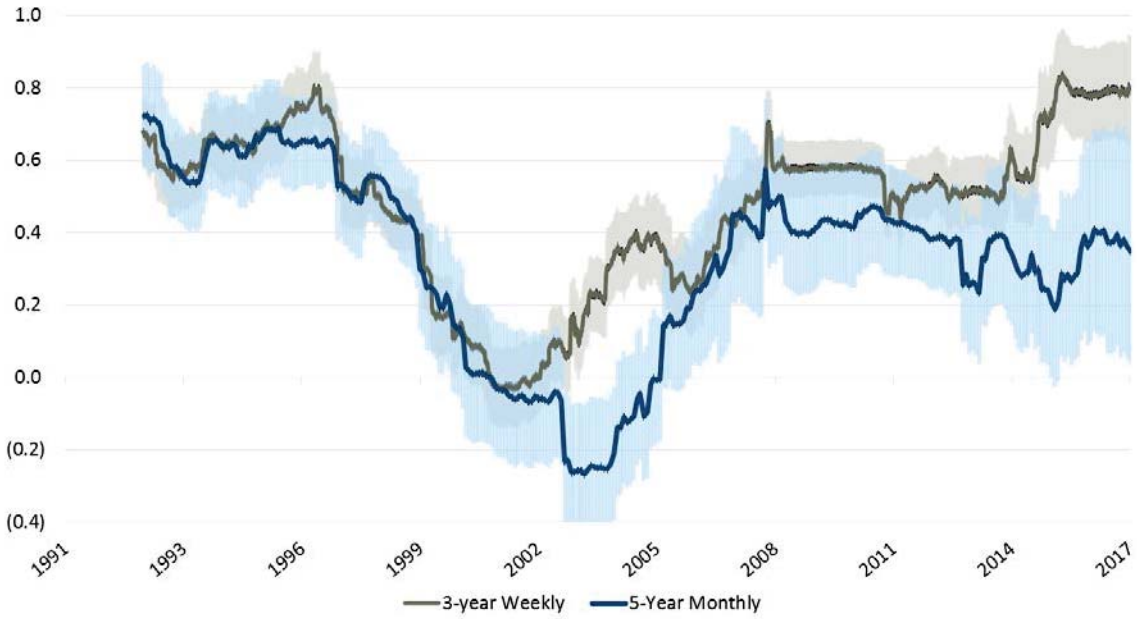
1 Specifically, this refers to an unadjusted 3-year monthly beta estimate measured as of December 31, 2017 for the TSX Utility Sub-index, with the TSX Composite index as the market proxy.

2 See Figure A-2 below and BV Workpaper R06_CONF

3 Cleary Evidence, PDF p. 46 (Figure 12) and Cleary Appendix B, PDF pp. 2-4, 8. In this section I show unadjusted betas for easier comparison with Dr. Cleary's discussion. However, academic evidence, as presented in my initial Written Evidence and the associated Technical Appendix, show that the use of adjusted betas provides a better estimate of the forward-looking cost of capital.

The vertical extension of the shaded intervals above and below the line indicates the range in which the "true" beta is 90% likely to be found.

Figure A-1
Comparison of Unadjusted 3-year Weekly and 5-year Monthly Betas for TSX-Utility Index with 90% Confidence Interval

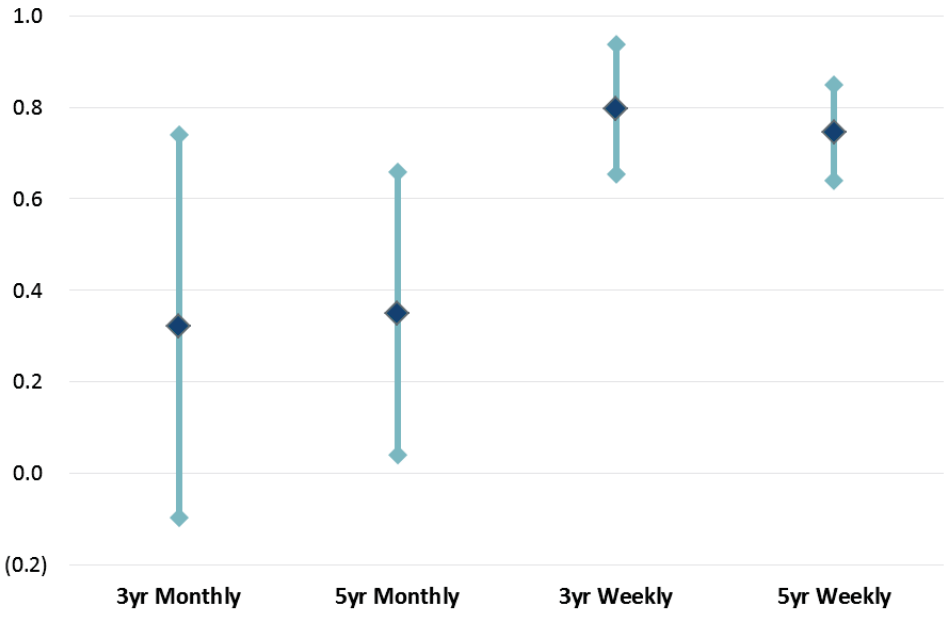


Source: BV Workpaper R06_CONF.

It is clear that the confidence intervals for the 3-year weekly estimates have consistently been narrower than the 5-year monthly estimates. This means that the weekly estimates are more precise (in a statistical sense). Importantly, though, the error bars for the 5-year monthly betas are currently quite a bit *wider* than they have been over the majority of the time depicted in the chart. Thus, they are even *more* imprecise (relative to the 3-year weekly estimates) than they have been in the past. For example, for the most recent betas depicted in Figure A-1, betas estimated using 3 years of weekly data allows us to say (with 90% confidence) that the unadjusted TSX Utility Sub-index beta falls in a relatively narrow range between 0.65 and 0.94. In contrast, for betas estimated using 5 years of monthly data we can only confidently place within a range 0.04 and 0.66. The estimation

error is thus approximately **twice as large** using monthly data.[4] This is even more clearly illustrated when viewing the most recent estimates in isolation, as in Figure A-2.

Figure A-2
TSX Utility Index Beta Estimate Comparison
with 90% Confidence Interval
(as of 12/31/2017)



Source: BV Workpaper R06_CONF.

Q4. Do you have any further observations regarding Figure A-1?

A4. Note that the confidence intervals for some of the recent monthly estimates include zero, which in a statistical sense means that one cannot claim that the beta is non-zero with a high level of certainty. The fact that these estimates cannot be confidently distinguished from zero suggests that the monthly beta estimates are not reliable, since the notion that investors would be willing to accept the same return on utility equity that they can expect to earn on risk-free *government* bonds is clearly not representative of the risk situation for Canadian utilities. As with the time period in the early 2000s when the unadjusted monthly point beta estimates were actually measured at or below zero, the low and

[4] BV Workpaper R06_CONF.

statistically imprecise current monthly beta estimates are likely *not* reflective of true systematic risk for Canadian utility companies.[5]

Q5. Is there another way to illustrate that monthly betas are currently much less statistically precise than weekly betas?

A5. Yes. To further illustrate the dramatic difference in statistical precision between current monthly and weekly betas, I compare scatter plots of the actual return data used to derive the betas.

Panel A of Figure A-3 depicts the 60 data points (corresponding to 60 months of returns) used to calculate the unadjusted 5-year monthly beta. Panel B depicts 260 data points (corresponding to 260 weeks of returns) used to calculate the unadjusted 5-year weekly beta. In each case, the beta is represented by the *slope* of the "line of best fit" drawn through the points.

If betas perfectly described the movements of utility stock returns, we would see all the data points fall *exactly* on the line with beta as the slope. Due to random variation in the return data, we obviously do not expect to get such perfectly precise measurements. However, the better the line "fits" the data (*i.e.*, the more closely grouped the plotted return observations are around the line), the more precise the beta is as an estimate of systematic market risk.

Figure A-3 clearly demonstrates that the **there is simply a much better fit using the weekly data compared to the monthly data points**, with the monthly data appearing to form a loose "cloud" rather than conforming to a clear linear relationship.[6]

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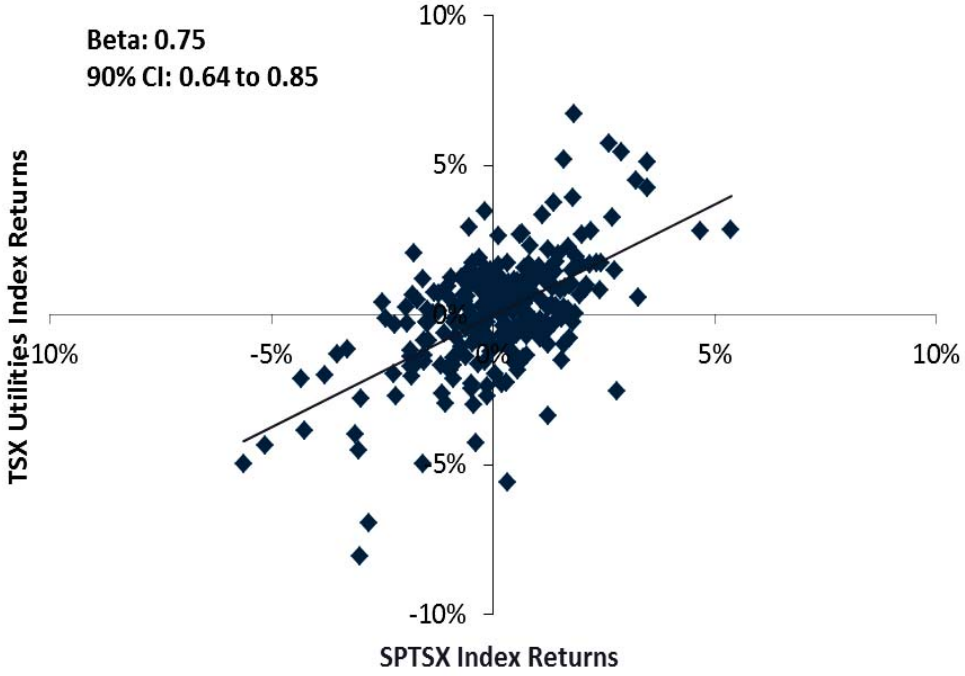
[5] Dr. Cleary also points out the nature of betas less than zero, specifically citing gold stocks as possible assets with negative betas. He states: "negative betas can only occur if an asset has a negative correlation coefficient with market returns." That is to say, negative betas can only occur if the asset moves in the opposite direction of the market. *See* Booth, Cleary, Drake, Corporate Finance, p. 340 (fn 13).

[6] Note that in Figure A-3, the return data in both scatter plots is from the same 5-year period, therefore, neither the difference in the beta values (slopes) or the precision of the estimates ("goodness of fit") is the result of different market conditions. The differences are simply due to the difference in the frequency (weekly or monthly) with which the returns are sampled.

Figure A-3
Scatter Plots 5 year Betas for Period Ending Dec. 31, 2017
Panel A – Monthly Returns

Panel B – Weekly Returns



Source: BV Workpaper R06_CONF.

Q6. Do you have further evidence supporting the statistical superiority of weekly betas as compared to monthly betas?

A6. Yes. In my workpaper, BV Workpaper R06_CONF, I allow the user to adjust the end date for the data used to produce the scatter plots shown above. For both ease of comparison and to be thorough, I provide scatter plots of the type depicted in Figure A-3 for monthly and weekly betas calculated using 3 years of data, as well as for monthly and weekly betas calculated using 5 years of data as shown above. By adjusting the end date, the user can change the data used to estimate these various betas at different points in time.[7]

In addition to the scatter plots of beta estimates, I produce histograms of the so-called "residuals" that measure how far each actual return point is from the "line of best fit" whose slope represents the beta estimate.[8] The residuals in the data are a measure of the "randomness" in the returns data that is not explained by the systematic risk as measured by beta.

These frequency plots provide additional evidence regarding the statistical validity of a beta estimate, in that one of the key assumptions in ordinary least squares ("OLS") regression estimation (the sort of estimation used for betas here) is that the frequencies of residuals of various sizes are distributed in the well-known "bell-curve" shape.[9] As can be observed in these these charts, weekly beta residuals conform much more closely to this distribution than do 5 year monthly betas, and dramatically more closely compared to 3 year monthly betas.

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[7] Due to the data available from the Bloomberg terminal for returns on the TSX Utility sub-index, the date range is restricted to the beginning of 1993 through the end of 2017. Additionally, I recommend using dates corresponding to the end of the month, to ensure comparability between the weekly and monthly data used.

[8] Simply put, a residual is the vertical difference between the actual data point and the expected data point. Using the results of the beta estimate, a residual represents the difference between what the estimation suggests that data point should be, and what that data point actually is.

[9] In technical terms, the OLS assumption is that the random variation in the data is "normally distributed," with symmetrical deviations in both directions ("too high" and "too low"). The symmetry is centered on 0, with most of the residuals representing "small" errors, and becoming fewer and fewer for errors of increasing magnitude.

Through adjustments to the "as of date", I have observed betas at many points in time through recent years. To further support my point of the imprecision of monthly betas now and during the dot-com bubble, I recommend using various end dates in these periods. Regardless of the end date used, a cursory look at the confidence intervals portrayed on the charts as well as the distribution of residuals shows weekly betas to be more statistically sound estimates.

III. DR. CLEARY'S "LONG-TERM AVERAGE" BETAS ARE DOWNWARDLY BIASED

Q7. Why is Dr. Cleary's long-term average beta estimate downwardly-biased and unrepresentative of current conditions?

A7. There are three main reasons why the multi-decade historical average relied on by Dr. Cleary are downwardly-biased and unrepresentative. First, Dr. Cleary primarily takes averages of monthly betas, which have been highly imprecise and unreliable estimates since the time of the great financial crisis if not before. Second, Dr. Cleary includes in his averages a great deal of data from periods that Dr. Cleary himself acknowledges were anomalous and unrepresentative. Finally, the manner in which Dr. Cleary calculates his averages gives extra weight to older periods that include the anomalous data.

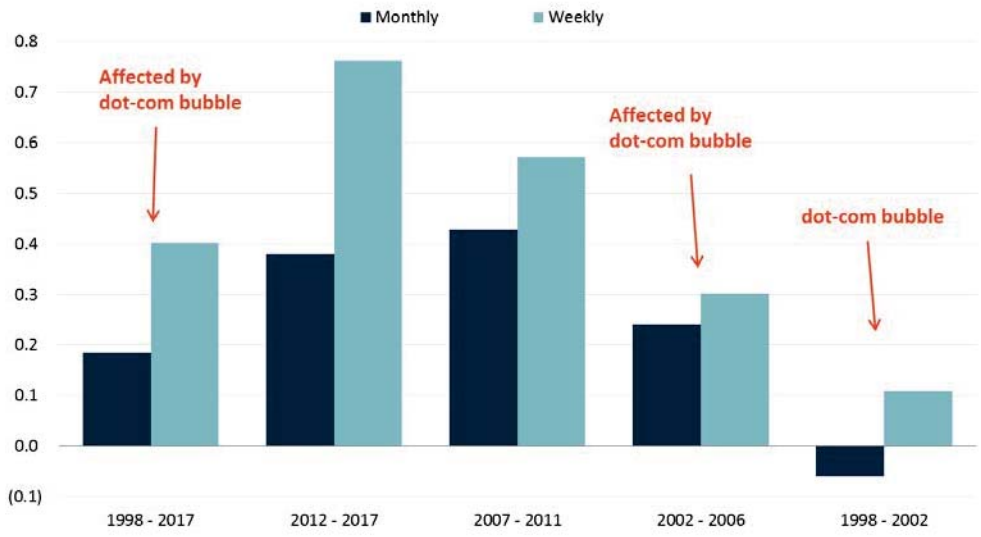
Q8. Please illustrate the downward bias arising from Dr. Cleary's emphasis on monthly betas.

A8. The downward bias can be clearly seen with reference to Dr. Cleary's Figure 12, which presents unadjusted monthly betas for the TSX Utility Sub-index estimated over five measurement windows. The first window uses 20 years of monthly return data from 1998-2017 to estimate a single beta; the other four estimates are for four 60-month intervals spanning those two decades.[10] In Figure A-4 below I have replicated Dr.

[10] Cleary Evidence, Figure 12 (PDF p. 46). Note that Dr. Cleary's 1998-2002 and 2002-2006 intervals both contain data for the year 2002.

Cleary's monthly beta estimates,[11] and also added unadjusted weekly betas calculated over the same measurement periods.

Figure A-4
Replication of Dr. Cleary's Figure 12



Source: BV Workpaper R06_CONF.

Figure A-4 clearly shows weekly betas for the TSX utility index were higher on average during each of the measurement periods considered by Dr. Cleary, and that this is especially true for the most recent data.

Q9. Does an examination of the data Dr. Cleary used to calculate his long-term averages reveal why his focus on monthly betas creates a downward bias?

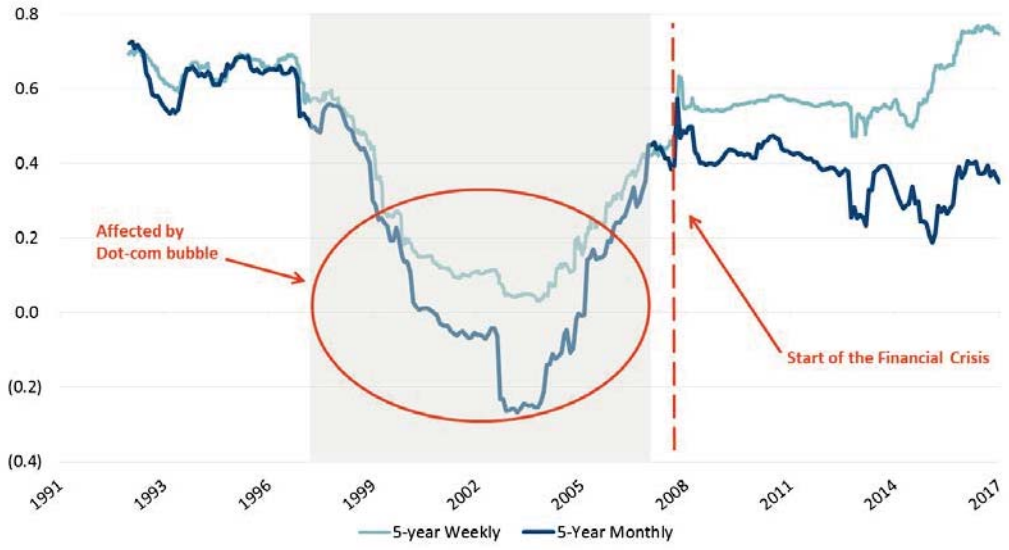
A9. Yes. Dr. Cleary's Appendix B refers to a figure from my 2016 GCOC Rebuttal Evidence that compared unadjusted 5-year weekly and monthly betas for the TSX utility sub-index calculated plotted on a rolling basis for dates between late 1992 and early 2016. He then takes the average of only the *monthly* betas underlying that graph, which is 0.32.[12]

[11] Note that due to apparent differences between Dr. Cleary's source of index returns and my own (Bloomberg), the measured monthly betas in Figure A 4 are very slightly different from what Dr. Cleary presented. The differences are not material.

[12] Cleary Appendix B, PDF p. 3.

I have replicated that graph and updated it to include rolling beta estimates through the end of 2017. I have also added annotations to indicate two time periods during which weekly and monthly betas diverged: (1) the time during and following the dot-com boom and bust around the turn of the millennium, and (2) the time period since the financial crisis of 2007-2008.

Figure A-5
Annotated Comparison of Unadjusted 5-year Weekly and Monthly Betas
For the TSX Utility sub-index



Source: BV Workpaper R06_CONF.

Q10. Please explain how Dr. Cleary's inclusion of monthly betas from anomalous periods downwardly biases his long-term average.

A10. The dot-com bubble period featured an extreme boom and bust cycle for early internet companies, resulting in unique market conditions that are not representative of today's market. Indeed, as Dr. Cleary notes, "over the 1998 to 2002 period, … betas for many industries, including utilities, were not meaningful."[13]

[13] Cleary Evidence, PDF p. 45.

During and following this period, the monthly and weekly betas diverged. Both became anomalously low, but monthly betas fell lower than those using weekly data. Indeed, as shown in Figure A-5, monthly estimates during and following the dot-com bubble remained negative for several years, illogically implying that an investor would accept a negative risk premium.

Dr. Cleary acknowledges the unrepresentativeness market return data from the dot-com bubble era for purposes of calculating betas. Importantly, each beta calculated for up to 5 years *after* the dot-com bubble era is still contaminated by the anomalous data. (For example, consider that a 5-year beta calculated as of the end of 2006 uses a full year of stock return data from 2002, which was affected by the dot-com bust.)

Thus, to eliminate the trailing impact of the anomalous data, a credible long-term average would have to exclude betas measured using returns data from 1998 through 2007.[14] Yet Dr. Cleary includes this anomalous data in his calculation.

Q11. Please explain how Dr. Cleary's long-term average beta estimate over-weights older data, including the anomalous period.

A11. Dr. Cleary takes an average of a series of betas that are estimated each month. For example, a beta as of December 2017 is based on monthly returns data from January 2013 through December 2017, while a beta measured as of January 2018 uses monthly returns data from February 2013 through January 2018. The implication of taking an average of these two betas is that the overlapping data (February 2013 through December 2017) is given twice the weight of the most current data point (January 2018) and the oldest data point (January 2013).

Though this is a simple example, when applied to 25 years of data, the calculation issue is exacerbated. The first 20 years of data is given more weight than the most recent 5

[14] Note that this speaks to another advantage of using shorter estimation windows. As can be seen in Figure A-5, the impact of the anomalous dot-com boom and bust period had "rolled out" of the estimation window for *three-year* betas by the end of 2005.

years of data, and the data underlying the most recent beta estimate is given the least weight of all. Clearly, this results in a backward looking estimate.

IV. DR. CLEARY'S DOWNWARDLY BIASED BETAS CONTRIBUTE TO HIS UNREASONABLY LOW CAPM COST OF EQUITY ESTIMATES

Q12. Please summarize how Dr. Cleary's choices for the CAPM inputs discussed above affect his CAPM estimates.

A12. The Cleary CAPM relies on an insufficiently forward-looking risk free rate of 2.6%, a 5% MERP that does not reflect current economic conditions or market expectations, and a downwardly-biased backward-looking beta of 0.45.

Plugging these inputs into the CAPM formula gives a result of 4.85%, which is simply not a reasonable estimate of the cost of equity for the Utilities. Even after adding Dr. Cleary's 13 bps "spread adjustments" and the Commission's standard 50 bps allowance for flotation costs, the "best estimate" produced by the Cleary CAPM is 5.49%, less than one percentage point higher than the embedded cost of debt for the Utilities.[15]

I also note that the low end estimate in the range of CAPM calculations put forth by Dr. Cleary is 4.05%, inclusive of flotation costs (but applying a 0% spread adjustment).[16] This instance of the Cleary CAPM utilizes a 2.2% risk-free rate, 4.5% MERP, and beta of 0.30, which together yield a "CAPM result" of 3.55%. This is lower than the current yield on 30-year A rated Canadian Utility bonds,[17] and cannot be a reasonable estimate of investors' required equity return.

Q13. Has Dr. Cleary also attempted to recast your CAPM analysis with different inputs?

A13. Yes. In Section 3.1.6 of his evidence, Dr. Cleary claims "it is instructive to compare my CAPM estimates with those that would have been provided by the utilities' experts if

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[15] *See for example* BV Workpaper R09 tab "Bell-WP 1 2016 Rule 005 Data" or tab "Madsen-Rule 005 Simple Average"

[16] Cleary Evidence, PDF p. 48 (Table 9).

[17] The Bloomberg reported yield as of Feb. 22, 2018 is 3.73.

they used more reasonable assumptions for RF and MRP, and did not use adjusted betas or U.S. evidence."[18] He then presents a Table claiming that the "results" of such an analysis applied to my Canadian sample are consistent with a 5.6% CAPM estimate (6.1% including flotation cost adjustment).[19]

Q14. How do you respond?

A14. First, I note that the source of Dr. Cleary's "Adjusted CAPM Estimates" for my Canadian sample is my response to the UCA's information request Villadsen-UCA-2017NOV21-015(b). The request instructed that I perform new calculations using the CAPM equation, with inputs selected by UCA: risk-free rate of 2.3% and MERP of 4.25%. The UCA IR also dictated that I employ raw rather than adjusted betas, and refrain from using standard financial economics tools to unlever and relever the betas in consideration of differences in financial leverage. Finally, the IR directed me to "ignore the ECAPM."[20]

Hence, the UCA was asking for a mathematical exercise using the Cleary CAPM with inputs parameters lower than Dr. Cleary "best estimate" on the risk-free rate and an MERP below Dr. Cleary's low-end input of 4.5%. For clarity, these parameters are inconsistent with my analysis and also with what Dr. Cleary considered to be reasonable.

Second, I emphasize that the results of the mathematical exercise requested by the UCA are (i) unreasonable on their face, but (ii) are still higher than Dr. Cleary's CAPM recommendations. To illustrate the former point, I have reproduced the relevant results table from my information response (Figure A-6 below), in which I highlighted each observation for which the "CAPM Result" determined according to the UCA's prescription is less than 100 basis points above the prevailing A-rated Utility bond yield in the country where the company's stock is traded.[21]

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[18] Cleary Evidence, PDF pp. 48-49.

[19] Cleary Evidence, PDF p. 49 (Table 10).

[20] Exhibit 22570-X0428, response to IR Villadsen-UCA-2017NOV21-015(b) (PDF p. 45).

[21] Exhibit 22570-X0428, response to IR Villadsen-UCA-2017NOV21-015(b), Pages 2-3 (PDF pp. 45-46).

Figure A-6
Results for Villadsen Canadian Sample
Implemented as Specified by the UCA
In IR Villadsen-UCA-2017NOV21-015(b)

Company	Adjusted Beta [1]	Raw Beta [2]	Risk Free Rate [3]	MERP [4]	CAPM Result [5]
Algonquin Power & Utilities Corp.	0.85	0.77	2.30%	4.25%	5.6%
AltaGas Ltd.	1.25	1.37	2.30%	4.25%	8.1%
Canadian Utilities	0.92	0.89	2.30%	4.25%	6.1%
Emera Inc.	0.69	0.54	2.30%	4.25%	4.6%
Enbridge Inc.	1.04	1.05	2.30%	4.25%	6.8%
Fortis Inc.	0.77	0.65	2.30%	4.25%	5.1%
Hydro One Ltd.	0.59	0.39	2.30%	4.25%	3.9%
TransCanada Corp.	0.97	0.96	2.30%	4.25%	6.4%
Valener	0.57	0.36	2.30%	4.25%	3.8%
Average	0.85	0.77			**5.6%**
Portfolio	0.95	0.92	2.30%	4.25%	**6.2%**

Source and Note:
[1]: BV WP05-CAN_CoE_CONF.xlsx, tab: Sample
[2] = ([1] - (1/3)) * (3/2)
[3], [4]: Requested values by UCA
[5] = [3] + [2] * [4]

It is noteworthy that even if the implausibly low results, which are highlighted in Figure A-6, were eliminated, the average result of the UCA-specified mathematical calculations would be 6.1%, close to the portfolio result of 6.2%, which Dr. Cleary ignores in his evidence. Adding 50 bps for flotation costs, these numbers would correspond to "Cleary CAPM" estimates of 6.6% - 6.7%, which is more than 100 bps higher than Dr. Cleary's "best estimate" of 5.49%. This result is obtained despite the fact that the Cleary CAPM values in Figure A 6 were calculated using risk-free rate and MERP assumptions substantially *lower* than Dr. Cleary's inputs and do not include any yield spread adjustment (which Dr. Cleary's "best estimate" does).

The reason for the difference is due to the betas employed. Even using raw betas as directed by the UCA, the current beta estimates for my Canadian sample are *much* higher than the backward-looking 0.45 value employed by Dr. Cleary.

In sum, Dr. Cleary's attempt to re-cast my Canadian sample results using the Cleary CAPM and UCA assumptions does not produce meaningful estimates of the cost of equity.

V. DR. CLEARY'S OBJECTIONS TO ADJUSTED BETA AND THE ECAPM ARE WITHOUT MERIT

Q15. Other than the choice of inputs, are there other factors that contribute to Dr. Cleary's low CAPM results?

A15. Yes. In addition to relying on input parameters that are backward-looking, including betas based on multi-decade historical averages, the Cleary CAPM exacerbates this problem by using raw rather than adjusted betas. In doing so, Dr. Cleary ignores well-established academic evidence showing that the Blume adjustment (so-named to recognize Professor Marshall Blume who originally developed it) improves forward-looking predictive power relative to raw historical betas.[22] Because the raw betas for most (though not all) relevant comparator companies in this proceeding are somewhat less than one, failing to implement the Blume adjustment—which adjusts beta estimates toward the market-wide average of one—biases Dr. Cleary's estimates downward.

Additionally, Dr. Cleary ignores the ECAPM and does not make any attempt to correct for the well-established academic evidence that the empirically observed risk-return relationship for market-traded securities is "flatter" than the security-market line posited by the traditional CAPM.[23] This empirical result indicates that the traditional CAPM underestimates it for companies with lower than average systematic market risk. Thus, in the context of this proceeding, ignoring the evidence supporting the ECAPM contributes to the downward bias in Dr. Cleary's results.

Q16. What are Dr. Cleary's arguments against using adjusted beta?

A16. Dr. Cleary's objection to the using adjusted betas in this proceeding is based on his view that the Blume adjustment is somehow not applicable to utility stocks:

> [T]he Blume beta adjustment is meant to adjust a regression coefficient (i.e., beta) towards its mean. Blume made this adjustment to "1" because he was examining all stocks in the market across all industries, and the average of all

[22] Blume, M. E. (1971), "On the Assessment of Risk," *Journal of Finance*, 26, p. 8.

[23] Villadsen Initial Evidence, Appendix B Section II "Risk Positioning Models –CAPM and ECAPM."

> of these stocks is in fact "1" (by definition). However, in our case, we are trying to estimate the beta for the average regulated utility, which is much less risky than the average company in the entire stock market, and as a result has a beta much less than one.[24]

Dr. Cleary goes on to claim that "an adjustment of beta estimates towards one makes no intuitive sense, since they have never even come close to 1.0 in practice," and argues betas should instead be adjusted toward their long term averages.[25] (Apparently this recommendation is also based on Dr. Cleary's "intuition," since he provides no academic or empirical support for the proposition that adjusting betas toward a "long-term mean" improves predictive power.)

Q17. In your opinion, are Dr. Cleary's objections to the use of adjusted beta valid?

A17. No. Dr. Cleary's central premise—that the Blume adjustment somehow only applies to industries or companies whose betas are or at some point have been equal to the market-wide average beta of 1—is incorrect. Indeed, Professor Blume's empirical study examined *literally all* common stocks traded on the NYSE (including utilities) during the periods he studied, and intentionally constructed portfolios with a wide distribution of measured betas—some with low systematic risk, some with high risk, some with average risk (as measured by a beta approximately equal to the market-wide average of 1) and others spread out along the spectrum. Blume summarized his empirical findings as follows.

> **[T]he estimated values of the risk coefficients [i.e., betas] in one period are biased assessments of the future values**, and furthermore the values of the risk coefficients as measured by the estimates of [historical beta] tend to regress towards the means **with this tendency stronger for the lower risk portfolios than the higher risk portfolios.**[26]

In other words, Professor Blume found that for stock portfolios that had more extreme (high or low) risk, a given measurement of its beta was a biased predictor of a subsequent

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[24] Cleary Appendix B, PDF pp. 9-10.

[25] Cleary Appendix B, PDF pp. 10.

[26] Blume, M. E. (1971), "On the Assessment of Risk," *Journal of Finance*, 26, p. 8. [Emphasis added.]

measurement, with the subsequent measurement likely to indicate somewhat less extreme risk. Clearly, and importantly, this was actually most strongly the case for the "lower risk portfolios."

Thus, Dr. Cleary's suggestion that the Blume adjustment should not be applied when dealing with lower-than-average risk securities such as utility stocks is fundamentally inconsistent with Professor Blume's empirical findings.

Q18. What about Dr. Cleary's "intuitive" argument that betas should not be adjusted toward 1 unless they have been at or close to 1 in the past?

A18. I find Dr. Cleary's position *un*intuitive and inconsistent with Professor Blume's research. The Blume adjustment does not suggest that a lower-than-average risk portfolio (such as a portfolio of utility stocks) should be adjusted because its beta eventually will *equal* 1. Instead, Professor Blume is concerned about the ability of estimated betas to more accurately predict future betas.

Mathematically, the adjustment (as typically employed by data providers such as Bloomberg and *Value Line*) places approximately 2/3 weight on the measured raw beta estimate, and only 1/3 on the market-wide average beta of 1, such that a measured beta value less than 1 would never be adjusted all the way up to 1.

Q19. Is it reasonable to adjust betas toward some long-term historical average?

A19. No. Dr. Cleary has not provided any evidence that utility betas converge to some long-term average. In contrast, as discussed in the Technical Appendix to my initial Written Evidence, the Blume adjustment is consistent with the proposition that measurement error is more likely to result in a downwardly-biased estimate for a lower-than-average-risk stock or portfolio, and an upwardly biased estimate for a relatively high risk security or portfolio. Consequently, by correcting for asymmetric measurement error, the Blume adjustment appropriately moves extreme (low or high) raw beta estimates *toward* the market-wide average of 1.

Q20. What are Dr. Cleary's criticisms of the ECAPM?

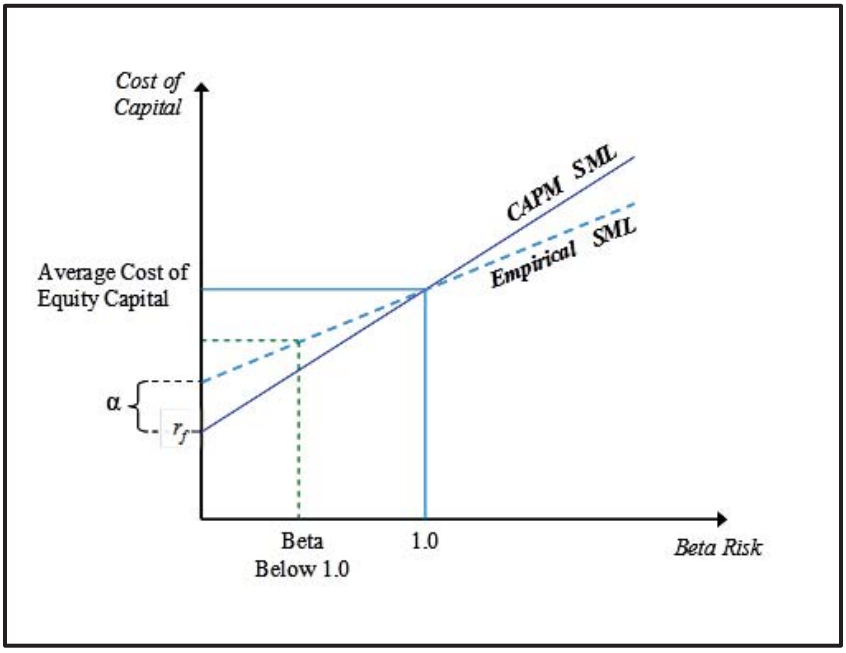
A20. Dr. Cleary provides no stand-alone argument against applying the ECAPM. Rather, he links his objection to his rejection of adjusted betas, and attempts to argue that the two techniques are equivalent or redundant, asserting that the ECAPM "implicitly adjusts the beta used in the traditional CAPM estimates," and that applying ECAPM with adjusted betas "essentially adjusts raw betas up twice."[27]

Q21. Do these criticisms have merit?

A21. No. Dr. Cleary attempts to conflate two separate and distinct empirical findings: (i) the observed market security line is flatter than the theoretical market security line and (ii) adjusted betas are better predictors of expected betas than raw betas. This can be shown by reference to Figure A-7 below, which illustrates the empirical security market line ("SML"). The Blume adjustment to beta corrects the estimate of the relative risk of the company, which is measured along the horizontal axis of the SML. The ECAPM adjusts the risk-return tradeoff (i.e., the slope) in the SML, which is on the vertical axis. Getting the relative risk of the investment correct does not correct for the empirical observation that the empirical SML is "flatter" than that posited by the traditional CAPM, nor does adjusting the slope of the SML correct for the tendency of raw historical betas to be biased predictors of the true beta that measures systematic risk in forward-looking applications of either the traditional CAPM or ECAPM.

[27] Cleary Evidence, PDF p. 49.

Figure A-7
The Empirical Security Market Line



Q22. How do you respond to Dr. Cleary's suggestion that the ECAPM and adjusted beta imply a similar upward adjustment relative to the traditional CAPM with raw beta?[28]

A22. Dr. Cleary is effectively arguing that because the Blume adjustment to beta and the ECAPM have the same directional impact, one must be redundant. But this is a logical fallacy. If a skier is skiing down a mountain with a strong wind at her back, she cannot conclude that gravity and the wind are the same force just because they are both acting to propel her down the mountain; nor should she assume that either force alone would be sufficient to achieve a given rate of speed. Yet Dr. Cleary makes just such an invalid logical leap by concluding that similar directional impacts on the cost of equity could only be produced by two alternative versions of the same adjustment.

The fact that these two adjustments move the "raw" beta data in the same direction does not make them the same adjustment, or redundant.

[28] Cleary Evidence, PDF p. 50.

Ultimately Dr. Cleary fails to engage with the empirical basis for these two distinct and independent adjustments. Empirically, the ECAPM and the Blume adjustment are simply not redundant. Both are warranted when deriving a forward-looking estimate of the cost of equity.