

NOVA SCOTIA ENERGY BOARD (M12451)

IN THE MATTER OF: THE PUBLIC UTILITIES ACT

- and -

**IN THE MATTER OF: AN APPLICATION by NOVA SCOTIA POWER
INCORPORATED for its 2026-2027 GENERAL RATE
APPLICATION**

**Evidence
of
Dr. Sean Cleary, CFA
Professor of Finance**

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1 INTRODUCTION

1.1 Qualifications

This evidence is prepared by Dr. Sean Cleary, CFA of Queen's University. I am a Professor of Finance at the Smith School of Business at Queen's University. I earned my Ph.D. in Finance at the University of Toronto in 1998 and earned my CFA designation in 2001.

I recently served as a consultant and expert witness for Board Counsel to the Nova Scotia Energy and Regulatory Boards Tribunal (NSERBT) in relation to the NS-NB Reliability Intertie Project (M12217) from April-September of 2025, and am currently serving in this capacity in the current Nova Scotia Power (NSP) Maritime Link Incorporated application (M12394). I have served as an expert witness on behalf of Ontario's Industrial Gas Users Association (IGUA) and the Association of Major Power Consumers in Ontario (AMPC) during the 2024 Ontario Energy Board (OEB) cost of capital proceedings, and previously for IGUA in the 2023 Enbridge Gas Inc. rebasing proceedings (EB-2022-0200). I have also appeared as an expert witness for the Office of the Utilities Consumer Advocate of Alberta on several occasions including generic cost of capital proceedings in 2013-2014 (Proceeding ID 2191), 2015-2016 (Proceeding ID 20622), 2018 (Proceeding ID 22570), 2019-20 (Proceeding ID 24110), 2022-23 (Proceeding ID 27084), as well as the generic regulated rate option proceeding (Proceeding ID 2941) in 2014 and the EPCOR Energy Alberta 2018-2021 Energy Price Setting Plan proceeding (Proceeding ID 22357) in 2017. I also prepared expert evidence on behalf of the Newfoundland Consumer Advocate in cost of capital hearings in 2015-2016, and in 2018.

In addition to this consulting work, my research has extensively involved examining corporate finance and cost of capital matters, consisting of over 35 publications. My work has been cited more than 6,000 times. Most of this work has dealt directly or indirectly with capital markets, capital structure, and cost of capital issues. I have authored or co-authored 14 finance textbooks, all of which deal with capital markets, capital structure, cost of equity, and cost of capital analysis. I examine capital market conditions and estimate the cost of capital for actual companies on a regular basis, which I use for teaching purposes. In addition, I previously worked as a commercial lender.

My CV is attached as Attachment A to my evidence.

1.2 Purpose of Testimony

My evidence is prepared in my role as a consultant and expert witness for Board Counsel to the NSEB. In this capacity, I have been asked to prepare expert testimony in relation to the General Rate Application (GRA) by Nova Scotia Power Incorporated (NS Power) (M12451).

I acknowledge that I have a duty to provide opinion evidence to the Nova Scotia Energy Board that is fair, objective and non-partisan.

2 EXECUTIVE SUMMARY

NS Power is requesting a continuation of its current allowed return on equity (ROE) of 9% and its 40% equity ratio (ER). NS Power notes in its application that Concentric recommended a much higher allowed ROE of 9.9% and an ER of 45%, with Concentric stating that 40% is “conservative.”

Concentric’s ROE recommendation is far too high for several reasons, which I discuss in greater detail in Section 3. My evidence provides an alternative and more appropriate estimate of the allowed ROE estimate for NS Power of 7.6% to that recommended by Concentric, combined with its current allowed ER of 40%.

I build my ROE estimate upon my analysis of current and expected macroeconomic and capital market conditions that is presented in Section 4 of my evidence. The details of my estimate of the appropriate base ROE is presented in Section 5 of my evidence and is based on estimating the current market determined required return on equity (or K_e) for NS Power.

My ROE analysis begins by providing evidence in Section 5.1 which shows that the allowed ROEs in Canada and the U.S. have not declined in line with reductions in government and utility bond yields, and hence are providing Canadian and U.S. utilities “excess compensation” in terms of allowed ROEs relative to their actual market-determined cost of equity.

The existence of currently inflated ROEs in Canada and the U.S. is reflected in the evidence I provide in Section 5.5, which shows that the average “market-determined” price-to-book (P/B) ratio for Canadian publicly traded utilities averaged 1.6 over the 2018-2024 period. This

1 indicates that Canadian utilities are earning (and expected to earn) rates of return that are at
2 least “fair,” if not above fair (i.e., $ROE > K_e$, since technically P/B should equal 1 if $ROE =$
3 K_e). It is further interesting to note that the average P/B ratio for the U.S. sample was greater
4 than the Canadian average every year, ranging from 1.7 to 2.4 and averaging 2.0 over the 2018-
5 2024 period. This is consistent with evidence provided in Section 5.1 mentioned above that
6 shows that allowed ROEs in the U.S. (which Concentric relies heavily upon in determining its
7 ROE estimate for NS Power) are even more upward biased than those in Canada.

8
9 There is general acceptance that utility companies are less risky than the average company in
10 the market as a whole. This implies the long-term expected return on the market **is a clear**
11 **upper bound**, for the establishment of a just and reasonable ROE for regulated Canadian
12 operating utilities, which are clearly below-average risk companies. Making reference to
13 current market forecasts from finance professionals managing trillions of dollars, as well as to
14 historical evidence, I conclude that **7.5%** is an appropriate estimate for expected long-term
15 Canadian stock market returns.

16
17 Clearly, Concentric’s ROE estimate for NS Power of 9.9% greatly exceeds this upper bound,
18 consistent with its heavy anchoring on the highly inflated allowed ROEs for U.S. utilities,
19 which are **not market-based** cost of equity estimates. In sharp contrast, my cost of equity
20 estimate for NS Power is a much more reasonable **7.6%** (which includes a 0.50% addition for
21 flotation costs) that is slightly below a 7.5% estimated required market return (before adding
22 0.5% for flotation costs). This estimate represents an equally-weighted average of my capital
23 asset pricing model (CAPM) estimate of 6.84%, my discounted cash flow (DCF) estimate of
24 7.86%, and my bond yield plus risk premium (BYPRP) approach estimate of 7.94%.

25
26 While a 40% ER is above my previous recommendations for Alberta transmission and
27 distribution (T&D) utilities and two large T&D Ontario utilities, I believe the additional equity
28 thickness is reasonable for NS Power given the somewhat lower debt ratings of NS Power
29 (BBB- Stable – S&P; BBB(High) Stable – DBRS) relative to those Canadian utilities, and
30 given the fact NS Power contains a higher percentage of generational assets than those utilities;
31 while noting that NS Power does benefit from the higher debt ratings of its parent Emera Inc.
32

1 The settlement agreement that was reached by NS Power and customer representatives
2 recommends a continuation of NS Power's currently allowed ROE of 9% and 40% equity
3 ratio. While remaining confident in my market-based ROE and equity ratio
4 recommendations, I acknowledge that reaching a settlement agreement does involve trade-
5 offs that the Board must take into consideration.

6 7 **3 ISSUES WITH CONCENTRIC'S ROE RECOMMENDATIONS**

8 Concentric's recommended allowed ROE of 9.9% is far too high for several reasons, which
9 are discussed below.

10 **3.1 Heavy Reliance on Allowed ROEs in Other (mostly U.S.) Jurisdictions**

11 Concentric's ROE and ER recommendations rely **heavily** on the main argument that since
12 allowed ROEs and ERs in mainly U.S. jurisdictions are higher than those for NS Power, the
13 allowed ROE and ER need to be increased. This approach is flawed as noted in the following
14 quotes from two previous Decisions by the Alberta Utilities Commission:

- 15
16 • *"As previously discussed in Section 4, the Commission will **not take any guidance***
17 ***from the evidence presented about approved utility ROEs in other Canadian and***
18 ***U.S. jurisdictions. The objective of the GCOC is to consider the market expectation***
19 ***for the affected utilities and not what other regulators are allowing."** (Alberta*
20 ***Utilities Commission Decision 22570-D01- 2018, para. 474 – bold added for***
21 ***emphasis)***
- 22 • *"The Commission finds that the material presented by Dr. Villadsen in Figure 21 of*
23 *her evidence simply lists the allowed ROEs and common equity ratios for a sample of*
24 *U.S. and Canadian utilities. **This information does not permit the Commission to***
25 ***address the deficiencies identified in the 2009 GCOC Decision such as applicable***
26 ***legislations and case law, and individual factors specific to the utility, like the***
27 ***business risk of the utility."** (footnote omitted) (Alberta Utilities Commission*
28 ***Decision 20622- D01-2016, para. 303 – bold added for emphasis)***

3.2 Concentric's Proxy Groups

Concentric constructs a Canadian proxy group of five utilities, a U.S. Integrated Electric proxy group of 10 utilities, and a North American Electric proxy group that is comprised of three Canadian utilities and 10 U.S. utilities. Concentric then uses these proxy groups to determine its DCF and CAPM cost of equity estimates for NS Power, and relying mainly on the results for the North American Electric proxy group.

It is noteworthy that this proxy group differs significantly from the North American proxy group Concentric constructed for the same purpose in evidence it prepared in May of 2025 for the NSP Maritime Link proceedings, which consisted of two Canadian utilities and three U.S. utilities (with none of these three U.S. utilities being included in Concentric's NS Power GRA North American proxy group). It also differs significantly from its "North American Electric T&D Proxy Group" of 19 utilities (four Canadian and 15 U.S.) provided in Figure 7 of its evidence that it provided during the 2024 Ontario Energy Board (OEB) proceedings dealing with the "2024 REVIEW OF COST OF CAPITAL PARAMETERS AND DEEMED CAPITAL STRUCTURE" (EB-2024-0063), which was filed on July 19, 2024.

In addition to continually changing the North American proxy group it uses, the one used by Concentric during the NS Power GRA proceeding is comprised of 10 U.S. utilities (or 77% of the total group of 13). I have argued that U.S. utilities are **NOT** reasonable comparators for Canadian utilities because they have significantly higher business risk – partly due to their holding company structure and business holdings, partly due to operating in the U.S. and not in Canada, and partly due to the nature of their operations which entails more risk. Appendix B of my evidence provides empirical support for the fact that U.S. utilities have higher business risk than Canadian utilities.

The evidence in Appendix B is further supported by evidence provided in Appendix C with respect to utility beta estimates in Canada and the U.S. In particular, Appendix C shows that over a long period of time, U.S. utility beta estimate historical averages are **much, much higher** than (i.e., **almost double**) the comparable Canadian beta estimates, and that this difference is even more pronounced after accounting for the higher leverage of Canadian utilities. As a measure of market risk, the fact that U.S. utilities have much higher beta

estimates than their Canadian counterparts supports the conclusions of business risk analysis presented in Appendix B. As a result, Concentric's DCF and CAPM analyses are both flawed by its heavy reliance on data for U.S. utilities rather than Canadian utilities.

3.3 DCF Estimates

In addition to the sampling issues noted above, the short-term earnings per share (EPS) growth rates used by Concentric in its DCF analysis are based upon the average of Value Line, Zacks, S&P Capital IQ Pro and Seeking Alpha "sell-side" (and not "buy-side") analyst forecasts. Sell-side analyst growth forecasts are **well-known to be upwardly biased**, as discussed in Appendix D, and as acknowledged by Mr. Coyne of Concentric in his rebuttal evidence during the 2018 Alberta GCOC proceedings, where on page 42 (lines 1-3) he noted that "Research by Easton and Sommers has put the "optimism" bias in analysts' growth forecasts at an average of 2.84 percent." (Source: Exhibit 22570-X0775, Rebuttal Evidence of James Coyne).

In response to NS Power (NSEB - CLEARY) IR-07(b) Concentric confirmed that the average short-term growth rates of 5.50% for its Canadian group, 6.76% for its U.S. group and 6.36% for its North American group used in its multi-stage DCF estimates exceed Concentric's own estimates for expected nominal GDP growth of **4.04%** for Canada, **4.14%** for the U.S. and **4.12%** for North America.

Recognizing that nominal GDP growth represents an ambitious target for low-risk utilities, the Alberta Utilities Commission has consistently rejected DCF estimates determined based on growth rates that exceed expected nominal GDP growth. For example, the 2018 Alberta GCOC Decision (Decision 22570-D01-2018, para. 438) stated (bold added for emphasis, footnote omitted):

438. With respect to the single-stage DCF model estimates presented by Dr. Villadsen, Mr. Coyne and Mr. Hevert, the growth rates used by each of these three witnesses in their single-stage DCF models are in **excess of the long-term GDP growth estimates** they put forward. Consistent with its determinations in prior GCOC decisions, **the Commission 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.** The

Commission recognizes that the utilities are, as Dr. Cleary stated in his evidence, **essentially monopolies in mature markets** and, because of this, the **use of long-term growth in excess of the long-term growth of GDP is unreasonable.**”

While Concentric does not rely on its single-stage DCF estimates in its NS Power GRA evidence for this reason, in its multi-stage DCF estimates Concentric assumes the higher analyst average growth rates of 5.50%, 6.76% and 6.36% exist **for a full 5 years**, then gradually decline over the **following 5 years** to stable long-term growth rates of 4.04%, 4.14% and 4.12% respectively (i.e., its estimates of average long-term nominal GDP growth for Canada, the U.S. and North America). Therefore, this approach assumes that utilities’ earnings and dividends will **grow at rates above nominal GDP growth for 10 years, then will grow at estimated nominal GDP growth from year 11 to infinity**. Hence, this approach implicitly assumes earnings and dividends will grow from now to infinity at an average rate “above” expected nominal GDP growth (i.e., since they would grow above estimated nominal GDP growth for 10 years and then fall to nominal GDP growth for years 11 to infinity).

In fact, Concentric confirmed in response to NS Power (NSEB - CLEARY) IR-07(e) that the long-term growth rate that would produce an identical single-stage DCF Ke estimate of 8.78% to its North American proxy group multi-stage DCF estimate would be **4.91%**, which is **well above** Concentric’s estimate of sample-weighted North American long-term nominal GDP growth of **4.12%**. As a result of the sampling and growth estimation issues identified, I recommend that Concentric’s DCF estimates of Ke are upward biased and should not be relied upon.

3.4 CAPM Estimates

Implementing the CAPM to determine Ke requires an estimate of the risk-free rate (RF), which is normally based on existing 30-year government bond yields, as it is meant to represent the actual existing risk-free asset that an investor can invest in today and earn the risk-free rate of return. However, Concentric’s estimate of RF is based on 2026-2028 forecasts of long-term Canada and U.S. yields during 2025, which **do not** represent currently attainable rates that investors could lock in at any particular point in time. Further, Appendix A provides strong

evidence suggesting it is incorrect to use forecast yields instead of using actual prevailing yields because **forecasts are upwardly biased**.

In fact, Concentric's evidence during the 2024 Ontario Energy Board (OEB) proceedings dealing with the "2024 REVIEW OF COST OF CAPITAL PARAMETERS AND DEEMED CAPITAL STRUCTURE" (EB-2024-0063) provided evidence of a **+0.40% upward bias in forecasts**. In Exhibit N-M2-7-AMPCO/IGUA-1 IGUA-AMPCO, in response to IR-1 (d), Concentric confirmed this upward bias the following (bold added for emphasis):

(d) Concentric **confirms** that, as stated in the Concentric report, the average difference between the OEB's deemed long-term debt cost rate and the Bloomberg index has been 40 basis points since 2010, and that that figure is approximately **the same as the "about 0.4%" difference found by Dr. Cleary when he compared average actual 30-year government yields from 2011-2023 to average September (November) Consensus forecasts**.

I do note that Concentric's RF forecasts of 3.67% for Canada almost exactly equals the November 20, 2025 yield on 30-year Canada bonds of 3.66%, while its U.S. 30-year forecast it uses of 4.14% is below the November 20, 2025 actual yield of 4.73%, so the difference in terms of the Canadian yields in this particular situation is minimal.

Concentric proceeds to estimate an appropriate beta to use in the CAPM formula for its North American proxy group, which includes 10 U.S. utilities (out of 13). As previously argued, I do not believe that U.S. utilities are reasonable comparators for Canadian utilities because they have significantly higher business risk (as discussed above and in Appendix B of my evidence), which is reflected in higher betas than for their Canadian counterparts (as discussed in Appendix C of my evidence).

In addition, Concentric uses adjusted betas, which adjust for the tendency of betas to revert toward the market mean of 1.0 over time. However, Appendix C of my evidence provides strong support for the fact that **utility betas do not gravitate towards one**. Hence, adjusted beta estimates for utilities are **upwardly biased**. In response to NS Power (NSEB - CLEARY) IR-09(c) (Attachment 2) Concentric reported that the corresponding CAPM estimates using

raw (i.e., unadjusted) beta estimates for the Canadian, U.S. and North American proxy groups are lower at 9.26%, 10.51% and 10.0% respectively, compared to **9.71%, 10.69% and 10.31%** when adjusted betas are used.

Concentric's final beta estimates are thus flawed by its heavy reliance on data for U.S. utilities, its use of adjusted betas, and because they do not consider the relevance of historical beta estimates, which is an important consideration since beta "estimates" can vary through time. Finally, Concentric estimates the market risk premium (MRP) it uses in its CAPM calculations using historical averages (where $MRP = \text{Expected Return on the Market (ER}_m) - RF$). In response to NS Power (NSEB - CLEARY) IR-10(b) and (c) Concentric confirmed that its historical MRP estimates (Canada - 1919-2023; U.S. - 1926-2023) are **much higher** than commonly referenced historical averages that contain a significant number of overlapping years. In particular, those responses confirmed the following:

- that the historical MRP estimate for Canada of 5.68% is **35% higher** than the arithmetic average estimate of 4.2% provided in the Dimson et al. (2016) study (which examines MRPs over the 1900-2015 period), and is **72% above** the geometric average of 3.3% determined in the same study.
- that the historical MRP estimate for the U.S. of 7.17% is **24% higher** than the arithmetic average estimate of 5.8% provided in the Dimson et al. (2016) study (which examines MRPs over the 1900-2015 period), and is **63% above** the geometric average of 4.4% determined in the same study.
-

A large source of the higher historical MRP estimates is due to Concentric's use of "income only returns" for bonds to determine MRPs rather than "total returns," which is standard practice for finance professionals. Using the total bond return to determine market risk premiums (MRPs) is the default in widely cited academic and finance practitioner research, such as the widely cited study by Dimson et al. (2016), which is the source for Figure 11 of my evidence. It is also standard practice in surveys by finance researchers, including in the widely cited survey by Fernandez et al. (2025), which is the source for Figure 12 of my evidence.

1 Total returns are the default since the actual return that is earned on a bond is comprised not
2 only of the “interest return” (i.e., the amount of interest paid on a bond divided by the purchase
3 price), but also a “capital gain (or loss) return” component. This is because bond prices change
4 every period based on changes in market-determined yields (that occur continuously and
5 through time). In addition, bond prices converge to their face value as they approach the
6 maturity date of the bonds, since this is the amount that will be repaid on them at that date.
7 Therefore, the actual return earned on a bond will reflect both components over a given period.
8 In short, considering only the income return on a bond **neglects an important component of**
9 **the return on bonds.**

10
11 Consider for example the data provided in in Attachment J that was used to construct Table 6
12 of my evidence that depicts the long-term returns on Canadian stocks and bonds. Over the
13 1938-2024 period the average annual total return on Government of Canada bonds was 5.9%.
14 However, the annual total bond return was actually negative in 21 of 87 years due to capital
15 loss yields (caused by bond price declines in response to increases in market bond yields in
16 those years). This would have occurred even though the quoted market yields, the coupon rates
17 or the income yields on the bonds would never have been negative at any time over the period.
18 On the flip side, in 14 of the 87 years, the total annual bond return exceeded 15%, which would
19 have been largely driven by double digit capital gains yields (as bond prices increased in
20 response to market yield declines in those years).

21
22 The expected “capital gain (or loss)” component on any bond is “built” into the market yield
23 that is quoted on a bond at any point in time, since this reported market yield is the expected
24 **yield to maturity** if the bond is held to the maturity date. Importantly, these quoted market
25 yields include the government bond yields that are used as a proxy for the risk-free rate (RF)
26 in the CAPM, and utility bond yields that are used to estimate utilities’ cost of debt.

27 It is informative to recognize that Concentric’s purpose for estimating the MRP is to use it in
28 the CAPM to estimate the required return on equity (Ke) for NS Power, the equation for which
29 is presented below:

30
$$K_e = R_F + (E_{R_m} - R_F) \text{ Beta, or}$$

31
$$K_e = R_F + (\text{MRP}) \text{ Beta}$$

32 Where,

33 K_e = the required rate of return on common equity

1 RF = the risk-free rate

2 $ER_m - RF = MRP$ (i.e., the expected market return (ER_m) minus RF)

3 Beta = the measure of market risk of a security

4
5 Notice that the MRP estimate as used in the CAPM equals the expected return on the overall
6 stock market minus RF that is proxied as the market yield (or expected yield in Concentric's
7 case) on long-term government bonds. As discussed above, this RF estimate will equal the
8 market yield (or yield to maturity) on government bonds and does **NOT** equal the income
9 yield. As a result, Concentric's approach to estimating MRPs based on income yields is **flawed**
10 **by design**.

11 In response to NS Power (NSEB - CLEARY) IR-10(d), Concentric states the following (bold
12 added for emphasis):

13 Dimson computes a real return on equities, inflation, and real bond returns
14 over this period. **If one adds Dimson's real equity returns to inflation and**
15 **subtract the real bond yields**, all reported by Dimson, these estimates are
16 higher than those used by Concentric from Kroll, resulting in an MRP of 8.8
17 percent in the U.S. and 8.5 percent in Canada.

18
19 This response demonstrates a **clear misunderstanding** by Concentric regarding how to deal
20 with nominal versus real returns – where the rule is to always compare nominal rates to nominal
21 rates, and compare real rates to real rates. The Dimson study correctly subtracts “real” equity
22 returns from “real” bond returns. However, Concentric's approach of adding back inflation to
23 the real equity returns (to create nominal equity returns), and then subtracting “real” bond
24 returns without adding inflation is totally incorrect since it combines a nominal return with a
25 real return. This is certainly not what is done in the Dimson et al (2016) study, which correctly
26 compares real returns to real returns.

27
28 Using the Canadian arithmetic averages from the Dimson et al (2016) to demonstrate, we can
29 see that over their sample period the arithmetic average “real” return for equities was 7.0%,
30 while the arithmetic average “real” return for bonds was 2.8%, resulting in an arithmetic
31 average MRP of 4.2%. If Dimson et al (2016) had instead used nominal returns, the average
32 MRP would still have been calculated as 4.2%. Specifically, the “nominal” arithmetic average
33 equity return would have been equal to the average “real” return of 7.0% plus the arithmetic

1 average inflation rate of 3.1%, or 10.1%. Similarly, the “nominal” arithmetic average bond
2 return would have been equal to the average “real” return of 2.8% plus the arithmetic average
3 inflation rate of 3.1%, or 5.9%. Trivially, the arithmetic average MRP would still equal 4.2%
4 (i.e., 10.1% - 5.9%), since the both nominal rates would result from adding the same average
5 inflation rate of 3.1% to the real returns used to estimate the MRP.

6
7 As a result of the issues related to its proxy group selection, and in estimating RF, beta and
8 MRP, I caution that Concentric’s CAPM estimates of K_e are upward biased.

9 10 **3.5 Risk Premium Model Estimates**

11 In response to NS Power (NSEB - CLEARY) IR-11 Concentric confirmed the following
12 regarding the Risk Premium Model it uses in its current evidence:

- 13
14 • that the Risk Premium approach discussed on pages 52-56 of Concentric’s evidence is
15 the same model that Mr. Coyne labelled as his Bond Yield Plus Risk Premium Model
16 “BYPRPM” during the 2018 Alberta GCOC proceedings.

17
18 However, the Alberta 2018 GCOC Decision (Decision 22570-D01-2018, paras. 392-393),
19 concluded that (bold added for emphasis):

20
21 “The BYPRPMs of Mr. Hevert and Mr. Coyne estimate the risk
22 premium component by comparing the approved ROEs to the long-
23 term government bond yields in place at the time, thus capturing the
24 inverse relationship. However, the Commission **has two concerns**
25 with Mr. Hevert’s and Mr. Coyne’s approach. First, because their
26 models estimate the risk premium in excess of long-term government
27 bond yields, i.e., the risk-free rate, **they lose the advantage of**
28 **incorporating the observable market data on utilities’ credit**
29 **spreads**, as compared to Dr. Cleary’s approach.

30 Second, these models **use the approved ROEs of other regulators**
31 **in the U.S. as proxies for the market return**. In the Commission’s
32 view, although observable, the ROEs approved for the U.S. utilities

are **not strictly market data**. Accordingly, the main assumption of these models, that the approved ROEs represent market return, does not hold, because the approved ROEs would be heavily influenced by the ROEs awarded by other regulators.”

The quote from that Decision identifies two important flaws in this approach: 1. using government bond yields “lose the advantage of incorporating the observable market data on utilities’ credit spreads;” and, 2. approved ROEs “**are not strictly market data**.” Importantly, using allowed ROEs in the U.S. does not provide market-based evidence, does not account for issues such as jurisdiction-specific legislations and case law, nor do they reflect utility-specific business risks affecting Canadian utilities.

As a result of the issues related to this approach, I recommend that Concentric’s Risk Premium Model estimates be disregarded.

4 THE ECONOMY AND CAPITAL MARKET CONDITIONS: PAST, PRESENT AND FUTURE

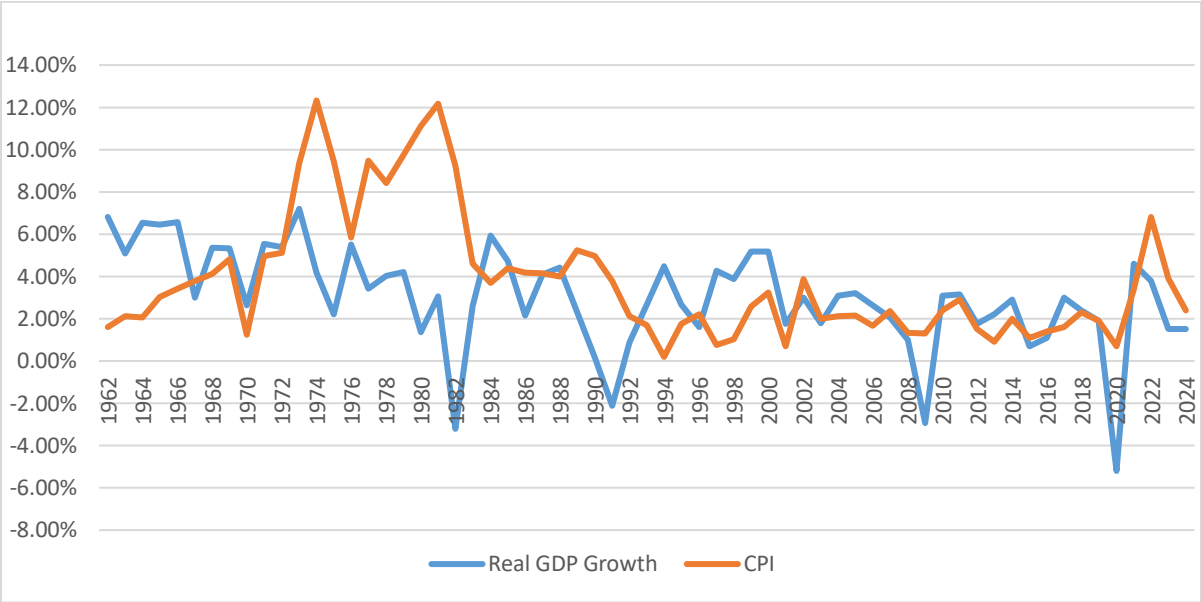
4.1 The Past and Present

4.1.1 GDP Growth and Inflation

Figure 1 below shows real GDP growth (%) and total inflation as measured by the Consumer Price Index (“CPI”) over the 1962 to 2024 period. The graph shows that real GDP growth has generally been in the 2-6% range, with the exceptions of 2020 (due to COVID) and during three recessionary periods that occurred in the early 1980s, the early 1990s, and during the 2008-09 financial crisis. Table 1 reports summary statistics that show the average GDP growth over the entire period was 3.0% (median 3.0%). It is interesting to note that GDP growth declined to an average of **2.3% (median 2.6%)** over the 1992 to 2024 period, which is more in line with recent forecasts for future growth estimates. This represents the period following the Bank of Canada’s initiation of a 2% inflation target in 1991, giving a year’s grace period until its implementation had begun to take solid footing. This decline in average growth is accompanied by reduced volatility which is obvious from Figure 1, and also as measured by the standard deviation of 2.1% for 1992-2024 versus 2.4% for 1962-2024 as reported in Table

1. The working papers for Figure 1 and Table 1, below, are appended as Attachment B to my evidence.

FIGURE 1
REAL GDP GROWTH AND CPI – CANADA (1962-2024)



Data Source: Statistics Canada.

TABLE 1
REAL GDP GROWTH AND CPI SUMMARY STATISTICS – CANADA (1962-2024)

	1962-2024 (%)		1992-2024 (%)	
	Real GDP	CPI	Real GDP	CPI
Average	3.01	3.82	2.27	2.07
Geometric Average	2.99	3.78	2.25	2.06
Median	3.01	2.90	2.62	1.99
Max	7.20	12.33	5.18	6.80
Min	-5.20	0.20	-5.20	0.20
Std Dev.	2.38	3.00	2.05	1.23

Data Source: Statistics Canada.

The 1962-2024 statistics are obviously driven by the high rates of inflation during the 1970s and 1980s. With the exception of 2022 and 2023, where inflation hit 6.8% and 3.9% respectively, rates have generally been within the Bank of Canada’s 1% to 3% target range since the policy’s adoption in 1991, being in line with the 2% target as evidenced by the

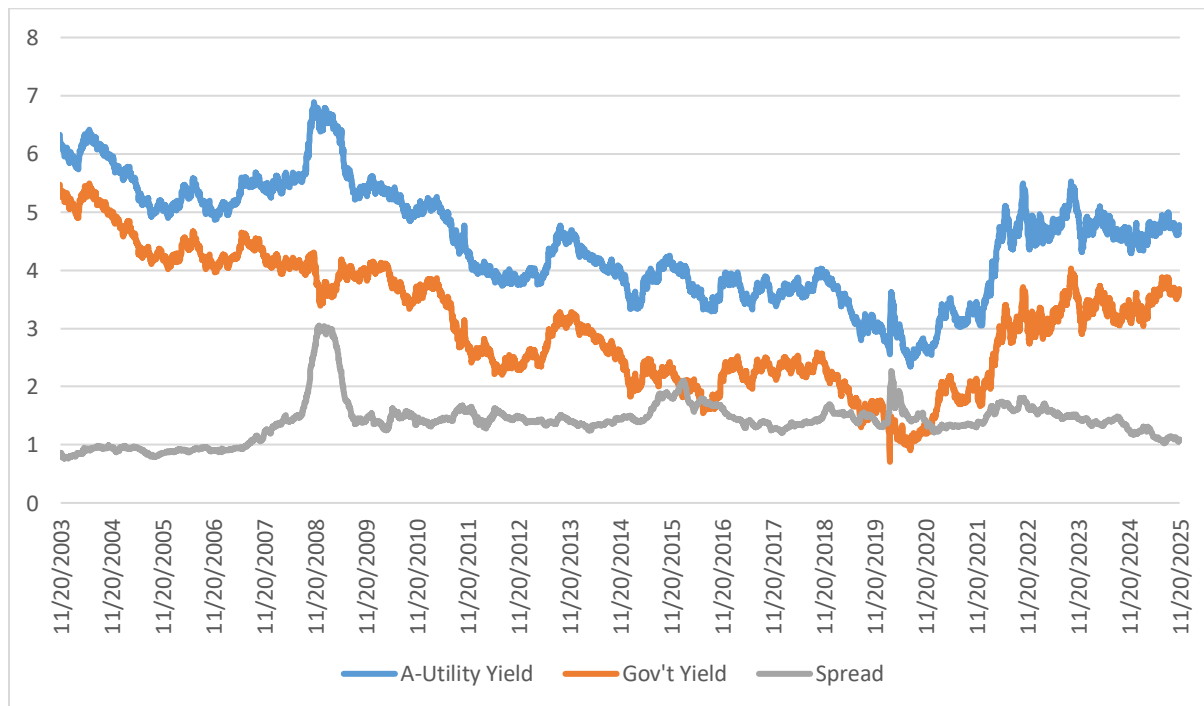
average CPI of 2.1 (median 2.0%). CPI growth has also been very stable during this latter period, which is obvious from Figure 1, and also by the huge decline in standard deviation from 3.0% over the entire 1962-2024 period to 1.2% since 1991.

4.1.2 Capital Market Conditions

The 30-year Government of Canada bond yield as of November 20, 2025 was 3.66%, while the 10-year yield was 3.23%. The total cost of borrowing to utilities is a function of both the level of government yields and the yield spreads on utility bonds, both of which fluctuate through time. Figure 2 reports long-term government yields and A-rated utility yields over the 2003-2025 period. Both yields have fluctuated but generally moved together through time, with the average spread between the yields being 1.39% (median 1.40%) over the period. As of November 20, 2025 the A-rated utility yield was 4.75%, while the 30-year Government of Canada yield was 3.66%, which translates into an A-rated utility yield spread of 1.09%, which is well below the long-term average and indicates that bond markets were pricing in below-average risk premiums into yield spreads. The working papers for Figure 2 are appended as Attachment C to my evidence.

FIGURE 2

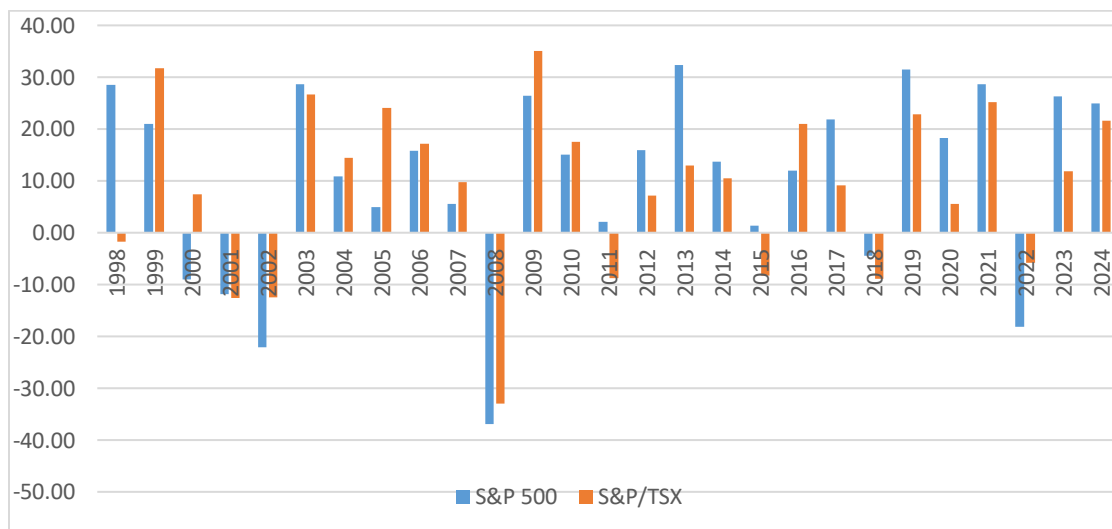
A-UTILITY YIELDS (January 1, 2003-November 20, 2025)



Source: Bloomberg.

Following a year of strong performance during 2021 with a total return of 25.2%, the Canadian stock market had a tough year during 2022, with a loss of 5.8%, but bounced back with returns of 11.8% in 2023 and 21.6% in 2024. U.S. markets did better than Canada in 2021 with a return of 28.7%, did much worse during 2022, producing a loss of 18.1%, but more than doubled Canadian performance in 2023 with a 26.3% return, and slightly outperformed Canada with a 24.9% in 2024. Figure 3 provides the average annual total stock returns for Canada and the U.S. over the 1998-2024 period. Over this period, stocks in Canada provided an average return of 8.9% (geometric mean of 7.7%), while U.S. stocks provided an average return of 10.5% (geometric mean of 8.9%). The Canadian figures are consistent with long-term “real” stock returns in the 5% to 7% range, and current market return expectations (both of which are discussed in Section 4.2.3). The working papers for Figure 3 have been appended as Attachment D to my evidence.

FIGURE 3
STOCK MARKET RETURNS (%) - (1998-2024)



Source: Bloomberg

The trailing price-earnings (“P/E”) ratio for the S&P/TSX Composite Index stood at 19.1 on November 20, 2025, while the P/E ratio for the U.S. S&P 500 Index was 24.3 on that date. It is common to hear market observers suggest that the stock market is undervalued when P/E ratios fall below 15, or that they are over-valued when they exceed 20, which is the range of long-term average P/E ratios. While this is very simplistic, it does suggest that the P/E ratios in the 12 to 19 range in Canada since 2021 are in familiar territory. The P/E ratios have been somewhat elevated in the U.S. sitting at 21.5 at the end of 2023, 24.7 by the end of 2024, and

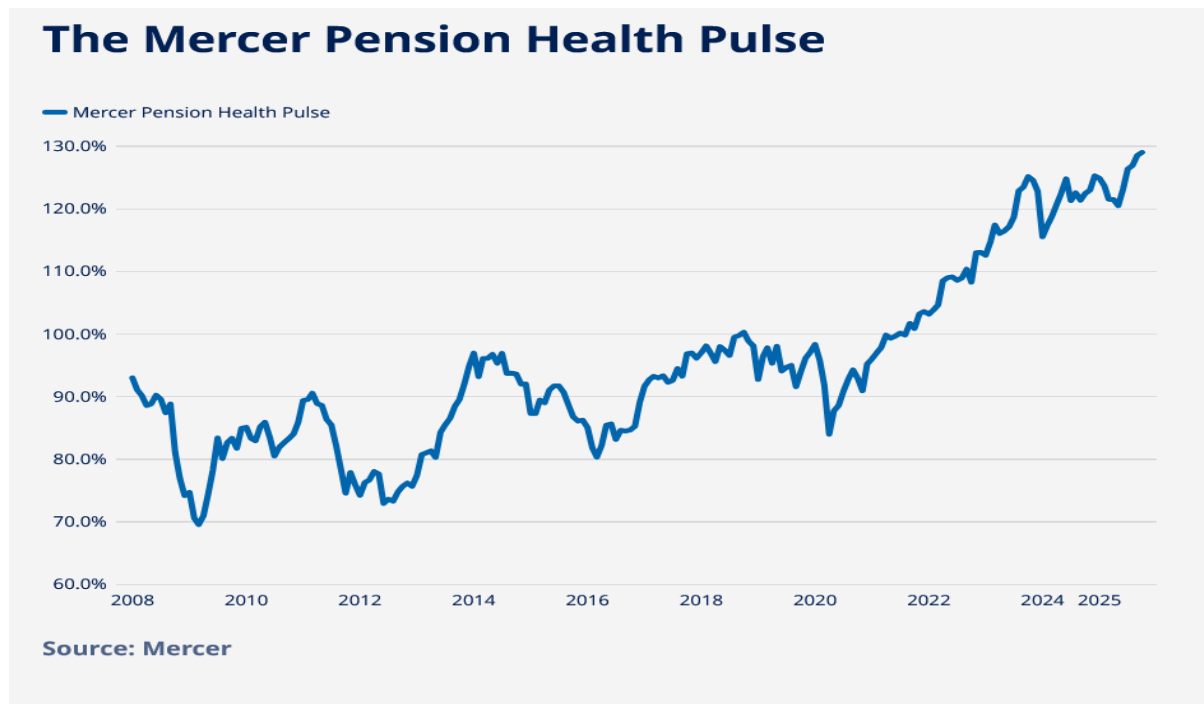
24.3 in November 2025, which is consistent with the extremely high U.S. stock returns of 26.3% during 2023 and 24.9% during 2024. For example, the current Canadian ratio of 19.1 is only slightly above the average (median) P/E ratio for the TSX Index of 16.8 (16.6) over the 2013-2024 period, while the current S&P 500 Index ratio of 24.3 is well above its 2013-2024 average (median) of 19.9 (19.1). As of the same date, dividend yields were 1.20% in the U.S. and 2.41% in Canada, with the Canadian yield lying within typical ranges, while the U.S. yield was rather low. For example, the average (median) dividend yields for the TSX Index and the S&P 500 Index over the 2013-2024 period were 2.99% (2.96%) and 1.77% (1.85%) respectively. The working paper supporting these statistics have been appended as Attachment E to my evidence.

The implied equity market volatility indexes in Canada and the U.S. have generally averaged in the 16-20 range through time. For example, the January 2017 to September 5, 2025 average (median) for the Canadian (S&P/TSX 60) VIX index was 15.80 (13.50), while the January 1990 to September 5, 2025 average (median) for the U.S. VIX index was 19.47 (17.61). As of November 20, 2025, the Canadian and U.S. VIX indices stood at 18.16 and 25.16 respectively, with the Canadian VIX value indicating slightly above average current market volatility, while the U.S. VIX indicates above average volatility.¹ It is important to recognize that these are short-term volatility measures – in fact both indexes were extremely elevated in April of 2025 after the announcements of global U.S. tariffs, with the Canadian VIX hitting 38.38 on April 10th and the U.S. VIX hitting 52.33 on April 8th. Such high levels represent periods of extreme market volatility; although both values are below the maximums for the Indexes that occurred during the March/April 2020 COVID period when the Canadian VIX hit 70.18 and the U.S. VIX hit 82.69.

¹ Sources: <https://www.spglobal.com/spdji/en/indices/indicators/sp-tsx-60-vix-index/#overview>, and https://www.google.com/search?q=vix+index+chart&sca_esv=fe03dc12a99e2005&source=hp&ei=5AW_aJeYAd7Lp84Pq9O_yAk&iflsig=AOW8s4IAAAAAaL8T9OPjUCJaD7Bq1S7-iYL8qW6cvFvT&oq=VIX+I&gs_lp=Egdnnd3Mtd2l6lgVWSVggSSoCCAlYCxAAAGIAEGLEDGIMBMgUQAABiABDIFEAAAYgAQyBRAAGIAEMgUQABiABDIFEAAAYgAQyBxAAGIAEGAoyBRAAGIAEMgUQABiABDIFEAAAYgARivVBQAFjENHAAeACQAQCYAWKgAckDqgEBNbgBAcgBAPgBAZgCBaACigTCAg4QABiABBixAxiDARiKBcICDhAuGIAEGLEDGNEDGMcBwgIREC4YgAQYsQMYxwEYjgUYrwHCAGsQLhiABBjRAXjHAcICCBAAAGIAEGLEDwgIOEC4YgAQYsQMYgwEYIALCAGUQLhiABMICCxAAGIAEGLEDGIoFwgIREC4YgAQYsQMY0QMYIAIYxwHCAgQLhiABBjHARivAcICCAuGIAEGLEDGNQCMAMAkgeDMi4zoAfmMLiHAzluM7gHigTCBwcyLTQuMC4xyAc4&sclient=gws-wiz, September 8, 2025.

Finally, pension fund health is a closely watched and important financial health indicator. Poor stock returns during the 2007-09 crisis, combined with extremely low levels of interest rates, hit the funding status of all pension funds. This created concerns that amounted to crises both at the individual and systemic levels. A commonly used measure of overall Canadian pension health is the Mercer Pension Health Index, which tracks the funded status of a hypothetical defined benefit pension plan. Figure 4 depicts the value of this index over the 2008 to Q3-2025 period. The index ended Q3 of 2025 at 129%, up from 126% and 123% at the end of Q1 and Q2 of 2025, and from 125% at the end of 2024. The index has been above 100 since 2022, and well above the all-time low of around 70% in early 2009. Hence, this measure of financial stability indicates relatively stable and solid market conditions, which are nowhere near crisis levels.

FIGURE 4
MERCER PENSION HEALTH INDEX - (2008-Q3, 2025)



Source: <https://www.mercer.com/en-ca/insights/retirement/mercero-pension-health-pulse/mercero-pension-health-pulse-q3-2025/>, November 24, 2025.

4.2 The Future

4.2.1 Global Economic Activity

The Bank of Canada's July 2025 Monetary Policy Report (MPR) noted that:

The global trade conflict continues to evolve. Since the time of the April Report, extreme trade tensions between the United States and China have receded. The US administration has reached agreements on tariffs with some countries, which have raised US tariffs significantly from January levels. The United States has also doubled its tariffs on imports of steel and aluminum and has threatened high, broad-based tariffs on many other trading partners if agreements are not reached soon.

Recognizing that the impact of the evolving global trade conflicts introduced significant uncertainty regarding the global and Canadian economic outlooks, the Bank's July 2025 MPR:

presents an economic scenario conditional on trade policies in place or agreed on as of July 27, 2025 - the *current tariff scenario* - rather than a conventional forecast. This Report also includes two alternative scenarios, one in which tariffs are reduced and another in which they are substantially increased - the *de-escalation scenario* and the *escalation scenario*, respectively. Taken together, these scenarios encompass a range of paths for trade policy and the Canadian economy.

The Bank's "current tariff scenario" assumed existing U.S. tariffs remained in place (with a U.S. weighted average world tariff rate of 13%), while existing retaliatory tariff rates remained in place, and the level of uncertainty remains elevated at a similar level to July of 2025. The Bank's "de-escalation scenario" assumed a decrease in U.S. tariffs (with a U.S. weighted average world tariff rate of 10% - and with tariffs on Canada cut in half), while existing retaliatory tariffs were removed or significantly reduced, and the level of uncertainty falls significantly relative to July 2025. The Bank's "escalation scenario" assumed an increase in

1 U.S. tariffs (with a U.S. weighted average world tariff rate of 28%), a significant increase in
2 retaliatory tariff rates, and the level of uncertainty remained similar to the July 2025 level.
3 In the Bank’s October 2025 MPR, the Bank returned to using “base-case” projections, as per
4 the discussion below included in that report:

5
6 In the first half of 2025, the trade conflict with the United States led to a sharp
7 rise in uncertainty. Faced with an unpredictable environment, the Bank of
8 Canada used scenarios rather than base-case projections in both the April
9 Report and the July Report. These scenarios illustrated different paths for US
10 trade policy and provided a range of possible outcomes for the Canadian
11 economy.

12
13 Since the extreme uncertainty of the spring, the United States’ intention to
14 impose universal tariffs on many countries and steep tariffs on specific sectors
15 has become apparent, as have the responses of other countries. Tariffs have now
16 been in place for many months, and their impact on the Canadian economy has
17 become clearer. Therefore, this Report returns to the usual practice of providing
18 a base-case projection. The current projection is presented relative to January,
19 which was the last Report with a base-case projection.

20
21 While the Bank returned to its usual “base-case” approach, it noted the continued importance
22 of considering various scenarios, stating:

23
24 However, considering a wider-than-usual range of risks to the outlook remains
25 important. The United States continues to broaden the set of goods subject to
26 tariffs, and, more generally, tariffs could both escalate and de-escalate. In
27 addition, the pace and scope of the restructuring of global trade routes and
28 supply chains will play out over time and have a significant effect on economic
29 developments going forward.

30
31 The Bank’s October 2025 MPR notes the continued importance of global trade uncertainties,
32 noting:

1 The global economy has been resilient to the historic rise in US tariffs, but it is
2 showing signs of slowing. Trade volumes are being rerouted away from the
3 United States as global exporters look for ways to avoid tariffs. The trade
4 conflict is also affecting investment decisions in many countries.

5 Global growth has been resilient. But the historic rise in US tariffs is reshaping
6 global trade, weighing on prospects for global growth and pushing up inflation
7 in the United States.

8
9 US trade policy has shifted significantly since January, which is leading to a
10 reconfiguration of global trade. The average US tariff rate has risen to 17%—
11 the highest it has been in more than 80 years—from just above 2% at the start
12 of 2025 (**Chart 25**).

13
14 New tariffs continue to be announced on top of existing tariff agreements with
15 the United States. While uncertainty around US trade policy remains elevated,
16 it has eased from its peak earlier in 2025 (**Chart 26**). At the same time,
17 retaliatory tariffs have been very modest.

18
19 The October 2025 MPR notes that:

20
21 Economic growth in the United States has remained strong despite the
22 imposition of tariffs and the rise in uncertainty. Recently, however,
23 employment growth has stalled, and investment outside of the growth in
24 artificial intelligence (AI) has weakened. Tariffs have also started pushing up
25 consumer prices.

26
27 It further states that:

28
29 After rebounding to 3.8% in the second quarter of 2025, US economic growth
30 is expected to average 2.5% in the second half of the year.

31 With respect to the Euro Zone, the October 2025 MPR states that:
32

1 After expanding at about 1.5% in the first half of 2025, growth in the euro area
2 has slowed due to persistent weakness in exports and decreased growth in
3 domestic demand. Inflation has remained near 2%.

- 4 ○ After a sharp pull-back in the second quarter, exports are
5 expected to decline further in the second half of 2025 because of
6 higher US tariffs and issues related to competitiveness, including
7 the recent appreciation of the euro.
- 8 ○ Growth in domestic demand, which has been resilient, is
9 expected to moderate.
- 10 ○ Policy uncertainty negatively affects growth in business
11 investment.

12
13 Later in the projection, growth is expected to pick up due to:

- 14 ○ the fading effects from tariffs and related uncertainty
- 15 ○ additional fiscal spending on defence and infrastructure

16
17 Finally, the October 2025 MPR notes:

18
19 Economic growth in China was solid in the first three quarters of 2025,
20 bolstered by strong government support to households. China has been rapidly
21 redirecting exports away from the United States to other countries. This has
22 mitigated export losses tied to the increase in US tariffs (**Chart 31**).

23
24 The Bank's October 2025 "base case" assessment for global growth is **very similar** to the
25 growth estimates provided for its "current scenario" forecasts provided in the July 2025 MPR.
26 According to the Bank's October 2025 MPR, Table 2 shows that the global economy is
27 expected to grow at around 3% annually over the 2025 to 2027 period, with growth estimates
28 of 3.2%, 2.9% and 3.0% respectively, very similar to its July 2025 MPR "current scenario"
29 forecasts of 3.0%, 2.8% and 3.1% (which are also reported in Table 2). Table 2 shows that this
30 global growth is expected to be solid despite slow growth in the Euro area of 1.2%, 1.0% and
31 1.5% during 2025, 2026 and 2027 (similar to the July 2025 MPR forecasts of 1.1%, 1.1% and
32 1.4%), and despite U.S. growth declining from 2.8% in 2024 to 2.1%, 2.2% and 2.1% in 2025,
33 2026 and 2027 respectively (similar to the July 2025 MPR forecasts of 1.8%, 2.4% and 2.1%).

Meanwhile, annual Chinese GDP growth is estimated at 4.9%, 4.4% and 4.1% in 2025, 2026 and 2027 respectively (similar to the July 2025 MPR forecasts of 4.9%, 4.5% and 4.2%).

TABLE 2
REAL GDP GROWTH GLOBAL FORECASTS (2025-2027)

	Real GDP Growth (%)		
	2025	2026	2027
World	3.2 (3.0)	2.9 (2.8)	3.0 (3.1)
U.S.	2.1 (1.8)	2.2 (2.4)	2.1 (2.1)
Euro area	1.2 (1.1)	1.0 (1.1)	1.5 (1.4)
China	4.9 (4.9)	4.4 (4.5)	4.1 (4.2)

Source: Bank of Canada October 2025 MPR and July 2025 MPR.
July 2025 MPR estimates are provided in parentheses.

4.2.2 Canada’s Outlook

The Bank’s October 2025 MPR notes the following:

The Canadian economy is adjusting to steep US tariffs on several industries and coping with elevated uncertainty. Tariffs have led to a fall in the demand for Canadian goods, affecting the broader economy. The reconfiguration of global trade and domestic production is also leading to higher costs. Total inflation has been around 2%, while underlying inflation has continued to be about 2½%.

With US tariffs and limited Canadian counter-tariffs in place, the effects of the trade conflict on growth and inflation in Canada are becoming clearer. Exports to the United States have fallen, and business investment has declined. The structural shift in the Canada-US trade relationship has put the economy on a lower path. At the same time, the reconfiguration of global trade and the restructuring of the Canadian economy are adding costs and putting upward pressure on inflation.

Considerable uncertainty remains around US tariffs and how changes to global trade relationships will affect economic growth and consumer prices in Canada.

1 This uncertainty includes the review of the Canada-United States-Mexico
2 Agreement.

3 How other major structural changes—such as shifting demographics and the
4 adoption of artificial intelligence—will affect the Canadian economy is also
5 unclear. The effects of these developments on output and inflation will play out
6 over many years.

7
8 The October 2025 MPR states that:

9
10 The Canadian economy contracted in the second quarter, with growth in gross
11 domestic product (GDP) at -1.6%. The contraction was largely due to the
12 disruptive impact of tariffs on exports and the effect of heightened uncertainty
13 on business investment. Growth is estimated to be weak in the second half of
14 2025, averaging about 0.75%. While exports and business investment will
15 likely decline further, household and government spending are supporting
16 growth.

17
18 Canada's GDP growth is projected to then strengthen gradually, with annual
19 growth averaging 1.4% over 2026 and 2027. This recovery is slow because
20 Canadian businesses need time to adjust to the new trade reality and a weak
21 labour market is weighing on household spending. In addition, population
22 growth is assumed to remain low. CPI inflation remains close to 2% throughout
23 the projection horizon.

24
25 The Bank's "base case" forecasts in the October 2025 MPR predict real GDP growth in Canada
26 during 2025 of 1.2%, and 1.1% in 2026, before increasing to 1.6% for 2027. These estimates
27 are very similar to the "current tariff scenario" forecasts included in the July 2025 MPR of
28 1.3%, 1.1% and 1.8% for 2025, 2026 and 2027 respectively.

Table 3 also includes real GDP forecasts from RBC, CIBC World Markets, BMO Capital Markets, Desjardins, TD Bank, Scotiabank, OECD, and the IMF.² The average of the 2025 Real GDP forecasts from these sources of 1.18% is roughly equal to the Bank's October 2025 forecast of Canada of 1.2%, while the 2026 average forecast of 1.33% is above the Bank's October 2025 forecast of 1.1%.

TABLE 3
REAL GDP GROWTH FORECASTS – CANADA (2025-2027)

	<u>2025</u>	<u>2026</u>	<u>2027</u>
RBC	1.2	1.2	
CIBC World Markets	1.2	1.4	
BMO Capital Markets	1.2	1.4	
Desjardins	1.2	1.5	
TD Bank	1.2	1.1	
Scotiabank	1.2	1.4	
OECD	1.0	1.1	
IMF	1.2	1.5	
 Average	1.18	1.33	
Max	1.2	1.5	
Min	1.0	1.1	
 Bank of Canada	1.2 (1.3)	1.1(1.1)	1.6 (1.8)

Source: Bank of Canada October 2025 MPR, July 2025 MPR and Attachment F.
July 2025 MPR estimates are provided in parentheses.

The October 2025 MPR notes that:

After being close to 2% for several months, consumer price index (CPI) inflation was 2.4% in September. Inflation excluding taxes was 2.9%, up from just over 2% in recent months. The preferred measures of core inflation have been sticky at around 3%, while a broader set of indicators suggest underlying inflation has persisted around 2½%.

It further notes:

² The figures (and data sources) for the predictions from other financial organizations that are reported in Tables 3, 4 and 5 are included in Attachment F, which is appended to my evidence.

The ongoing trade conflict is fundamentally reshaping Canada’s economy and will have a lasting negative impact on economic activity. At the same time, the reconfiguration of global trade and domestic production is putting upward pressure on costs. Reflecting these two competing forces, inflation remains near the 2% target over the projection horizon.

The October 2025 MPR predicts that inflation will remain almost exactly equal to the mid-point of its target range of 2% during the 2025-2027 period. Table 4 shows that in October 2025 the Bank expects inflation of 2.0% in 2025, 2.1% in 2026, and 2.1% in 2027, very close to the July 2025 “current tariffs scenario” forecasts of 1.9%, 2.0% and 1.9% in 2025, 2026 and 2027 respectively. Table 4 shows that the Bank’s 2025 inflation projection of 2.0% equals the average of the other forecasts of 2.0%, while its 2026 projection of 2.1% is slightly above the average forecast of 1.9%.

TABLE 4
CPI FORECASTS – CANADA (2025-2027)

	<u>2025</u>	<u>2026</u>	<u>2027</u>
RBC	2.0	2.1	
CIBC World Markets	2.0	1.7	
BMO Capital Markets	2.3	2.0	
Desjardins	2.0	1.8	
TD Bank	2.0	2.1	
Scotiabank	1.9	1.7	
OECD	2.1	2.1	
IMF	2.0	2.0	
Average	2.04	1.94	
Max	2.3	2.1	
Min	1.9	1.7	
Bank of Canada	2.0 (1.9)	2.1 (2.0)	2.1 (1.9)

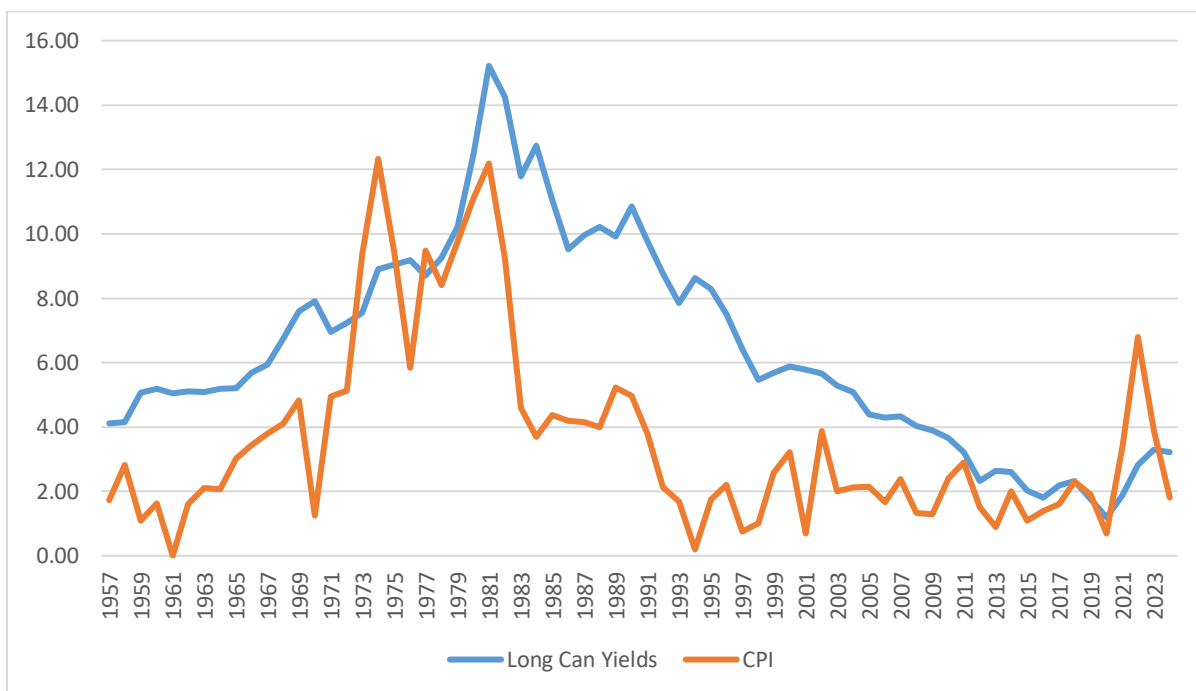
Source: Bank of Canada October 2025 MPR, July 2025 MPR and Attachment F.
July 2025 MPR estimates are provided in parentheses.

4.3 Capital Market Conditions and Expectations

4.3.1 Debt Markets

What does all this mean for capital markets? I begin by looking at bond yields in particular. Figure 5 shows the relationship between long-term Canada bond yields and inflation since 1957. The graph shows that yields are closely related to inflation, with a correlation coefficient of 0.63 over the 1957-2024 period. Of course, yields are determined based on “expected” inflation, and we can see a few years in the 1970s and also in 2021, 2022 and 2023, where actual inflation exceeded bond yields, since inflation greatly exceeded expectations. The decline in both inflation and yields since 1991 is obvious from the graph, with inflation hovering around the 2% target, except for 2021, 2022 and 2023, and bond yields declining and tracking inflation so that by 1998 they were below 6% and have been below 4% since 2008, where they have remained ever since. It is the post 1998 part of the graph that we should focus on, since this is more representative of our current monetary regime, and during this period, long-term Canada bond yields averaged 3.58% (median 3.29%), with inflation averaging 2.18% (median 2.00%). Not only have long-term Canada bond yields not exceeded 6% since 1998, they have not exceeded 4% since 2008.

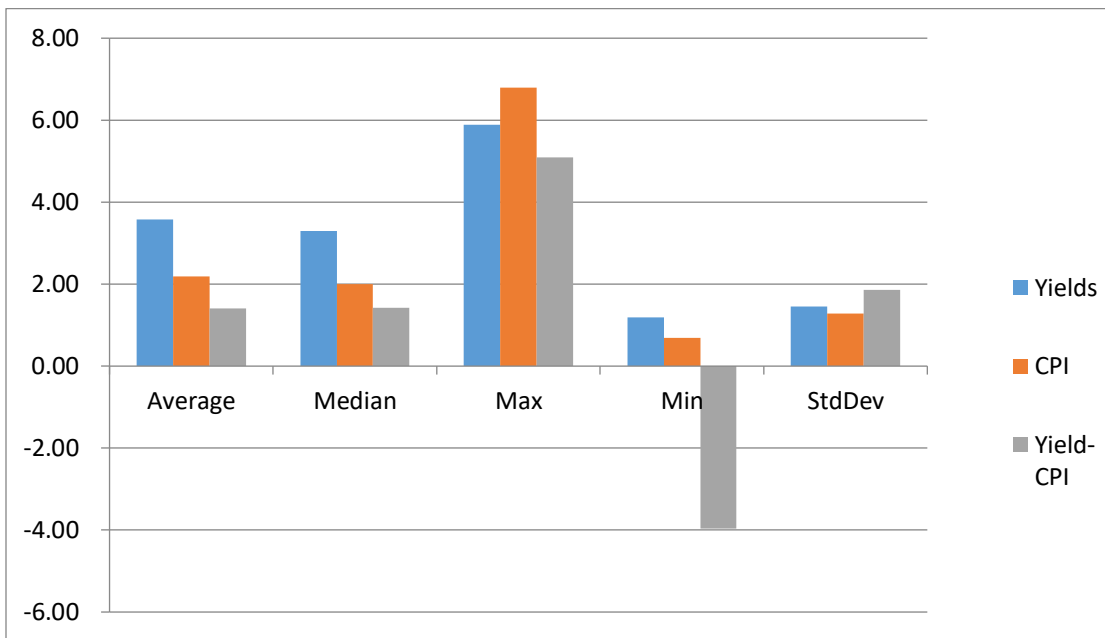
FIGURE 5
BOND YIELDS AND INFLATION – CANADA (1957-2024)



Data Source: <https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1010012201#timeframe>.

It is noteworthy that the volatility in yields and inflation has decreased significantly since 1998, which is obvious from Figure 5. This can also be seen in the standard deviations reported in Figure 6, which reports summary statistics for the 1998 to 2024 period. For example, the standard deviation of the yields was 1.45% over this period, versus 3.26% over 1957-2024. Figure 6 also shows that the difference between yields and inflation averaged 1.40% over the 1998-2024 period, with a standard deviation of 1.86%. The working papers for Figure 5 and Figure 6 are appended as Attachment G to my evidence.

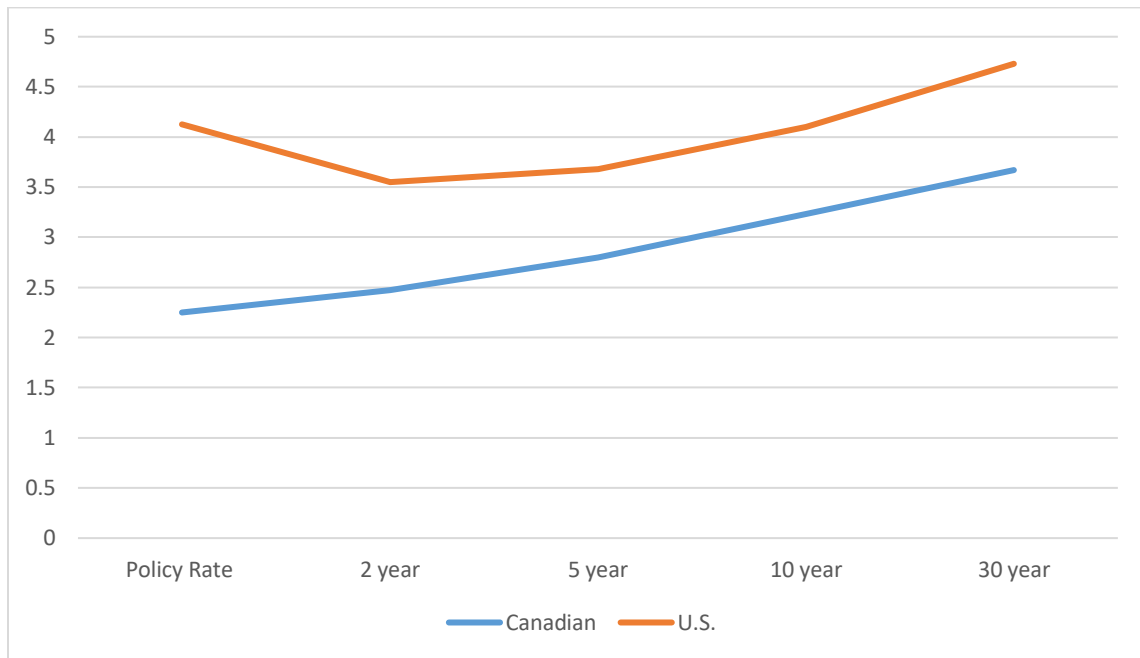
FIGURE 6
SUMMARY STATISTICS YIELDS AND INFLATION – CANADA (1998-2024)



Data Source: <https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1010012201#timeframe>.

Figure 7 below depicts the yield curves for Canada and the U.S. as of November 20, 2025. The Canadian yield curve is slightly upward sloping, while the U.S. curve slightly humped shaped curves, with very short-term rates slightly above mid-term rates, and with long-term rates being above mid-term rates. We can see that the U.S. Fed target rate (mid-point) of 4.125% is about 1.9% above the Bank of Canada overnight target rate of 2.25%. Two-year U.S. bond yields were about 1.1% higher than in Canada, while 5-year U.S. yields were about 0.9% higher. The U.S. 10-year yield was 4.10%, 0.87% above the Canada 10-year yield of 3.23%, while the 30-year U.S. yield of 4.73% was 1.07% higher than the 30-year Canada yield of 3.66%. The working papers for Figure 7 are appended as Attachment H to my evidence.

FIGURE 7
YIELD CURVES – CANADA AND THE U.S. (NOVEMBER 20, 2025)

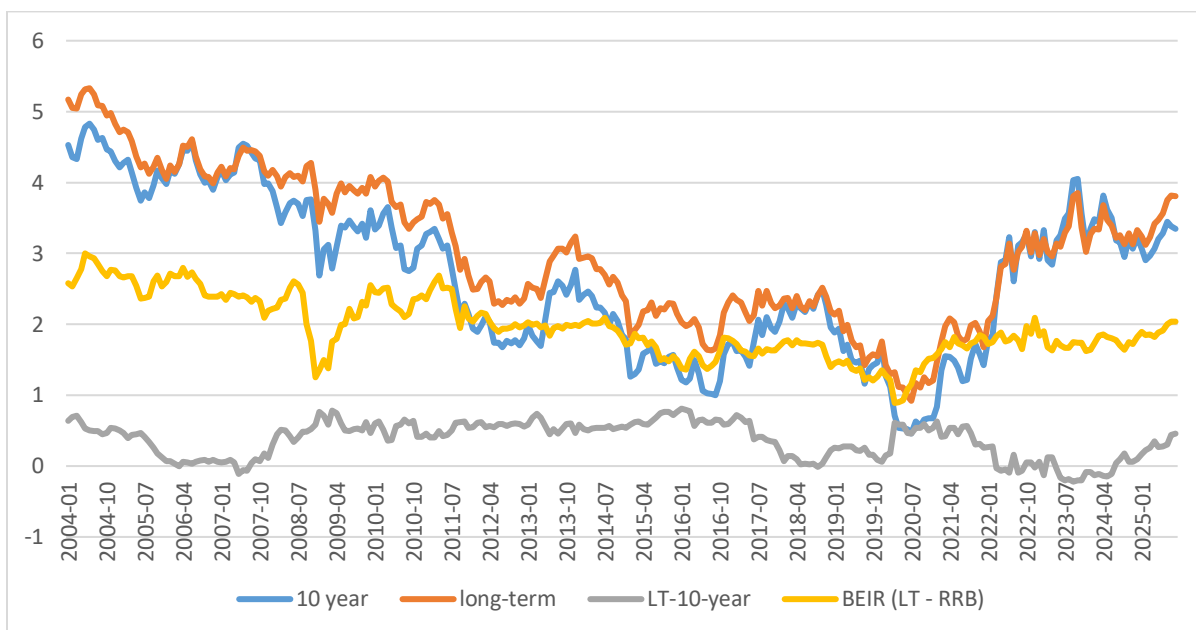


Source: Globe and Mail Report on Business, B18, November 21, 2025.

4.3.2 Interest Rate Levels

Figure 8 shows 10-year and long-term bond yields in Canada since January of 2004, which have moved in tandem for the most part, with a correlation coefficient of 0.97 over the period. The graph also shows the spread between the two rates, which had an average (median) of 0.37% (0.45%) over the entire period. It is obvious from Figure 8 that this spread has narrowed considerably during the 2018-25 period, averaging 0.18% over the past seven years, but sitting at 0.45% as of September 29, 2025. Figure 8 also shows the break-even inflation rate (“BEIR”), which is the difference between the yield on long-term Canada bonds and the yield on Canadian Real Return Bonds. The BEIR is often viewed as an indicator of future inflation rates. This rate remained within the Bank of Canada’s target band for inflation almost entirely over the entire period, peaking at 3.0% in 2004, and hitting a trough of 0.79% in March 2020, and averaging 1.96% overall, right at the Bank’s target rate of 2%. It sat at 2.04% as of September 2025, equal to the Bank’s 2025 CPI forecast of 2.0% and the average of other forecasts from Table 4. It is also about half-way between the Bank’s 2026 forecast of 2.1% and the average of other 2026 CPI forecasts of 1.94%. The working papers for Figure 8 are appended as Attachment I to my evidence.

FIGURE 8
SELECTED BOND YIELDS – CANADA (January 2004-September 2025)



Data Source: Bank of Canada website at <http://www.bankofcanada.ca>.

Table 5 provides the forecasts for Government of Canada 10-year and 30-year bond yields from some of the largest Canadian financial institutions that were included in the GDP and CPI forecasts included in Tables 3 and 4. The average of the provided forecasts for 10-year Canada yields were 3.21% for Q4/2025, 3.20% for Q2/2026 and 3.28% for Q4/2026 – averaging, averaging 3.23%. The average of the provided forecasts for 30-year Canada yields were 3.61% for Q4/2025, 3.58% for Q2/2026 and 3.62% for Q4/2026 – averaging 3.60%. These forecasts were made during the fall of 2025, when 10-year yields hovered around 3.2%, with a prevailing 10-year yield of 3.23% as of November 20, 2025, while 30-year yields hovered around 3.6% and were 3.66% as of November 20, 2025. Therefore, the 10-year and 30-year yield average forecasts of 3.23% and 3.6% were very close to the yields that prevailed during the fall of 2025.

While the yield forecasts are very close to existing yields, as discussed in Appendix A of my evidence, there is compelling evidence that supports simply using the actual yields at a given point in time to predict future yields, and this is the approach I will employ in estimating future yields, which in fact makes little difference in this particular instance, since the forecasts essentially assume rates will stay the same as the 30-year November 20, 2025 yield of 3.66%.

TABLE 5
10-YEAR AND 30-YEAR GOVERNMENT OF CANADA YIELD FORECASTS

	10-year yields			30-year yields		
	<u>Q4-25</u>	<u>Q2-26</u>	<u>Q4-26</u>	<u>Q4-25</u>	<u>Q2-26</u>	<u>Q4-26</u>
RBC	3.4	3.45	3.5	3.6	3.65	3.7
CIBC World Markets	3.19	3.2	3.45	3.65	3.6	3.7
BMO Capital Markets	3.2	3.2	3.15	3.7	3.7	3.7
Desjardins	3.1	3	3.1	3.55	3.4	3.45
TD Bank	3.2	3.15	3.15	3.5	3.45	3.45
Scotiabank	3.15	3.2	3.3	3.65	3.7	3.7
Average	3.21	3.2	3.28	3.61	3.58	3.62
Max	3.4	3.45	3.5	3.7	3.7	3.7
Min	3.1	3	3.1	3.5	3.4	3.45

Source: Attachment F.

4.3.3 Stock Markets

Predicting stock market performance in the short run is always fraught with uncertainties, and it is always much more productive to think in terms of long run expectations. Table 6 reports summary statistics for Canadian capital markets over the 1938 to 2024 period. The working papers for Table 6 are appended as Attachment J to my evidence.

TABLE 6
CAPITAL MARKET SUMMARY STATISTICS – (1938-2024)

1938-2024 (%)	<u>CPI</u>	<u>Cdn. Stocks</u>	<u>Long Canadas</u>	<u>T-bills(91-day)</u>	<u>U.S. Stocks (in CAD)</u>
Average	3.64	11.09	5.91	4.46	13.11
Median	2.73	11.08	4.03	3.66	13.83
Std. Dev.	3.30	16.11	9.44	4.14	17.13
Geo. Mean	3.59	9.88	5.50	4.38	11.78

Data Source: Data to 2008 are from the Canadian Institute of Actuaries; return data since 2009 are from Bloomberg, while the CPI data are from CANSIM. The 2024 CPI figure is the 2024 CPI estimate provided by the Bank of Canada in its July 2025 MPR.

The long-term average return in the Canadian stock market over this period was 11.09%, with a geometric mean of 9.88%. This occurred over a period in which inflation averaged 3.6% (geometric mean of 3.6%) and real GDP growth was higher than it has been recently. This implies “real” returns of approximately 7.5% (6.3%). If we combine these with long-term

1 expected inflation of 2%, we would expect stock returns of 8.3% to 9.5% going forward. These
2 numbers are higher than the average and also most current estimates of expected stock returns
3 going forward by market professionals, as will be shown in Table 7 and as discussed in Section
4 5.2.3.

5 **4.4 The Nova Scotia Economy**

6 The Conference Board of Canada (“CB”) September 2025 Ontario Five-Year Outlook
7 estimates real GDP growth for Nova Scotia (NS) of 1.3% during 2025, in line with the Bank’s
8 2025 estimate for Canada of 1.3% and the average of forecast estimates provided by financial
9 institutions (FIs) of 1.35% which were reported in Table 3. The CB predicts real GDP growth
10 for NS of 1.2% in 2026, which is in the middle of the Bank’s 2026 estimate for Canada of
11 1.1% and the average forecast estimates by FIs of 1.39%. The CB’s 2027 NS estimate for real
12 GDP growth of 1.6% is slightly below the Bank’s 1.8% for Canada. So overall, we could say
13 that forecasted economic growth for NS is similar to the forecasts for Canada as a whole. CB
14 further estimated real GDP growth for NS of 1.6% in both 2028 and 2029.

15
16 The CB estimates inflation for NS of 1.9%, 1.8%, 1.8%, 2.0%, and 1.9% for 2025 through
17 2029 respectively. The 2025 forecast equals the Bank’s 2025 estimate for Canada of 1.9% and
18 is slightly below the average forecast estimates by FIs of 2.1%, while the CB’s estimate of
19 1.8% in 2026 is slightly below both the Bank’s and the average of forecast estimates by FIs
20 2026 estimates for Canada of 2.0%. The CB’s 2027 inflation estimate for NS of 1.8% is slightly
21 below the Bank’s 1.9% for Canada. In conclusion, the real GDP growth forecasts and inflation
22 forecasts for NS are very close to those for Canada, and are slightly below long-term real GDP
23 growth for Canada, but in line with long-term inflation in Canada, at least since the 2% inflation
24 target was introduced in 1991.

25 **5 ROE CALCULATIONS**

26 **5.1 Some Notes on Allowed ROEs**

27
28 This section provides evidence demonstrating that allowed ROEs have not declined adequately
29 in response to the reduction in the cost of capital that utilities’ have experienced, as long-term
30 government bond yields (or RF) and A-rated utility bond yields have declined significantly

over the last two decades. Figure 9 shows that since 2004, both RF and A-rated utility yields have declined markedly, while the allowed ROEs for NS Power, for Ontario (OEB) utilities, and for Alberta utilities have declined much less so over this period.³ As a result, the spreads between allowed ROEs and these measures, both of which directly affect the utilities' cost of capital, have *increased* dramatically through the years. Figure 10 depicts these ROE-RF⁴ and ROE-A yield "spreads" for NS Power, and shows that both spreads have increased significantly throughout this period. For example, in January 2004, the allowed ROE for NS Power was 9.55%, at a time when 30-year government yields (RF) were 5.31% and A-rated utility yields (A yields) were 6.10%. So, the spreads between the ROE and RF was **4.24%**, and between ROE and A yields was **3.45%**. As of November 20, 2025, NS Power's allowed ROE was only 0.55% lower than in 2004 at 9.00%, while RF was 1.65% lower at 3.66%, and A yields were 1.35% lower at 4.75%. As a result the ROE-RF spread was 1.10% higher than in 2004 at **5.34%** (a 26% increase from 2004), while the ROE-A yield spread was 0.80% higher at **4.25%** (a 23% increase). The average ROE-RF spread for NS Power during the January 2004-November 2025 period of **6.10%**⁵ is 1.86% (or 44%) higher than the 2004 level of 4.24%, while the average ROE-A yield spread of **4.69%**⁶ is 1.24% (or 36%) higher.

While not reported in Figure 10, it is useful to note that this widening of allowed ROE and RF and A-yield spreads was not unique to NS, but very similar to that which occurred in Ontario and Alberta. In January 2004, the allowed ROE for Ontario (Alberta) utilities was 9.88% (9.6%), when RF was 5.31% and A yields were 6.10%. So, the spreads between the ROE and RF was **4.57% (4.29%)**, and between ROE and A yields was **3.78% (3.50%)**. As of November 20, 2025, Ontario (Alberta) utilities' allowed ROE was only 0.52% (0.63%) lower than in 2004 at 9.36% (8.97%), while RF was 1.65% lower at 3.66%, and A yields were 1.35% lower at

³ The working papers for Figures 9 and 10 are appended as Attachment K to my evidence.

⁴ The spread between the ROE and RF can be thought of as the stock market's ex-post market risk premium (MRP), which is used in the capital asset pricing model (CAPM), which is discussed in the next section.

⁵ This is equivalent to using the CAPM and using an MRP estimate of 6.1%, which is at the high end of traditionally employed estimates, and simultaneously using a beta for NS Power of 1.0 (which is more than double the long-term average beta for Canadian utilities of about 0.35). Or alternatively this 6.1% figure could result if we used a beta of 0.5 for utilities, but then used an MRP of 12.2% - which far exceeds any estimates ever used for this variable.

⁶ This is equivalent to using the bond yield plus risk premium approach (discussed later in my evidence) to estimate the cost of equity, and using a risk premium estimate of 4.7%. This number is close to the maximum range of traditional estimates used (i.e., in the 2.0-5.0% range) – and would apply to high risk companies, and clearly not to regulated operating utilities such as NS Power, which will be well below average risk – so something less than 3.5% should be used – and I use 2.5%.

1 4.75%. As a result, the Ontario (Alberta) ROE-RF spread was 1.13% (1.02%) higher than in
2 2004 at **5.70% (5.31%)**, while the ROE-A yield spread was 0.83% (0.72%) higher at **4.61%**
3 **(4.22%)**.
4

5 Unfortunately, the fact that allowed ROEs have not decreased in North American jurisdictions
6 (including NS) proportionately to changing capital market conditions and the associated
7 reduction in the costs of capital to utilities has resulted in awarded ROEs that have been well
8 in excess of their cost of equity, with the costs being borne by consumers.

FIGURE 9
ALLOWED ROES, GOVERNMENT YIELDS
AND A-RATED UTILITY YIELDS (January 2004-November 20, 2025)

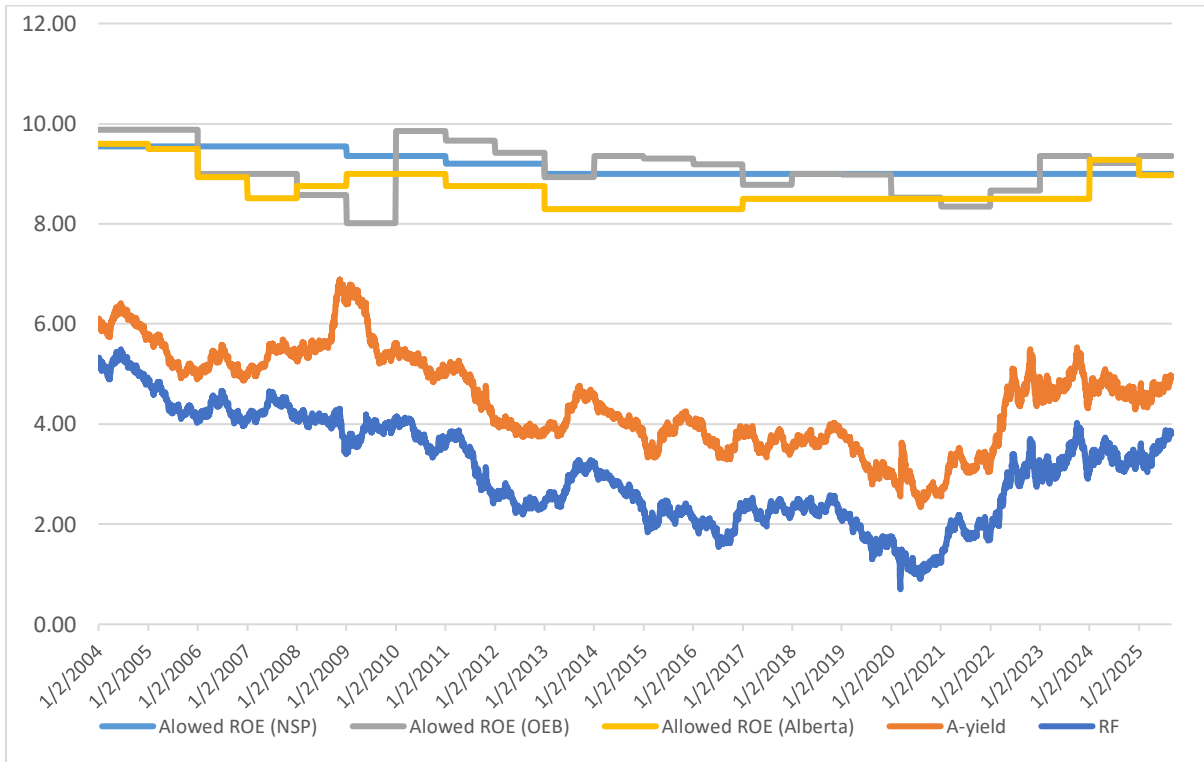
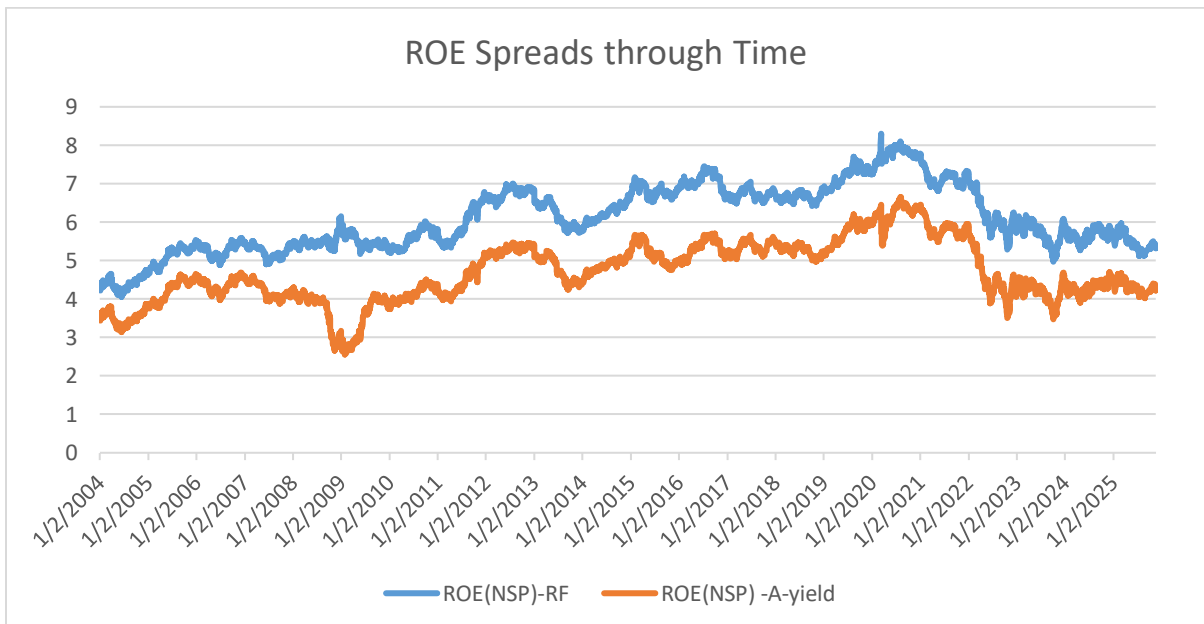


FIGURE 10
ALLOWED ROE-RF and ROE-A-YIELD SPREADS
(January 2004-November 20, 2025)



1 The downward “stickiness” in awarded ROEs noted above is not unique to NS, Ontario and
2 Alberta, but can be observed in other Canadian jurisdictions. This pattern is even more
3 prevalent in the U.S., which is evidenced in the results of a 2017 study that examines “a dozen
4 years’ of gas and electric rate-setting decisions” in the U.S. and Canada over the 2005-2016
5 period.⁷ This study provides evidence “demonstrating empirically that allowed returns on
6 equity diverge significantly and systematically from the predictions of accepted asset pricing
7 methodologies in finance.” A large part of this can be explained by the fact that allowed ROEs
8 “tend to exhibit considerable stickiness around focal ‘odometer’ points.” Consistent with the
9 evidence for Ontario and Alberta discussed above, the authors note that “awarded ROE spreads
10 over risk free treasuries have progressively *widened* significantly since 2005, even though
11 systematic risk in the utilities industry has *fallen continuously* during the same time period.”
12 As a result, the authors find that:

13
14 Indeed, if the awarded ROEs were an asset class, they would generate a mean positive
15 abnormal return (“alpha”) of between 7.5 and 8.5 percent, an amount that overshadows
16 even the performance of Fortune Magazine’s top twenty stock investments for the last
17 decade.
18

19 A recent study by Sikes (2022) entitled “Regulatory Inequity” shows that the average awarded
20 ROE is much greater than the average utility’s cost of equity, which means that any
21 investments undertaken by the utilities creates value (i.e., generates economic rent).⁸ He
22 examines the FERC’s Opinion 569-A, issued in May 2020 as a case study to examine the
23 appropriateness of allowed ROEs at a broader level, since the decision and the decision process
24 are typical of most rate decisions, noting (on page 4) that:

25
26 It is in fact an apt case-study which encompasses the prevailing methodologies used,
27 in one form or another, by utility commissions throughout the nation to determine the
28 ROE. As such, examination of the fallacies behind Opinion 569 reveals in general how
29 regulators’ acceptance of flawed financial analysis inflates the profit of public utilities.

⁷ Source: S. Azgad-Tromer and E. Talley, 2017, “The Utility of Finance,” Working Paper, Columbia University (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2994314).

⁸ Source: Sikes, Thomas, M. S. January 2022, “Regulated Inequity – How regulators’ acceptance of flawed financial analysis inflates the profit of public utility companies in the United States.”

Sikes notes flaws in the implementation of Risk Premium methodologies and DCF analysis, which lead to upwardly biased estimates. He suggests that the CAPM is the only viable approach, but goes on to note that typical CAPM estimates are also upwardly biased due to **typical implementation flaws such as the use of adjusted betas and market risk premiums that greatly exceed current expectations of market professionals**. He goes on to conclude (page 71 – bold added for emphasis) that “Generations of utility regulators and financial analysts have become inculcated in the idea, at least implicitly, that utilities are fairly compensated with an ROE similar to that expected from the average firm. Because of this, there will be **inertia in moving towards the truly just and reasonable ROE.**”

5.2 Capital Asset Pricing Model (CAPM) Estimates

5.2.1 CAPM Overview

This section employs the commonly used CAPM to estimate the allowed ROE for a typical regulated Canadian utility. Essentially CAPM can be used to estimate the required ROE (or K_e) for a firm from the point of view of a well-diversified investor. It can be presented as:

$$K_e = R_F + (E_{R_m} - R_F) \text{ Beta}$$

Where,

K_e = required rate of return on common equity

R_F = the risk-free rate

$E_{R_m} - R_F$ = the market risk premium or MRP (i.e., expected market return (E_{R_m}) minus R_F)

Beta = the measure of market risk of a security

This model is widely used:

- by over 68 percent of financial analysts;⁹
- by over 70 percent of U.S. CFOs;¹⁰

⁹ Model Selection from “Valuation Methods” Presentation, October 2007, produced by Tom Robinson, Ph.D., CFA, CPA, CFP®, Head, Educational Content, CFA Institute. Copyright 2007, CFA Institute.

¹⁰ Graham, John R., and Harvey, Campbell R. “The Theory and Practice of Corporate Finance: Evidence from the Field.” *Journal of Financial Economics* 60 (2001), pp. 187–243.

- by close to 40 percent of Canadian CFOs.¹¹

Of course, the CFOs and analysts are using the CAPM for the same purpose as we are – to estimate a firm’s cost of equity for cost of capital considerations. It has also been heavily relied upon in previous decisions, which is appropriate in my opinion, and as recommended by Sikes (2022).

A study by Berk and van Binsbergen (2017)¹² also provides support for the use of CAPM as the most widely used model by investors, stating:

We find that investors adjust for risk by using the beta of the capital asset pricing model (CAPM). Extensions to the CAPM perform poorly, implying that investors do not use these models to compute discount rates.¹³

The authors go on further to highlight the fact that this model should be used by practitioners, despite its limitations, quite simply because it is the most widely used model by investors, who in turn drive equity returns:

We have demonstrated that among a range of proposed models, the CAPM—though perhaps far from being a perfect model of risk—is most consistent with investor behavior. Thus, if the criterion for deciding how to compute the discount rate is to use the method investors use, **practitioners should use the CAPM.**¹⁴

5.2.2 Estimating the Risk-Free Rate (RF)

Technically, the CAPM is a one-period model, and the government T-bill rate should be used as the appropriate RF, since it is virtually guaranteed and does not fluctuate. However, it is common practice to use the CAPM to estimate the required return on common equity over many periods, such as when trying to estimate the cost of a firm’s common equity financing component when estimating the firm’s overall cost of capital. Under these circumstances, it is

¹¹ H. Kent Baker, Shantanu Dutta and Samir Saadi, “Corporate Financial Practices in Canada: Where Do We Stand” *Multinational Finance Journal* 15-3, 2011.

¹² J. B. Berk and J. H. van Binsbergen, 2017, “How Do Investors Compute the Discount Rate? They use the CAPM,” *Financial Analysts Journal*, Vol. 73, No. 2: pp. 25–32.

¹³ *Ibid.*, page 25.

¹⁴ *Ibid.*, page 32.

appropriate to use the yield on long-term government bonds instead of T-bills since they are more representative of the rate that could be obtained over longer investment horizons. This practice is consistent with standard utility regulation practice.

As discussed in Section 4.3.2, Appendix A of my evidence demonstrates that using the actual yields at a given point in time to predict future yields performs far superior to both using Consensus forecasts or using the mid-point of actual yields. As a result, I will use the existing long-term government yield of **3.66%** as of November 20, 2025 as my estimate for **RF**; although it makes little difference at this particular point in time since this figure is very close to the average forecasts for 30-year Canada yields of 3.6% that was provided in Table 5, as discussed previously.

5.2.3 Expected Market Returns and Estimating the Market Risk Premium (MRP)

The next CAPM input is the MRP that is measured by the expected long-term return on the equity market less the long-term government bond yield (which measures RF). Table 7 below provides useful guidance in determining a reasonable estimate for expected stock market returns, which in turn can be used to estimate MRPs, or to assess the reasonableness of MRP estimates. It is broken into two categories: (1) historical returns; and, (2) current (i.e., 2024-25) long-term market forecasts from four different sources. It is noteworthy that one of the sources of long-term forecasts (i.e., Horizon) provides summary statistics based on extensive surveys of finance professionals, and hence Table 7 provides a comprehensive view of the forecasts of the professional finance community. In particular, Horizon's report is based on the forecasts of 41 investment advisors, which includes prominent advisory firms (e.g., Aon, Mercer, and Willis Towers Watson), several large commercial and investment banks (e.g., Bank of New York Mellon, Goldman Sachs Asset Management, J.P. Morgan Asset Management, Merrill, Morgan Stanley, UBS, etc.), and large asset managers (e.g., BlackRock, The Vanguard Group, etc.). As such, it provides a comprehensive representation of the views of finance professional managing trillions of dollars of wealth.

Sikes (2022) (page 45) verifies the relevance of expected market returns by the financial community, noting "investors' expected market return should effectively set a ceiling on the

ROE approved by regulators as utility stock is less risky than the overall stock market.” The Alberta Utility Commission (AUC) for example, has also previously noted that such forecasts are informative and reaffirmed this position in the 2018 Alberta GCOC Decision, stating¹⁵:

Consistent with its determinations in previous GCOC decisions, the Commission continues to hold the view that return expectations of finance market professionals are germane to the determination of a fair ROE for regulated utilities.

Hence, the AUC believes that such information is relevant, and I agree. In fact, I would argue that the beliefs of professionals who participate in the markets and influence market activity is far more relevant than market expectations determined using unrealistic growth assumptions, such as those I have seen provided by utilities’ experts during previous regulatory proceedings. In other words, market participant beliefs represent an important and practical “benchmark,” against which any utility ROE estimate must be compared. Table 7 provides Canadian, U.S. and global historical evidence and forecasts; however, since I estimate the CAPM using the Canadian stock market, I focus my discussion on the Canadian evidence; although I would note that the average expected U.S. and World Developed Market returns according to industry professionals of 6.47% and 6.71% are 0.91% and 1.15% higher than the Canadian average estimate of 5.56%, all of which are below my final estimate for expected market returns.

TABLE 7
HISTORICAL AND FORECAST EQUITY RETURNS

<u>Source</u>	<u>Horizon</u>	<u>Canada</u>	<u>U.S.</u>	<u>World / Developed Markets (excl. U.S.)</u>
HISTORICAL RETURNS				
1. Historical Data (Cleary Evidence, Table 6, Section 4.3.3)	Historical: 1938- 2024	Real: 6.3% GA 7.5% AA		
2. Dimson, E., P. Marsh, and M. Staunton, “Long-Term Asset Returns,” in <i>Financial Market History</i> , CFA Institute Research Foundation, December 2016.	Historical: 1900- 2015	Real: 5.6% GA 7.0% AA	Real: 6.4% GA 8.3% AA	Real (World Excl. U.S.): 4.3% GA 6.0% AA
3. “The Real Economy and Future Investment Returns,” McKinsey &	Historical: 1915-		Real: 6.5%	

¹⁵ Decision 22570-D01-2018, 2018 Generic Cost of Capital, page 97, para. 460.

Company, January 17, 2017.	2014			
Average (Range)		Real: 6.6% (5.6%-7.5%)	Real: 7.1% (6.4%-8.3%)	Real: 5.2% (4.3%-6.0%)
FORECAST RETURNS				
4. . Institut québécois de planification financière (IQPF) and Financial Planning Standards Council (FPSC), “Project Assumption Guidelines,” April 2025. Source: https://institutpf.org/assets/Documents/Normes-projection/InstituteFP-PAG.pdf	Long-term forecast	Nominal: 6.6%	Nominal: 6.6%	Nominal: 6.9% (Foreign developed market equities)
5. Horizon Actuarial Services, LLC, “Survey of Capital Market Assumptions,” 2025. Source: https://www.horizonactuarial.com/_files/ugd/f76a4b_a39fff36468c4cf9bf837c85a9b56d76.pdf	10 years 20-years		U.S. Large Cap (Nominal) 6.39% 7.00%	Non-US Dev. Mkts. 7.03% 7.35%
6. Franklin and Templeton Investments, “Capital Market Expectations 2024 and Beyond,” December 2024. Source: https://franklintempletonprod.widen.net/content/38ufr69tb0/pdf/capital-market-expectations-2025-non-us.pdf	10-year forecast	Nominal: 7.4%	Nominal: 7.2%	Nominal: EAFE Equities: 8.6%
7. “Capital Market Assumptions” BlackRock, August 2024. https://www.blackrock.com/institutions/en-us/insights/charts/capital-market-assumptions	10-year forecast 20-year forecast	Large Cap - Nominal: 3.45% 4.80%	Large Cap – Nominal: 5.2% 6.4%	World excl. Can (in CAD): Nominal: 4.47% 5.90%
Average (Range)		Nominal: 5.56%¹⁶ (3.45%-7.40%)	Nominal: 6.47% (5.2%-7.2%)	Nominal: 6.71% (4.47%-8.6%)

The first three sources in Table 7 provide historical long-term real returns for Canadian, U.S. and global stock returns over three extremely long time periods (i.e., 86 years, 116 years and 100 years). The Canadian evidence suggests average real returns of 6.6%, with a range of estimates of 5.6% to 7.5%. Combining these figures with 2% expected inflation would suggest expected nominal returns of 8.6%, ranging from 7.6% to 9.5%, based solely on historical results.

¹⁶ This average is determined by taking the average of BlackRock’s two forecasts and using it as one of three estimates (i.e., three different sources).

The next four sources represent 2023-24 estimated long-term market returns from a number of important and reputable sources with various mandates (i.e., the Financial Planning Standards Council; consulting firms, investment and commercial banks, and other investment management firms). All of these estimates are provided in nominal terms. The Canadian market nominal estimates range from 3.5% to 7.4%, and average **5.6%**. Deducting the 2% expected inflation, this translates to an average *real* return of 3.6%. In other words, most market professionals are of the belief that Canadian stocks are unlikely to earn their historic long-term *real* rates of return in the 5.6-7.5% range over the next 10-20 years.

While I do not focus on the U.S. evidence, it is noteworthy that the average expected market return for U.S. stocks is 6.47% - well below its average of the last few decades. This is important to recognize, as it indicates that expected market returns (and related MRP) forecasts that rely heavily on recent U.S. stock returns, will be overly optimistic. In fact, it is well-known that the U.S. stock market has experienced exceptional returns over the last few decades, producing abnormally high real returns relative to its longer term history, and relative to global equity returns in other markets.

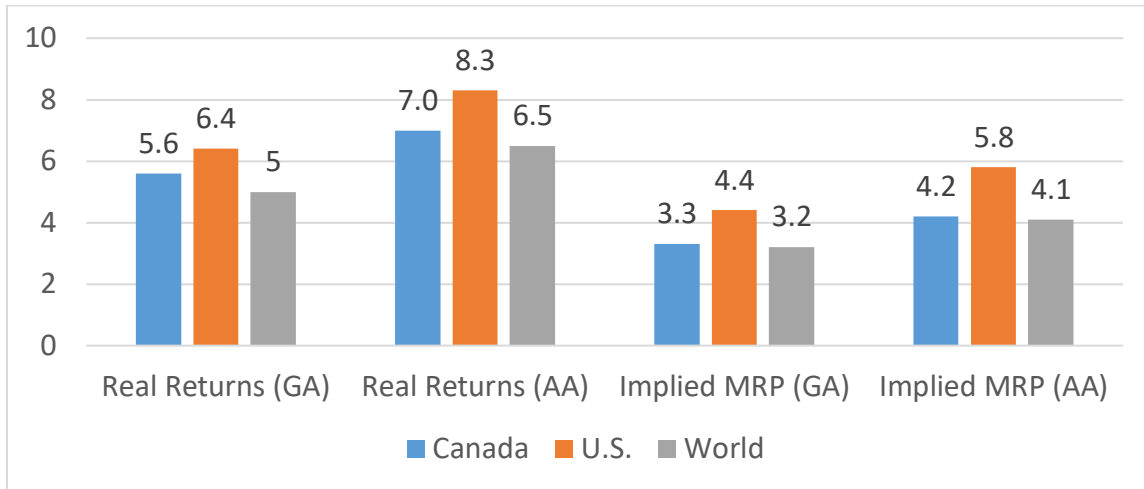
A March 26, 2024 Globe and Mail article by Benjamin Felix entitled “Do stocks return 10 to 12%, on average? No, and that’s a dangerous assumption,” expands on this matter. The author notes that: “The real return on U.S. stocks from 1950 through 2023 was 7.63 per cent, and 7.16 per cent for the 20 years ending December 31, 2023. A real return above 7 per cent is exceptional even for the U.S. market. From 1900 through 1950, U.S. stock returned a real annualized 5.57 per cent.” He further notes that “Global real stock returns from 1900 through 2023 were 5.16 per cent annualized” (based on analysis of 38 developed markets). Putting this in perspective, he notes that: “The often cited 10-per-cent return for stocks based on the post-1950 period is roughly equivalent to a 7-per-cent real return in the historical data. That is about 2 per cent higher than unbiased estimates of U.S. expected returns, U.S. equity returns before 1950 and global stock returns spanning 1890 through 2023.” Similar to the U.S. stock returns forecast by investment professionals reported in Table 8, the authors expect future real returns for U.S. stocks in the 4.25% range, and combine this with 2.5% expected inflation to arrive at an expected U.S. stock market return of 7.24%, which is much more in line with the nominal forecasts provided in Table 8.

1 I believe that both historical returns and current expectations of market professionals represent
2 the best sources of information regarding future long-term market returns. Combining the
3 historical results and market forecasts for Canada that are presented in Table 7 and discussed
4 above, suggests a wide range of estimates from 3.5% to 9.5%, with a mid-point of 7.1%
5 between historical averages (when adjusted to nominal terms) of 8.5% and the forecast average
6 of investment professionals of 5.6%. This is consistent with my usual recent assumptions that
7 an appropriate range for expected long-term Canadian stock market returns is 6-9%, and that
8 the mid-point of **7.5% represents an appropriate point estimate**.¹⁷ This is well above the
9 consensus view of financial professionals of 5.6% that is estimated in the bottom portion of
10 Table 7, but is below historical averages, so it seems reasonable. It is important to recognize
11 that this expected market return of **7.5%** represents an **upper bound** for the cost of equity to
12 regulated utilities (before adding 0.50% for flotation costs), since they are less risky than the
13 average company in the market.

14
15 Figure 11 shows that the world market MRP, as measured by the return on the market less the
16 long-term government bond yield over the 1900-to-2015 period, provided an arithmetic
17 average of 4.1% (geometric mean of 3.2%). These means are lower than the corresponding
18 U.S. figures (5.8% and 4.4%) and slightly below the Canadian figures (4.2% and 3.3%) over
19 that period. The figures for Canada are about 1% below the differences between the average
20 (and geometric mean) returns for Canadian stock and bond returns over the 1938 to 2024
21 period, which were 5.18% (4.38%) as previously reported in Table 6. These numbers are also
22 below the expected MRPs according to a recent survey of analysts, companies, and finance
23 professors, which were in the 5 to 6% range for most regions. The results for Canada and the
24 U.S. are reported in Figure 12, with 2025 figures of **5.6%** and 5.5% respectively.

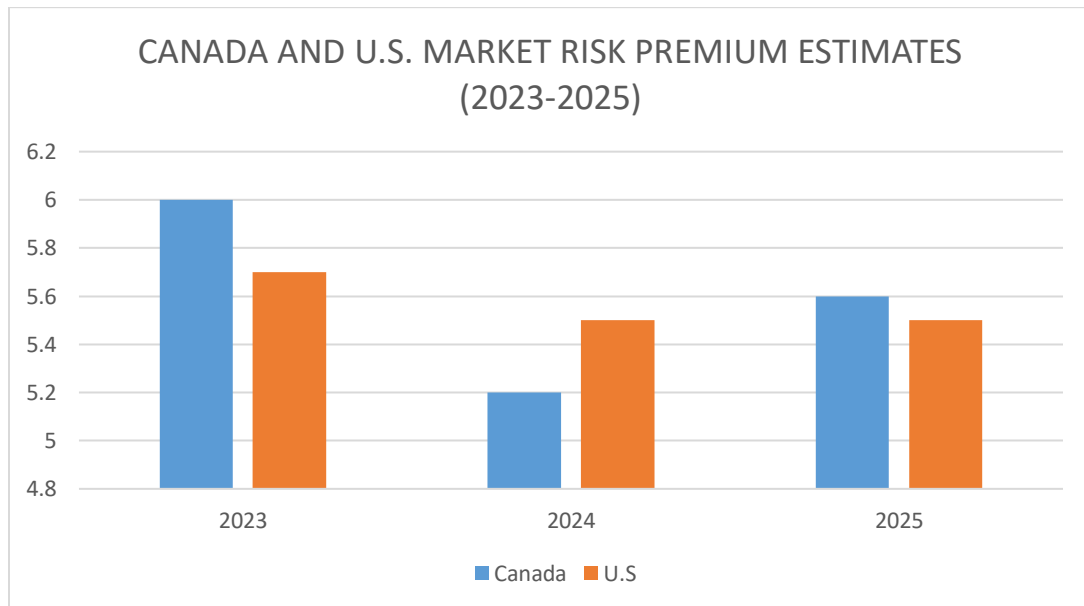
¹⁷ This estimate of 7.5% for future expected Canadian market returns is reflective of my analysis of historical market returns and forecasts for future returns from investment professionals discussed above. A July 3, 2024 Globe and Mail article from Rob Carrick entitled “This is the average return you should expect from Canadian blue-chip stocks” discusses the historical performance of the iShare S&P/TSX 60 Index ETF (XIU). The article provides support for the reasonableness of my estimate, suggesting that: “The average annual total return since inception for XIU is 7.6 per cent. If you invest in big Canadian companies, that’s your benchmark for measuring returns over periods of 10 years and longer.”

FIGURE 11
CANADA, U.S. AND GLOBAL MARKET RISK PREMIUMS (1900-2015)



Source: Dimson, E., Marsh, P. and M. Staunton, “Long-Term Asset Returns,” in *Financial Market History*, CFA Institute Research Foundation, December 2016.

FIGURE 12
CANADA AND U.S. MARKET RISK PREMIUM ESTIMATES (2023-2025)



Source: “Survey: Market Risk Premium and Risk-Free Rate used for 54 countries in 2025,” 2025 Fernandez et. al.

Based on the previous discussion of capital markets in Section 4.1.2, it appears that Canadian stock markets reflect fairly normal conditions in terms of P/E ratios, dividend yields and with slightly above average short-term market volatility as measured by the VIX and Canadian VIX

indexes. Further, A-rated Canadian utility bond yield spreads were sitting at 109 bp as of November 20, 2025, well below the long-term average spread of 139 bp, which indicates a low risk environment. Normally this would lead me to use an MRP of 5% or even 4.5%; however, the discussion of the Canadian and global economies in Section 4.2 identifies uncertainty due to global trade tensions, which poses a risk to future economic growth. Therefore, I use an **MRP of 5.5%**, which is slightly above the mid-point of the commonly used 4-6% range.¹⁸ This figure is above the 5.18% average difference between Canadian stock and government bond returns over the 1938-2024 period, is 2.2% (1.3%) above the long-term geometric mean (arithmetic average) MRP of 3.3% (4.2%) estimated by Dimson et al., and is slightly below the 5.6% forecast MRP documented by Fernandez et. al (2025). It is also consistent with the practice of using 6% when market uncertainty is well above average, using 5% when markets are close to normal, and using 4% during periods of extreme market and economic optimism. I know from having read numerous investment reports and from having seen numerous presentations from finance professionals that it is common practice to use a range of 3-7% for the MRP when using the CAPM to estimate required returns of equity for firms. The large majority of MRP estimates tend to fall in the 4-6% range, as noted by Sikes (2022), who cited two market surveys¹⁹, and one research article²⁰ to support this assertion. In fact, it is so common to use MRPs between 4 and 6%, it is almost assumed. Similarly, it has also always been the case that the MRP would be adjusted upwards during higher periods of uncertainty, and downwards during periods of less uncertainty. I provide some strong evidence below regarding MRPs which is included in two research articles written by prominent finance professors.

In a 2013 working paper, Aswath Damodaran discusses MRP estimation (which he refers to as the equity risk premium (ERP)).²¹ In this paper, Dr. Damodaran discusses the results of

¹⁸ This point estimate of 5.5% is identical to that used (for the U.S. MRP) by J. Randall Woolridge as noted on page 63 of his evidence provided during the Nova Scotia Power 2022-24 General Rate Case (M1043), in which he also notes that “the appropriate risk premium in the U.S. is in the 4.0% to 6.0% range.”

¹⁹ John R. Graham and Campbell R Harvey, “The Equity Risk Premium in 2015” (October 1, 2015). Available at SSRN: <https://ssrn.com/abstract=2611793> at 7 (Table 1); and, Pablo Fernandez, Alberto Ortiz Pizzaro, and Isabel Fernandez Acin, “Discount Rate (Risk-Free Rate and Market Risk Premium) Used for 41 Countries in 2015: A Survey” (October 17, 2017). Available at SSRN: <https://ssrn.com/abstract=2598104> at 3 (Table 2 – Market Risk Premium) and 4 (Table 3 – Risk Free Rate).

²⁰ Aswath Damodaran, “Equity Risk Premiums (ERP): Determinants, Estimation, and Implications – The 2021 Edition” (March 23, 2021). Available at SSRN: <https://ssrn.com/abstract=3825823>, at 91-92.

²¹ Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2013 Edition,” Aswath Damodaran, Stern School of Business, New York University.

1 Merrill Lynch from its monthly surveys of global institutional investors:

2
3 Merrill Lynch, in its monthly survey of institutional investors globally, explicitly poses
4 the question about equity risk premiums to these investors. In its February 2007 report,
5 for instance, Merrill reported an average equity risk premium of 3.5% from the survey,
6 but that number jumped to 4.1% by March, after a market downturn. As markets settled
7 down in 2009, the survey premium has also settled back to 3.76% in January 2010.
8 Through much of 2010, the survey premium stayed in a tight range (3.85% - 3.90%)
9 but the premium climbed to 4.08% in the January 2012 update.²²

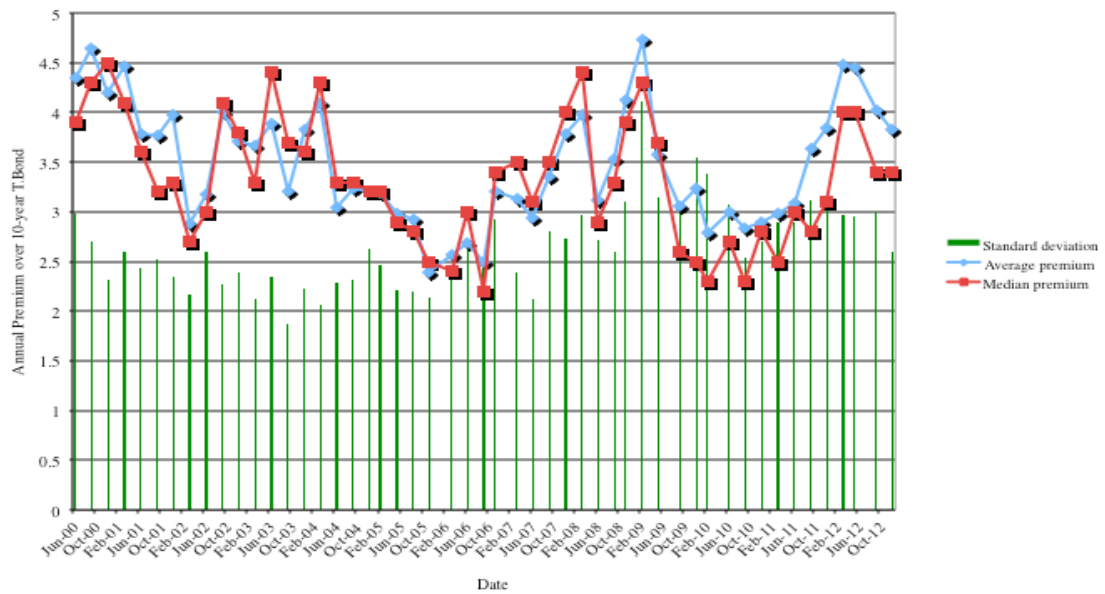
10
11 This evidence verifies that finance professionals believe that MRPs lie within the 3-6% range
12 (or, more aptly, the 3-4.5% range), and that the MRP increases during periods of uncertainty,
13 and declines during periods of less uncertainty.

14
15 Dr. Damodaran then proceeds to discuss the results of Graham and Harvey (2013)'s surveys
16 of CFOs regarding MRPs:

17
18 To get a sense of how these assessed equity risk premiums have behaved over time,
19 we have graphed the average and median values of the premium and the cross-sectional
20 standard deviation in the estimates in each CFO survey, from 2001 to 2012, in Figure
21 2.

²² *Ibid.*, pages 18-19.

Figure 2: CFO Survey Premiums



Note the survey premium peak was in February 2009, right after the crisis, at 4.74% and had its lowest recording (2.47%) in September 2006. The average across all 13 years of surveys (about 9000 responses) was 3.53%.²³

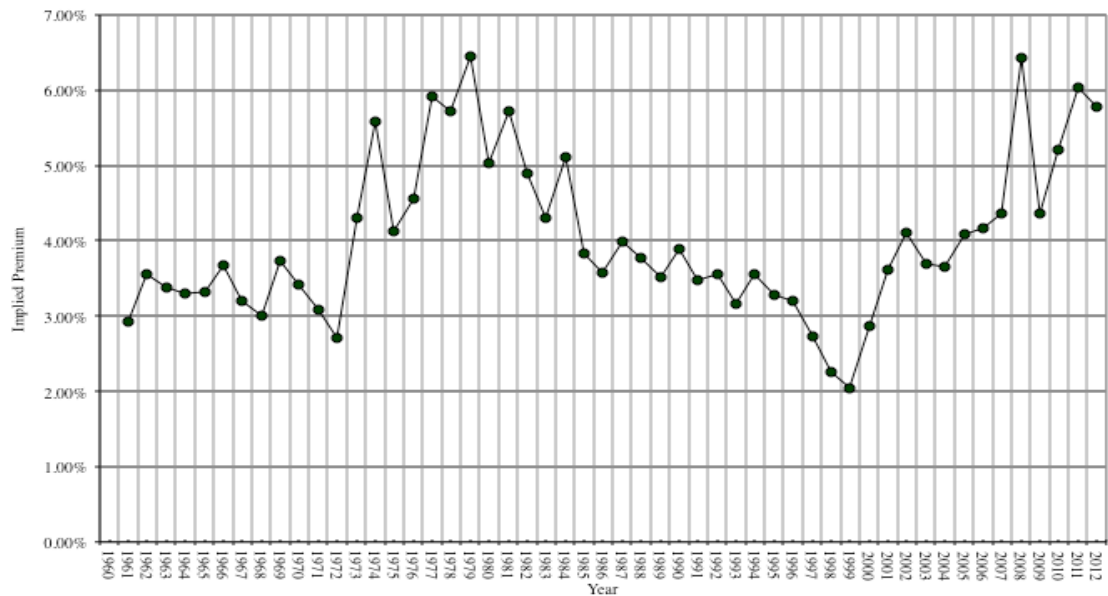
This evidence also verifies that finance professionals believe that MRPs lie within the 3-6% range (or, more aptly, in the 2.47-4.74% range) over the 2000-2012 period, and that the MRP increases during periods of uncertainty, and declines during periods of less uncertainty.

Dr. Damodaran also discusses the implied MRPs in the S&P 500 Index from 1960-2012 and produces Figure 9, below:²⁴

²³ *Ibid.*, pages 20-21.

²⁴ *Ibid.*, page 74.

Figure 9: Implied Premium for US Equity Market



This evidence also shows that implied MRPs generally lie within the 3-6% range (and in fact are never less than 2% or above 6.5%), and that the MRP increases during periods of uncertainty (e.g., 1979 and 2008), and declines during periods of less uncertainty (e.g., the boom in stock markets at the end of the 1990s).

Dr. Damodaran discusses his own approach to estimating and using MRPs when valuing companies, stating:

On a personal note, I believe that the very act of valuing companies requires taking a stand on the appropriate equity risk premium to use. For many years prior to September 2008, I used 4% as my mature market equity risk premium when valuing companies, and assumed that mean reversion to this number (the average implied premium over time) would occur quickly and deviations from the number would be small. Though mean reversion is a powerful force, I think that the banking and financial crisis of 2008 has created a new reality, i.e., that equity risk premiums can change quickly and by large amounts even in mature equity markets. Consequently, I have forsaken my practice of staying with a fixed equity risk premium for mature markets, and I now vary it year-to-year, and even on an intra-year basis, if conditions warrant. After the crisis, in the first half of 2009, I used equity risk premiums of 6% for mature markets in my valuations. As risk premiums came down in 2009, I moved back to using a 4.5%

equity risk premium for mature markets in 2010. With the increase in implied premiums at the start of 2011, my valuations for the year were based upon an equity risk premium of 5% for mature markets and I increased that number to 6% for 2012. In 2013, I will be using a slightly lower equity risk premium (5.80%), reflecting the drop from 2012.²⁵

This evidence verifies that a well-respected finance professional, textbook author, and provider of financial data uses MRPs in the 4-6% range and varies his choice of MRP so that it increases during periods of uncertainty, and declines during periods of less uncertainty.

The results of a 2013 survey by Graham and Harvey was discussed above by Dr. Damodaran.²⁶ I would also note the following conclusions Dr. Graham and Dr. Harvey reached based on their ongoing surveys of CFOs:

...the CFOs believe that the “risk premium” is a longer-term measure of expected excess returns and best covered by our question on the expected excess return over the next ten years – rather than the one-year question. Three-fourths of the interviewees use a form of the Capital Asset Pricing Model (which is consistent with the evidence in Graham and Harvey, 2001). They use a measure of the risk premium in their implementation of the CAPM.²⁷

These conclusions are consistent with the long-term (with adjustments) approach to estimating the MRP that I advocate. It also shows that 3/4th of CFOs use some version of the CAPM. Further, Dr. Graham and Dr. Harvey examine the relationship between MRPs and two other common measures of risk aversion that I have referenced previously – the VIX and yield spreads:

Finally, we consider two measures of risk and the risk premium. Figure 5 shows that over our sample there is evidence of a strong positive correlation between market volatility and the long-term risk premium. We use a five-day moving average of the implied volatility on the S&P index option (VIX) as our volatility proxy. The

²⁵ *Ibid.*, page 79.

²⁶ “The Equity Risk Premium in 2013,” John Graham and Campbell Harvey, Fuqua School of Business, Duke University. “The Equity Risk Premium in 2013,” John Graham and Campbell Harvey, Fuqua School of Business, Duke University.

²⁷ *Ibid.*, page 8.

correlation between the risk premium and volatility is 0.52. If the closing day of the survey is used, the correlation is roughly the same. Asset pricing theory suggests that there is a positive relation between risk and expected return. While our volatility proxy doesn't match the horizon of the risk premium, the evidence, nevertheless, is suggestive of a positive relation. Figure 5 also highlights a strong recent divergence between the risk premium and the VIX.

We also consider an alternative risk measure, the credit spread. We look at the correlation between Moody's Baa rated bond yields less the 10-year Treasury bond yield and the risk premium. Figure 6 shows a highly significant relation between the time-series with a correlation of 0.54.²⁸

This evidence confirms that MRPs tend to increase as risk aversion increases, and decrease as risk aversion declines, which is consistent with my approach to estimating MRPs.

5.2.4 Estimating Beta

We now require a beta estimate to apply the CAPM, and my approach is justified based on the extensive empirical analysis and discussion regarding estimating beta that is provided in Appendix C of my evidence. In particular, the examination of the historical evidence in Appendix C confirms the following three important facts:

1. Canadian utility beta estimates have averaged somewhere between 0.20 and 0.40 – with **0.35** representing the best estimate.
2. Canadian utility beta estimates have never come close to one, with maximum values in the 0.6-0.8 range. Neither have U.S. utility beta estimates ever come close to one for that matter. Hence **the use of traditional adjusted betas is totally inappropriate.**
3. **U.S. utility beta estimates are significantly higher than those for Canadian utilities, and should not be considered.**²⁹ This is consistent with the higher level of business risk associated with U.S. utilities.

²⁸ *Ibid.*, pages 14-15.

²⁹ For example, Appendix C shows that Mr. Hevert's historical average Canadian beta estimates of 0.34 (monthly) and 0.38 (weekly) are just over half their U.S. counterpart estimates of 0.61 (monthly) and 0.72 (weekly), after accounting for leverage differences. The implied "unlevered" U.S. betas (0.234 monthly; 0.278 weekly) are almost double those for the Canadian utilities (0.131 monthly; 0.140 weekly).

Based on these observations, I recommend the following approach for determining reasonable beta estimates, which can be used by Canadian regulatory bodies such as the OEB when they receive a wide spread in beta estimates:

1. Ensure beta estimates are from reasonable comparators – i.e., **exclude U.S. utility beta estimates.**
2. **Do not use traditional “adjusted beta” estimates,** which are based on the inaccurate assumption that utility betas gravitate towards one in the long run. If there is a desire or need for a “mechanical approach” to adjusting current beta estimates, simply adjust them toward the long-term average of 0.35, or even 0.45, rather than toward 1.0, as is done with published adjusted betas provided by services such as Bloomberg and Value Line.
3. Based on historical evidence, establish a range of reasonable beta estimates with a lower bound of 0.30 and an upper bound of 0.60.
4. After collecting and considering as much evidence as possible, and given the constraints (i.e., permissible range) discussed in #3 above, make a simple judgment based on current beta estimates.

As noted above, a review of the 2018 Alberta GCOC utilities’ experts’ evidence showed that Canadian utility beta estimates have averaged somewhere between 0.20 and 0.40 – with 0.35 representing the best estimate. In the 2018 Alberta GCOC Decision, the AUC calculated a historical utility beta average of 0.47, based on data that excludes the 1998-2007 period, in order to discard the abnormally low estimates obtained over the 1998-2002 period. It is important to recognize that as an average, this implies approximately half of the estimates would be both below and above this estimate of central tendency. The fact that this average is so close to the 0.45 that I have used in several previous utility proceedings confirms the appropriateness of the range that I used and the judgment I employed in determining my beta estimate.

Table 8 includes beta estimates for five Canadian utilities that were determined to be “reasonable comparable Canadian utilities” during the 2024 Alberta GCOC Proceedings based on the results of a lengthy process involving party submissions, a technical conference, and

1 ensuing follow up on remaining issues.³⁰ The 28 U.S. utilities included in this table were also
2 determined during that lengthy process. I include the U.S. utilities in this table and also in my
3 discounted cash flow analysis for information purposes only, even though **I do not consider**
4 **the U.S. sample results** in my final Ke estimates due to concerns about the comparability of
5 U.S. utilities, which are riskier than Canadian utilities.

6
7 In particular, U.S. utilities included in U.S. proxy groups are typically holding companies that
8 own several distinct operating utilities, which operate in numerous jurisdictions that are subject
9 to different U.S. regulatory regimes that vary considerably across each other, and even more
10 so relative to Canadian regulatory bodies. Appendix B of my evidence supports the fact that
11 U.S. utilities possess greater risk than Canadian utilities, while Appendix C of my evidence
12 shows that U.S. utilities have higher betas, despite the fact they have higher equity ratios (and
13 lower financial risk) on average.

14
15 The top portion of Table 8 provides both weekly and monthly beta estimates for the Canadian
16 utility sample as of December 31, 2024, as well as the eight-year average of beta estimates
17 over the 2016-2024 period.³¹ The December 31, 2024, weekly point beta estimate average is
18 **0.663**, while the average for monthly betas is **0.426**. The weekly beta estimate is well above
19 the long-term average beta estimate of 0.35 discussed above, and the 0.45 beta estimate I have
20 used during previous Proceedings, while the monthly estimate is in line with both 0.35 and
21 0.45. The eight-year average weekly betas for the Canadian sample is **0.509**, while the eight-
22 year average monthly beta estimate is **0.290**. The average of all four beta estimates provided
23 for this sample is **0.47**, above the long-term average beta estimate of 0.35, but very close to my
24 usual beta estimate of 0.45.

25
26 In my 2023 Alberta GCOC evidence, I obtained the same beta estimates using December 31,
27 2022, available Bloomberg data, and the average of the four averages at that time was 0.355,
28 while in my OEB evidence in 2024, the average was 0.60 using December 2023 data. This
29 illustrates that beta “estimates” for companies can change dramatically through time, and

³⁰ As noted in the November 10, 2022 Alberta Utilities Commission (AUC) memorandum to all parties, titled
“Proceeding 27084, Determination of the Cost-of Capital Parameters in 2024 and Beyond: Appendix A –
Finalized screening criteria,” (27084-X0256 2022-11-10 Appendix A - Finalized screening criteria).

³¹ The working papers for Table 8 are appended as Attachment L to my evidence.

therefore why it is appropriate to reference long-term averages and use judgment since beta estimates at any given point in time based on historical data may not represent the best estimates of “future” betas, which is of course is what we are trying to determine. I would further note that during 2023, I continued to use my estimate of 0.45, rather than adjust it downwards based on the 2022 average estimate of 0.355, and despite the fact this was almost identical to the long-term average Canadian utility beta estimate. Therefore, I would judge my 0.45 estimate be a conservative and appropriate beta estimate for low-risk regulated operating utilities.

TABLE 8
BETA ESTIMATES – December 31, 2024

<u>Firm</u>				
	Weekly Betas		Monthly Betas	
CANADIAN SAMPLE	<u>Dec 31 / 24</u>	<u>2017-2024 Average</u>	<u>Dec 31 / 24</u>	<u>2017-2024 Average</u>
Algonquin Power & Utilities Corp.	1.132	0.656	0.536	0.373
Canadian Utilities Ltd.	0.596	0.581	0.649	0.533
Emera Incorporated	0.652	0.463	0.335	0.213
Fortis Inc.	0.450	0.478	0.264	0.112
Hydro One Ltd.	0.486	0.369	0.348	0.217
Average	0.663	0.509	0.426	0.290
	Weekly Betas		Monthly Betas	
US SAMPLE	<u>Dec 31 / 24</u>	<u>2016-2024 Average</u>	<u>Dec 31 / 24</u>	<u>2016-2024 Average</u>
ALLETE	0.253	0.605	0.786	0.516
Alliant Energy Corporation	0.277	0.539	0.592	0.413
Ameren Corporation	0.258	0.483	0.494	0.351
American Electric Power Company, Inc.	0.187	0.496	0.551	0.314
Atmos Energy	0.407	0.540	0.708	0.432
Black Hills	0.601	0.686	0.708	0.492
CMS Energy Corporation	0.205	0.482	0.414	0.228
CenterPoint Energy	0.438	0.776	0.948	0.765
DTE Energy Company	0.290	0.572	0.694	0.491
Dominion Energy, Inc.	0.383	0.461	0.600	0.383
Duke Energy Corporation	0.173	0.453	0.478	0.280
Entergy Corporation	0.290	0.612	0.702	0.541
Evergy Inc.	0.295	0.500	0.627	0.417
Eversource Energy	0.349	0.581	0.629	0.399
MGE Energy Inc.	0.514	0.485	0.754	0.534

New Jersey Resources Corporation	0.434	0.615	0.657	0.523
NiSource Inc.	0.338	0.551	0.534	0.347
NorthWestern Corporation	0.519	0.641	0.498	0.390
Northwest Natural Holding Company	0.582	0.489	0.614	0.463
OGE Energy	0.452	0.704	0.763	0.678
ONE Gas Inc.	0.509	0.551	0.703	0.445
Portland General Electric Company	0.414	0.531	0.621	0.409
Sempra Energy	0.542	0.635	0.791	0.633
Southern Company	0.200	0.523	0.512	0.350
Spire, Inc.	0.490	0.563	0.592	0.348
Unitil Corporation	0.464	0.541	0.622	0.371
WEC Energy Group	0.180	0.457	0.467	0.233
Xcel Energy Inc.	0.046	0.453	0.433	0.295
Average	0.360	0.554	0.625	0.430

Data Source: Bloomberg, September 2025. Refer to Attachment L.

The bottom portion of Table 8 provides both weekly and monthly beta estimates for the U.S. utility sample as of December 31, 2024, as well as the eight-year average of beta estimates over the 2017-2024 period. The December 31, 2025, weekly point beta estimate average is 0.360, while the average for monthly betas is 0.625, with the weekly estimate being well below the 50-year average beta estimate of 0.55 determined by Sikes (2022) discussed above, and with the monthly estimate being above it. The eight-year average weekly beta for the U.S. sample is 0.554, while the eight-year average monthly beta estimate is 0.430. For the U.S. beta estimates in Table 8, the average of the four U.S. estimates is 0.49, which is only slightly above the Canadian average of 0.47, and is slightly below the 0.55 estimate from Sikes (2022).

As argued above, I will not consider the U.S. beta estimates, since I believe they are too risky to be legitimate comparators; although it would not make much of a difference based on the current beta estimates. Based on the evidence provided in Table 8 and combining it with long-term historical averages, it is obvious that a reasonable estimate of beta for a typical Canadian utility should lie within the 0.30 to 0.60 range. The current average of Canadian beta estimates I note above is 0.47, which is well above the long-term average of 0.35, but is very consistent my decision to use the mid-point figure of my recommended range (i.e., 0.30-0.60) of **0.45** as my best point estimate.

5.2.5 Final CAPM Estimates

While government bond yields have risen over the past few years, they still remain relatively low, both in absolute terms and by historical standards. A-rated Canadian utility bond yield spreads were sitting at 109 bp as of November 20, 2025, well below the long-term average spread of 139 bp. Generally, I adjust for any differences in this average yield spread based on research provide by analysts at the Bank of Canada that indicated that much of this increased spread is due to liquidity problems, but some still reflects increased risk premiums for even low risk companies like Canadian utilities.³² Based on this this research, I subtract half of the “below average” yield spread (i.e., $(0.109 - 0.139)/2$), or **-0.15%**, to my CAPM estimate to account for this time varying risk premium.

My Bond Yield Plus Risk Premium (BYPRP) analysis in Section 5.4 indicates that NS Power is paying about 0.35% more on its long-term debt than the average Canadian utility. Therefore, I will add this **0.35%** spread to adjust my CAPM cost of equity estimates upwards, since the CAPM estimates are based on using data available for average Canadian utilities. Finally, I add **0.50%** for financial flexibility (or flotation costs), consistent with previous current practice with several Canadian regulators. Combining these items, I provide my CAPM estimates for the required equity return for the typical regulated Canadian utility, which are reported in the table below. Based on these calculations my CAPM analysis suggests an ROE of **6.84%**.

³² Refer to: A. Garcia and J. Yang, “Understanding Corporate Bond Spreads Using Credit Default Swaps,” Bank of Canada Review, Autumn 2009.

TABLE 9
CAPM ESTIMATES – NOVEMBER 2025

Estimate	RF (%)	MRP (%)	Beta	Spread Adjust. (%)	Debt Cost Spread (%)	Financial Flex. (%)	Ke (%)
CAPM Best Estimate	3.66	5.5	0.45	-0.15	0.35	0.50	6.84%

5.3 Discounted Cash Flow (DCF) Estimates

5.3.1 DCF Model Overview

I use two approaches to apply the DCF model to estimate the appropriate ROE for regulated Canadian utilities using data as at the end of 2024 to:

1. find the implied rate of return for the overall market, which should be significantly higher than that for the average utility company which is much less risky than the average company in the market (and which serves as a useful upper bound for utility Ke estimates); and,
2. apply the models at the industry level using numbers that are representative of a typical publicly-traded utility company in Canada.

The model requires start of period market data and is based on estimating cash flows from now to infinity.

The Dividend Discount Model (“DDM”) is a commonly used DCF model that assumes common shares can be valued according to the present value of their expected future cash flows, as represented by dividends. The constant-growth (or single-stage growth) version of the DDM is a simplification of the broader model that holds if we assume that the growth in dividends (and earnings) is expected to occur at the same annual rate indefinitely (i.e., to infinity). The constant-growth model can be represented as:

$$\text{Price} = D_0(1 + g) / (K_e - g) = D_1 / (K_e - g)$$

Where,

Price is the firm’s most recent common share market price

D_0 represents the dividends paid over the most recent 12-month period
 g represents the expected long-term average growth rate in dividends and earnings
 K_e represents the required returns by a firm's common shareholders.

The single-stage DDM is convenient in the sense that it can be easily arranged to solve for the implied rate of return on common shares, as follows if we know their current price and dividends, and can estimate a long-term consistent growth rate:

$$K_e = (D_0/\text{Price}) \times (1 + g) + g$$

5.3.2 Market DCF Estimates

Table 1 showed that real GDP growth has averaged 2.3% over the 1992 to 2024 period, which provides one potential estimate of long-term growth that could be used in the single-stage model, since one might expect long-term growth for the overall market to gravitate towards this figure. Similar assumptions are commonly made by financial analysts. The average forecast for real GDP growth for Canada for 2025 provided in Table 3 was 1.18%, which is virtually identical to the 1.2% forecast from the Bank of Canada in its October 2025 MPR. The Bank further predicted 1.1% real GDP growth for 2026, which is below the average forecast of 1.3% from other financial organizations – so the mid-point of these estimates is 1.2% (the same as the 2025 estimates).

Of course, we are trying to estimate a “nominal” required rate of return, so we should use nominal GDP growth as “ g .” We can estimate nominal growth rates by applying the 2% Bank of Canada inflation target, which generates the following long-term nominal Canadian GDP growth rate estimates that correspond to the real growth rates noted above of 4.3% (long-term average) and 3.2% (2025 and 2026 forecasts) - where 3.75% or **3.8%** represents the mid-point of these figures. These growth rates are in line with those used by security analysts when they use single-stage growth models to value securities (i.e., they usually use numbers in the 3-5% range when they use single period models).

The dividend yield for the S&P/TSX Composite Index as of December 31, 2024, was 2.83%. This is the “lagged” dividend yield (i.e., D_0/Price) since it is estimated using dividends over

the most recent 12-month period. Substituting the average nominal GDP growth estimate of 3.8% noted above into the single-stage DDM equation provided above, we get the following estimate for the implied equity return for the market as a whole for 2024:

$$K_e = (0.0283) \times (1.038) + .038 = 0.0674 \text{ or } \mathbf{6.74\%}$$

Despite the limitations of the model, and with the simplifying assumption of constant growth indefinitely, this estimate seems reasonable; albeit slightly low. For example, while it is below my long-term forecast for expected market returns of 7.5%, it is well above the average forecast for future Canadian stock market returns of 5.6% found in Table 7.

We can overcome one limitation of the single-stage growth model (which assumes constant growth in dividends from now to infinity) by using a variation of the DDM, called the H-Model. The H-Model is a multi-stage growth version of the DDM, and using a multi-stage growth model seems to make sense in this situation. In particular, given the below long-term average GDP growth estimates during 2025 and 2026 due to global trade tensions, it makes sense to account for this fact and not assume this will be a long-term result. The H-model assumes that growth in dividends moves in linear fashion from some current short-term growth rate (defined as g_s) toward some long-term growth rate (defined as g_L) over a specified period of time, defined as $2H$, where H is hence defined as the “half-life.” It also offers the advantage that, similar to the single-stage DDM, it can be rearranged to determine a finite solution for K_e , which is shown below:

$$K_e = (D_0/\text{Price}) \times [(1 + g_L) + H(g_s - g_L)] + g_L$$

The average 2025 and 2026 real GDP growth forecasts of 1.2% can be translated into a 3.2% nominal GDP growth rate. I will use this as my short-term growth rate (g_s), and I will use the historical long-term GDP nominal growth rate average of 4.3% as the long-term growth rate (g_L). Assuming it takes four years to get back to this long-term expected growth rate, then we would use $H = 2$, which provides an estimate for K_e of **7.19%**.

Combining the results from the two DDM models, we get estimates for K_e for the market in the 6.74-7.19% range. Taking the mid-point of these two estimates, we arrive at **6.97%** as my

best estimate of the implied return on the market using DCF models, which is below my 7.5% estimate for future market returns. DCF models will work better in aggregate than for Canadian utilities, which leaves us with the issue of how to adjust these figures into a reasonable implied return for utilities that possess considerably less risk than the average company in the market. At minimum, we could say that the market DCF estimates suggest that utility returns should be *lower than 7%*.

5.3.3 Canadian Utility DCF Estimates

I will now apply both of the DCF models discussed above to the utilities' samples. Of course, determining the inputs here is somewhat trickier than for the broad market. A common way of estimating the growth rate for companies is to determine the company's **sustainable growth rate**, which can be estimated by multiplying the earnings retention ratio (which equals "1 – payout ratio")

$$g = (1 - \text{payout ratio}) \times \text{ROE}.$$

The intuition behind the use of this formula is that growth in earnings (and dividends) will be positively related to the proportion of each dollar of earnings reinvested in the company multiplied by the return earned on those reinvested funds, which can be measured using ROE. For example, a firm that retains all its earnings and earns 8% on its equity would see its equity base grow by 8 percent per year. If the same firm paid out all of its earnings, it would not grow. It should work quite well for utility firms that pay a significant proportion of their earnings out as dividends, and that possess relatively stable ROE figures that are generally close to allowed ROEs, which do not usually fluctuate by large amounts.

Estimating future earnings growth rates using the sustainable growth rate represents an approach that is included in the CFA curriculum and in numerous academic textbooks, and is widely used in practice. In contrast, relying upon sell-side analyst growth estimates in DCF models, which are known to be overly optimistic, will lead to invalid estimates of K_e when using DCF models. For example, a study by Easton and Sommers³³ estimates the "optimism"

³³ Source: Easton, Peter D., and Gregory A. Sommers. "Effect of Analysts' Optimism on Estimates of the Expected Rate of Return Implied by Earnings Forecasts." *Journal of Accounting Research* 45 no. 5 (December 2007), pp. 983-1016.

1 bias in analysts' growth forecasts inflates final DCF cost of equity estimates by an average of
2 2.84%. J. Randall Woolridge also noted this analyst forecast optimism bias on page 44 of his
3 evidence provided during the Nova Scotia Power 2022-24 General Rate Case (M1043), and
4 provided his own empirical analysis of U.S. electric and gas utilities over the 1985-2021
5 period. He found that (bold added for emphasis) "the mean forecasted EPS growth rate is over
6 **200 basis points above** the actual EPS growth rate."

7
8 The use of these overly optimistic growth forecasts often leads to adopting growth rates for
9 utility earnings and dividends that exceed expected growth in the economy (i.e., nominal GDP
10 growth), which is simply not realistic for mature, stable operating utilities operating within a
11 defined region. For example, Cornell (2010) notes that GDP growth provides an upper limit
12 on future EPS growth, and further that future real GDP growth averaging above 3% is unlikely
13 for developed markets.³⁴ Appendix D of my evidence provides greater details regarding these
14 matters.

15
16 Table 10 below includes summary statistics on the 2018-2024 average dividend yields, payout
17 ratios and ROEs for both the Canadian and U.S. utility samples that were included in Table 8.
18 This data can then be used to estimate sustainable growth rates for the utilities, and ultimately
19 the implied required rate of return using my two DCF models. Panel A reports the average,
20 median, maximum and minimum figures for the Canadian sample over the 2018-2024 period
21 for dividend yield ("DY"), payout ratios³⁵, and ROEs. Panel B reports the same statistics for
22 the U.S. sample. The working papers for Table 10 (and Table 11) are appended to my evidence
23 as Attachment M.

24
25 The summary statistics included in Panel A of Table 10 appear reasonable for a typical
26 regulated and publicly-traded Canadian utility in several regards. High dividend yields
27 averaging 5.2% and the corresponding high payout ratios averaging 76.6% are in line with
28 historical figures, and are consistent with the high dividend paying nature of such profitable,
29 slow growing firms. The ROE average of 7.5% is also reasonable; albeit slightly low. The

³⁴ Source: Bradford Cornell, "Economic Growth and Equity Investing," *Financial Analysts Journal* (January-February 2010).

³⁵ Payout ratios were "capped" at 100% to control the influence of extreme payouts on averages - this process obviously had no effect on the reported medians.

statistics for the U.S. sample included in Panel B are also reasonable. It is noteworthy that the average dividend yield of 3.5% and the average payout ratio of 68% are both well below the corresponding figures for Canadian utilities, indicating that U.S. firms are priced higher and maintain lower dividend payouts than Canadian utilities. The U.S. sample ROE average of 9.5% is much higher than that for the Canadian sample, which is consistent with the observation that allowed ROEs are generally higher in the U.S. than in Canada.

TABLE 10
DCF INPUT ESTIMATES – 2018-2024 FIGURES

	2018-2024 Avg DY	2018-2024 Avg Payout	2018-2024 Avg ROE
<u>Panel A</u> <u>(Canadian Sample)</u>			
Average	5.17	76.55	7.51
Median	5.41	78.65	7.06
Max	6.70	88.69	12.30
Min	3.91	62.60	-0.07
<u>Panel B (U.S. Sample)</u>			
Average	3.52	67.92	9.49
Median	3.34	68.17	9.87
Max	6.22	69.71	10.60
Min	2.04	65.64	7.22

Data Source: Morningstar at www.morningstar.ca, September 2025.

It is difficult to find “typical” or representative Canadian regulated publicly-traded utilities. However, using averages and medians (which offset to some extent the influence of extreme observations) provides a useful starting point. Column 2 Table 11 provides estimates of sustainable growth rates (g) using the ROE and payout averages and medians reported in Table 10. These are calculated using the formula above (i.e., $g = (1 - \text{payout}) \times \text{ROE}$), as reported in Column 2 using the averages and medians for the 2018-24 ROEs and payout figures. The average and median growth rates are 1.76% and 1.51% respectively, with a mid-point of 1.64%. This seems reasonable for mature low-risk, regulated utilities that should be expected to grow slower (but steadier) than average firms and overall GDP growth in the 3.2-4.3% range discussed previously. The average and median growth rates for the U.S. sample are higher at 3.05% and 3.14% respectively (mid-point 3.10%), reflecting both the lower payout ratios and the higher ROEs of U.S. utilities.

1 It is important to recognize with respect to growth rates used in DDM estimates that the long-
2 term growth rate of nominal GDP should be viewed as a “ceiling” for long-term rates used in
3 this model, as I have argued previously. For example, the AUC noted in the 2018 Alberta
4 GCOC Decision (bold added for emphasis) that:

5
6 The Commission recognizes that the utilities are, as Dr. Cleary stated in his evidence,
7 essentially monopolies in mature markets and, because of this, **the use of long-term**
8 **growth in excess of the long-term growth of GDP is unreasonable.**³⁶
9

10 Further, even the assumption of nominal GDP growth (i.e., average growth) estimated
11 previously as 3.3-4.3% is an ambitious target for regulated utilities that operate virtual
12 monopolies in mature markets, with little opportunity for dramatic growth, as also
13 acknowledged previously by the AUC, in the 2013 GCOC Decision:

14
15 However, the Commission is also mindful that, as both experts acknowledged, **the**
16 **GDP growth rate may be an ambitious target** for long-run earnings growth in
17 respect of low-risk, mature, utilities.³⁷
18

19 In other words, **growth estimates that exceed GDP growth should not be used in constant-**
20 **growth versions of DCF models.** Given the upward bias of **analyst growth estimates** noted
21 above and discussed in detail in Appendix D, they **should not be used** – either in constant-
22 growth DCF models or in multi-stage DCF models. I note that Concentric uses analyst
23 forecasts provided by Zacks, SNL, Value Line and Seeking Alpha in their single-stage DCF
24 estimates that produce average growth forecasts of 5.50% for its Canadian proxy group, 6.76%
25 for its U.S. proxy group and 6.36% for its North American proxy group, and which leads to a
26 single-stage DCF ROE estimates of 10.43%, 11.07% and 10.74% respectively. These growth
27 rates **exceed Concentric’s own estimate of future nominal GDP growth** of 4.04% in
28 Canada, 4.14% in the U.S. and 4.12% for North America. As such, Concentric’s constant-
29 growth DCF estimate should be disregarded, as in fact Concentric chose to do.
30

³⁶ Decision 22570-D01-2018, 2018 Generic Cost of Capital, page 92, para. 438.

³⁷ Decision 2191-D01-2015, 2013 Generic Cost of Capital, para. 190 [emphasis added] [footnote omitted].

However, as discussed in Section 3, Concentric used these growth estimates exceeding expected nominal GDP growth in its multi-stage DCF growth estimates, which should also be disregarded. In particular, its multi-stage DCF model assumes the higher analyst average growth rates of 5.50%, 6.76% and 6.36% respectively exists **for a full 5 years**, then gradually decline over the **following 5 years** to stable long-term growth rates of 4.04%, 4.14% and 4.12% equal to its estimates of average long-term nominal GDP growth. Therefore, this approach assumes that utilities' earnings and dividends will **grow at rates above nominal GDP growth for 10 years, then will grow at estimated nominal GDP growth from year 11 to infinity**. Hence, this approach implicitly assumes earnings and dividends will grow from now to infinity at an average rate "above" expected nominal GDP growth (i.e., since they would grow above estimated nominal GDP growth for 10 years and then fall to nominal GDP growth for years 11 to infinity).

TABLE 11
SINGLE STAGE DDM ESTIMATES

	Implied g (2018-24)	Implied Ke (2018-24 g and 7-year DY)
<u>PANEL A: Canadian Sample</u>		
Average	1.76	7.02
Median	1.51	7.00
Mid-Point of Average and Median		
g = 1.64%		Mid-Point Ke = 7.01%
<u>PANEL B: U.S.</u>		
Average	3.05	6.67
Median	3.14	6.58
Mid-Point of Average and Median		
g = 3.10%		Mid-Point Ke = 6.63%

The final two columns in Table 11 report the Ke estimates that are derived using the single-stage DDM and inputting the appropriate growth estimates from column 2 or 3 along with the corresponding dividend yield (reported in Table 10). Recall this formula can be represented as follows when we begin with the dividend yield based on dividends over the previous 12 months: $Ke = (D_0/Price) \times (1 + g) + g$.

1 The Canadian sample Ke average and median estimates are virtually identical at 7.02% and
2 7.00%, so I will use the mid-point of **7.01%** as my best single-stage DDM estimate (before
3 flotation costs). Since this is above my 6.74% single-stage growth DDM estimate for the
4 market, and about equal to my overall DDM market estimate of 6.97%, 7.01% can be
5 considered high since regulated utilities are considerably less risky than the average company.
6 If we add 50 basis points for flotation costs, we end up with a best estimate of **7.51%**. While I
7 do not use the U.S. Ke estimates, the overall average would be 6.63% (before flotation costs
8 adjustments), 0.38% below my 7.01% estimate for the Canadian sample.

9
10 Similar to the approach used above to estimate Ke for the market, I would normally also apply
11 the H-Model to estimate the implied rate of return for a typical Canadian utility using the 2024
12 average and median payout ratios and ROEs to determine the estimated short-term growth
13 rate (g_s), and using the 2018-24 longer term averages for payout ratios and ROEs and to
14 estimate the longer term growth rate (g_L). However, due to a negative average ROE of -0.07%
15 (driven by a -29.6% ROE for Algonquin) and abnormally high payout ratios during 2024, the
16 estimated average (median) sustainable growth rates for 2024 are -0.01% and 0.00%, both of
17 which seem unreasonably low, and would lead to unrealistically low Ke estimates. Therefore,
18 I will rely solely on my single-stage DDM estimate, even though it is slightly high, as discussed
19 above.

20
21 As before, I will use only my Canadian sample estimates for Ke, for the reasons discussed
22 above. Therefore, my Ke DDM estimate for the Canadian sample is 7.01% plus a 0.35% cost
23 of debt adjustment plus a 0.50% allowance for flotation costs, or **7.86%**. I would note that this
24 is 0.38% above my U.S. DDM estimate of 7.48% (if we also add 0.35% plus 0.50% to the
25 6.63% estimate). As discussed previously, this estimate of 7.01% (before adjustments) is only
26 slightly below my market return estimate of 7.5%, and it is well above current estimates of
27 finance experts of 5.6%. It is also virtually identical to my overall DCF estimate for the market
28 of 6.97%, so it seems slightly high for below-average risk utilities relative to overall expected
29 market returns.

5.4 Bond Yield Plus Risk Premium (BYPRP) Estimates

The BYPRP approach adds a risk premium (generally in the 2-5% range) to the yield on a firm's outstanding publicly-traded long-term bonds. This risk premium is not to be confused with the market risk premium used in CAPM, which represents the premium above government risk-free yields and expected market stock returns. The BYPRP approach is depicted below:

$$K_e = \text{Company's Bond Yield} + \text{Company Risk Premium}$$

It is more widely used by analysts and CFOs than DCF approaches; albeit not used as much as the CAPM. In particular, evidence suggests this approach is used by 43 percent of financial analysts³⁸ and by over 50 percent of Canadian CFOs.³⁹

The intuition behind the approach is that we are able to use typical relationships between bond and stock markets, along with information that can be readily obtained from observable *market-determined* bond yields, to estimate a required rate of return on a firm's stock. In other words, since stocks are riskier than bonds, we know that investors will require a higher return to invest in a firm's stocks than its bonds. The riskier the company, the greater the difference between these required returns (i.e., the greater the risk premium).

This approach employs solid intuition. For one thing, it overcomes technical issues that arise when beta estimates are suspect due to extreme market movements, such as those observed during the early 2000s, or difficulties in estimating future growth rates in dividends and earnings. In fact, as a risk-based model, there is a relationship with the CAPM in several ways. For example, the firm's yield on outstanding debt will be related to RF, as well as to yield spreads which will vary with market conditions, just as the MRP does in the CAPM. Also, we can "adjust" the risk premium applied to a particular firm according to its riskiness - one measure of which might be by making reference to its typical beta (i.e., lower company risk premiums should be used for firms with lower betas and vice-versa).

³⁸ Model Selection from "Valuation Methods" Presentation, October 2007, produced by Tom Robinson, Ph.D., CFA, CPA, CFP®, Head, Educational Content, CFA Institute. Copyright 2007, CFA Institute.

³⁹ H. Kent Baker, Shantanu Dutta and Samir Saadi, "Corporate Financial Practices in Canada: Where Do We Stand" Multinational Finance Journal 15-3, 2011.

The first step in applying the BYPRP approach is to obtain an estimate of the current market cost of long-term debt. As of November 20, 2025 the yield on long-term A-rated Canadian utility bonds was 4.75% according to the Bloomberg data used to construct Figure 3. This figure is close but slightly below the average “mid-point” yield of 4.83% on bonds outstanding for the six Canadian utilities provided below as of November 20, 2025 (according to Bloomberg):

Description	S&P	Fitch	DBRS	Moody's	Maturity Date	Bid Yield	Ask Yield	Mid-Point
Fortis Alberta Inc	A-		A(low)	Baa1u	Oct-52	4.799	4.737	4.768
Fortis BC Inc			A(low)	Baa1	Jul-47	4.966	4.898	4.932
CU Inc		A	A(high)		Nov-50	4.783	4.736	4.7595
Enbridge Gas Inc	A-		A		Nov-50	4.842	4.795	4.8185
Hydro One Inc	A		A(high)	A3	Dec-51	4.771	4.718	4.7445
Nova Scotia Power Inc	BBB-		BBBH		Mar-42	4.968	4.915	4.9415
As of Nov 20, 2025					Average	4.855	4.800	4.827

This evidence implies that 4.8% is a good estimate of the current bond yield for Canadian utilities, while the mid-point yield for NS Power is slightly higher at 4.94%. I will use 4.94% as the starting point for my BYPRP estimate, since I am estimating the cost of equity for NS Power.

The table above shows that the November 20th yield on NS Power bonds maturing in March 2042 was 4.94%, which is 0.15% above the 4.79% average for the other five utilities. This is reflective of the fact that the other five utility yields presented had higher debt ratings than NS Power – with A and/or A- ratings, and with all of them having at least one A- rating. However, 4.94% is only slightly above the yield of 4.93% for Fortis BC Inc.’s bonds which are rated slightly lower than the bonds for the other four utilities (i.e., A(low) - DBRS; Baal1 - Moody’s), and that matured closer to the date of NS Power’s bonds (July 2047).

Aside from NS Power having a lower credit rating than the other utilities, it is noteworthy that the NS Power bonds have a shorter maturity than the other five bonds (about 16.5 years), versus maturities of 22 years (Fortis BC Inc.), and four others with maturities in the 25-27 year range. This would also impact the yield on NS Power bonds relative to longer maturity bonds because

the yield curve was slightly upward sloping at the long end of the curve in November 2025. For example, as of November 25, 2025, the “average” Canada yield across all Canada bonds with maturities greater than 10 years was 3.58%, the long-term Canada yield was 3.61%,⁴⁰ while the yield on 20-year Canada bonds was 0.20% lower at 3.41%.⁴¹ Adding a 0.20% maturity spread to the 0.15% spread noted above for the NS Power bond yield versus the average for the other five utilities suggests NS Power is paying about 0.35% more on its long-term debt than the other Canadian utilities. As discussed, I have previously used this **0.35% spread** to adjust my CAPM and DCF cost of equity estimates upwards, since those estimates were based on using data available for average Canadian utilities.

We now need to determine the appropriate risk premium to add to NS Power’s 4.94% cost of long-debt. As mentioned, the usual range is 2-5%, with 3.5% being commonly used for average risk companies, and lower values for less risky companies. Given the low-risk nature of Canadian regulated utilities, a low-risk premium is appropriate, suggesting the use of a 2-3% range, with a best estimate of 2.5%. Combining this information, I obtain the following estimate for K_e according to this approach: $K_e = 4.94 + 2.5 = 7.44\%$

If we add 50 bp for flotation costs, we end up with a K_e estimate **7.94%**. This is virtually identical to my market estimate of 7.5% (if we subtract the 0.50% flotation cost adjustment); therefore, it seems on the high side for low-risk Canadian utilities (including NS Power). It is also well above my CAPM estimate of 6.84% for Canadian utilities and only 8 bp above my DCF estimate of 7.86% (which is also high).

5.5 Price-to-Book Ratios and Equity Returns

Table 10 reported a 2018-2024 average ROE for the 5 Canadian utilities in the Canadian sample of 7.51%. This figure is well below the 2024 allowed ROE for NS Power for example of 9%. This allowed ROE is also higher than the average earned ROE for the Canadian sample of publicly listed utilities; albeit most of those utilities are holding companies that hold assets in several jurisdictions that are riskier than most Canadian jurisdictions, and most also hold some unregulated assets. This indicates that 9% is a very healthy allowed ROE, which is in

⁴⁰ Source: <https://www.bankofcanada.ca/rates/interest-rates/canadian-bonds/>, November 25, 2025.

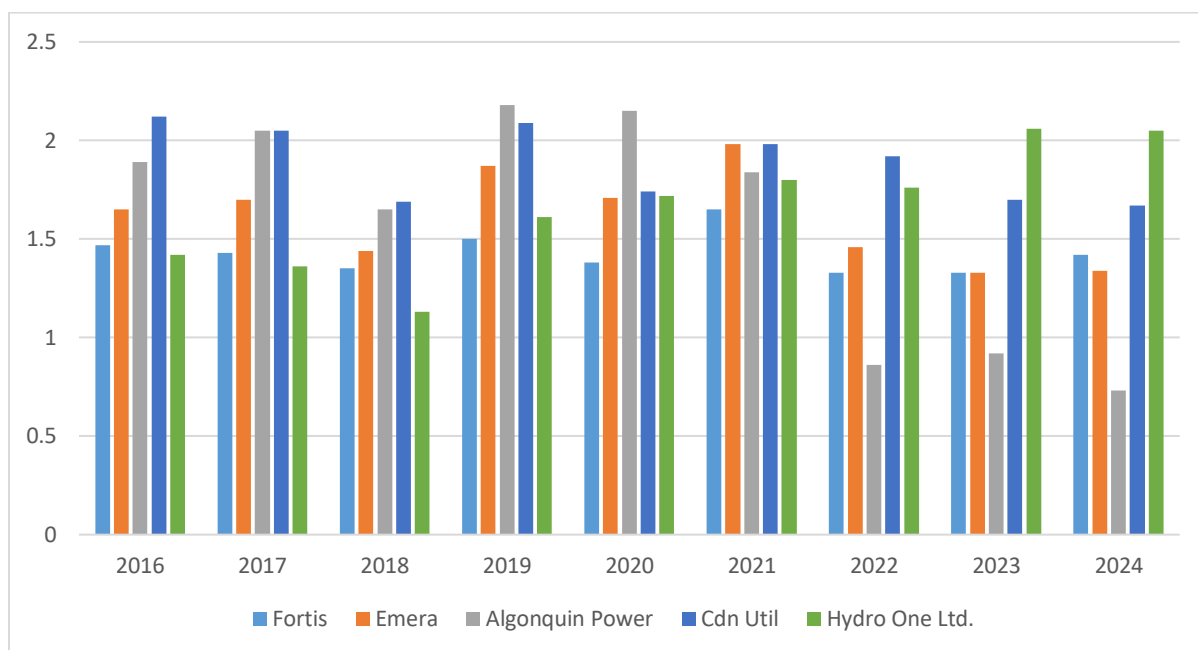
⁴¹ Source: <https://www.marketwatch.com/investing/bond/tmbmkca-05y?countrycode=bx>, November 25, 2025.

1 fact well above the required equity return estimates (after adding flotation costs) I previously
2 determined using the CAPM, DCF and BYPRP approaches, with best estimates of 6.84%,
3 7.86% and 7.94% respectively.

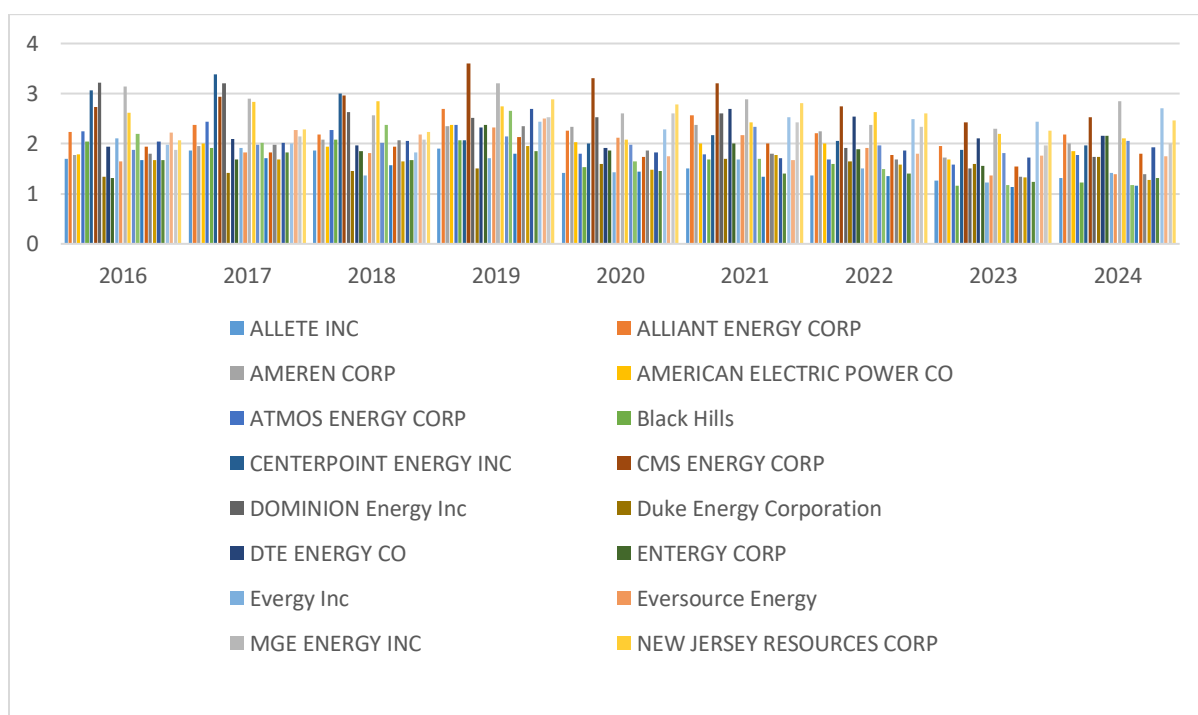
4
5 In this section, I examine the relationship between allowed ROEs, earned ROEs and investor
6 required returns on equity by making reference to P/B ratios and stock returns. I begin by
7 considering the P/B ratios over the 2018-2024 period for the Canadian and U.S. utility samples
8 examined previously in the DCF analysis. The individual P/B ratios for the Canadian sample
9 are presented in Panel A of Figure 13. It is obvious from the chart that almost all of the ratios
10 are above one throughout the entire period, with the exception of the P/B ratio for Algonquin
11 in 2022, 2023 and 2024. Panel B presents the P/B ratios for the U.S. sample over the same
12 period, and none of the individual P/B ratios was ever less than one. Table 12 provides
13 summary statistics for the two samples. Panel A shows that the average P/B ratio for Canada
14 ranged between 1.44 and 1.85 over the period, averaging 1.61. Panel B shows that the average
15 P/B ratio for the U.S. sample was greater than the Canadian average every year, ranging from
16 1.69 to 2.36 and averaging 2.00 over the 2018-2024 period. The working papers for Figure 13
17 and Table 12 have been appended to my evidence as Attachment N.

FIGURE 13
UTILITY P/B RATIOS – 2016-2024

Panel A: Canadian Sample



Panel B: U.S. Sample



Data Source: Morningstar at www.morningstar.ca.

TABLE 12
P/B RATIO SUMMARY STATISTICS (2018-2024)

Panel A: Canadian Sample

<u>All Utilities</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2018-24 Average</u>
Average	1.45	1.85	1.74	1.85	1.47	1.47	1.44	1.61
Median	1.44	1.87	1.72	1.84	1.46	1.33	1.42	1.58
Max	1.69	2.18	2.15	1.98	1.92	2.06	2.05	2.00
Min	1.13	1.50	1.38	1.65	0.86	0.92	0.73	1.17

Panel B: U.S. Sample

<u>All Utilities</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2018-24 Average</u>
Average	2.09	2.36	1.99	2.11	1.95	1.69	1.84	2.00
Median	2.065	2.36	1.885	2.01	1.9	1.64	1.825	1.96
Max	3	3.6	3.31	3.21	2.75	2.44	2.85	3.02
Min	1.36	1.5	1.41	1.34	1.35	1.14	1.16	1.32

Data Source: Morningstar at www.morningstar.ca.

Generally speaking, higher P/B ratios indicate greater future growth opportunities, and firms that have P/B ratios greater than one are earning rates of return that are at least “fair,” if not above fair. This is consistent with the AUC’s statement in the 2011 Alberta GCOC Decision. The AUC confirmed the usefulness of P/B ratios in the 2013 Alberta GCOC Decision, noting:

Overall, the Commission confirms its findings in Decision 2011-474 that an examination of a given company’s P/B ratio in isolation is unlikely to provide a foundation for definitive conclusions regarding the establishment of a specific ROE for regulatory purposes. However, it also considers that such information, where available, may supplement an investigation into the perceived fitness of a regulated utility with a view to determining the adequacy of a utility’s awarded ROE to ensure that it is sufficiently able to attract investment in the capital markets at reasonable rates and maintain its financial integrity.⁴²

The constant-growth DDM can actually be rearranged to show that the appropriate P/B ratio can be expressed as:⁴³ $P/B = (ROE - g) / (K_e - g)$

⁴² Decision 2191-D01-2015, 2013 Generic Cost of Capital, para. 221.

⁴³ This is true if we use the following sustainable growth rate for “g” in the DDM: $g = (1 - \text{payout}) \times ROE$.

This expression implies that P/B ratios will be greater than one if actual ROE > Ke, will equal one if Ke = ROE, and will be less than one when ROE < Ke (which implies they are earning excess economic rent). This is all very intuitive – firms that earn a return on their equity above the cost of that equity will increase firm value. We can use the equation above to estimate the implied cost of equity (Ke) for given values for P/B, ROE and g. For the Canadian sample, we can examine the 2024 average ratio of 1.44 for P/B. I will use 1.64% as an estimate for “g” since it is the mid-point of the average growth rate of 1.76% and the median growth rate of 1.51% that were provided in Table 11. Calculations provided in Attachment N show that if we used the current allowed ROE of 9% for NS Power as our ROE input, we would get an implied Ke figure of **6.75%**. If we instead used the median 2024 ROE of 7.53% for the Canadian sample as our ROE input (as per Table 10), we would get an implied Ke figure of **5.73%**, while if we used the 2018-24 average ROE of 7.51% (as per Table 10), the implied Ke would be **5.72%**. For the U.S. sample, we can use the 2024 average ratio of 1.84 for P/B and 3.10% for “g” (i.e., the mid-point of the growth rate of 3.05% and the median growth rate of 3.14% that were provided in Table 11). If we used the current allowed ROE of 9% for NS Power as our ROE input, we would get an implied Ke figure of **6.31%**, while if we used the average 2018-2024 ROE of 9.49% for the U.S. sample, we would get an implied Ke figure of **6.57%**.

Both the Canadian and U.S. implied Ke estimates are well below my final ROE estimate for Canadian utilities of **7.6%** (but that estimate also includes adding 0.35% for NS Power debt costs to the CAPM and DCF estimates, and 0.5% for flotation costs to all three Ke estimates). While I do not assign any weight to this estimate for purposes of determining Ke, the bottom line of this analysis is that the P/B ratios for utilities reported above indicate that Canadian utilities appear to be earning a more than satisfactory ROE, and have done so for quite some time. This is important **market-based** information that supports my Ke estimates, and confirms that Canadian (and U.S.) utilities earn ROEs well in excess of their required equity return.

5.6 Summary of ROE Calculations

I have weighted all three of my Ke estimates equally because all three methods are used in practice and provide different perspectives on Ke. As discussed previously, CAPM is more heavily relied upon in practice due to its conceptual advantages. For example, returning to the

previous studies that were cited with respect to the DCF approaches to estimating K_e , they were used by:⁴⁴

- only 15% of U.S. CFOs - versus over 70% for CAPM;⁴⁵
- about 12% of Canadian CFOs - versus close to 40% for CAPM.⁴⁶
- Not widely used, while CAPM was used by the majority of investors.⁴⁷

CAPM is also more intuitive from the point of view of a utility cost of capital hearing. In particular, it has a direct relationship to financing costs (i.e., RF and MRP). The CAPM also makes a direct adjustment for the risk of utilities relative to the market, unlike DCF models, since it has a direct measure of risk (i.e., beta) included in the model. In addition, there are uncertainties associated with determining some of DCF input estimates for pure play regulated Canadian industries, as discussed earlier.

I also give equal weighting to the BYPRP approach which is much more widely used than DCF approaches due to its intuitive nature, and because it adjusts for market-determined borrowing rates and risk. In fact, the BYPRP approach is more widely used than CAPM by Canadian CFOs, as mentioned earlier. Thus, the BYPRP approach accounts for interactions between company debt costs and equity markets, and as such it is intuitively sound.

Based on an equal weighting of the three approaches, I determine the following best estimate for allowed Canadian utility ROEs:

$$\begin{aligned} K_e &= 1/3 \text{ CAPM} + 1/3 \text{ DCF} + 1/3 \text{ BYPRP} \\ &= (1/3)(6.84) + (1/3)(7.86) + (1/3)(7.94) = 7.55\%, \text{ or } \mathbf{7.6\%} \end{aligned}$$

⁴⁴ DCF estimates of K_e were not used by any of the analysts in the Robinson (2007) survey, in which 68% used CAPM. This is because the focus was on which discount rate would be used “in” DCF models, so the use of a discount rate determined by such models would be inappropriate, since it lead to a “circular argument.”

⁴⁵ Graham, John R., and Harvey, Campbell R. “The Theory and Practice of Corporate Finance: Evidence from the Field.” *Journal of Financial Economics* 60 (2001), pp. 187–243.

⁴⁶ H. Kent Baker, Shantanu Dutta and Samir Saadi, “Corporate Financial Practices in Canada: Where Do We Stand” *Multinational Finance Journal* 15-3, 2011.

⁴⁷ J. B. Berk and J. H. van Binsbergen, 2017, “How Do Investors Compute the Discount Rate? They use the CAPM,” *Financial Analysts Journal*, Vol. 73, No. 2: pp. 25–32.

1 This estimate is reasonable, albeit slightly high, when compared to average expected long-term
2 overall stock market returns of 5.6% and my long-term expected market return of 7.5%
3 (without any flotation charges added), when we consider the low-risk nature of regulated
4 utilities.

5 **6. CAPITAL STRUCTURE RECOMMENDATIONS**

6 **6.1 NS Power's Credit Rating Reports**

7 NS Power's January 2025 debt ratings are BBB high (stable) from DBRS Morningstar
8 (DBRS); and, BBB-(stable) from S&P. Both reports mention the \$117 million received from
9 the provincial government for fuel-adjusted regulatory assets and the \$500 million federal loan
10 guarantee as favorable developments during 2024 that allowed it to reduce debt.

11
12 The DBRS report lists "**low-risk regulated electricity business**" as its number one factor
13 affecting its business risk assessment; while S&P rates NS Power's business risk as "**strong.**"
14 Both reports also recognize that NS Power has significant generation assets, which increases
15 its business risk profile relative to other Canadian operating utilities, many of which are almost
16 exclusively transmission and distribution companies.

17
18 NS Power also benefits from the slightly higher debt ratings of its parent Emera Inc., which is
19 BBB (stable) from both S&P and Fitch. For example, S&P notes "The stable outlook on NSPI
20 reflects the stable outlook of its parent Emera, as well as our expectation that NSPI's FFO to
21 debt will average about 10-11% through 2026." Meanwhile, in its financial risk assessment,
22 DBRS notes that NS Power has a "reasonable financial profile."

23 **6.2 The Cost of Debt for NS Power**

24 As of November 20, 2025, the yield on long-term A-rated Canadian utility bonds was 4.75%
25 according to the Bloomberg data used to construct Figure 2. This figure was slightly above the
26 November 20, 2025, average yield of 4.83% on the bonds outstanding for the six Canadian
27 utilities provided previously in Section 5.4, at which time the yield on NS Power bonds
28 maturing in March 2042 was 4.94%. As discussed in Section 5.4, since the NS Power bonds
29 had a shorter maturity than the other five bonds (about 16.5 years), this would impact the yield

on NS Power bonds because the yield curve was slightly upward sloping at the long end of the curve in November 2025.

NS Power's bond yield of 4.94% as of November 20, 2025, is above the 4.79% average for the other five utilities, which is reflective of the fact that the other five utility yields presented had mostly A or A- ratings, and all of them had at least one A- rating. However, it was not that large a spread, and shows that NS Power's cost of debt remains very reasonable. In fact, 4.94% is only slightly above the yield of 4.93% for Fortis BC Inc.'s bonds at the time whose debt is rated slightly lower than the bonds for the other four utilities (i.e., A(low) - DBRS; Baa1u - Moody's) and that mature closer to those for NS Power (July 2047). In other words, NS Power is able to attract debt capital at rates that are only slightly above other similar low-risk Canadian utilities.

6.3 NS Power's Ability to Earn its Allowed ROE

A useful way of reviewing the performance of utilities is to examine their ability to earn their allowed ROEs on a consistent basis. Table 13 reports the earned versus allowed ROEs for NS Power from 2012 to 2024, which ranged from 9.4% in 2012 to 7.88% in 2020.⁴⁸ The table shows that since 2012, NS Power has on average earned its allowed ROE, and has exceeded its allowed ROE in 8 of 12 years; although it earned slightly below it for three of the last four years. This evidence shows that NS Power has been able to consistently earn its allowed ROEs since 2012, and can be considered a positive indicator that it possesses low total risk

Table 13
NS Power Allowed versus Earned ROEs

	Earned	Allowed	Difference
2012	9.40	9.2	0.20
2013	9.24	9	0.24
2014			
2015	9.25	9	0.25
2016	9.25	9	0.25
2017	9.25	9	0.25
2018	9.25	9	0.25
2019	9.25	9	0.25
2020	7.88	9	-1.12
2021	9.08	9	0.08

⁴⁸ I was unable to find the earned ROE for NS Power for 2014.

2022	8.65	9	-0.35
2023	8.28	9	-0.72
2024	8.74	9	-0.26
Average	8.96	9.02	-0.06
Median	9.25	9.00	0.22

6.4 NS Power's Financial Risk and Credit Metrics

As noted in Section 6.1, the January 2025 DBRS report notes that NS Power has a “reasonable financial profile,” while S&P noted “The stable outlook on NSPI reflects the stable outlook of its parent Emera, as well as our expectation that NSPI’s FFO to debt will average about 10-11% through 2026.”

Table 14 below reports the three main credit metrics considered by each of DBRS and S&P from 2018 to 2023, as well as the September 2024 estimated ratios from DBRS, the estimated 2024 S&P ratios, the 2025 and 2026 forecast metrics by S&P, and the forecast metrics provided by NS Power in response to NS Power (NSEB - CLEARY) IR-01 Attachment 1.

TABLE 14
NS POWER DBRS AND S&P CREDIT METRICS (2020-2026)

Year	S&P			DBRS		
	Debt/EBITDA	FFO/DEBT (%)	FFO/Cash Interest	CF/Debt (%)	Total Debt (%)	EBIT Interest Coverage
2020	6.0	12.0	3.8	12.6	66.6	2.02
2021	5.9	11.9	3.7	12.9	66.3	1.97
2022	7.2	8.3	3.0	9.8	69.9	1.58
2023	7.0	9.3	2.9	9.9	66.3	1.39
2024 (estimate)	5.5-6.5*	10.0-11.0*	2.5-3.5*	10.7**	64.5**	1.32**
2025 (forecast)	6.0-7.0*** 6.3****	10.0-11.0*** 10.6****	3.0-3.5*** 3.2****	12.2****	61.0****	2.4****
2026 (forecast)	6.0-6.5*** 6.8****	10.5-11.5*** 11.3****	3.0-3.5*** 3.6****	11.2****	61.2****	2.5****

* Estimated 2024 metrics from S&P.

** September 2024 estimated metrics from DBRS.

*** Forecast metrics from S&P.

**** Forecast metrics from NS Power in response to NS Power (NSEB-Cleary) IR-01 Attachment 1.

Table 14 shows that NS Power’s DBRS metrics have generally been at the top end of the BBB rating range and bordering on (or slightly in) the A range. For example, according to page 8 of DBRS’ June 2024 discussion of its methodologies for rating regulated utilities, it reports the following guidelines it uses to conduct its Financial Risk Assessment (FRA) of “fully regulated utilities with only moderate exposure to nonregulated operations”:

Regulated Utility – FRA Metrics				
Metric	AA	A	BBB	BB/B
Cash flow-to-debt (%)	> 17.5	12.5 to 17.5	10.0 to 12.5	0.0 to 10.0
Debt-to-capital (%)	< 55	55 to 65	65 to 75	75 to 90
EBIT-to-interest (x)	> 2.8	1.8 to 2.8	1.5 to 1.8	1.0 to 1.5

While S&P does not provide a similar table to that for DBRS with respect to regulated utilities and credit rating categories, it is worth noting that on page 59 of its November 19, 2013 publication entitled “Criteria / Corporates/ General: Corporate Methodology,” it provides the following guidelines for credit metrics for “Low Volatility,” which would generally apply to credit metrics for regulated utilities such as NS Power, which S&P rated as “Strong” for business risk in its January 2025 ratings report.

Cash Flow/Leverage Analysis Ratios--Low Volatility

	--CORE RATIOS--		--SUPPLEMENTARY COVERAGE RATIOS--	
	FFO/DEBT (%)	DEBT/EBITDA (X)	FFO/CASH INTEREST (X)	EBITDA/INTEREST (X)
Minimal	35+	Less than 2	More than 8	More than 13
Modest	23-35	2-3	5-8	7-13
Intermediate	13-23	3-4	3-5	4-7
Significant	9-13	4-5	2-3	2.5-4
Aggressive	6-9	5-6	1.5-2	1.5-2.5
Highly leveraged	Less than 6	Greater than 6	Less than 1.5	Less than 1.5

Comparing NS Power's S&P historical and forecast credit metrics from Table 14 to these categories shows that despite S&P's overall financial risk rating for NS Power of "aggressive" the Debt/EBITDA metric is the only one that falls into this category, with the FFO/Debt ratio falling consistently in "significant" range of 9-13, and the FFO/Cash Interest metric falling in the "intermediate" range of 3-5.

6.5 Summary

Overall, this section highlights that NS Power is a low-risk Canadian utility; however, it is slightly riskier than the average A-rated Canadian operating utility. This conclusion is consistent with the following main points regarding NS Power discussed in the sub-sections above:

1. Its debt ratings of BBB high (stable) from DBRS Morningstar (DBRS) and BBB- (stable) from S&P are both considered stable.
2. Both ratings providers recognize its low business risk as a strength.
3. Its financial risk profile is reasonable and consistent with its current ratings.
4. It is able to attract debt capital at rates that are only slightly above other similar low-risk Canadian utilities with slightly higher debt ratings.
5. NS Power's credit metrics are consistent with its BBB (High) and BBB- debt ratings from a financial risk perspective, and given its low level of business risk, which was acknowledged by both rating agencies.

While NS Power's currently allowed (and requested) 40% ER is above my previous recommendations for Alberta T&D utilities and two large T&D Ontario utilities, I believe the additional equity thickness is reasonable for NS Power given the somewhat lower debt ratings of NS Power (BBB- Stable – S&P; BBB(High) Stable – DBRS) relative to those Canadian utilities. In addition, NS Power contains a higher percentage of generational assets than those utilities; however, it does benefit from the higher debt ratings of its parent Emera Inc. Therefore, I believe a 40% allowed equity ratio is reasonable.

APPENDIX A

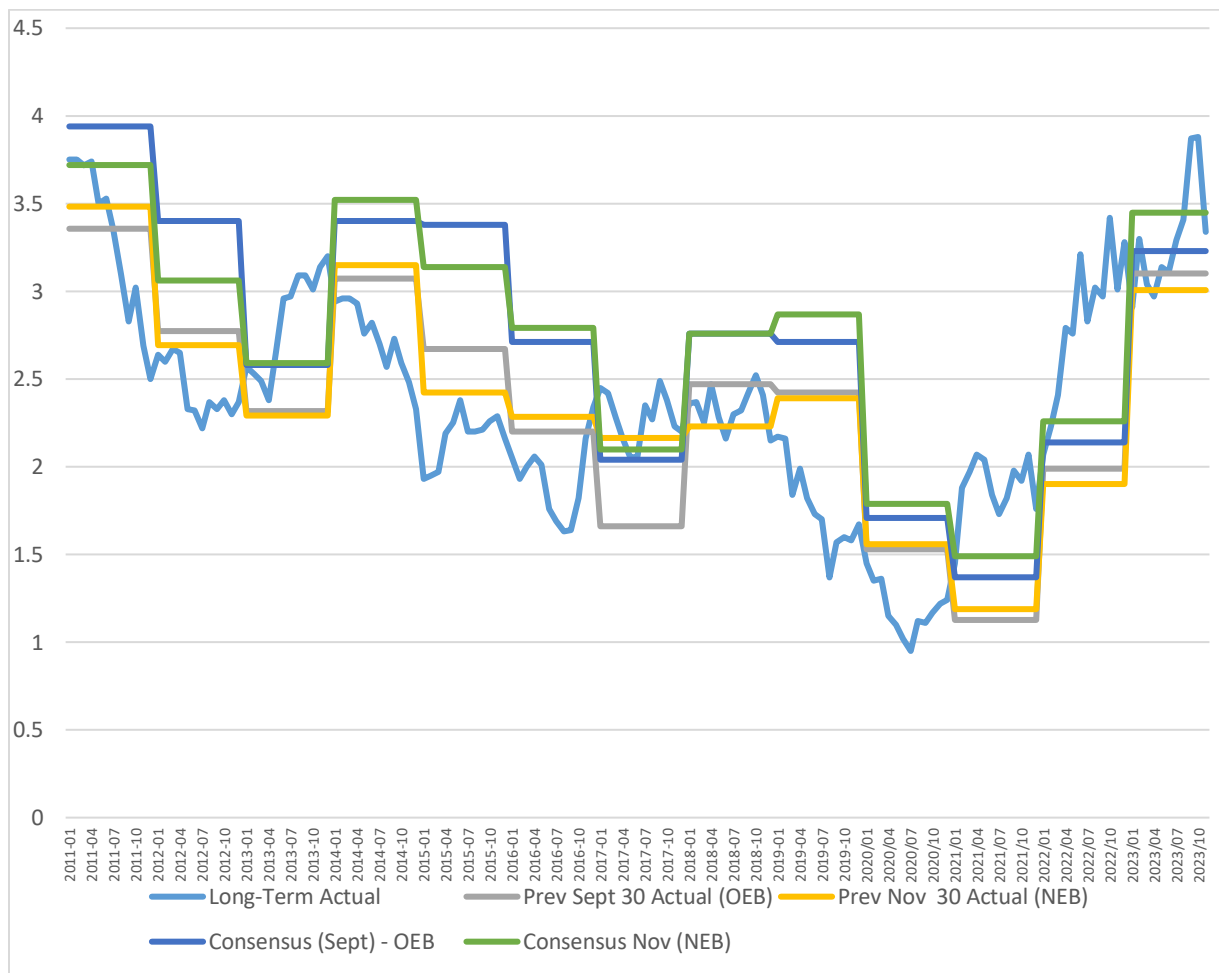
Using Actual Yields versus Economists' Forecasts

I have consistently argued that using Consensus yield forecasts to as a proxy for future 30-year Canada yields has led to an **upward bias** relative to the subsequent actual yields that prevail. This bias does disappear when we simply use the prevailing 30-year rate as close as possible to the start of the period – for example using the actual yield on September 30th or November 30th as the risk-free rate for the upcoming year. In other words, forecasters are often wrong, while existing rates offer the benefit of a starting point that reflects actual yields (i.e., yields that investors can actually achieve today), rather than forecasts which may or may not materialize. In addition to the inaccuracy associated with 10-year yield forecasts, the use of Consensus 10-year yield forecasts is simply the starting point. This is because we must then obtain another “estimate” – i.e., the spread between 10 and 30-year yields, which varies through time, and hence is also subject to estimation errors. For example, while this spread averaged +0.40% over the 2004-2023 period, it has been as low as -0.23% and as high as +0.81%.

In this section of my evidence below I pick up on the points made above and examine the forecasting ability of Consensus forecasts at the beginning of test periods, versus simply using actual prevailing long-term government yields. In particular, I compare the actual prevailing 30-year government bond yields to forecasts of these yields obtained using adjusted Consensus forecasts from September in the previous year (as used by the OEB) and from November of the previous year (as previously used by the National Energy Board (NEB)). I consider forecasts based on using RF forecasts based on the actual long-term government yields as of September 30th and November 30th in the previous calendar year. Figure A1.1 depicts the results of this analysis using data over the 2011-2023 period. Figure A1.1 demonstrates clearly that both the September (OEB) and November (NEB) Consensus yield forecasts were consistently much higher than the actual prevailing rates during the subsequent test periods. For example, while the average actual 30-year government yield over the period was 2.57%, the average September (November) Consensus forecasts was 0.37% (0.38%) higher at 2.94% (2.95%). These figures indicate an **upward bias** over this 13-year period of **about 0.4%**, which is substantial. In contrast, the average forecast yields using the previous actual

September 30th (November 30th) yields was 2.58% (2.57%) – virtually the same as the average for the actual prevailing yields of 2.57%. Table A1.1 shows that using Consensus forecasts would have added an average excess allowed ROE of 0.4% (borne by the consumer), when used in the OEB formula (and also in terms of CAPM cost of equity estimates), whereas using actual prevailing RF rates would have been unbiased on average. The working papers for Figure A1.1 and Table A1.1, below, are appended as Attachment O to my evidence.

FIGURE A1.1
LONG-TERM CANADA BOND YIELDS VERSUS FORECASTS (2011-2023)



In order to examine the statistical significance of the differences in forecasting accuracy, I estimate the mean squared error (MSE) of forecasts and present them in Table A1.1. This analysis shows that the MSE for September and November Consensus forecasts are 0.509 and 0.445 respectively. These MSEs are close to double the corresponding MSE estimates using

previous September and November actual yields (i.e., 0.272 and 0.241). The t-tests provided in Table A1.1 show that the differences in MSE estimates are statistically significant when comparing those determined using actual yields to Consensus forecasts, but the differences are insignificant between using September and November actuals, and between using September and November Consensus forecasts. In other words, using beginning of test period actual long-term government rates as a forecast for future RF values would provide statistically significantly better forecasts of long-term government yields. I revisit this evidence in Section 5.2 when I discuss my RF estimate for the CAPM.

TABLE A1.1
STATISTICS FOR LONG-TERM CANADA BOND YIELD FORECASTS
(2011-2023)

	Difference using Sept. 30 Actual Yields	Difference using Nov. 30 Actual Yields	Difference using September Consensus Forecast	Difference using November Consensus Forecast
Average	-0.015	0.002	-0.369	-0.377
Median	-0.151	-0.066	-0.440	-0.470
Max	1.432	1.518	1.280	1.160
Min	-1.052	-1.020	-1.450	-1.500
StdDev	0.523	0.492	0.612	0.552
Mean Squared Error (MSE)	0.272	0.241	0.509	0.445
t-tests (MSE vs Consensus OEB)	-4.292***	-4.883***		
t-tests (MSE vs Consensus NEB)	-5.356***	-5.878***	1.295	
t-tests (MSE Actual Sept vs Actual Nov)	0.877			

*** indicates statistically significant at the 1% level

Concentric recently documented an identical +0.40% bias of forecasts derived using Consensus data to forecasts for 30-year Canada yields over the 2011-2023 period in the evidence it provided in the 2024 Ontario Energy Board (OEB) proceedings dealing with the “2024 REVIEW OF COST OF CAPITAL PARAMETERS AND DEEMED CAPITAL STRUCTURE” (EB-2024-0063). Specifically, in Exhibit N-M2-7-AMPCO/IGUA-1 IGUA-AMPCO, in response to IR-1 (b-d), Concentric confirmed the following (bold added for

emphasis):

b) The “OEB Deemed Long-Term Debt Rate” is provided annually by the OEB in its Cost of Capital Parameter Calculations. **It is the 10-year Government of Canada Consensus Forecast**, plus the actual spread of the 30-year over 10-year Government of Canada bond yields, plus the actual A-rated utility bond yield spread over 30-year Government of Canada bond yields.

c) Concentric confirms that the cited reference indicates that the actual long-term debt cost rates have exceeded the OEB’s deemed long-term debt cost rate **by an average of 40 basis points since 2010.**

d) Concentric **confirms** that, as stated in the Concentric report, the average difference between the OEB’s deemed long-term debt cost rate and the Bloomberg index has been 40 basis points since 2010, and that that figure is approximately **the same as the “about 0.4%” difference found by Dr. Cleary when he compared average actual 30-year government yields from 2011-2023 to average September (November) Consensus forecasts.**

This upward bias in forecast bond yields has been noted by others, including J. Randall Woolridge on page 52 of his evidence provided during the Nova Scotia Power 2022-24 General Rate Case (M1043): “As stated before, forecasts of higher interest rates have been notoriously wrong for a decade.”

The fact that using existing rates would have worked much, much better than using Consensus forecasts over the 2011-2023 period is well-supported by academic studies. For example, a study by Hafer and Hein (1989) shows that economic forecasters do not perform any better than using futures rates, and perform **worse** than naïve forecasts (i.e., simply using the existing rates). In particular, this study shows that naïve forecasts perform the best under one of their measures of accuracy, while using interest rate futures performs best under their other measure of forecasting accuracy. Economic forecasters, on the other hand, perform worst under both measures of forecast accuracy. Similarly, a 2005 study by Mitchel and Pearce (2007) examined the six-month-ahead forecasts of Treasury bill and Treasury bond rates from 1982 to 2002. This study found that: “Most economists’ forecast accuracy is statistically indistinguishable from a random walk model in forecasting the Treasury bill rate, but many are significantly worse in forecasting the Treasury bond rate and the exchange rate.” Yet another study by

1 Spiwoks, Bedke and Hein (2008) examined 10-year US government bond yield and three-
2 month US Treasury bill rate forecast accuracy for the 1989 to 2004 period. They found that
3 “sign accuracy is significantly better than random walk forecasts in only a very few of the
4 forecast time series.” This indicates forecasters are not very successful in simply forecasting
5 the direction of future interest rates. Not surprisingly, they further find that “the information
6 content of most of the forecast time series is lower than that of the naïve forecasts.”
7

APPENDIX B

Comparing the Risk of Canadian Utilities to U.S. Utilities

The DBRS Morningstar January 15, 2025, debt rating report for NS Power identified “low-risk regulated electricity business” as the #1 consideration in its business risk assessment, while the January 28, 2025, S&P rating report rated NS Power as “strong” in terms of business risk. Similarly, debt rating reports have consistently suggested that Ontario and Alberta transmission and distribution utilities possess very low business risk, which is often viewed as their number one strength by debt rating agencies. The same can likely be said for most other Canadian regulated utilities that operate in supportive regulatory environments. Certainly, it is easy to see that such regulated utilities have very low business risk when compared to companies operating in other industries that are non-regulated, that face greater demand variability, greater competition, and that do not have as great of an ability to flow through increases in their costs to their customers.

One effective way to evaluate overall utility risk is to examine their ability to earn their allowed ROEs, as I did for Ontario-based Enbridge Gas (and previously Union Gas) in 2023 evidence (*IGUA_EB-2022-0200_EVD_Sean Cleary_20230421*) that was submitted to the OEB as part of the Enbridge Gas rebasing application (EB-2022-0200), and as I did for Alberta regulated utilities in 2022 in evidence (*27084-X0320 2023-02-01 Evidence of Dr. Sean Cleary*) submitted during the Alberta 2023 Generic Cost of Capital Proceeding (#27084). My Ontario evidence showed that Enbridge Gas earned ROEs above the allowed ROEs for 33 straight years from 1990 to 2022, and that over the entire period it earned ROEs that exceeded allowed ROEs by an annual average (median) of 1.09% (1.10%). My Alberta evidence similarly showed that Alberta utilities earned ROEs above the allowed ROEs on average every year from 2006 to 2021, and that over the entire period they earned ROEs that exceeded allowed ROEs by an annual average (median) of 0.81% (0.93%) with a revenue-weighted annual average of 1.12%. This is bottom line empirical evidence showing that regulated Canadian utilities in general have low risk, specifically in Alberta and Ontario.

While I have not conducted such an analysis for U.S. utilities, I can point to two sources that did so using broad samples of US utilities, both of which provide strong evidence that **the**

1 **average U.S. utility earns well below their allowed ROE!** For example, a recent Oliver
2 Wyman report on North American utilities suggested that the “average utility **does not earn**
3 **its allowed return on equity.**”⁴⁹

4
5 Even stronger support for this conclusion can be found in an empirical study by Azgad-Tromer
6 and Talley (2017). This study examined allowed ROEs versus actual ROEs using observations
7 from all 50 states as well as four Canadian provinces over the 2005-2016 period.⁵⁰ The study
8 contained predominantly U.S. observations, with only 18 of the 544 observations being from
9 Canada. Hence their finding that “awarded ROEs appear to overshoot realized ROEs by
10 between 1.5 and 1.75 percent...” can be seen as a strong indication that U.S. utilities do not on
11 average earn their awarded ROE. In fact, it seems they significantly fall short of doing so, with
12 average (median) **under-performance of 1.79% (1.45%)** according to Figure 4 of their study.
13 Clearly, it is inappropriate to compare the Canadian utilities to U.S. utilities, which amounts
14 to comparing apples to oranges.

15
16 Aside from referencing these sources of evidence regarding US utilities’ inability to earn their
17 awarded ROE, another approach to comparing the riskiness of Canadian utilities to that of US
18 utility proxy groups is to compare the volatility in earned ROEs. ROE volatility is a measure
19 of total risk (i.e., business and financial risk), since business risk influences operating income
20 volatility while financial leverage influences net income volatility. Using the coefficient of
21 variation of earned ROEs (i.e., $CV(ROE)$)⁵¹ as an ROE volatility measure, I have recently
22 provided evidence showing that U.S. utilities displayed **much greater volatility in ROEs**. In
23 particular, my 2023 OEB evidence showed that the average $CV(ROE)$ across US utilities over
24 the 2013-22 period was 0.446, which was more than three times larger than the 1990-2022
25 average for Enbridge Gas (EG) of 0.133, and was **more than six times larger** than EG’s 2013-
26 2022 average of 0.069. I documented similar results in my 2022 Alberta evidence which
27 examined the $CV(ROE)$ for Alberta utilities over the 2005-2021 period and U.S. utilities over

⁴⁹ Source: Page 10 of “North America Utilities: Still a Smart Bet for the New Grid,” Oliver Wyman, 2015.

⁵⁰ Source: S. Azgad-Tromer and E. Talley, “The Utility of Finance,” Working Paper, Columbia University
(<https://www.semanticscholar.org/paper/The-Utility-of-Finance-Azgad-Tromer-Talley/c5913d92dc6600974956b13c9383bee6f61b731b>).

⁵¹ The $CV(ROE)$ is determined by dividing the standard deviation (SD) of the ROE by the average ROE value. The rationale for using the CV as a measure of ROE volatility, rather than simply using the SD is that the SD is affected by the size of the average ROE. In other words, firms with larger ROEs would have higher SDs, even if they have less volatility, simply because the level of the ROEs figures used to determine the SD are higher.

1 the 2016-2021 period. These results also showed that the U.S. utilities displayed much greater
2 volatility in ROEs than the Alberta utilities with average and median CV(ROE) figures for
3 U.S. utilities of 0.380 and 0.230, which were **much higher** than the corresponding figures of
4 0.136 and 0.145 for Alberta utilities.

5
6 The analysis and discussion above clearly shows U.S. utilities possess greater risk than
7 Canadian utilities. This is hardly surprising given that this sample is comprised of holding
8 companies with various ownership structures and a variety of exposures to risks to which
9 Canadian utilities are not exposed – at least not to the same extent. Appendix C provides further
10 support for this fact, showing that despite having higher ERs, U.S. utilities have greater betas
11 than their Canadian counterparts.
12

APPENDIX C

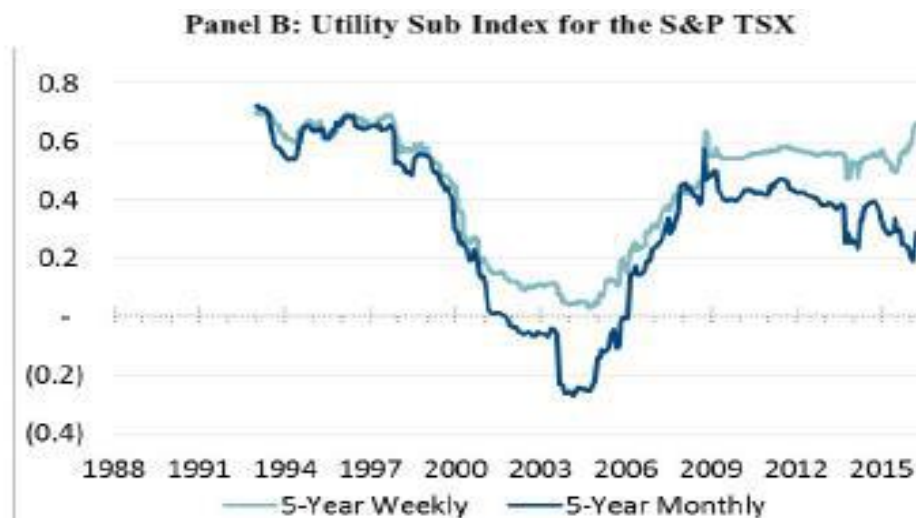
Beta Estimation

In order to apply the CAPM, we require beta estimates. I copy below two figures and some of the discussion from previous Alberta GCOC proceedings, that discusses historical beta estimates:

1. I make reference to Figure 6 at page 45 of Dr. Villadsen's rebuttal evidence in the 2016 Alberta GCOC proceedings (Attachment 20622-X0457), which was referenced in VILLADSEN-UCA-16 2017NOV21-014, and is reproduced below. It depicts 5-year rolling monthly and weekly beta estimates calculated (1) over the 1988-April 2016 period for Dr. Booth's sample of Major Canadian Utility Holding Companies (Panel A); and, (2) over the 1992-April 2016 period for the Utility Sub Index for the S&P TSX (Panel B).

Figure 6: Comparison of Historic 5-Year Monthly and Weekly Betas¹³⁶
Panel A: Simple Average of Booth's Major Canadian Utility Holding Companies





The average beta estimate over the 28-year 1988-2016 period in Panel A (for Dr. Booth's sample) is **0.35**, while the maximum is 0.63, and the minimum is -0.05. The average beta estimate in Panel B (for the Utility Sub-Index) is **0.32** for the TSX sample and **0.31** for the Booth sample, while the maximum is 0.72 for the TSX sample and 0.52 for the Booth sample, while the minimums are -0.27 (TSX sample) and -0.05 (Booth sample). The graphs make it very clear that nowhere during this entire period do the beta estimates even come close to 1.0 (i.e., the Booth sample never has a beta estimate exceeding 0.63, while the TSX sample never has a beta estimate exceeding 0.72). This long-term evidence strongly refutes using betas that are adjusted toward one, given long-term average betas in the 0.31-0.35 range, with beta estimates never exceeding 0.63-0.72. Clearly, such an adjustment of beta estimates towards one makes no intuitive sense, since they have never even come close to 1.0 in practice.⁵²

2. I next turn to the evidence provided by Mr. Hevert in the 2018 Alberta GCOC proceedings. Chart 20 and Chart 21 on page 79 of Mr. Hevert's evidence depict the historical raw beta estimates for his Canadian Utility sample over the 1995-2017 period using five years of weekly data (Chart 20) and using five years of monthly data (Chart 21). I reproduce these two charts below.

Chart 20: Canadian Utility Proxy Group Unadjusted Beta Coefficients –

⁵² For future reference, I note that adjusted betas (i.e., Bloomberg, Value Line, etc.) are determined using the following equation, which adjusts a raw (unadjusted) beta towards "1": $\text{Beta}(\text{adjusted}) = (2/3)(\text{Raw Beta}) + (1/3)(1)$.

Weekly Return over Five Years

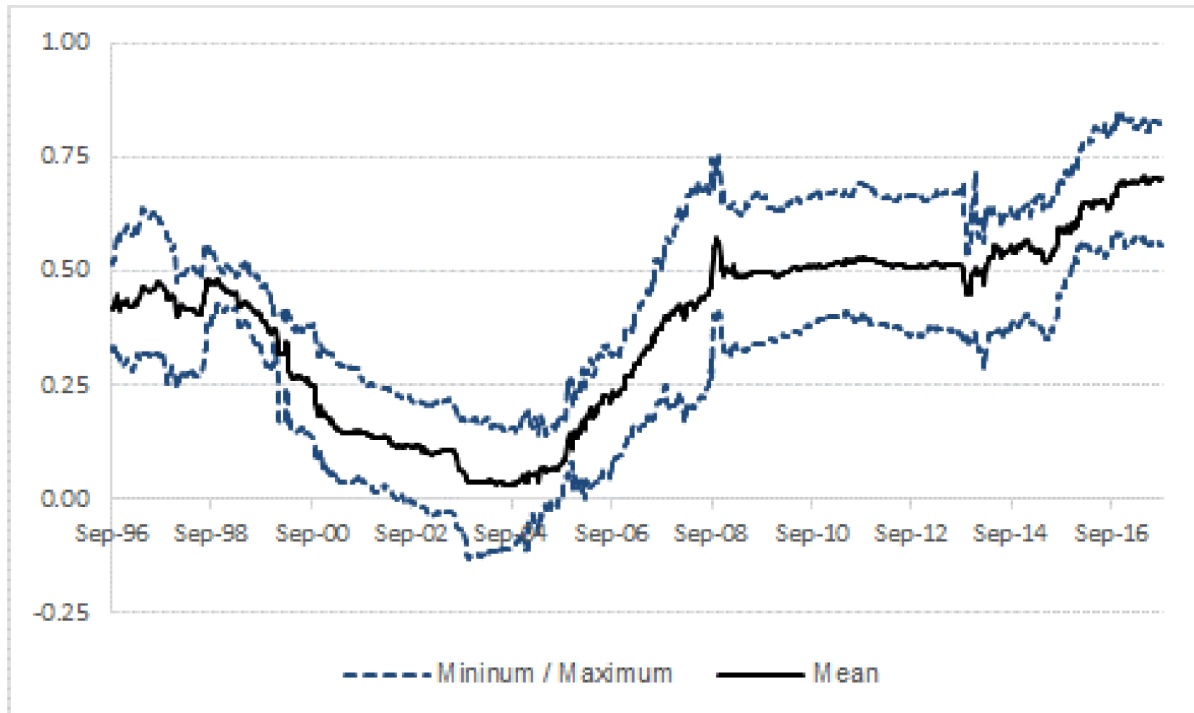
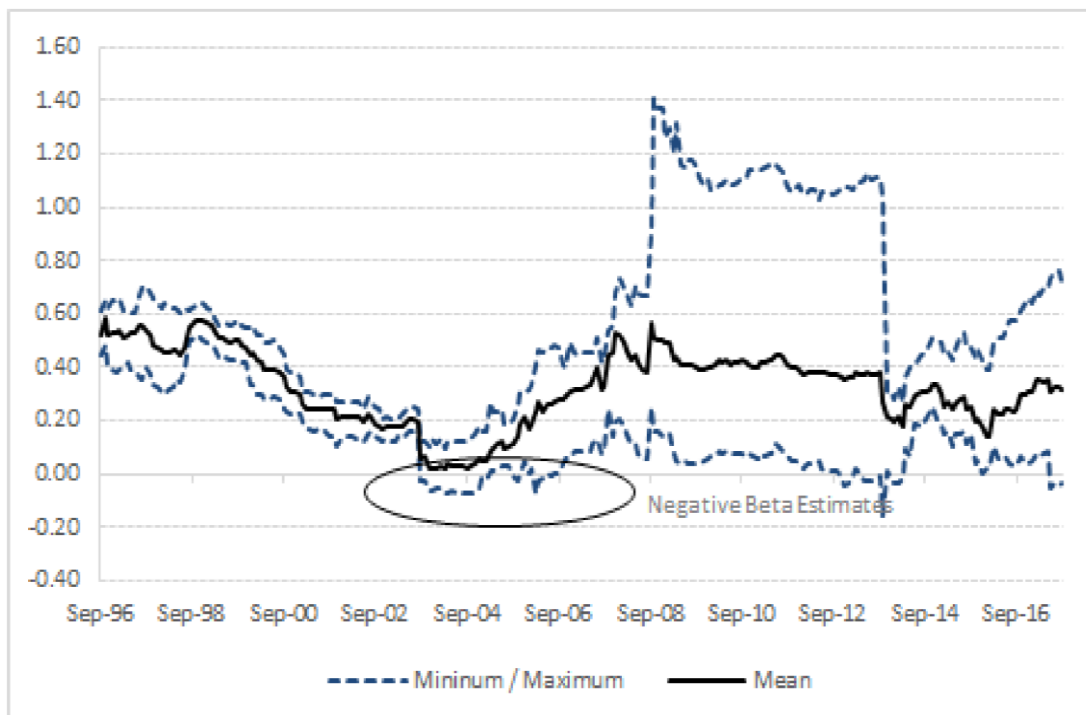


**Chart 21: Canadian Utility Proxy Group Unadjusted Beta Coefficients –
Monthly Return over Five Years**



Mr. Hevert confirmed in response to HEVERT-UCA-2017NOV21-026(c) that the following statistics for Charts 20 and 21 are correct:

Chart 20 (weekly data): Average – 0.38 / Median – 0.43 / Max – 0.71

Chart 21 (monthly data): Average – 0.34 / Median – 0.37 / Max – 0.61

Notice that the reported averages here of 0.34 and 0.38 are consistent with those provided in Dr. Villadsen’s 2016 rebuttal evidence between 0.31 and 0.35 evidence. Also, similar to the charts provided in Dr. Villadsen’s 2016 rebuttal evidence, these two charts (i.e. Charts 20 and 21) clearly show that nowhere during this entire 22-year period do the Canadian Utility beta estimates even come close to 1.0, with maximum values of 0.71 and 0.61. This evidence confirms the fact that it makes no sense to adjust betas toward one.

Charts 22 and 23 on page 80 of Mr. Hevert’s 2018 evidence also depicts the historical raw beta estimates for his U.S. Utility sample over the 1995-2017 period using five years of weekly data (Chart 22) and using five years of monthly data (Chart 23). Mr. Hevert confirmed in response to HEVERT-UCA-2017NOV21-026(e) that the following statistics for Charts 22 and 23 are correct:

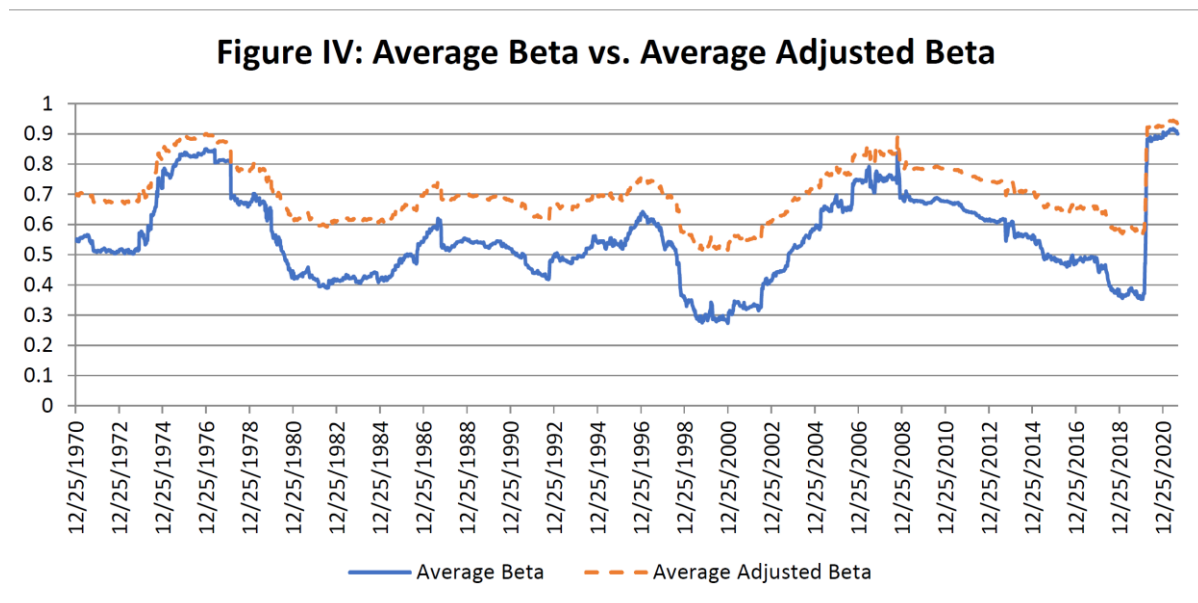
Chart 22 (weekly data): Average – 0.51 / Median – 0.52 / Max – 0.83

Chart 23 (monthly data): Average – 0.43 / Median – 0.47 / Max – 0.82

These two charts for U.S. utilities show that nowhere during this entire 22-year period do the U.S. Utility beta estimates even come close to 1.0.

The evidence above is consistent with the conclusions of Sikes (2022) regarding U.S. utility betas, who notes (pages 46-47) that in his study “Using adjusted betas instead of the appropriate unadjusted betas increased the CAPM estimate by ~100 basis points.” He went on to note that this was consistent with the findings of Michelfelder and Theodossiou (2013) “who showed empirically that utility betas do not have a tendency to converge to 1.0 and concluded that the adjusted betas as reported by Value Line are not applicable for public utilities.”

Sikes provided a chart (Figure IV) depicting raw versus adjusted betas for U.S utilities over a 50-year period, from 1970-2020, which I have copied below:



Source: Page 48 of Sikes (2020).

Sikes went on to note (page 48) that: “It is undeniable based on Figure IV that the Value Line Adjustment is inappropriate. Clearly, utility betas have been consistently below 1.0 and as shown in Attachment II of the Appendix, the historical sample suggests an average of 0.55.” I would further note that the line depicting adjusted betas in Sikes’ chart is **always** above the line depicting actual betas – this is the definition of a biased estimator – in this case **upwardly biased**. Since the raw or unadjusted beta is used to predict the actual relationship between market returns and security returns (in this case utility returns), using adjusted betas will provide upwardly biased estimates of betas for future returns, as it always has done.

Notice that the average of 0.55 noted by Sikes (2022) for U.S. utilities is higher than the Canadian average noted above, which is closer to 0.35. Charts 22 and 23 of Mr. Hevert’s evidence also show that the U.S. utility beta estimates have consistently exceeded those of Canadian utilities, with long-term averages of 0.51 and 0.43, which are 34.2% and 26.5% higher than his corresponding Canadian weekly and monthly average estimates of 0.38 and 0.34. In fact, however, this difference in Canada-U.S. beta estimates understates the true difference in risk, since the estimated betas are “levered” betas (i.e., they do not adjust for differences in the leverage ratios of the companies used to estimate them). The reason this is misleading is because U.S. utilities display higher levered betas, despite the fact they should be expected to have lower leverage ratios on average (i.e., since U.S. utilities have higher allowed equity ratios).

To illustrate the impact that leverage differences would make, I note from Figure 28, page 76 of Dr. Villadsen’s evidence in the 2018 Alberta GCOC proceeding that the 2017 allowed equity ratios for U.S. Natural Gas, Electric and Electric T&D are 48.7%, 48.6% and 48% respectively, versus 39.6% for all Canadian utilities. These suggest debt-equity (D/E) ratios of (51.5/48.5) for U.S. utilities and (60/40) for Canadian utilities. Using the Hamada equation used by Mr. Hevert in his 2018 evidence (page 103, equation [12]), and the 27% tax rate that he used in applying this equation, we can obtain the following equivalent “relevered” U.S. beta estimates that can be compared to the Canadian levered beta estimates of 0.38 and 0.34:

U.S. (monthly) beta estimate = 0.43:

1st: Unlever accounting for U.S. leverage ratios:

$$B(\text{unlevered}) = B(\text{levered}) / \{[1 + (1 - \text{Tax rate})(D/E)]\}$$

$$= 0.43 \{[(1 + (1 - .27))(51.5/48.5)]\} = 0.43 / \{1.837\} = 0.234$$

2nd: Relever accounting for Canadian leverage ratios:

$$B(\text{levered}) = B(\text{unlevered}) \times \{[1 + (1 - \text{Tax rate})(D/E)]\}$$

$$= 0.234 \{[(1 + (1 - .27))(60/40)]\} = 0.234 \times \{2.595\} = \mathbf{0.61}$$

U.S. (weekly) beta estimate = 0.51:

1st: Unlever accounting for U.S. leverage ratios:

$$B(\text{unlevered}) = 0.51 / \{1.837\} = 0.278$$

2nd: Relever accounting for Canadian leverage ratios:

$$B(\text{levered}) = 0.278 \times \{2.595\} = \mathbf{0.72}$$

So, in fact the “comparable” U.S. beta historical averages of 0.61 (monthly) and 0.72 (weekly) are **much, much higher** than (i.e., **almost double**) the comparable Canadian beta estimates of 0.34 and 0.38, after accounting for leverage differences. The implied “unlevered” U.S. betas (0.234 monthly; 0.278 weekly) are **almost double** those for the Canadian utilities (0.131 monthly; 0.140 weekly) using D/E ratios of 0.515/0.485 for U.S. utilities and using D/E ratios of 0.60/0.40 for Canadian utilities. This historical data provides strong evidence to suggest that in determining allowable ranges for regulated Canadian utilities, the Commission should **not** consider U.S. utility beta estimates.

The examination of the historical evidence above confirms the following three important facts:

1. Canadian utility beta estimates have averaged somewhere between 0.20 and 0.40 – with **0.35** representing the best estimate.

2. Canadian utility beta estimates have never come close to one, with maximum values in the 0.6-0.8 range. Neither have U.S. utility beta estimates ever come close to one for that matter. Hence **the use of traditional adjusted betas is totally inappropriate.**

3. U.S. utility beta estimates are significantly higher than those for Canadian utilities, and should not be considered.⁵³ This is consistent with the higher level of business risk associated with U.S. utilities.

Based on these observations, I recommend the following approach for determining reasonable beta estimates, which can be used when we observe a wide spread in beta estimates:

1. Ensure beta estimates are from reasonable comparators – i.e., **exclude U.S. utility beta estimates.**

2. Do not use traditional “adjusted beta” estimates, which are based on the inaccurate assumption that utility betas gravitate towards one in the long run. If there is a desire or need for a “mechanical approach” to adjusting current beta estimates, simply adjust them toward the long-term average of 0.35, or even 0.45, rather than toward 1.0, as is done with published betas provided by services such as Bloomberg and Value Line.

3. Based on historical evidence, establish a range of reasonable beta estimates with a lower bound of 0.30 and an upper bound of 0.60.

4. After collecting and considering as much evidence as possible, and given the constraints (i.e., permissible range) discussed in #3 above, make a simple judgment based on current beta estimates.

As noted above, a review of the 2018 utilities’ experts’ evidence showed that Canadian utility beta estimates have averaged somewhere between 0.20 and 0.40 – with 0.35 representing the best estimate. In the 2018 Alberta GCOC Decision, the AUC calculated a historical utility beta average of 0.47, based on data that excludes the 1998-2007 period, in order to discard the abnormally low estimates obtained over the 1998-2002 period. It is important to recognize that as an average, this implies approximately half of the estimates would be both below and above

⁵³ For example, I show above that Mr. Hevert’s historical average Canadian beta estimates of 0.34 (monthly) and 0.38 (weekly) are just over half their U.S. counterpart estimates of 0.61 (monthly) and 0.72 (weekly), after accounting for leverage differences. The implied “unlevered” U.S. betas (0.234 monthly; 0.278 weekly) are almost double those for the Canadian utilities (0.131 monthly; 0.140 weekly).

1 this estimate of central tendency. The fact that this average is so close to the 0.45 that I have
2 used in previous Proceedings and during the current Proceedings, confirms the appropriateness
3 of the range that I use and the judgment I employ in determining my beta estimates, and which
4 lies at the mid-point of the range of reasonable beta estimates.
5

APPENDIX D

Discounted Cash Flow (DCF) Growth Estimates

During every proceeding that I have been involved in, utilities' experts have relied upon analyst growth estimates despite the well-known concerns about the overly optimistic nature of such forecasts, as noted in Mr. Coyne's Alberta GCOC 2018 rebuttal evidence on page 42 (lines 1-3), where he notes that "Research by Easton and Sommers⁵⁴ has put the "optimism" bias in analysts' growth forecasts at an average of 2.84 percent."⁵⁵ This upward bias in analyst growth estimates is not surprising because the publicly available analyst estimates are almost always (if not entirely) those provided by "sell-side" analyst estimates, which are generally overly optimistic, which is a well-known fact among finance professionals – i.e., by definition their job is to promote sales.⁵⁶ For example, it is well-known that sell-side analysts rarely issue "sell" recommendations on stocks and tend to provide overly bullish stock price forecasts: with 60-65% "buy" recommendations; 30-35% "hold" recommendations; and, usually less than 5% "sell" recommendations.⁵⁷

Using analyst growth rates leads to adopting estimated future growth rates for utility earnings and dividends that exceed expected growth in the economy (i.e., nominal GDP growth), which is simply not realistic for mature, stable Canadian operating utilities operating within a defined region. In fact, in the Alberta GCOC Decision 22570-D01-2018, para. 438, the AUC recognized this fact, stating (footnote omitted) (emphases added):

438. With respect to the single-stage DCF model estimates presented by Dr. Villadsen, Mr. Coyne and Mr. Hevert, the growth rates used by each of these

⁵⁴ Source: Easton, Peter D., and Gregory A. Sommers. "Effect of Analysts' Optimism on Estimates of the Expected Rate of Return Implied by Earnings Forecasts." *Journal of Accounting Research* 45 no. 5 (December 2007), pp. 983-1016.

⁵⁵ Source: Exhibit 22570-X0775, Rebuttal Evidence of James Coyne, page 42, PDF page 44, lines 1-3.

⁵⁶ The growth forecasts determined by "buy-side" analysts (i.e., analysts working for the financial institutions (like pension funds, mutual funds, etc.) that actually "provide the capital" and invest (rather than make commissions on the buy and sell transactions like the sell side)), is almost always proprietary – for obvious reasons. I have had access to numerous of these reports in the past; but of course they are proprietary, so I could not share even if I wanted to (and still had any of them). Suffice it to say, their growth estimates are much lower and much more realistic.

⁵⁷ See for example: "Monitoring changes in analysts' advice gives key insight: report," (Tim Shufelt, *Globe and Mail*, Report on Business, May 24, 2019, page B7.

three witnesses in their single-stage DCF models are in **excess of the long-term GDP growth estimates** they put forward. Consistent with its determinations in prior GCOC decisions, **the Commission 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.** The Commission recognizes that the utilities are, as Dr. Cleary stated in his evidence, **essentially monopolies in mature markets** and, because of this, the **use of long-term growth in excess of the long-term growth of GDP is unreasonable.”**

Further, even the assumption of expected nominal GDP growth (i.e., average growth) estimated in my evidence at 3.3-4.3% is an ambitious target for regulated utilities that operate virtual monopolies in mature markets, with little opportunity for above average growth, as also acknowledged previously by the AUC, in the 2013 GCOC Decision:

However, the Commission is also mindful that, as both experts acknowledged, **the GDP growth rate may be an ambitious target** for long-run earnings growth in respect of low-risk, mature, utilities.⁵⁸

Growth estimates that exceed GDP growth should not be used in constant-growth versions of DCF models. Given the upward bias of **analyst growth estimates** noted above, they **should not be used** – either in constant-growth DCF models or in multi-stage DCF models.

In contrast, the growth rates that I estimate and use in my DCF models are determined using the company’s **sustainable growth rate**, which is included in the CFA curriculum and numerous academic textbooks, and is widely used in practice. This approach provides reasonable growth rates that are below the expected nominal GDP growth rate and make intuitive sense for the low-risk nature of regulated operating utilities operating in well-defined markets with limited growth potential.⁵⁹

⁵⁸ Decision 2191-D01-2015, 2013 Generic Cost of Capital, para. 190 [emphasis added] [footnote omitted].

⁵⁹ In the past, the utilities’ experts have pointed to some specific cases of higher growth displayed by utility “holding companies,” which of course is a different issue, as they can grow “inorganically” by acquiring new operating companies. This is not an option for Canadian regulated operating utilities (like NS Power), whose growth must come organically – i.e., through increased demand and revenues, or reduced operating costs.

1 It is also worth extending the current discussion to multi-stage DCF models. An approach used
2 by Concentric during these proceedings, and in previous Alberta proceedings to avoid rejection
3 of their constant-growth DCF estimates that use growth rates above expected nominal GDP
4 growth has been to incorporate these abnormally high growth estimates into the first growth
5 stage (usually 10 years) of their multi-stage DCF estimates, and then assume a long-term
6 growth rate equal to expected nominal GDP growth. However, all of these multi-stage DCF
7 estimates are based on growth assumptions that similarly violate the AUC's pragmatic growth
8 condition noted above. This is simply intuitive because if we consider using the higher analyst
9 growth rates exist for a full 5 years (say 5.53%, which is what Concentric assumes in its
10 NSPML 2025 evidence), then have these growth rates gradually decline over the following 5
11 years to a stable long-term growth rate equal to its estimate of long-term nominal GDP growth
12 (of 4.16%). It is obvious that this is equivalent to using the single-stage growth model, with a
13 long-term growth rate much higher than expected nominal GDP growth of 4.16%.

14
15 The discussion above shows mathematically (and intuitively) that using short-term growth
16 rates in excess of expected nominal GDP growth, and then using expected nominal GDP
17 growth as the long-term growth rate in multi-stage DCF models also produces Ke estimates
18 that are based on unrealistic assumptions about future long-term growth for mature regulated
19 utilities.

20
21 This concludes my evidence.